

Object-based learning and research-based education: Case studies from the UCL curricula

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The general broadening in recent years of what counts as legitimate learning has included an interest in objects, including those from curated collections such as artefacts, natural history specimens and archival items, which may have complex cultural or scientific meaning in their own right. A more sophisticated interaction with objects has been a particular focus for some time and meshes well with newer initiatives and strategies. Indeed, it was a forerunner of bringing research-based education into university curricula. These case studies describe how students could be part of genuine research projects while drawing on traditionally neglected aspects of learning such as touch and direct experience. It is no artificial exercise: Kador and his colleagues record that students have at times corrected mistakes in cataloguing, as well as reconsidering the ethics of objects often taken without permission as colonial curiosities. Francis Galton and his colleague Flinders Petrie must be reckoned with again, given the provenance of many of the objects available to UCL students on site. They are also concerned with the opposite direction: creating virtual versions of objects gives students the chance not just to learn, but to ‘produce’, by creating exhibitions.

Overview

This chapter explores the strong relationship that exists between object-based learning and research-based education. Object-based learning as

applied here prioritizes interaction with museum objects to enhance critical thinking and key skills in university learners. Research-based education is focused on the students themselves engaging in the process and practice of primary research, rather than teachers imparting their research through their teaching. Our four case studies taken from current teaching at UCL demonstrate how object-based learning using museum objects can be used effectively within research-based curricula. In this context this chapter responds to UCL's Connected Curriculum initiative, which will see a gear-change in teaching and learning at the university – one that prioritizes holistic degree programmes with research practice and teacher–student collaboration at their core.

Introduction

How can cultural resources be utilized to design a research-based education? To answer this question our chapter presents a number of case studies that illustrate the use of museum objects in engendering student research through the practice of object-based learning. As an educational institution, UCL is very fortunate to have ready access to a substantial number of specimens and artefacts from 18 large teaching collections. This includes four public museums: the UCL Art Museum, the Petrie Museum of Egyptian Archaeology, the Pathology Museum and the Grant Museum of Zoology, as well as a further 14 departmental and subject-specific collections of objects, ranging from anatomy to space exploration and totalling approximately 800,000 objects. Students and teachers at UCL are particularly privileged to have access to such a diverse collection. However, most other universities – even if they do not have a university museum of their own – are usually located in proximity to museums or galleries with which they could forge collaborative partnerships. Such partnerships would provide their students with access to collections for object-based educational programmes similar to those discussed here.

Before presenting the case studies we will briefly outline what object-based approaches to learning entail and what the pedagogical benefits of using cultural resources for a research-based education are. Put simply, object-based learning is a pedagogy that prioritizes facilitated interaction with 'material culture' to enhance critical thinking and key skills. Material culture is a very broad term that includes everyday objects, documents, works of art, biological specimens and artefacts, to name but a few (Buchli, 2002). However, in the context of this discussion we are particularly

interested in exploring the merits of utilizing objects and specimens from museums' collections in university teaching.

What do collections of museum objects bring to research-based teaching in higher education?

There is a long-standing historical relationship between (higher) education and object handling. Collecting, touching and engaging with physical objects – from artworks and historical artefacts to natural history reference collections – used to be the mainstay of many academic disciplines. This has led to the creation of teaching collections and as they became larger, many of them gave rise to university museums. For example, the oldest university museum in Britain, and probably one of the oldest in the world, is the Ashmolean Museum in Oxford, which dates back to the gift in 1683 of Elias Ashmole's collection, which in turn largely comprised John Tradescant's collection of curiosities and rarities (MacGregor, 2001). There are even some examples of universities that began as museums, such as the University of Bergen in Norway (Lourenço, 2005: 375; Roselaar, 2003: 257). The museums at UCL were established with the founding of the university in 1826, and incorporated Robert Edmond Grant's teaching collection of zoological specimens, growing in 1847 with the donation of a large collection of John Flaxman's sculptures (Chambers, 2008). Similarly, universities in numerous other European cities established museums between the seventeenth and nineteenth centuries, and many such university museums still remain across Europe. However, the use of their collections in day-to-day teaching and their custodial care appears to have declined steadily throughout the (second half of the) twentieth century. A concern with this decline led to the formation of the University Museums Group in the UK in 1987 (Arnold-Forster, 2000). In the light of mounting evidence for the benefits of object-based learning, this neglect is beginning to reverse, and we can observe a resurgence in the integration of university museums and their collections into mainstream teaching (e.g. Alvord and Friedlaender, 2012; Bartlett *et al.*, 2014; Chatterjee, 2008; Chatterjee *et al.*, 2015). For instance, in 2013, more than 700 university courses were taught in the United Kingdom using university museum collections (Hide *et al.*, 2013).

The value of objects in learning

Objects can be viewed from many different perspectives to reveal multiple, and sometimes contested, meanings. Engagement may start with

object-focused questions such as ‘What is it? What is it made of? How was it made? Where is it from? When was it made? How was it used?’ Answers to these questions open up further research areas about how objects connect people and places, hold multiple meanings, express knowledge and cultural values. In this way objects and collections lend themselves extremely well to active learning (Bonwell and Eison, 1991), as object-focused tasks allow learners to engage with the history, contexts, relationships and even the social life of the object, on an ever more complex level. Students can discover these new avenues of investigation for themselves: as they respond to the prompts the object raises for them personally, they can begin to make their own meaning and are thus much more likely to recall their discoveries subsequently (Kolb, 1984).

In contrast to traditional teaching styles that tend to foreground the verbal and visual, object handling provides opportunities to engage through touch (Chatterjee, 2008). The case studies presented in this chapter, taken from the UCL curricula, provide some good illustrations of this process in action. For example, in both Object Lessons and the Mystery Specimen exercise (discussed below), students are tasked to engage closely with one specific museum object for the duration of an entire term. This offers the students the opportunity to approach the object and make sense of it for themselves from multiple perspectives and choose to apply the approach that works best both for them personally and for the particular object they are working with.

Object-based learning also lends itself extremely well to social learning, as discussed by Vygotsky (1978), and is therefore well suited for students with particular strengths in interpersonal intelligence. Staying with Object Lessons, the second part of this module focuses on a team exercise in which the students, in small groups, have to bring together their individual objects in order to find a common denominator that will provide the theme for a virtual exhibition that they are tasked to design. To do this they must sharpen not only their observational and investigative skills for engaging with the objects, but also their interpersonal, communication, decision-making, delegation and team working abilities.

Directly engaging with objects is a very practical and physical experience. This allows students to relate theoretical concepts to something applied and tangible. For example, looking closely at a number of zoological specimens can make plain seemingly complex taxonomical relationships between different species. Objects demand that learners master these ‘threshold concepts’ before they can move on and engage with a topic on a higher level (Meyer and Land, 2003, 2005). However, as students

are so focused on the object(s) and the task in hand, mastery of difficult concepts can frequently take place almost unnoticed, as part of the broader investigative process. So while students work on achieving an understanding of an object, the learning of the concepts associated with this task does not seem arduous, which is, as we argue here, an attractive model for learning.

In addition to the ever-growing body of literature highlighting the educational benefits of learning through objects (see, for example, contributions in Chatterjee and Hannan, 2015), at a wider and more holistic level there is also an increasing amount of evidence for the broader health and well-being benefits of engaging with objects, especially through touch (Chatterjee and Noble, 2013). Therefore, learning with objects will not only help students in grasping difficult concepts, but could also bring further positive outcomes by providing a more enjoyable learning experience.

The first step in designing object-based learning activities is to identify the right objects for the task and this generally means collaborating with a museum or the curator of a teaching collection. As already discussed, students and teachers at UCL are in an extremely fortunate position in this regard and it is very straightforward for UCL academics interested in utilizing object-based learning in their teaching to get started. What is more, the department responsible for the museums and collections at the university, UCL Culture, has a team of curatorial, conservation, education and public engagement specialists specifically employed to enhance the learning opportunities that these collections present. Therefore, the key mission at UCL Culture is not only to use the collections to drive our own teaching and research programmes, but also to facilitate our colleagues from across UCL (and beyond) to work with these collections in developing innovative teaching and learning programmes appropriate to their own students and academic disciplines. This is well illustrated by the case studies presented here from the Digital Humanities, the BAsC Arts and Sciences degree programme and the Biological Sciences. They demonstrate how museum objects can be used to facilitate both disciplinary and interdisciplinary learning and, crucially, most of this learning takes place through student-led investigation in response to the objects. This is precisely the learning achievement associated with our first case study.

Case study 1: Mystery specimens for bioscience students

UCL's Grant Museum of Zoology is an example of a museum collection that was necessarily repurposed to address a number of emerging needs. To begin with, traditional specimen-based teaching has been replaced by broader theoretical learning. There has also been a drive to train students

with transferable skills, while the explosion of biological science disciplines (genetics, ecology and modelling) has put pressure on traditional bioscience course content. Across universities, zoology departments became subsumed into biology departments, at first still offering zoology degree programmes but later only zoology modules within biology or biological science programmes. This led some to question whether biology graduates could define the difference between snakes and earthworms (Bowler, 2007). The Mystery Specimen project, developed with staff from the Grant Museum of Zoology and teaching staff from the Department of Genetics, Evolution and Environment, was designed to take advantage of object-based learning to encourage students to put biological theory into practice.

The project is a term-long practical that forms 50 per cent of the final mark of Vertebrate Life and Evolution, a module available to third- and fourth-year undergraduates. Teaching takes place at the Grant Museum where students are each given a vertebrate (an animal with a backbone) specimen that has been ‘de-taxonomized’; this means that all of its associated labels and identifying description have been removed. The specimen could be anything from a bone to a piece of skin. The students’ first task is to identify which part of the animal it came from, which involves quite detailed anatomical observation and perhaps some drawings or photographs, making use of the wider collections at the Grant Museum. Thinking about where the specimen fits in with the rest of the animal kingdom is the beginning of the process that helps to lead the students to an identification of what type of animal it might be.

There is a wide range of students on the course – most study biological sciences but students also come from Geography, Anthropology or Human Sciences. However, most of them will not previously have been faced with an unidentified specimen as part of their taught curriculum. Over the course of a term, students have several sessions to access their specimen. The first session involves learning how to look at specimens and think about a detailed description (anatomy), starting from the general and moving towards the detail. Does the specimen have a beginning or end, top or bottom? Is it complete or partial? What material does the specimen comprise? Students then have several sessions in the Grant Museum and are given the opportunity to ask museum staff for comparative material to try to match or narrow down the identification (comparative anatomy). Throughout this process they are encouraged to explore other museum collections and the published literature, modelling the same process as genuine specimen-based research in Biology and Palaeontology.

The students have to identify their specimen as far as they can from an unknown part of an unknown animal to the correct class, order, family, genus or species. The written assessment for this practical is to write up their diagnosis in the style of a scientific journal article – modelled on *Trends in Ecology and Evolution* – giving students experience of how to translate observations, description and analysis into the formal language and format of descriptive taxonomy. When presented with their mystery specimens, students are often puzzled as to where to start and it is very difficult to get the answer by using popular internet search engines without being able to describe or define what the specimen is. The Grant Museum staff who select the specimens ensure that students are given diagnostic material and not specimens that are impossible to identify or only possible to identify at a basic level. Most students are able to narrow down their identification to a basic group of vertebrate – whether it is a bird, fish, reptile, amphibian or mammal. Refining the identification further can be more challenging and it is here that students have to start thinking critically about variations in biological specimens. Is their specimen from a male or a female, or from an adult or juvenile? Has their specimen been affected by pathology or altered during preparation? At this stage they need to consult the literature as widely as possible, focusing on detailed searches of relevant journal articles using the online citation indexing service Web of Science,² contemporary texts or older material where original descriptions were published.

The students' journal articles are assessed, not on whether the identification was correct according to the museum identifications, but on the quality of the detective work, research and quantification in reaching the identification. Students also need to propose what further work they would ideally undertake to narrow down or confirm the identification and this is where they can reflect on the range of scientific techniques that they have encountered in the course of their degree programme to date. Would isotope analysis, DNA sampling, X-ray or micro-CT scanning aid in a better identification? An added benefit of this practical is that the museum receives copies of the coursework to compare with the identifications in the museum catalogue, as in some cases, students have been able to identify or re-determine previously misidentified specimens through their coursework. In January 2016 the Grant Museum installed an exhibition case with such student discoveries of previously misidentified specimens.

The Mystery Specimen model has been very successful at UCL and has been adapted for use in a range of modules including for Bioscience undergraduate and Museum Studies Master's students. One particularly successful element has been the focus on systematic research-based learning

starting from a museum specimen. What is more these practicals also give students a realistic experience of working life, such as what it would be like to work in a museum environment with specimens and in collaboration with museum professionals, thus creating a direct link between academic learning and the workplace.

Moving from the first case study with a primary focus on supporting teaching specific disciplinary skills, the second case study, also based within one particular UCL collection – namely that associated with Sir Francis Galton – demonstrates how museum objects can be employed both to teach practical skills for the workplace and stimulate reflection on key ethical questions.

Case study 2: Object-based learning with the Galton collection

Digital Resources in the Humanities (hereafter DRH) is a core module of UCL's MA/MSc in Digital Humanities programme. This programme was launched in 2010 within UCL's Department of Information Studies (UCL Centre for Digital Humanities, 2015). It is an interdisciplinary programme that investigates the past, present and future roles of digital technologies in the research and teaching of the humanities and cultural heritage. The module provides students with a wide-ranging introduction to established and emerging areas of Digital Humanities, especially the use of computational technologies to explore, interpret and reimagine the 'cultural complex' of the humanities (ESF, 2007).

Elsewhere some of us (Nyhan *et al.*, 2015) have discussed how and why object-based learning has become a pedagogical pillar of this course. At the broadest level, it is useful because it can help students to learn in an 'integrative' way. Integrative learning seeks to help students to notice the connections between the otherwise seemingly disparate subjects, concepts and debates that they study in their various modules (Huber and Hutchings, 2005). The outcome of such learning should be the ability to apply their knowledge independently and creatively to the novel situations (such as research-based teaching exercises) that they encounter within and outside the classroom, now or in the future. Indeed, such learning is *sine qua non* in Digital Humanities because the subject is not only interdisciplinary but also 'extramural' in the sense that successful students can expect to find subsequent employment in a wide range of contexts and industries. We will now briefly introduce the history of UCL's Galton collection and describe how it is integrated into DRH as an object-based learning exercise.

As mentioned above, in addition to its four public museums, UCL is home to a number of other collections that are accessible upon request but not on permanent display. The Galton collection falls into this category. Sir Francis Galton (1822–1911) was born in Birmingham and went on to read mathematics at Cambridge. From today’s vantage point Galton is a perplexing and discomfiting character (Bulmer, 2003; Gillham, 2001). He was an important and productive scientist who made many significant contributions such as the science of fingerprinting, weather maps and advancements to statistical analysis. However, he was also a key proponent of so-called ‘scientific racism’ and coined the term *eugenics* ‘to describe the science and idea of breeding human “stock” to “give the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable”’ (Challis 2013: 80, citing Galton 1907: 70).

Though he was not directly employed by UCL, he worked closely with some of its professors, such as Karl Pearson and Flinders Petrie. In 1904 UCL also provided Galton with rooms at 50 Gower Street for the ‘Eugenics Records Office’. Upon his death, in 1911, he bequeathed £45,000 to UCL for the establishment of a Chair of Eugenics along with a number of objects that form the basis of what is now known as the Galton collection. It comprised his personal effects, objects that he brought back from his travels, and various artefacts relating to the research he did on areas such as Criminology. To many of us, the most challenging and unsettling objects in the collection are those relating to Galton’s ‘anthropometrics’ research, the measurement of human features, which he considered indicators of human ability and behaviour (Galton, 1884: 4–5). For example, the ‘Haarfarbentafel’ is a collection of 30 samples of dyed hair, numbered from 1–30. Carole Reeves has written of it:

The hair scale is scientific. It is a ‘standard’ scale which means that all race scientists invest in its truth. The dark-haired races cannot escape the truth. At Auschwitz-Birkenau, Bergen-Belsen, Dachau, Treblinka, Hadamar, hair shaved from those who perish rarely matches samples 12 to 24. Most are piles of clipped raven’s wings. (Reeves, 2013: 61)

The Galton collection catalogue is online and freely accessible; however, it is very difficult to use without prior knowledge of the scope of the collection. Each year students of DRH are asked to explore the catalogue in advance of the object-based learning session, which is usually led by the collection’s curator. The class discussion (and inevitable debate) that follows the viewing of the collection offers students a unique opportunity to

apply the knowledge they have already gained on the course to a completely new set of objects and, most importantly, to problematize that knowledge.

Once they have viewed the collection, the students are asked to describe the kind of digital collection they would produce if money and resources were no object. We discuss the various approaches and techniques that would allow the collection to be published online and searched with more ease: for example, 3D digitization and faceted browsing. However, the wider social and cultural complexities of digitally recording and publishing such a collection invariably emerge during this discussion. In earlier sessions of the module students will have discussed digitization as an unqualified good and a force for the democratization of access to knowledge and objects. The objects in the Galton collection may not negate this statement but they certainly cast it in a new light. Up to this point the various themes of the module will have been taught on a weekly, and somewhat disjointed, basis. However, using the Galton collection in teaching emphasizes that a rich understanding of Digital Humanities approaches to cultural heritage requires not only knowledge of technological issues but also, among other things, the necessity of sensitive and ethical approaches to making digital collections – in this case, of objects devised for racist purposes – universally available. So too, the object-based learning session affords opportunities to reflect on more far-reaching issues, such as the ubiquity of narratives of techno-triumphalism (McNeil, 2000) and the role of Digital Humanities in disrupting them. In this way the session on the Galton collection prompts students not only to integrate and apply the wide range of knowledge and skills that they will have acquired during the module (and the programme as a whole) to a novel situation but also to consider the future of Digital Humanities and the contribution that they can each make to it.

The third case study – also drawn from the Digital Humanities – will continue with this possibility of students, through their research and enquiries, making an actual and valuable contribution to the wider teaching and research community of UCL and beyond. In fact, making a tangible contribution, beyond the remit of their module of study, has been a feature of both of the previous case studies.

Case study 3: Teaching digitization with the Slade Archive Project

The Slade School of Fine Art, an internationally leading art school based at UCL, which since 1871 has trained generations of world-renowned artists,³ has an intriguing but underused archive relating to students and staff, and their teaching, artworks and experiences. This extensive archive provides

rich evidence of the college culture and includes papers, photographs, class lists, student records, audio recordings, films, prospectuses, death masks and other artefacts. However, this archive is difficult to access, its cataloguing is incomplete, many documentation systems are not interoperable and no attempt has ever been made to present it to a wider audience (Bruchet *et al.*, 2014; Terras *et al.*, 2015).

The Slade Archive Project (n.d.), jointly undertaken by the Slade and UCL Centre for Digital Humanities since 2012, is a highly iterative, exploratory collaboration, investigating how digital tools and techniques can increase engagement with the archive. The project informs and enhances the use and understanding of digital methods available to art historians – a field that has not, to date, made much use of computational research methods (Rodríguez *et al.*, 2012; Rodríguez, 2013; Long and Schonfeld, 2014; Dobrzynski, 2014) – and encourages and supports new archival approaches (Bruchet *et al.*, 2014; Terras *et al.*, 2015). Additionally, using the Slade Archive as part of the teaching on the Digital Humanities programme (set within a Library and Information Studies School) allows students the opportunity to engage with current debates on best practice in archival digitization, contributing both to the digital element of the Slade Archive Project, and to developing students' practical and professional skills.

The project was conceived as a flexible and collaborative framework under which various sub-projects could be developed, driven by the specific interests of those working at the Slade, and governed by available resources. Framing it as a Digital Humanities project enabled access to resources maintained by UCL's Centre for Digital Humanities, such as the multi-modal digitization suite, and allowed embedding activities in teaching delivered as part of the MA/MSc in Digital Humanities module Introduction to Digitisation. Students have to work in groups, with a small, defined set of material from the Slade Archive, to undertake a complete digitization project from 'nail to nail'.⁴ This includes taking historical photographic material from the archive, digitizing and creating digital image surrogates, providing full metadata, and delivering the resulting files in such a way that they can be incorporated into UCL's digital library catalogue and Slade Archive site, so others can access the material. The digital materials thus created are then delivered back to the Slade. The teams of students have to establish hierarchies and workflows in this time-limited task, which gives them an understanding of commercial digitization practices within the cultural and heritage sector that would only be possible through undertaking such a practical task. As a second part to the assignment, students are required

to produce a self-reflective essay documenting what they have learnt about digitization, and themselves, by undertaking this activity.

In conducting the student projects in this way, we are, as curator Matthew Teitelbaum wrote, ‘learning in public’ (1996: 40). The range of activities have expanded beyond the familiar art historical activities of researching in, and extracting from, the archive, to encompass the collaborative, digitally iterative and publicly situated work of ‘enabling, making public, educating, analysing, criticizing, theorizing, editing, and staging’ (von Bismarck *et al.*, 2012: 8). Embedding the archive in teaching provides the means to approach, refine and choose ways in which to interrogate and understand the nature of the archive, while challenging conventional epistemological and disciplinary frames, as it brings methods, practices and theories together in new configurations (Cook, 1997). The teaching element of the Slade Archive Project allows those involved to rethink the remit and scope of such archival projects conceptually, and the role that Digital Humanities programmes have in fostering and exploring new teaching techniques utilizing archival materials. New convergences of collections, teaching, and the digitized spaces between, continue to form new opportunities in pedagogy.

Over the course of the previous three case studies we have seen a move from practical, disciplinary skill to more broadly reflective and interdisciplinary approaches using objects and collections from across the university. The fourth and final case study reports on an innovative module that aims to draw on the entire spectrum of available cultural resources at UCL in a truly interdisciplinary approach to research-based education through object-based learning.

Case study 4: Designing and teaching an interdisciplinary object-centred module

Object Lessons: Communicating Knowledge through Collections is a module on UCL’s BAsc Arts and Sciences undergraduate degree programme. This programme was launched in 2012 and offers students in UK higher education a new experience – the opportunity to study both arts and sciences within one undergraduate degree programme. While the degree is naturally very broad-based, students are able to tailor their studies by choosing a major pathway: Cultures; Health and Environment; Sciences and Engineering; or Societies. These pathways allow learners to navigate the fantastically broad range of modules available to them (anything from Anthropology to Civil Engineering or Zoology). A series of degree-specific core modules also run through the programme and have been designed to develop students’

knowledge and skills in an explicitly interdisciplinary way. Object Lessons is one of these core modules and is taken in the second term of the second year of the BAsC programme. Here, we will discuss the way the module was designed with research-based education in mind and will reflect on how teaching the module has shed light on the opportunities and challenges of making our curriculum ‘connected’.

Object Lessons is structured around weekly lectures and seminars. The lectures, which form the backbone of the module, are given by a range of speakers and introduce the students to different disciplinary perspectives on studying material things. For example, a lecture on ‘Materials and Materiality’ by Professor of Archaeological Sciences Marcos Martín-Torres is followed by one on ‘The Social Life of Things’ by design anthropologist Dr Adam Drazin. In this way, the lectures move through key conceptual, theoretical and research practice issues as they are encountered in materials science, archaeology, anthropology and historical material culture studies. In the second half of the module, lectures are delivered by curators and museum professionals in order to help students think about objects not only as embodiments of ideas but also as tools for communicating those ideas. The content of the lecture series was chosen to provide students, week by week, with the tools they need to complete their assessed work. The first series of disciplinary approaches to the study of material culture accompanies the students through their own object-based research and report writing, while the second half of the lecture series underpins their group work on an exhibition project. Weekly seminars provide a space to discuss the content of the lectures further and to test things out in practice. The seminars are active, enquiry-based learning sessions conducted in small groups (with a facilitator per group of six students). These classes use museum objects to help students improve their analytical skills and to prepare for their assessments.

The module has two main pieces of assessed work: an object report (conducted individually) and a virtual exhibition group project. At the start of the module, each student is allocated a different object, item or specimen⁵ to research from a UCL museum, collection or library. This could be a zoological specimen, an ethnographic or archaeological artefact, an object relating to the history of science, a rare book, manuscript or an artwork. Objects are allocated in such a way as to generate interdisciplinary encounters, for example a student focused mainly on humanities disciplines (in their wider programme pathway) might be given a scientific instrument to research, whereas a student studying sciences might be assigned a work of art. The students are asked to conduct independent research into their

object and to make use of more than one disciplinary framework for the study of material culture in this process. They arrange visits to the museum collection and are able to delve into existing museum records as primary research material. The students might also draw on the knowledge of the given curator and are expected to conduct wider secondary reading to contextualize their object and develop an argument for the resulting report. The object report is 2,000 words in length and carries 40 per cent of the total mark for the module. The intention with this assessment is to offer students a genuine, individual research project – in some cases a real mystery as many museum objects have had very little research conducted on them to date and are in need of better documentation, as was seen in case study 1. As each student is given a different object, they must consider how to respond to the particularities of ‘their’ object and make decisions about how they can use evidence to make an argument in their reports. In this way, students are asked to make decisions about how to use evidence, methods of analysis, methodology and argumentation to the best effect. This is a challenging exercise, but the module provides ample opportunities for one-to-one support as students develop the shape of their research and plan their report writing. There is also an emphasis on students bringing their own cross-disciplinary knowledge to this project, alongside the perspectives offered in lectures, in order to achieve an interdisciplinary response to the object. Student feedback in module evaluation has reflected this ethos:

There was a lot of flexibility in terms of how to ‘interpret’ the object report, which at first seemed very daunting. In the end, it ended up being a good learning process, having to figure out yourself how to best structure the assignment according to your object. (Object Lessons student, spring 2015)

In the second half of term, the students work in groups of six to devise a virtual exhibition featuring the six objects that formed the basis of their individual object reports. The first step is to develop a theme that connects the objects and discuss how to communicate this theme through the exhibition. The groups decide on a target audience for the exhibition and tailor the content to this audience. While they draw on the content of their object reports in constructing the exhibition, it is important that they make sure the exhibition achieves an appropriate tone and consistent mode of presentation throughout. The lectures during this second half of the module are very much focused on issues of communication, audience, design, ethics and digital interactivity. The group project itself is worth 40 per cent of the total module mark and the students give an oral presentation on the

process of putting together the exhibition, for which they are awarded the remaining 20 per cent of their mark. Through this process of interrogation, research, documentation and presentation, students develop a range of research and practical skills. They acquire an awareness of the strengths and weaknesses of different sources of information, for example the textual, visual and auditory material, and learn how to combine these sources in the analysis of a particular theme or research focus. As one student commented:

It was enlightening to learn about objects through actually interacting with them. It really helps to get knee-deep into the subject matter and not make it just one more example in the textbook. (Object Lessons student, spring 2015)

From the outset, Object Lessons draws students into the practice of primary research by asking them to conduct an entirely novel research project and providing them with the support they need to access relevant resources and expertise. Students are initially given access to the object they are to research but must, thereafter, make arrangements with curators or librarians to conduct follow-up research visits, thus developing independent research skills. As one student described:

I enjoyed it. It felt far more independent and investigative than other forms of research. (Object Lessons student, spring 2015)

As with the Mystery Specimen project (case study 1), student research of a good quality is added to existing documentation within the relevant museum or collection archive and forms a part of the research resources made available for future researchers using these collections. In this way, the students actively participate in research culture and contribute their own research findings to institutional holdings. Throughout the module, students are explicitly asked to make connections across subjects, and this is an important assessment criterion for their object report. As a student commented in 2015:

[Object Lessons is] mind-opening; it is a good introduction to museum curation and it brings us new perspectives to view things around us. I like this very much as we can really touch and learn a real thing and connect them with the culture context. (Object Lessons student, spring 2015)

The virtual exhibition project requires students to develop content aimed at a specified public audience and – in collaboration with colleagues in UCL Digital Education (formerly e-Learning Environments) – the Object

Lessons teaching team have put in place a system whereby students can choose to publish or open their virtual exhibition and have continued access to it for future use. This has converted an assessment that was not publicly accessible into a piece of work that can become part of each student's personal portfolio and a product that can be publicly accessible and invite dialogue with audiences outside UCL. There is more work to be done on streamlining the logistics of making a piece of formal assessment into a usable, public-facing product of ongoing use to the students and the wider (academic) community. It is hoped that by exploring this subject in terms of this module, lessons can be learnt that will be of use to other programmes across the university and beyond.

Object Lessons also aims to connect learners with world-leading research via the lecture series, which introduces them to a range of UCL academics working at the cutting edge of their field. As outlined above, these lectures offer students different theoretical and disciplinary frameworks for thinking about material culture. Through conducting research on collections and working directly with specialists – in the form of curators and librarians – on the project work, they are introduced to the detail of professional life in museums and libraries. Students are asked to consider the opportunities and constraints offered by the museum or library as a custodian of collections when they build their own exhibitions in a virtual environment. In this way, Object Lessons connects them not only with academic research, but also with workplace learning in the museum, library and wider cultural sectors.

Lastly, Object Lessons ensures that students connect with each other during their course of study. Every weekly seminar involves small group work and is based around active, object-based or enquiry-led learning activities. The group project also encourages students to engage with each other's strengths and academic perspectives in order to create the best possible virtual exhibition and thus also bestows upon them essential transferable team working skills.

Conclusions

In a connected curriculum the threshold between expert researchers and novice students is lowered significantly. Learners – in this case university students – are directly and collaboratively integrated into the research process and become thus empowered to construct their own meanings. There are many ways to move current teaching practice in higher education in this direction. We hope that our chapter has highlighted how object-based approaches to learning – primarily using collections of museum (and library) objects – provide excellent opportunities for students to become

researchers whether by engaging closely with only one object or dealing with an entire collection. Heritage is always a field of controversy and even conflict (Tunbridge and Ashworth, 1996) and therefore there are never simple, singular ways to understand or engage with material culture. Being given the opportunity to work with real objects and to appreciate their often troublesome and conflicted meanings – as, for example, those from the Galton collection – students will acquire not only subject-specific skills but will also analyse and question the epistemological frameworks within which knowledge is and has been constructed. Finally, with assessments specifically geared to real-world problems, students are also able to contribute to the creation of understandings and the production of resources that will be useful beyond the context of their own course of study. This is the case in relation to all four case studies presented here, where the best and most successful assessments have been adopted by the curators of the relevant collection as future aids for teaching and research.

Notes

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² <http://wok.mimas.ac.uk>; www.webofknowledge.com

³ Famous alumni include Gwen and Augustus John, Stanley Spencer and Ben Nicholson around the turn of the twentieth century, Richard Hamilton and Eduardo Paolozzi in the 1940s, and Derek Jarman, Paula Rego, Euan Uglow and Craigie Aitchison in the 1950s and 1960s. More recent Turner Prize-winning alumni include Martin Creed, Rachel Whiteread, Antony Gormley and Douglas Gordon.

⁴ A commonly used term in the Gallery, Library, Archive and Museum sector to cover the period when an item is taken out of store for digitization or exhibition and when it is returned safely.

⁵ For ease of discussion we will employ the term ‘object’ to refer to all these four categories of material (i.e. objects, artefacts, items and specimens).

References

- Alvord, E. and Friedlaender, L. (2012) ‘Visual literacy and the art of scientific inquiry: A case study for cross disciplinary institutional collaboration’. In Jandl, S.S. and Gold, M.S. (eds) *A Handbook for Academic Museums: Exhibitions and education*. Edinburgh: MuseumsEtc., 144–65.
- Arnold-Forster, K. (2000) ‘“A developing sense of crisis”: A new look at university collections in the United Kingdom’. *Museum International*, 52 (3), 10–14.
- Bartlett, D., Meister, N. and Green, W. (2014) ‘Employing museum objects in undergraduate liberal arts education.’ *Informal Learning Review*, 124 (Jan./Feb.), 3–6.
- Bonwell, C.C. and Eison, J.A. (1991) *Active Learning: Creating excitement in the classroom* (ASHE-ERIC Higher Education Report). Washington, DC: George Washington University.

- Bowler, K. (2007) 'Zoology is the latest victim of audit culture'. *Times Higher Education*, 16 March. Online. www.timeshighereducation.com/news/zoology-is-the-latest-victim-of-audit-culture/208193.article (accessed 13 March 2018).
- Bruchet, L., Malik, A., Collins, S., Beavan, D., Giacometti, A., Volley, J. and Terras, M. (2014) 'The digital curatorial landscape of the Slade Archive Project'. Paper presented at the Archives 2.0 Conference: Saving the Past, Anticipating the Future, University of Leeds, 24–26 November 2014.
- Buchli, V. (ed.) (2002) *The Material Culture Reader*. Oxford: Berg.
- Bulmer, M. (2003) *Francis Galton: Pioneer of heredity and biometry*. Baltimore, MD: Johns Hopkins University Press.
- Challis, D. (2013) *The Archaeology of Race: The eugenic ideas of Francis Galton and Flinders Petrie*. London: Bloomsbury Academic.
- Chambers, E. (2008) *UCL Art Collections: An introduction and collections guide*. London: UCL Art Collections.
- Chatterjee, H.J. (ed.) (2008) *Touch in Museums: Policy and practice in object handling*. Oxford: Berg.
- Chatterjee, H.J. and Hannan, L. (2015) *Engaging the Senses: Object-based learning in higher education*. Farnham, Surrey: Ashgate, 1–20.
- Chatterjee, H.J., Hannan, L. and Thomson, L. (2015) 'An introduction to object-based learning and multisensory engagement'. In Chatterjee, H.J. and Hannan, L. (eds) *Engaging the Senses: Object-based learning in higher education*. Farnham: Ashgate, 1–18.
- Chatterjee, H. and Noble, G. (2013) *Museums, Health and Well-being*. Farnham: Ashgate.
- Cook, T. (1997) 'What is past is prologue: A history of archival ideas since 1898, and the future paradigm shift'. *Archivaria*, 43, 17–63.
- Dobrzynski, J.H. (2014) 'Modernizing art history'. *Wall Street Journal*, 28 April. Online. www.wsj.com/articles/a-cultural-conversation-with-james-cuno-modernizing-art-history-1398720987 (accessed 13 March 2018).
- ESF (European Science Foundation) (2007) *Standing Committee for the Humanities (SCH) Position Paper 2007*. Strasbourg: European Science Foundation. Online. http://archives.esf.org/fileadmin/Public_documents/Publications/SCH%20Position%20paper_01.pdf (accessed 19 March 2018).
- Galton, F. (1884) *Anthropometric Laboratory*. London: William Clowes and Sons.
- Galton, F. (1907) *Probability, the Foundation of Eugenics: The Herbert Spencer Lecture delivered on June 5, 1907*. Oxford: Clarendon Press.
- Gillham, N.W. (2001) *A Life of Sir Francis Galton: From African exploration to the birth of eugenics*. Oxford: Oxford University Press.
- Hide, L., UMG (University Museums Group) and UMIS (University Museums in Scotland) (2013) *Impact and Engagement: University museums for the 21st century*. University Museums Group and University Museums in Scotland. Online. <http://universitymuseumsgroup.org/wp-content/uploads/2013/11/UMG-ADVOCACY-single.pdf> (accessed 19 March 2018).
- Huber, M. and Hutchings, P. (2005) *The Advancement of Learning: Building the teaching commons*. San Francisco: Jossey-Bass.
- Kolb, D.A. (1984) *Experiential Learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

- Long, M.P. and Schonfeld, R.C. (2014) *Supporting the Changing Research Practices of Art Historians*. New York: Ithaka S+R.
- Lourenço, M.C. (2005) 'Between Two Worlds: The distinct nature and contemporary significance of university museums and collections in Europe'. Unpublished PhD thesis, Conservatoire national des arts et métiers, Paris.
- MacGregor, A. (2001) *The Ashmolean Museum: A brief history of the institution and its collections*. Oxford: Ashmolean Museum.
- McNeil, M. (2000) 'Techno-triumphalism, techno-tourism, American dreams and feminism'. In Ahmed, S., Kilby, J., Lury, C., McNeil, M. and Skeggs, B. (eds) *Transformations: Thinking through feminism*. London: Routledge, 221–34.
- Meyer, J.H.F. and Land, R. (2003) 'Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines'. In Rust, C. (ed.) *Improving Student Learning Theory and Practice – 10 Years On: Proceedings of the 2002 10th International Symposium*. Oxford: Oxford Centre for Staff and Learning Development, 412–24.
- Meyer, J.H.F. and Land, R. (2005) 'Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning'. *Higher Education*, 49 (3), 373–88.
- Nyhan, J., Mahony, S. and Terras, M. (2015) 'Digital humanities and integrative learning'. In Blackshields, D., Cronin, J., Higgs, B., Kilcommins, S., McCarthy, M. and Ryan, A. (eds) *Integrative Learning: International research and practice*. London: Routledge, 235–47.
- Reeves, C. (2013) 'The importance of being blonde'. In *Conversation Pieces: Inspirational objects in UCL's historic collections*. Oxford: Shire Publications.
- Rodríguez, N., Baca, M., Albrezzi, F. and Longaker, R. (2012) 'The Digital Mellini Project: Exploring new tools and methods for art-historical research and publication'. Paper presented at the Digital Humanities Annual Conference, University of Hamburg, 16–22 July 2012. Online. www.dh2012.uni-hamburg.de/conference/programme/abstracts/the-digital-mellini-project-exploring-new-tools-methods-for-art-historical-research-publication/ (accessed 19 March 2018).
- Rodríguez, N. (2013) 'Digital art history: An examination of conscience'. *Visual Resources*, 29 (1–2), 129–33.
- Roselaar, C.S. (2003) 'An inventory of major European bird collections'. *Bulletin of the British Ornithologists' Club*, 123A, 253–337.
- Slade Archive Project (n.d.) Project blog. Online. <http://blogs.ucl.ac.uk/slade-archive-project/> (accessed 4 April 2018).
- Teitelbaum, M. (1996) 'Notes on the meeting of cultures'. In Watson, S., Hill, T. and White, P. (eds) *Naming a Practice: Curatorial strategies for the future*. Banff: Banff Centre Press, 40–4.
- Terras, M., Bruchet, L., Malik, A., Collins, S., Beavan, D., Volley, J. and Giacometti, A. (2015) 'Digital humanities as catalyst for digital art history: The Slade Archive Project'. Paper presented at the Digital Humanities Annual Conference, Sydney, 29 June–3 July 2015. Online. http://dh2015.org/abstracts/xml/TERRAS_Melissa_Digital_Humanities_as_Catalyst_for/TERRAS_Melissa_Digital_Humanities_as_Catalyst_for_Digit.html (accessed 19 March 2018).
- Tunbridge, J.E. and Ashworth, G.J. (1996) *Dissonant Heritage: The management of the past as a resource in conflict*. Chichester: Wiley.

UCL Centre for Digital Humanities (2015) 'MA/MSc in Digital Humanities'.
Online. www.ucl.ac.uk/dh/courses/mamsc (accessed 10 November 2015).

Von Bismarck, B., Schafaff, J. and Weski, T. (eds) (2012) *Cultures of the Curatorial*. Berlin: Sternberg Press.

Vygotsky, L.S. (1978) *Mind in Society: The development of higher psychological processes*. Ed. Cole, M. Cambridge, MA: Harvard University Press.