

Digital Humanities Pedagogy: Integrative Learning and New Ways of Thinking About Studying the Humanities

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Abstract

This paper reflects on an aspect of Digital Humanities pedagogy employed at University College London and how integrative learning approaches are used by the faculty to communicate a research-based curriculum to an international cohort of students from widely differing backgrounds, with a range of qualifications. It presents case studies that describe and evaluate the use of integrative learning exercises to scaffold the learning experience of students in both an established and also a newly developed core module, with supporting evidence from student feedback as well as from the tutors' reflective practice.

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1. Introduction

One of the great challenges in higher education is to foster students' abilities to integrate their learning across contexts and over time. Learning that helps develop integrative capacities is important because it builds habits of mind that prepare students to make informed judgments in the conduct of personal, professional, and civic life; such learning is, we believe, at the very heart of liberal education. (Huber and Hutchings 2004: 1)

The application of computing technologies to cultural heritage within the academy, heritage organisations commercial contexts, and indeed even in the home has radically transformed how the human record can be communicated, comprehended, questioned and imagined. Within this context, the MA/MSc in Digital Humanities (DH)¹ in the Department of Information Studies² at University College London (UCL) was launched in 2010. It is an interdisciplinary programme, exploring the intersection of digital technologies, humanities scholarship and cultural heritage. It is however, as we will see, not the only vehicle for delivering DH integrative learning pedagogy within the faculty.

This paper examines how integrative learning methodologies can be successfully used to enhance student learning and acquisition of new knowledge, and the importance of these techniques as part of the DH pedagogy tool kit. The first case study comes from the module *Digital Resources in the Humanities* (DRH)³, a core module for MA/MSc DH students and an option for other programmes in the College. The second is taken from a new cross-departmental core 'content module', *Introduction to Digital Humanities (tailored for European Languages, Culture and Society students)* (IDH)⁴, following the merger of the six formerly independent language departments into the new School of European Languages, Culture

and Society at UCL.⁵ The first will explore an exercise designed to foster integrative learning by way of an object-based learning approach. This exercise, in turn reflects some of the many ways that integrative teaching and learning is being incorporated into our teaching as part of a wider object-based learning context. The second makes use of web-based bibliographic reference and geo-spatial mapping tools to develop small-scale student-led collaborative DH projects. Both modules make effective use of small group discussions and group projects and are inspired by the 'Connected Curriculum'⁶ initiative at UCL.

To those of us that are educators it seems a given that we learn from our students, but we must remember that students also learn from their interaction with each other. Learning is a triangular relationship: tutor to student, student to tutor, and student to student. To encourage this it is important that a module facilitates a structured dialogue and allows the 'Conversational Framework' as described by Diana Laurillard (2012: chapter 6, 'Motivating and Enabling the Learning Cycle'), to allow students to express, compare and develop their knowledge. This framework in turn looks back to the 'Conversation Theory' of Gordon Pask (Pask 1976) and indeed to earlier theorists such as John Dewey, for whom collaboration and the exchange of ideas this encourages is seen as an essential aspect of cognitive development: '[...] the educational process has two sides - one psychological and one sociological; and [...] neither can be subordinated to the other or neglected' (Dewey 1959). The importance of knowledge development through discussion is also a cornerstone of the approach termed 'social constructivism' by Lev Vygotsky, who argues that learning through discussion is distinct and separate from learning through practice (Vygotsky 1978). The integrative learning method which utilises a combination of discussion and practical -including object-based and project- learning pulls these strands of learning practice together.

2. DH Perspective

Digital Humanities can be defined in many ways and from a variety of perspectives (see, for example, Terras, Nyhan and Vanhoutte 2013). However, it is widely agreed that DH usually involves the use of technology to ask both new and different questions about the humanities, often in ways that would not otherwise be possible. The process can also go in the other direction too, as perspectives of the humanities are brought to bear on technological tools and methods in order to understand and critique them in

new ways. On the whole DH tends to operate in contexts that are related to, but somewhat different from the traditional humanities; for example, DH centres may be based in traditional academic departments but also in libraries, museums and other cultural heritage and memory institutions. Accordingly, the intellectual, institutional and technical conditions required to carry out DH research are often different from those of the more traditional disciplines. Indeed, DH research is often collaborative, interdisciplinary and trans-institutional (see, for example, Warwick et al., 2012). It is essential that students are made aware of these issues by looking at practical, real world examples of projects and practices so that they may be challenged to explore new ways of thinking.

As part of our DH teaching model we need to ensure that students understand the multi-layered interrelationship between, for example, a hard copy scholarly text edition and its electronic surrogate; a museum object or an artefact in an anthropological exhibition and their 3D representations (particularly if they may have been made for the general public as well as museum professionals or researchers). In essence we need to be made clear that all digitisation involves interpretation. This is essential because DH practitioners of the future will not otherwise be able to conceptualise or build digital tools and artefacts that push forward the state of the art if they do not properly understand the ones on whose shoulders they stand and that have been used in scholarly research over the centuries.

Moreover, in order to develop the skills and knowledge needed to push beyond this, students must become self-aware and self-directed learners who can respond to the complexities of real-world problems by effectively integrating their domain knowledge, practical skills (e.g. tool building and coding), critical understanding and creativity. It is in facilitating these learning practices that integrative learning is so powerful:

'[...] integrative learning goes beyond academic boundaries and often occur as learners address real-world problems, unscripted and sufficiently broad to require multiple areas of knowledge and multiple modes of inquiry, offering multiple solutions and benefiting from multiple perspectives.' (Huber and Hutchings, 2005: 13)

3. Institutional Framework

In common with teaching programmes all over the world, the way that we teach the content of our programmes is directly shaped by the context that we teach it in. Indeed, UCL's local and institutional context is an important consideration within which to contextualise this argument. The MA/MSc DH programme attracts a primarily international student cohort with the majority of students -to date- being non-native speakers of English. Our teaching is based primarily in the wider Information Studies department, where there is also a significant international cohort, but students are mainly from the UK. In addition to the wealth of languages that students speak and the differing cultural backgrounds they come from, we must also take professional and academic experience into account: a significant number of the DH students we teach are looking for new and extendable skill sets and some already have graduate degrees (including PhDs) or extensive professional experience. At the same time, many come straight from their undergraduate degrees which may have been in the humanities and sciences.

The situation is little different in the IDH module, which is a cross-departmental core module for students from the six formerly independent language departments, that now make up the School of Modern Languages. It goes without saying, therefore that here too, a wide mix of native languages are spoken, in addition to those languages that are being studied, and all students are proven high achievers having secured their place at UCL.

When teaching both of these modules we must ensure that multidirectional communication -including from student to tutor, from tutor to student, and from student to student- can take place in an effective yet exciting way. In addition to careful planning and preparation, tutors must strive to cultivate a relaxed, open and challenging learning environment that fosters the key outcomes of integrative learning: that students 'pursue learning in a more intentionally connected way' and develop their capacity to 'make connections for themselves' (Huber and Hutchings, 2005: 1 & 5). Naturally we find this a challenging context to teach in; we equally find it a fascinating one that each year brings new challenges to be explored and enjoyed.

4. Case study 1: Digital Resources in the Humanities ⁷

DH is an ever developing and evolving field and so the content and scope of our modules is always changing. DRH currently addresses fundamental concepts such as 'What is DH?', 'Digitisation of Text, Image and Object', 'Geographical Information Systems (GIS)', 'Text Analysis and Stylometry' and the 'Text Encoding Initiative'. Object-based learning sessions, group work and problem-based practical sessions are also included. The benefit in each of these scenarios is the element of discussion and the exchange of ideas for the generation of new knowledge. As well as this, fostering integrative and collaborative learning facilitates two particular issues: how to leverage the potential of the complex contexts that the module is taught in, and how to elicit the 'Understanding Goals' over and above the module's particular and stated Learning Outcomes. This is achieved by a combination of guest lectures, to set the scene for the more abstract sessions using real world examples, and object-based practical sessions.

Some students come to us with fixed and often unquestioned assumptions about a perceived hierarchical relationship between the physical and the digital that places them in opposition. From the start, the DRH sessions challenge these assumptions and introduce students to structured ways of evaluating both the physical and the digital, whilst calling on different points of view and different interpretations to be expressed and discussed. The approach is a problem-based one that is informed by reflective (Brockbank and McGill 2007) and social-constructivist (Vygotsky 1978) theories of learning.

An early exercise asks students to describe their understanding of DH in a few sentences on the module blog and to then describe and critique an online resource as part of a small group interaction, before having the opportunity to revise their original position and reflect on any new knowledge they have developed in the group exercise. They are asked the question: has your initial definition of DH changed and if so in what way? From the perspective of the tutor, one of the most notable things about this exercise is the shifting moods that pervade the classroom, from the quiet and contemplative atmosphere that dominates the reflective parts of the practical, to the animated and lively debates that characterise the students' group interactions. This is where the most effective learning takes place as the group work facilitates integrative learning by encouraging different points of view to be discussed, challenged and perhaps modified.

Further sessions allow objected-based learning with support from the extensive holdings of UCL Special Collections⁸ and UCL Museums and Collections.⁹ Indeed, the Petrie Museum of Egyptian Archaeology,¹⁰ the Grant museum of Zoology¹¹ and UCL Art Museum¹² were originally established as teaching collections at UCL (MacDonald 2013). There are also the several so-called 'hidden collections' which are curated and available on request but do not have a permanent public display. Again, for these sessions (for example at the Grant Museum of Zoology), students are asked to compare and contrast the physical and the online versions of some of these resources; they are then able to review their thoughts following a visit to the museum or collection and exchange of views facilitated by group discussion. Here too it is interesting to observe the shift from often entrenched and prejudiced views of the physical versus the digital and the relationship between the two. Generally student feedback clearly indicates that the most informative and stimulating experience (65% at the last academic session) is a combination of visiting the museum (which includes a talk from a curator) and viewing the collection online.

A particularly challenging but overall rewarding experience for the students is the object-handling session using the Galton collection.¹³ The Galton laboratory was amalgamated into UCL in 1904 and on his death Sir Francis Galton (1822-1911) left a significant number of artefacts to UCL which now forms his eponymous collection. Unlike the Grant Museum, this collection currently has no physical space and for this session the students have a guest lecture by the curator who then introduces them to some of the objects in the holdings. Galton made fundamental contributions to many areas of science such as introducing statistical method to meteorology and criminology (for example he developed the science of finger printing); however in some circles he is better known for his interests in heredity (following his cousin Charles Darwin and the publication of *The Origin of Species*) and coining the term 'eugenics' whilst calling for the development of a super-race by selective breeding of intellectuals (Brookes 2004). Following the expert talk, the students are shown artefacts from the collection and asked to speculate on their use and purpose. The discussion that follows encourages students to discuss and apply their prior learning to this new context and the sensitive nature of some of the objects (for examples see the Galton Collection online <http://www.ucl.ac.uk/museums/galton> and consider the purpose of the box of glass eyes and the effect of their stare that greets you).

These activities encourage the students to re-evaluate their assumptions regarding the physical and the digital and to the realisation that neither one

is an overall good to the exclusion of the other; both have a part to play in our understanding of the artefacts, collections and indeed the function of museum and gallery space. They are also challenged to reflect on the ways in which cultural heritage knowledge is constructed, curated and communicated. Working together in small groups before coming together in a full class discussion facilitates the student interaction and the exchange of ideas in a way that would not be possible in the context of one-way transmission such as a lecture or by only setting prescribed readings.

5. Case Study 2: Introduction to Digital Humanities (tailored for European Languages, Culture and Society students)

Geo-spatial mapping technologies have received considerable critical attention in recent years, both within the DH community and beyond (e.g. Knowles 2008; Nowvskie 2013; Martin 2013). They allow blending of spatial analysis and literary scholarship, and investigate how individuals imagine and experience spaces (HASTAC 2013). On a pedagogical level this new focus on location and space raises questions about how using mapping tools affects students' understanding of both real and literary environments (HASTAC 2013). Likewise the use of web-based bibliographic reference tools in teaching has been subject to a number of research studies (e.g. Dhuong, 2010; Zaugg et al., 2011, Park et al., 2011; Butros & Taylor, 2012), although often in quite conventional ways, focusing on conducting research as it has been used in the pre-internet era, it is merely transported into a digital environment. This case study focuses on how these tools can be embedded in teaching in a way that makes sense for members of the 'net generation' (Tapscott 1998, 2008) and challenges them to use them in 'born digital' rather than in 'digitised' ways.

The institutional and pedagogical setting of this module needs a brief explanation as it impacts on the module's delivery; after all knowledge is 'situated' and cannot be separated from 'the activity, context, and culture in which it is used' (Brown et al., 1989: 32). Following the merger of several departments to form a single School of Modern Languages in 2012, the curricula of the formerly independent departments were partially merged to enable a significant part of 'content modules' to be taught in English as cross-departmental core courses with relevance for all students. A welcome by-product of this restructuring, that was largely driven by extra-pedagogical factors, was that it provided a very constructive opportunity to

introduce digital methods in the humanities into the undergraduate curriculum, tailored for the needs and requirements of –a very mixed cohort of– modern language students.

Tailoring an introduction to the field of DH that encompasses such diverse subfields as digitisation, text encoding, image processing, crowd-sourcing, social media etc. (Warwick et al., 2012) to a heterogeneous group of students from different language departments, with different backgrounds and technological capabilities was challenging and required making careful selections. Following a methodological interpretation of DH, it was important to let the students learn to use practical tools that would be of relevance to further studies in their respective background disciplines, whilst at the same time enabling them to gain insights into disciplinary practice and problems of DH by letting them do ‘hands-on work’ and to create their own small-scale digital projects.

While this module also covered some theoretical debates in DH and a range of other tools and methods, the two main learning technologies employed were bibliographical reference managers, and geo-temporal visualisation tools that would allow students to effectively visualise and interpret humanistic data. Using both technologies, students developed small-scale student-led collaborative DH-projects, digital exhibitions that used time and or space to explore a topic from their home discipline, collaboratively in groups of about five, organised by background discipline. The overarching theme holding all module projects together was that they needed a connection to London; for example, projects on particular writers that lived in this city; the characters or sites of a particular novel or the complete works of an author. Students collaboratively collated the necessary data using a web-based bibliographic reference manager, in this case *Zotero*, which then fed into a geo-temporal visualisation tool, in all but one case¹⁴ *Neatline* (Nowvskie, 2012), which is a plugin to the virtual exhibition platform *Omeka* (Omeka, 2013). The plan was to publish all projects together online so that students could add these to their CVs or portfolios, with possible benefits for their employability or academic progress as welcome side-effects. In line with institutional regulations regarding assessment, the overall marks were split between the collaborative project (60%) and an individual essay (40%) which required a reflection on the process and the research questions that the visualisation enabled.

Apart from the heterogeneous background of the group of learners, the two main challenges that presented themselves to the module tutor were: firstly how to deal with the inherent tension in DH between *making* and

interpreting, including its implications on a teaching and learning level; and secondly, how to deal with *collaborative* versus *individual* forms of learning.

The fuzziness of the disciplinary boundaries within DH, gives rise to a tension between 'those who suggest that digital humanities should always be about *making* (whether making archives, tools or new digital methods) and those who argue that it must expand to include *interpreting*' (Fitzpatrick, 2012: 13). On a pedagogical level this disciplinary tension is closely related to what Sfard (1998) described as a linguistic turn from the acquisition of knowledge to its construction through participation in activities. The emphasis is now placed on the process of becoming acculturated to the culture of a particular 'community of practice', a term coined by Wenger (1998): 'The talk about states has been replaced with attention to activities. In the image of learning that emerges from this linguistic turn, the permanence of *having* gives way to the constant flux of *doing*.' (Sfard, 1998: 3) The shorthand Sfard is using for this is 'participation metaphor' which contrasts with the more traditional 'acquisition metaphor'. Crucially both metaphors are not necessarily mutually exclusive but can complement each other (Sfard, 1998: 5).

Bibliographical reference managers have distinctive advantages over manual keeping of bibliographies; they enable students to store and manage references found during research in a database with a user-interface offering additional functionalities. In doing so they not only allow automatically generated bibliographies in a variety of academic styles, they also offer a wider range of management options, from annotating references and quotations, over plug-ins for the most commonly used word processors to generally keeping track of sources and avoiding accidental plagiarism, to overall project management.

While using bibliographic reference managers in today's digital age is hardly a difficult choice, the focus here is not on specific products -there are plenty of individual product reviews (e.g. Trinoskey et al. 2009; Zimmerman, 2010; Arellano, 2010) as well as comparisons of various reference managers (e.g. Ritterbush 2007; Butros and Taylor, 2010)- but rather on the strengths of web-based interactive (Web 2.0 type) reference managers in teaching and learning contexts. At the time of writing, *Mendeley*¹⁵ and *Zotero*¹⁶ are the leading examples, with the former being more prevalent in the STEM subjects. Both adapt Web 2.0 principles for academic scholarship by combining bibliographic reference manager functions with features of social networking tools and so ideally lending themselves for collaborative projects (Zaugg 2011). There is however often a tension to be found as institutions

may have invested resources in their own systems such as *EndNote*, *Reference Manager* and even geo-temporal visualisation tools. This raises the question why students should use institutionally supported proprietary software when openly available alternatives or cloud services offer arguably superior functionalities in an inter-operational way and will also continue to be available to students after their graduation.

Using the example of *Zotero*, Dan Cohen explains:

"I believe one critical element of the Zotero-project has been the way in which we think of any scholarly tool or resource as existing in an interconnected digital ecosystem - that is, the way in which the Project looks beyond itself [...] In a Web 2.0 environment, no application or repository should be an island; to live in this digital realm, applications and repositories must connect with each other, must be able to give to and take from other applications and repositories, and must be able to leverage the combined knowledge and actions of scholars from around the world." (Cohen 2008).

The rationale behind *Zotero's* approach, according to Cohen, was to break down the boundaries between applications: rather than the standard 'balkanization of the research environment into multiple, generally unrelated windows, such as Word, a Web browser, a standalone citation tool like Endnote, and notes written in various digital [...] forms' (Cohen 2008); the decision was taken to no longer have the tool 'exist as a separate application' but rather embed the tool in the browser, 'one of the most important design decisions for the *Zotero-project*'. (Cohen 2008)

The situation is similar regarding geo-temporal visualisation tools, the use of which in humanistic scholarship is fairly recent but expanding significantly (see for example the work at UCL at the Bartlett Centre for Advanced Spatial Analysis, CASA). Numerous packages are available but on a Web 2.0 level that is geared toward teaching, *Neatline* - 'a digital storytelling tool from the Scholar's Lab at the University of Virginia Library'- was the only suitable one identified at the time of writing, as it 'aims for ease of use by scholars new to the digital humanities' (Nowviskie et al., 2013). MIT's Simile-Exhibit-Framework (MIT, 2010), around which the module was originally designed, whilst capable and flexible, was found too challenging in this pedagogical setting with entry level students as it meant them having to acquire scripting knowledge.

Restricting applications to Web 2.0 technologies narrows down the range of products but ensures other advantages such as use off-campus and continued availability after graduation. Further, using *Neatline* as an example for the generic technology, it can be characterised as a:web-based tool with which students, scholars, and curators can express the geo-temporal dimensions of literary, historical, or other digital collections. These customized interfaces take the form of highly interpretive exhibits that link together interactive maps, timelines, texts, images, sound and video files, and archival objects. (Nowviskie et al., 2013).

Importantly 'for people working with messy humanities data, *Neatline* goes beyond plonking markers on Google Maps. It's designed to express ambiguity, complexity and nuance.' (Ridge, 2012). It also '[asserts] the value of hand-crafted visualisation as a mode of praxis and scholarly inquiry.' (Nowviskie 2013).

The usefulness of both technologies within this integrative learning context is further supported by brief evidence in the form of feedback from the annual course evaluations. From the 19 students that attended the module in its first iteration, 16 anonymous feedback forms (84.2%) were received. Overall, the module seemed to work very well. The student projects, small scope Digital Humanities projects in the students' home disciplines, included visualisations of such diverse topics as: the activities of the Bloomsbury Group (Virginia Woolf et al.); or the 1990s artist group Young British Artists (YBA) across London; the impact of the 2012 Olympics on the city; 20th century 'Brutalist' architecture; one particularly felicitous project used the settings of children's books in London, allowing conclusions to be drawn on the distribution of these settings for example between the West End and the East End, with, among others, *Mary Poppins* in East Finchley and the *Wombles* on Wimbledon Common being conspicuous outliers. All projects were of consistent high quality and students commented on having gained valuable insights into concepts, methods and tools of Digital Humanities as well as practical skills that were considered 'useful for the future'. Content, workload and pace were generally felt to be at a suitably challenging level, students felt encouraged to participate and found the learning material distributed via Moodle to be useful.

Individual students' comments on the technologies used included:

"It was good that we had the chance to apply the tools to our own projects";

"Softwares [sic] are interesting to learn & very useful for the future";

“I got to know many interesting things - also how to make my bibliography easier for example with a program [called] *Zotero*”.

The remaining responses commented on aspects of assessment, teaching rooms, and support available. Of course this data only provides brief indications and inviting students for in-depth interviews during the academic summer was not an option; nevertheless the data corroborates the value of the chosen technologies for the learning context discussed here. The external examiner also commented on the high quality of the coursework, especially of the reflective aspect.

6. Conclusion

The strengths of the technologies outlined in the second case study -*Zotero* and *Neatline*- lie in their inherent Web 2.0 qualities which include ease of use, and of particular importance in a teaching and learning context, interoperability and suitability for collaboration.

Upon starting our courses students are already familiar with web-based products and are used to integrating them in a variety of ways and platforms (laptop/tablet/phone); moving away from institutional and commercial software packages for teaching, to openly available software or cloud services liberates them from the computer lab or the now commonplace ‘thin client’ operating the institution’s global desktop solution. Students and teachers can take a pick-and-choose attitude to a great many user-friendly, collaborative, and often inter-operational software and cloud services. This is especially salient in a DH-context with its heavy focus on openness and collaboration. While not all cloud services are free, entry level versions are typically offered for free or at low cost; for example, the free version of *Zotero* comes with a generous allocation of storage space, currently 300 MB, and has a subscription option if more storage, for perhaps a complete PDF collection, is needed (*Zotero*, 2013).

In this way students can aggregate their tools and build their personal or personalised learning environments instead of having to use institutional virtual learning environments (Mahony 2007). Giving a choice of tools is good practice as students will then have to evaluate their performance in relation to their project requirements and in addition will also be able to continue using the tools and the skills acquired through using them after graduation, when they are no longer covered by the campus licences. It is also necessary to remember that when not limiting teaching to the

institutional software, students will have a variety of platforms and operating systems (i.e. devices, whether notebooks, tablets or smartphones running Android, iOS or indeed Windows) and so it is important to allow the students to select their preferred choice of software application rather than being prescriptive and this needs to be taken into account especially when setting assignments and assessments. For example, when launched *Zotero* was only available as a *Firefox* plugin but is now available for other browsers as well as standalone clients for Mac, Windows and Linux.

To encourage the integrative nature of learning and for the students to engage with each other for the creating of new knowledge and understanding; the value of collaboration, especially at institutions with a traditionally 'competitive' culture, needs to be taught. Students need to understand why collaboration is important for the specific teaching and learning context at hand as well as its importance as a transferrable skill that is highly sought after by employers. It is through the discussions with their peers that the process resulting in the ability to make connections for themselves and see that the skills learned in one situation can be applied in another is developed.

Integrative learning and reflective practice are central to DH teaching at UCL, and as assessment is one of the most powerful drivers for learning, it should involve the features discussed in these case studies. The assessment for DRH consists of an individual written essay where the student is free to choose their own material (subject to the approval of the module tutor) and must compare and contrast a digital object, system or presence with its 'real world' counterpart. They are expected to analyse the respective digital and analogue forms, look at the relationship between the digital and analogue artefact and assess their various strengths and weaknesses. In doing so the students must also demonstrate an understanding of one or more of the application areas looked at during the module. At UCL we do not of course, teach 'to' the examination but by the end of the module the students will have had plenty of experience to draw on to inform this assignment.

Given that collaboration is also central to DH, a collaborative element providing institutional regulations allow, is also essential (and provided for in the MA/MSc DH programme in other core modules). For the second case study, the regulation that an identifiable element of the assessment needs to be an individual piece of work is met by a 40/60per cent split, allowing for a practical group project of 60per cent, and so the individual item can be a final reflective write-up. Overall, this worked very well for the learning context described, especially as students also had the individual opportunity

to reflect on the collaborative aspects of their work. Several students had various degrees of misgivings about collaboration at first, particularly with regards to dealing with the possibility of group members not contributing as much as they should ('freeriders') or dominant personalities taking over. Feedback clearly indicated that this was insignificant when compared to how much individual students learned from working together with the other members of their team; for example, proof reading each other's work for the final combined report and discussing best practice for citation. Including a form of peer-assessment in which the project groups are given a number of marks to distribute between themselves, might be an alternative to consider in future iterations of this module.

As part of the integrative process, students should be opened up to the importance of critical reflection as part of the learning process and be encouraged to reflect on what insights using these tools offered that was not available without them. This is not just about answering research questions but about how they enable new and perhaps better questions to be asked. Asking new questions should be encouraged as well as looking for answers to existing ones. Using these new technologies as an end to itself is not enough; rather it is necessary to develop communities of both practice and learning around them (Mahony et al., 2013) which will pose further significant cultural challenges as the modules progress.

With a developed programme based around integrative learning practice, students in these case studies were able to strengthen their digital literacy and foster the cultural change to collaborative learning and research practice. With the exchange of ideas through collaborative group working students are able to make connections to enable the creation of new knowledge and understanding. As learners they become more self-confident and capable in the use of digital technologies. '[They] also develop a wider and more effective range of strategies for their own learning, and more critical stances within disciplinary or professional contexts of knowledge practice. [...] learners rarely have opportunities to develop knowledge practices in their chosen programmes of study in which the use and meaning of digital technologies are integrated.' (Littlejohn et al., 2013).

Integrative learning methodologies, together with collaborative and reflective practice, allow students a unique and valuable learning experience and maximise their opportunity for developing increased levels of understanding and the generation of new personal knowledge.

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Footnotes

1. A/MSc in Digital Humanities <http://www.ucl.ac.uk/dh/courses/mamsc>.
2. UCL Department of Information Studies <http://www.ucl.ac.uk/dis>.
3. Digital Resources in the Humanities <http://www.ucl.ac.uk/dis/taught/pg/INSTG008>.
4. Introduction to Digital Humanities
<http://www.ucl.ac.uk/selcs/interdepartmental-modules/intermediate-modules-14-15/intermediate-modules-14-15/elcs6046-1314-introduction-to-digital-humanities>.
5. UCL School of European Languages, Culture and Society <http://www.ucl.ac.uk/selcs/>.
6. Connected Curriculum
http://www.ucl.ac.uk/teaching-learning/strategic_priorities/connected-curriculum.
7. Since presenting this research at the Digital Humanities Congress 2014, a detailed account of this case study has been published as part of Nyhan, Terras and Mahony (2014). 'Integrative learning and Digital Humanities'. In, *Integrative Learning: International Research and Practice*, edited by Daniel Blackshields et al., Routledge: UK. For this reason it will be only briefly outlined here and more words given to the second case study.
8. UCL Special Collections <http://www.ucl.ac.uk/library/special-collections>.
9. UCL Museums and Collections <http://www.ucl.ac.uk/museums>.
10. Petrie Museum of Egyptian Archaeology <http://www.ucl.ac.uk/museums/petrie>.
11. Grant Museum of Zoology <http://www.ucl.ac.uk/museums/zoology>.
12. UCL Art Museum <http://ucl.ac.uk/museums/uclart>.
13. The Galton Collection <http://www.ucl.ac.uk/museums/galton>.
14. Geocommons (<http://geocommons.com>) was used in one project.
15. Mendeley <http://www.mendeley.com/>.
16. Zotero <https://www.zotero.org/>.