

Designing for difference: lessons from a cross-disciplinary implementation of Universal Design for Learning

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Introduction

Universal Design for Learning (UDL) is a pedagogical framework that seeks to provide students with flexible ways of learning, flexible study resources, and flexible ways of testing learning. Just as Universal Design (UD) provides for difference of physical ability amongst users, UDL provides for difference of learning styles amongst students. Like UD, UDL assumes that learner difference, not commonality, is the norm.¹

De Montfort University (DMU) is a public teaching and research university located in the city of Leicester in the East Midlands of England. In 2016, DMU adopted UDL as part of a university-wide program to offset the consequences of changes to central government support for students with disabilities. Alongside a significant investment in lecture capture and replay technology, DMU's adoption of the principles of UDL has challenged faculty members teaching at all levels and in all disciplines to re-appraise the accessibility and inclusivity of their teaching.

This paper discusses research-in-progress from a cross-discipline survey of the implementation of the principles of UDL at DMU.* The project examines the perceptions and feelings of freshman students from a range of different backgrounds and in a range of subjects about the impact of UDL on their experience of higher education. When complete, the project will evaluate how the implementation of the principles and ideas of UDL are interpreted and applied by students, alongside their recommendations for the academic practice of staff.

* As this paper presents an ongoing piece of research, the version delivered verbally at the conference will present additional findings and outcomes.

A changing context of higher education

In the UK over the last decade, higher education in general and architectural education in particular have been subject to a series of profound environmental changes.² For students with disclosed learning differences, these changes have been particularly acute. From the start of the 2016/17 academic year, central government support for students in higher education has been reduced, with universities rather than government now responsible for the provision of non-medical support staff, such as classroom scribes. Central government funds have also been reduced.³ Undergraduate students with long-term physical or mental health conditions or specific learning difficulties such as dyslexia are eligible for up to £5,358 for specialist equipment, up to £21,305 for a non-medical helper, and up to £1,790 for other costs. However, these figures are maxima and the majority of students receive much less.⁴ During a period of sustained fiscal austerity in government, the financial burden of supporting these students' particular needs is being shifted to higher education providers. This is in keeping with the current government's desire to regard universities as businesses, legally obliged by the 2010 Equality Act to make reasonable accommodation for customer difference.

From Universal Design to Universal Design for Learning

Universal Design (UD) provides for difference of physical ability amongst users. In the late nineteen-seventies, architect Michael Bednar described UD as an appreciation that the elimination of physical barriers in the built environment enhanced everyone's functional capacity. For example, drop curbs were initially introduced to aid the mobility of those in wheelchairs, but they were soon found to benefit many others, such as physically able persons pushing prams and strollers.^{5 6}

Just as the principles of UD demonstrate that the physical environment should be designed from the outset to accommodate different kinds of users, the principles of UDL prompt teachers to design curricula from the outset to accommodate different kinds of learners. UDL was first defined by David Rose at the Harvard Graduate School of Education in the late 1990s as a means of removing physical, cognitive and structural barriers to learning.^{7,8} There exists a unique opportunity for design disciplines - and especially architecture - to critically examine the parallels between UD and UDL. Architects' engagement with the principles of UD can range from (at best) holistic and inclusive built environments that accommodate rather than accentuate physical difference to (at worst) the piecemeal application of ramps, handrails and high contrast materials.

The aims and ideas of UDL

As implemented at DMU UDL is arranged around three aims, and six ideas. The three aims are to provide students with flexible ways of learning, flexible study resources, and flexible ways of testing learning, and the six ideas provide instructors with constructive prompts for the enhancement of their teaching. These ideas are as follows.

1. Teachers should make learning materials available to students in a modifiable format 48 hours before each teaching session.

Like most universities, DMU uses a proprietary Virtual Learning Environment (VLE), version 9.1 (April 2014) of Blackboard, produced by Blackboard Inc. of Washington, DC. All undergraduate and taught postgraduate courses at DMU are delivered through discrete modules, and each module is provided with a dedicated module 'shell' on Blackboard through which Module Leaders and Instructors can undertake assessments, receive assignments, and most importantly disseminate information. While academic staff at DMU have been using Blackboard since 2003 (with a minimum threshold use required since 2011), the implementation of UDL has established a benchmark for good academic practice, namely the advance dissemination of learning materials at least 48 hours in advance of each teaching session, and in a modifiable format (for example .doc instead of .pdf) so that students may edit and re-format such information.

2. Self-directed learning is signposted in each teaching session.

This idea prompts instructors to ensure that every teaching session, whether it be a lecture, seminar, workshop or tutorial is planned in such a way to include periodic references towards self-directed learning opportunities. These may include tradi-

tional reading lists of books, chapters and articles, but they can also include hyperlinks to videos, podcasts, or online resources.

3. Students are provided with opportunities for active learning and knowledge checks.

The third idea sets a benchmark expectation for educators at DMU, encouraging the routine provision of opportunities for active learning and knowledge checks in teaching sessions. This is especially encouraged with regard to activities and tasks that can be disseminated via the VLE, providing students with opportunities for active engagement in learning material both in and out of class.

4. Students able to review replay or revisit teaching sessions in the Virtual Learning Environment.

Beginning in autumn 2016, DMU has implemented a staged roll out of DMU Replay, a proprietary web-based lecture capture, storage and replay system developed by the Seattle, Washington based Panopto Inc. This roll began with year 0 (foundation), first year undergraduate, and first year taught postgraduate cohorts. This element of the six UDL ideas has been the source of continuing discord between university management some academic staff. While faculty staff teaching modules to these cohorts have been encouraged to take advantage of DMU Replay, staff cannot be contractually obliged to do so, and as of the time of writing 19 weeks into the academic year, not a single teaching session in BA (Hons) Architecture year one has been thus recorded.

The DMU branch of the University and College Union (UCU) currently advises its members not to engage with DMU Replay, and if challenged to declare that they are exercising their rights under the 1988 Copyright, Designs and Patents Act and 1998 Data Protection Act.⁹ While this paper does not attempt to summarize the disagreement between DMU and UCU, the recommendation not to engage with lecture capture is made in response to two broad areas of concern. Firstly, whereas for instance a PDF file of an instructor's lecture slides - including copyrighted images of works of art - can be distributed to students via a VLE under legitimate fair use terms, distributing a video of that lecture in which the teacher speaks over these images could potentially reclassify it as a performance, and a very different interpretation of UK and EU copyright law might apply. Secondly, in the absence of any specific agreement that material recorded by lecture capture may not be used for such purposes, the Union has expressed concerns that material produced by lecture capture may later be used by the University either for commercial purposes or for disciplinary action against

the staff member. While it is the stated position of the Union to support reasonable adjustments for individual students who wish to record teaching sessions on their own personal devices, it will only endorse the use of lecture capture “as long as the rights of staff are protected and such system is used for educational purposes only.”^{10,11}

5. Do modes of assessment provide the opportunity for all students to demonstrate knowledge and understanding?

The fifth idea of the UDL framework prompts teachers at DMU to consider whether their modes of assessment can be adjusted in any reasonable way to better accommodate different learning styles. Whereas reasonable accommodations can be made for dyslexic students in the completion of timed examinations (such as with the use of computers or granting of additional time), this UDL idea prompts instructors to consider whether traditional modes of assessment are necessarily appropriate for both the course and the students. Could presentations of video submission replace certain written submissions, for instance?

6. Do module VLE shells meet the DMU Threshold for the use of technologies in the curriculum?

Finally, DMU has agreed four university-wide minimum criteria for the use of technologies to support curricula and students. Firstly, websites and VLE pages must be easy to navigate and provide access to core information. Secondly, all communication between staff and students must be consistent and meet the expectations set by the course. Thirdly, assessments and feedback are clearly presented, including consistent deployment of Turnitin plagiarism detection and anonymous marking of all summative assessment. Fourthly, consistent monitoring processes must be in place to ensure a comparable on-line learning experience for all students across all platforms. This is particularly relevant for students with different learning needs.

Student perceptions of UDL

In order to assess student perceptions of the roll out of UDL at DMU, during the 2016/17 academic year a team of academics from across DMU’s four faculties made a successful bid to the University’s Teaching Innovation Project fund. The resultant research project, *Towards Equitable Engagement: the Impact of UDL on Student Perceptions of Learning* engages with students from a wide range of backgrounds in order to understand whether there are differential impacts of UDL. This research

represents the first university-wide evaluation of the implementation of UDL, and will inform the evaluations that are planned as part of the implementation of what is informally referred to as UDL-2, starting in the 2017/18 academic year. It is a matter of importance that this pilot project captures how the UDL principles are interpreted and applied by students, alongside their recommendations for the academic practice of staff. The intention is to include students affected directly by the changes to DSA, as well as those who are not.

The project team and this paper’s authors represent all four of DMU’s Faculties. James Benedict Brown is Senior Lecturer in Architecture in the Faculty of Arts, Design and Humanities. Richard Hall is Professor of Education and Technology in the Faculty of Health and Life Sciences. Ros Lishman is Senior Lecturer in the the Department of Politics & Public Policy in the Faculty of Business and Law. Jo Rushworth is Senior Lecturer in the the School of Allied Health Sciences in the Faculty of Health and Life Sciences. Richard Snape is Research Fellow in the Institute of Energy and Sustainable Development in the Faculty of Technology. Four of the team members (Brown, Lishman, Rushworth, & Snape) are undertaking small scale research projects in their respective subject areas, representing the four Faculties of DMU. Each has recruited six first year undergraduate students from within their Faculty as partners. In the Faculty of Technology, the research will focus on the particular experience of learning difference for students with autism through a first year undergraduate mathematics for engineering module. In the Faculty of Health and Life Sciences, the research is examining the impact of UDL on a programme with large cohorts, and will provide a comparative analysis between first and second year undergraduate students, the latter who did not benefit from UDL in their first year. In the Faculty of Business and Law, the research will undertake a latitudinal study of student perceptions from across a range of different programmes. Small focus group workshops will course programme student representatives. In each case, the methodology and outputs of the research will be defined in partnership with the students through small scale participative action research.

This paper will focus on the research being undertaken in the Leicester School of Architecture, part of the Faculty of Arts, Design and Humanities.

ID	Gender	Age	UK / EU / or ex-EU international	Did the student complete a foundation year at DMU? ¹²	Is student in receipt of DSA?	Declared disabilities
F1	F	19	International	Yes	No	None
M1	M	19	EU	No	No	Dyslexia
M2	M	19	International	Yes	No	None
F2	F	50	UK	No	Yes	Some mobility difficulties and weakness following a stroke; foraminal stenosis; arthritis & multiple sclerosis.
M3	M	18	UK	No	No	None
M4	M	18	UK	No	Yes	Dyslexia

Figure 1: Sample of BA (Hons) Architecture undergraduate students.

Student perceptions of UDL in Architecture

A focus group formed of a representative sample of six students on the first year of the BA (Hons) Architecture course has been formed to collect detailed student feedback on the implementation of UDL. Of the four disciplinary areas being examined in this university-wide study, this is the only in a design discipline, and the only in a programme that is validated externally by the respective professional bodies of the discipline.¹³

Six first year undergraduate students on the BA (Hons) Architecture programme were recruited via an open call for volunteers (see figure 1). The students will meet regularly through the spring and summer terms of the 2016/17 academic year, and will be remunerated for sixteen hours of their time at the UK National Minimum Wage of £7.20 (approx. \$9.00) per hour. From a cohort of 162 full-time students, 8 volunteers presented themselves and 6 were selected based on a very approximate demographic representation of the cohort's gender and background. Two of the students had completed a one year foundation course at DMU prior to beginning their undergraduate studies, and as such had had some experience of the institution before the start of their undergraduate studies. Three students

had declared disabilities: two are diagnosed dyslexia and one has profound physical disabilities affecting her personal mobility.

With no elective options, all students on the programme are enrolled on the same modules in year one: Architectural Design 1 & 2 (15 & 30 credits, delivered sequentially), Architectural Communications (15 credits), Architectural History and Theory (30 credits), and Building Performance and Technology (30 credits). All modules involve some degree of lecture-based teaching; and Communications and Building Performance and Technology are both largely delivered through small group workshops. The signature pedagogy of architectural education at DMU remains studio tuition in Architectural Design 1 & 2, which with six hours of tuition per week throughout the academic year remains the single biggest element of the students' teaching calendar.

As an ice breaker exercise at the first focus group, and to prompt initial conversations about learner differences, the student volunteers were invited to complete a learning style questionnaire based on that of Peter Honey and Alan Mumford, itself derived from the work of David A. Kolb.¹⁴ Recognizing the limitations of any such exercise, students were then invited to

discuss whether or not they agreed with the classifications generated by the questionnaire. Perhaps pleasingly for a subject that prides itself on the intersecting skillsets of design, technology and the humanities, few students found that they were clearly characterized by any one of Honey and Mumford's learning styles, with all students reporting that they represented variety of combinations of activists, reflectors, theorists, and pragmatists. Having prompted a discussion about the potential limitations of such classifications, the focus group turned its attention to four of the six UDL ideas, which were introduced to the students in turn. Students were prompted to respond to the following questions, and the researcher transcribed responses on screen. The transcription was then coded to generate the following summative statements.

Does it help you to be able to download, view and/or edit learning materials before a teaching session?

When questioned about the value of reading learning materials before a class, the focus group revealed itself to be composed of a remarkable diversity of learning styles. Only one of the four students present declared that he would usually read learning materials distributed online before a class, and this practice was informed by the difficulty he had experienced processing learning materials in secondary education. All four students reported very different combinations of engagement with lectures, from active note taking to passive listening. One student regularly makes his own audio recordings of lectures to clarify details later.

Of the DMU UDL requirement that instructors distribute editable versions of learning materials before classes, only one student supported the ability to open, edit and re-format documents. Of the two students with dyslexia, the one in receipt of DSA reported the usefulness of specialist software purchases using the funding, notably text-to-speech software that was capable of reading PDFs composed of scanned pages of books.

All students reported an awareness of the different attitudes to UDL demonstrated by different instructors, including instructors who make it clear that they will not distribute full lecture notes online as a means of encouraging active listening and engagement.

During a teaching session, does it help you to be directed towards other independent learning opportunities?

The focus group unanimously reported a universal disdain for the traditional bibliography, explicitly referring to the recommended reading list of more than thirty titles in one Module as particularly unhelpful. Regardless of learning style, the academic profile of students enrolling on BA (Hons) Architecture is highly diverse, with students beginning the programme with very different experiences of literate subjects. Regardless of academic background, students reported that in year one it was difficult to approach a long bibliography or an eight hundred page book on the history of architecture with confidence. Instructors who distributed PDF scans of individual chapters were praised.

During a teaching session, does it help you to be provided with opportunities for checking your learning?

For written work, one student with dyslexia expressed the benefits of being able to share drafts of written work with a specialist tutor provided for by DSA support funds. Students were generally unfamiliar with the possibilities afforded for knowledge checks, tests, and quizzes by VLE software, and expressed only mild enthusiasm for the benefits of such tools.

Would it help you to be able to replay, rewind, pause, and skip through a video of a teaching session online?

While no Instructor in year one of the BA (Hons) Architecture course currently engages with DMU Replay, students were aware that the technology existed and was being used by some instructors in other programmes. Not having directly experienced lecture capture, the students' responses were entirely hypothetical, but nonetheless recognized the relative applicability of the technology across the different modes of teaching in their programme. All students agreed that there might be value in being able to replay lectures, as it would afford students the opportunity to revisit not only the narrative being delivered by the lecturer, but also the images that illustrate it. Two students acknowledged – unprompted by the researcher – that the reassurance of lecture capture being available would make attendance at lectures in person less desirable.

Perhaps most significantly, there was agreement amongst the students that as the core element of their curriculum (both in terms of credit weight and study hours) the design studio was not an appropriate environment for lecture capture. This was attributed in part given to the practicalities of recording group tutorials in open plan studio spaces, and in part to concerns about student privacy in an environment in which one to one

and small group tutorials are generally structured around the constructive criticism of individual student's work.

Discussion

At the time of writing, the research project this paper describes is ongoing, and as such it is not yet possible to present summative conclusions. However, it would be apposite to make the following statements with regard to how one university's engagement with UDL has been experienced through the eyes of beginning architecture students.

Firstly, it should be noted that the authors are aware of the limitations of the questions we are posing. UDL is being deployed at DMU in order to broaden academic opportunity to the widest possible range of learner styles. Student perceptions of its appropriateness as a learning and teaching framework are naturally going to be constrained by their own limited appreciation of others' learning styles.

It is difficult to ascertain whether implementing the aims and ideas of UDL across all of DMU's programmes is helping to recruit and retain students with a wider range of learning styles, or whether current students feel that it is practically enhancing their student experience. A much wider qualitative survey is recommended, and it is the intention of this research project to inform such research as and when DMU formally introduces the second phase of its UDL programme in the 2017/18 academic year.

UDL has been introduced at DMU in response to cutbacks in government support for students with disabilities. It is unclear whether students of architecture perceive whether the stated benefits of UDL are in alignment with the University's ambitions for the programme. However from their varied past experiences of secondary education and their initial experiences of higher education, it is clear that implementing UDL is unable to replace the dedicated learning support some of our students clearly benefit from, such as the specialist feedback provided by learning support tutors. Our initial findings suggest, however, that there is no difference between the perceptions of UDL by those with declared learning differences and those without. While even our students who have not had direct experience of lecture capture at DMU report enthusiasm for the adoption of the technology, especially if it allows for different degrees of engagement with scheduled teaching sessions, it is self-evident that an audio described playback of a lecture is of little use to a deaf student who might still rely on a scribe or sign language interpreter. So while these technologies and these pedagogical

principles are being heralded as a response to changing financial support for students with the most extreme learning differences, they are in fact more appropriately considered here as radical opportunities for all students to interact differently with both learning materials and the institution that delivers them.

While lecture capture technology is rolled out in classrooms and lecture theatres across the DMU campus, its usefulness at the core of a design discipline such as architecture remains potentially limited. The introduction of DMU Replay at the start of the 2016/17 academic year just so happens to have been concurrent with the opening of brand new teaching spaces for art and design subjects in the multi-million pound Vijay Patel Building. However the hardware that is required for lecture capture – fixed digital video cameras, lectern microphones, classroom microphones, and preloaded software on lectern computers - remains extremely expensive to deploy and seemingly incompatible with studio tuition. Given that the signature pedagogy and teaching space of architectural education is proving to be both practically and pedagogically incompatible with lecture capture, the potential impact of this element of DMU's interpretation of UDL remains limited to the traditional mode of teaching by lecture.

Notes

¹ Center for Universal Design, 2008. Universal Design History. [Online] Available at: https://www.ncsu.edu/ncsu/design/cud/about_ud/udhistory.htm [Accessed February 6, 2017].

² See James Brown & Eileen McGonigal (2016). *One to one to one: a triumvirate of interpersonal relationships in beginning architecture education*. NCBDS 32, Cal Poly San Luis Obispo, CA.

³ Sally Weale (2015) 'Government to cut funding for disabled university students.' Guardian [Online] Available at: <https://www.theguardian.com/education/2015/dec/02/government-to-cut-funding-disabled-university-students-jo-johnson> [Accessed February 6, 2017]

⁴ HM Government (2016) Disabled Students' Allowances [Online] Available at: <https://www.gov.uk/disabled-students-allowances-dsas> [Accessed February 6, 2017]

⁵ Michael J. Bednar (ed) (1977) *Barrier-free environments*. Stroudsburg, PA: Hutchinson and Ross.

⁶ Stephanie L. Moore (2007) Book Review: David H. Rose, Anne Meyer, Teaching Every Student in the Digital Age: Universal Design for Learning. *Education Tech Research Dev.* 55:521–525

⁷ Raymond Orkwis & Kathleen McLane, 1998. *A Curriculum Every Student Can Use: Design Principles for Student Access*. [Online] Available at: <https://eric.ed.gov/?id=ED423654> [Accessed February 6, 2017]

⁸ David H. Rose & Anne Meyer, 2002. *Teaching Every Student in the Digital Age: Universal Design for Learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

⁹ UCU DMU Branch Committee email to members, September 2, 2016.

¹⁰ UCU DMU Branch Committee email to members, September 30, 2016.

¹¹ For further discussion of the legal issues surrounding lecture capture in the UK Higher Education context, see JISC Legal, 2010. Recording Lectures: Legal Considerations. Glasgow: University of Strathclyde.

¹² DMU offers a variety of one year foundation courses for applicants who are not eligible for direct entry to an undergraduate course. These include a Business and Technology Education Council (BTEC) Diploma in Art and Design, and in collaboration with Leicester International Pathway College an International Foundation Certificate in Art and Design. For more information see <http://www.dmu.ac.uk/study/courses/foundation-courses/foundation-courses.aspx> and <http://www.dmu.ac.uk/dmu-leicester-international-pathway-college/dmu-leicester-international-pathway-college.aspx>

¹³ The Royal Institute of British Architects, the Architects Registration Board, and the Commonwealth Association of Architects.

¹⁴ Peter Honey & Alan Mumford (2006) *The Learning Styles Questionnaire: 80-item Version*. Oxford: Peter Honey Publications.