University of Glasgow

E-Learning Strategy 2013 - 2020

FOREWORD

The Strategy outlined in this document sets out a vision for the future learning environment at the University of Glasgow and a pathway to follow to achieve this vision. It is important to stress here that the Strategy does not tell staff how to teach or students how to learn but rather seeks to empower them by increasing both the range and accessibility of the methods they can adopt. In a rapidly changing world, where higher education is becoming increasingly global in nature, it aims to put in place measures that will maintain and enhance the position of the University as a world-class place of research informed learning.

The strategy builds on the aspirational vision for our learning environment originally outlined in the University strategic plan and further developed in our Learning and Teaching Strategy. It specifically addresses the core commitment that "*the learning experience will be enhanced by physical and virtual infrastructure of the highest quality and excellent learning resources that are targeted to address our diverse learning community's needs and to provide them with flexibility in what, how, when and where they learn*".

The Strategy outlines how e-learning can support this vision and identifies specific strategic priorities for the coming years and the enablers that will allow the delivery of these priorities. Appendix 1 puts the strategy in context, identifying both the factors that are driving change in the learning environment and the challenges that we face in moving forward.

1.0 AN E-LEARNING STRATEGY FOR THE UNIVERSITY OF GLASGOW

The vision outlined in our Strategic Plan, *Glasgow 2020 - A Global Vision*, and further developed in our Learning and Teaching Strategy describes our aspirations for the future learning environment at the University of Glasgow. Here, we describe the features that a strong E-Learning capability and culture will contribute to this vision.

1.1 The E-Learning Vision

At the heart of our vision is an academic community that is empowered to creatively consider and take advantage of the opportunities to foster investigative learning afforded by technology at the early stages of course and programme design and is both confident and well-supported in its use.

The learning experiences of our student community will be enriched by

- an increasingly personalised, technology-supported, student learning experience to offset the depersonalising effects of large classes

- increased access to and interaction with rich educational content via mobile devices within and beyond the physical bounds of our campuses

- access to a limited range of wholly online, interactive and feedback-rich courses, available on-campus, to increase both the flexibility and the breadth of the learning experience.

our staff and students will be supported throughout by

- a robust IT infrastructure that allows pervasive high-speed connectivity, has sufficient bandwidth, storage capacity and technical capability to create and deliver rich multi-media course content to our students on demand.

- a robust but flexible Virtual Learning Environment (VLE) that incorporates a range of well-supported interactive tools for teaching and assessment both on campus and at distance

- technology enabled physical teaching, study and assessment spaces designed to be flexible and aligned to the teaching and learning strategies of our staff and students

and, finally, our global reach and reputation will be enhanced through

- supporting a significant number of learners at distance on a range of high-quality, online degrees aligned with both our research expertise and the needs of high-level professionals

- enabling the University's Transnational Education Strategy via seamless support for flexible delivery in-country or online across national boundaries

- contributing to and drawing from world-class Open Educational Resources to both enhance our reputation as a leading education provider and to enhance our student learning experience

1.2 Strategic Priorities

Many of the building blocks required to deliver the vision outlined above are already in place but several are not and these deficiencies must be addressed as key priorities in the next few years. Specifically, the University will

- Empower and support staff to develop and deliver effective approaches to teaching enabled by the creative use of technology and, if appropriate, provide pathways for embryonic activity to be mainstreamed

- Enhance the on-campus learning experience through more effective, integrated use of interactive technologies

- Support staff in developing and sustaining a core capability in online, distance education targeted primarily at high-quality programmes aligned to our research strengths, the needs of high-level professionals and in support of transnational education

- Extend the reach and flexibility of our VLE, learning toolset and student support systems to provide easy access and interaction through mobile and tablet devices and to create the opportunity for students to increasingly personalise their own learning space

1.3 Key Enablers

Achievement of our strategic priorities will only be possible if the foundation on which we build activity is strong. There are a series of key enablers that must be enacted at the core to our learning and teaching environment for this to happen. These are:

- Staff: We will establish effective financial and staff-development mechanisms to support a significantly increased proportion of our staff in engaging with and developing expertise in E-Learning.

- Policy: We will proactively assess the elements of our current academic policy framework in terms of their future suitability to support staff and student aspirations of the increased use of technology supported learning.

- Evidence-based progress: We will establish mechanisms to evaluate the effectiveness of approaches to E-Learning including, where appropriate, learning analytics

- IT Infrastructure: We will progressively upgrade our IT infrastructure to support the delivery of our strategic vision

The significance of each of these key enablers is now discussed

1.3.1 Staff

It is important to recognise that the success of this strategy will depend critically on the talent, creativity and expertise of our staff. Technology alone is useless without staff who provide the intellectual capital and driving force behind the intelligent use of technology to enhance student learning. For this reason, staff in the University must be empowered to move our strategy forward. The barriers to adoption must be low and training and technical support must be readily available. If this is done well, we will grow a community of practice that will create additional momentum in taking us forward.

We will empower staff by providing targeted incentives to develop new provision and our recognition, reward and promotions procedures will also recognise developmental contributions aligned to our E-Learning Strategy. We will further support staff through the local deployment of specialists to assist and advise them in the development stages of new courses. We will also develop a range of online resources to support centrally delivered university-wide training on key aspects of the effective integration of technology in course and programme design.

1.3.2 Policy

Our learning and teaching environment is regulated and shaped by our academic policy framework. As technologies become more pervasive, they can give rise to issues that are either not fully addressed by or fall outside of the framework. For example, while the actual recording of a lecture may be relatively straightforward to achieve technically, the policy issues around this may be much more complex.

Assessment is also an area where technology is likely to see increasing use. At present, end of course written examinations tend to use the traditional method of pen and paper. For essay-based subjects, this approach can be completely at odds with the skills the student has developed in computer-based writing and may arguably prevent the student from showing their true mastery of the subject. This has been recognised by a number of universities who are experimenting with

computer-based final exams. While in this case the technological solution is not straightforward, neither is the development of a workable academic policy.

If we are to achieve our vision, we must recognise the pressures technological change will place on our policy framework and, where appropriate, proactively develop the framework to address these pressures.

1.3.3 Evidence-Based Progress

The monitoring and evaluation of progress via evidence is an essential part of this strategy. The University has benefitted greatly from the biennial survey of the attitudes and behaviours of first year students in relation to the use of technology. We have also, through monitoring of Moodle usage, been able to satisfy demand for VLE use and understand the training needs of staff. We know also, that patterns of IT usage in the early months of a degree programme can provide early warning of a student at risk of dropping out.

In going forward, we must refine our evidence-based approach to understand not only the uptake of new approaches and technologies but also the effectiveness of these in enhancing the learning experience. By consideration of the need for evidence-based development at the design stage, we can use feedback systems as an integral part of the course or programme to both gauge the effectiveness of the pedagogy and inform future development. In doing so, we will develop expertise in the use of learning analytics that will allow us to develop systems that adapt to and support different student learning styles.

1.3.4 IT Infrastructure

The forward planning of our IT infrastructure must be aligned to our strategic vision to ensure that we can achieve our ambitions. The vision outlined in this document is of a very different teaching infrastructure to the one we have at present. Pervasive, high-bandwidth connectivity must be factored in to future expansion of the campus network and server and network capacity should be sufficient to support significantly increased use of multi-media content within the VLE. This should be true in and between all locations on which the University of Glasgow has a presence. Operability must also be high so that educational innovation is not stifled by unreliable technology.

The use of personal devices for a wider range of academic activity will become more pervasive on campus and this will have implications for the configuration of fixed computing installations. Interactive engagement with large student groups in a flexible classroom environment via personal devices will also feature in the future teaching environment. A key consideration will be the use of technology in assessment. In the short term, this may require enhancement of IT within physical spaces to accommodate e-assessment in fixed locations with fixed IT installations and, in the longer term, the introduction of technologies to support assessment in any wifi enabled space. In planning for the future, account must also be taken of

emerging factors such as 4G and cloud computing that have the potential to impact on our IT infrastructure.

1.4 Other Factors

1.4.1 Physical Infrastructure

The importance of our physical infrastructure to this strategy has already been highlighted in our vision. It is essential that the physical spaces in which we teach and in which our students study evolve as our teaching and content delivery methods change. In reality, we have already been anticipating change by progressively developing more flexible teaching spaces and we will continue to do this. The integration of technology within these spaces is, however, a key factor that will have increased prominence at the design stage in the future.

1.4.2 Generic Capability

There are always new technology-supported approaches to teaching emerging in higher education. For example, the use of gaming techniques for learning is currently attracting considerable interest in the broader community. If we deliver against our priorities we will, by default, have the capacity to seamlessly evaluate, test and implement new technology-supported pedagogic approaches where they have real potential to impact positively on our learning environment. This is why, although the strategy recognises some of the emergent trends in technology-supported pedagogy it deliberately avoids identifying specific approaches in the vision or in the setting of strategic priorities.

1.4.3 Collaboration

In recent years there has been significant growth in student-student, student group, staff-student or staff-staff collaboration through both formal and social-media channels both in individuals' personal lives and in support of teaching and learning.

As collaboration tools and environments evolve in the coming years and students increase their use of external content it is logical to assume that students will increasingly seek to collaborate with fellow students, alumni and subject matter experts from outside of the University. The University is already encouraging students to widen their horizons and take advantage of these new opportunities to enhance the learning experience that they have at Glasgow. This strategy will further enable progress in this area.

1.4.4 The Personalised Learning Experience

Throughout this strategy, reference is made to personalising the student learning experience. E-Learning offers significant potential to enhance the way in which the University supports the learning experience of each individual student. Examples of this include the potential to offer

- improved generic and individual feedback through a range of media

- individual formative exercises based on performance
- additional support for students with disabilities
- improved progress monitoring and early intervention
- support for flexible study patterns
- collaboration tools for students working in groups including across time zones

This list is not intended to be exhaustive but rather merely highlights the potential in this area.

APPENDIX 1

There are many different definitions of E-Learning that vary in the extent of their coverage. One of the most straightforward definitions has been provided by JISC, i.e.

"*Learning facilitated and supported through the use of information and communications technology*"

Through this definition, E-Learning is seen to encompass a wide range of possibilities from technological interventions in the classroom to the provision of an educational experience via distance learning. It is this range of activity that is covered by this document.

1.0 STRATEGIC CONTEXT

In making our commitment to Visionary Course Development, Delivery and Review in our Strategic Plan, Glasgow 2020 – a Global Vision, we have recognised the need to *monitor and enhance our teaching and assessment methods continuously and keep up with the latest technologies*. Consistent with this, the Strategic Plan also recognises the importance of the Virtual Learning Environment (VLE) in continuing to deliver an excellent student experience.

Our Learning and Teaching Strategy expands on these commitments further by stating "*the learning experience will be enhanced by physical and virtual infrastructure of the highest quality and excellent learning resources that are targeted to address our diverse learning community's needs and to provide them with flexibility in what, how, when and where they learn*". This is translated into one of the core commitments of the strategy, "*to continually improve our physical and virtual learning space to be a robust, accessible, and sustainable platform for innovation in our provision and the enhancement of student learning*".

It is against the backdrop of these institutional commitments that this E-Learning strategy has been developed.

1.1 Internal Context

1.1.1 The Virtual Learning Environment

For several years now we have invested in ensuring that our physical learning environment is of the highest quality. Since 2006 we have invested more than £7.5M in enhancing our formal teaching spaces together with additional investment in social learning spaces. We have an ongoing commitment within the Capital Plan to continue with this investment, targeted towards new build and teaching laboratory refurbishment. The effect of this rolling programme of investment has

been to place the physical teaching environment at Glasgow amongst the best in the UK.

At the same time, we have maintained a robust VLE based on Moodle that has seen increased uptake from both staff and students. For example, in the 2006/07 academic year, Moodle was accessed 8.4 million times. By 2011/12, this figure had grown to approximately 32.7 million. Much of this growth has been driven by student demand for consistency of delivery of courses.

In the coming year, staff across the University will transition their courses onto Moodle 2 which has improved functionality and usability. It is likely that both the scale and range of VLE usage will continue to grow in the years ahead. The Moodle usage data show that staff are now using much more of the inherent functionality of Moodle to deliver their courses but, for many, the VLE is still merely a document repository. In some cases this is by choice but, in others, lack of support, the time involved and the complexity of fully embracing the functionality of Moodle has been prohibitive. The way in which we support staff in the future in understanding and engaging with innovations in pedagogy supported by technology will be central to enhancing our global reputation for delivering a world-leading student learning experience.

The VLE has also been enhanced by the provision of a number of additional "virtual" tools. At present, there is extensive use of Turnitin for plagiarism detection and some use of the related GradeMark software for assessment. We are also using Aropa and Peerwise software for peer assessment and student creation of multiple choice questions. Big Blue Button and Adobe Connect have been trialed as virtual classroom solutions and the former is available within the Moodle. We have also provided Camtasia licences across campus for the development of online user guides and other video demonstrations. Across the University, we use a range of subject-specific software solutions to deliver specialist courses and, in some cases, have devised local software solutions to meet specific student learning needs. In moving forward, we must continue to build an environment in which innovation of this kind is encouraged and supported.

1.1.2 Technology in the Classroom

The deployment of technology in the classroom has changed considerably in recent years. Some of this is invisible to the user, such as remote equipment conditioning monitoring which anticipates equipment failure in advance and increases the operational availability of equipment in core teaching spaces. Other changes are, however more visible, such as the implementation of a standard AV "set" in all of the main teaching rooms to simplify the user experience for staff and provide a consistent technology platform for in-class teaching.

One notable in-class technological intervention has been the use of Electronic Voting Systems (EVS). This type of system allows a lecturer to ask students multiple-choice questions in the classroom to develop a clearer picture of student understanding

during lectures. In some cases, staff have used this capability to replace the conventional lecture with a much more interactive, peer-assisted learning experience in class. Where this has been done, both at Glasgow and in other institutions, it has resulted in increased student attainment. At present, however, the EVS system is not straightforward to use. It has to be booked in advance by staff and they then have to hand out voting pads to students at the beginning of the session and collect them in at the end. If any of the pads are inoperative there is disruption to the session and so on. The complexity of the system limits its use and so EVS usage remains relatively low on campus. This is an example where technological change elsewhere, specifically the growth in student use of mobile devices, may now provide a solution to making in-classroom voting accessible to and practical for all staff.

The most recent evolution to our standard AV set in our major teaching spaces has been the progressive introduction of a lecture recording capability. The School of Medicine piloted the use of lecture recording using the Echo360 system. This work, which was presented at the University Learning and Teaching Conference in 2012, generated significant interest and other areas of the University are now either increasingly using or asking for this capability.

This comes at a time when we have seen a substantial growth in the proportion of students for whom English is a second or third language studying at the University. This has significant implications in the learning environment and the pedagogies deployed there. Comprehension within the classical lecture scenario is more challenging for these students who not only have to cope with the translation of the subtleties of complex ideas but often struggle to understand the accent of the lecturer. It is not surprising that the average level of comprehension for these students is well below that of native English speakers in this type of situation. For this group of students, recording of lectures can have a major impact because it allows them to review the lecture, to go over difficult phrases or concepts several times until they are clear on what is meant by the lecturer.

Much like Moodle, when it was first introduced, the likelihood is that lecture recording and availability through Moodle will become an expectation amongst the student community in the next few years and so student demand will grow. A number of our Russell Group peers already routinely record lectures and provide student access to them through the VLE. The implications of this for our IT infrastructure are significant as it was never built to sustain high-volume multi-media hosting and traffic.

1.1.3 Student Behaviours and Expectations

Another important dimension that impacts on the future shape of our learning environment is the changing behaviours of our students. A significant proportion of our students now have some kind of part time job, are engaged in volunteering or are active in one of the many clubs and societies. These time commitments mean that learning patterns vary considerably and that students are likely to access e-

resources at almost any time of day. This is well illustrated by the patterns of usage in the University Library and the login data that were collected during the MyCampus registration and enrolment phase in the current academic year.

The way in which students access information has also changed substantially in recent years. The first point of call for students is usually information sources on the internet and the way in which we provide information is mirroring this. The University Library, which was conceived as a physical information resource centre, is rapidly transforming into a semi-social study space in which physical resources are increasingly being replaced by virtual resources. As this happens, the physical shelf space in the library is making way for individual or group study spaces and informal learning environments.

Technology is evolving to allow access to virtual resources more easily and we have facilitated this through the provision of pervasive wifi across campus and power points in social and study spaces to allow students to recharge their devices. We also provide a virtual desktop for students to use on their own devices allowing them to access the software they need for specific courses. On the hardware side, mobile computing is now available through a range of platforms that offer different degrees of usability but that are both portable and operationally robust; the software failure is now very much the exception rather than the rule and so mobile devices are seen as flexible, easy to use and reliable. They are also powerful collaborative tools and we have yet to fully realise the potential of this within the learning environment.

Laptop usage amongst students is extensive. In a recent survey of our first year students[1], it was found that almost 95% of students have ready access to a laptop (compared to 72% in 2007) whereas desktop computer ownership is dropping. Smartphone usage is also increasing with around two-thirds of first year students possessing a smartphone compared with only 41% in 2007. In this study, student ownership of computing tablets was not explored but global trends show sharp increases in tablet ownership. In the last quarter of 2012, tablet ownership amongst the entire US population rose by 7% to 38% and 30% of all UK internet connected adults now own a tablet. There has also been a significant shift in the expectations of students in terms of what content the University will provide online. The data show increased expectations in terms of the supply of virtually all forms of learning related content with a rise of around 10% in the expectations around accessing recoded audio/video content as part of their course.

Possibly the most significant shift, however, is in the attitudes of the students in relation to the role of technologies in their studies. In 2007, students thought that the number one benefit of technology in their studies would be improve their long-term career and employment prospects closely followed by helping them to improve

[1] "*First Year Student Use of Technology and their Expectations of Technology Use in their Courses*", Gardner and Honeychurch, Learning and Teaching Centre, 2012

their IT/information management skills. The implication of this was that the students did not see technology as an integral part of the learning experience but rather as something which could benefit them in the longer term in their career beyond University. In 2011 both of these are now ranked at the bottom of the list and have been replaced at the top by "technology makes it more convenient to complete work in my subjects" and "technology will help me get better results in my subjects". This represents a complete reversal of the 2007 rank order and clearly illustrates the role that students believe technology should play in supporting learning. In part, this reflects changes in the use of technology at primary and secondary school level but is also indicative of the general shift in society towards accessing content from the internet.

The increased emphasis students place on technology-supported learning can have the effect of reducing the relevance to them of the traditional lecture if the lecture is not an engaging, interactive experience. Increasingly, and this pattern is being replicated around the world, attendance at lecture classes is sharply deteriorating after the start of the course as more and more learning resources are made available through the VLE. There are potentially significant implications here for the future of the campus-based university experience that have yet to be fully understood. It is clear, however, that careful course design that considers the appropriate use of technology at an early stage has the potential to deliver an engaging on-campus experience that adds significant value above and beyond content delivery through the VLE. Increasingly world-class, campus-based institutions are evolving their provision in recognition of this.

1.1.4 An International University

As the University develops its global presence, the number of our students studying outside of the UK will increase. The University already has a presence in Singapore and it is likely that, in the years ahead, we will establish activity in other countries such as China. Even with an in-country presence, supporting students at distance is not straightforward. Technology has a key role to play that may extend well beyond access to the VLE. For example, sustaining activity at scale in another country is potentially easier if some of the courses or sections of courses can be delivered at distance online. To do this, however, the University must have a strong capability in the delivery of online courses.

Another feature that is increasingly characterising the "global university" is its ability to reach out to provide a personalised educational experience to individual learners in a range of countries through online provision. In the case of a research-intensive university like Glasgow, we have the added ability to offer high-level, specialised masters level programmes, for example in Medical Sciences or the Arts, that other universities cannot offer. Unfortunately, the potential international student base for these programmes can be severely limited if they appeal to high-level professionals who cannot take a career break to study here full-time or if the range of countries from which applicants are likely to be drawn has a low income base. Both of these issues can be overcome if the programmes are offered online.

The current capability and expertise in online course delivery at Glasgow is severely limited. Despite this, there is strong interest in the University in establishing either courses or full Masters programmes online. If, as we state in our Strategic Plan, we are to continue to increase our global reach and reputation, we must develop a capability in distance delivery that is both robust and progressive. In doing so, we should not exclude the possibility of collaboration with an external partner who has expertise in this space to accelerate the growth in our own core capability.

1.1.5 Supporting our Staff

The support provided for staff in terms of engaging with technology in teaching has been delivered through a variety of routes including local technical support, peer support, seminar and training sessions in the Learning and Teaching Centre and direct support via the Learning Technology Unit and IT Services. The demands on academic staff time are such that, to be effective and to encourage proper engagement, support has to be targeted and efficient in terms of time. At present, our support mechanisms are not sufficiently structured to scaffold engagement with innovative technology-based teaching methods and this must be addressed as we move forward.

1.2 External Context

1.2.1 Online Learning

The recent emergence of Massively Open Online Courses (MOOCs) has focused public interest on online learning. The reality is, however, that online learning has been growing steadily now for a number of years and MOOCs are merely an artifact of that growth. These courses provide universities with an opportunity to connect with a much broader student base that would otherwise be possible and, in marketing terms, this has the potential to significantly impact on the external profile of an institution. It remains to be seen if a sustainable financial MOOC model can be developed and if this will become a disruptor in Higher Education provision.

A survey by Ambient Insight Research[2] has shown that the worldwide market for e-learning products was $32.1 billion (£20.5 billion) in 2010 and predicted that it would rise to $49.9 billion by 2015. Other studies predict a higher growth rate but the basic message that this is a growth market is consistent across all studies. Interestingly, Higher Education currently holds a relatively small share of this market which is dominated by CPD and other vocational training delivered by private providers.

Despite this, most universities offer some distance e-learning provision within their portfolio of degree programmes. In 2010-11 (Appendix 2), the average number of students studying outside of the UK on a distance, flexible or distributed learning

[2] Ambient Insight Research Report for Global Self Paced e-Learning 2010-2015

programme in a Russell Group university was 612 compared with 25 at the University of Glasgow. Since then some universities, such as Edinburgh, have invested substantially (Edinburgh £4.5M over five years) in growing the number of students studying distance learning courses or, in the case of Liverpool, have partnered with a private provider to deliver a suite of online programmes. Other research intensive universities, such as the University of British Columbia, have begun to offer a proportion of their campus-based courses online to provide increased flexibility for their students while providing a knock-on effect in terms of reducing physical estates costs. This type of behavior is reflected in a recent study[3] conducted by the Innosight Institute into the trends in US universities. They noted that "roughly 10 percent of US students in 2003 took at least one online course. That fraction grew to 25 percent in 2008, was nearly 30 percent in the fall of 2009, and is projected to be 50 percent in 2014."

The emergence of MOOCs has generated considerable interest within the media and different reactions from within the Higher Education sector. Some have argued that they represent the end of Higher Education as we know it whereas others believe that MOOCs are merely a passing fad. Either way, the level of investment that world-leading institutions have been prepared to invest in MOOCs is a strong signal of the general belief that online learning will be a major feature of Higher Education in the future. There are currently a number of MOOCs offering courses from a range of universities around the world. At the forefront of these are Coursera and EdX that both include some of the world's leading universities in their lists of partners. Interestingly, there is now some overlap in the lists suggesting that organisations like EdX and Coursera may begin to operate in the same way as mobile phone network operators in the future with university partners being able to operate on more than one network. As yet, the MOOC financial model has not been fully developed and there are still many problems associated with their operation, such as very high drop-out rates (>95%). The pedagogic approaches employed by the MOOCs are also generally relatively basic and this may be a contributing factor to the high drop-out rate. This potentially provides an opportunity for organisations with considerable experience of delivering successful distance learning underpinned by learning diagnostics, such as the Open University in the UK, who has recently entered the market with its own FutureLearn MOOC platform. The success, or otherwise, of this and the other MOOC ventures remains to be seen.

In parallel with the MOOCs there has been a steady growth in course content delivery via multi-media repositories such as iTunes U and YouTube EDU. The University of Glasgow initiated its iTunes U presence in April 2012 and by June 2012 the content had been accessed for downloading or streaming around 112,000 times. Increasingly, academics are building this kind of content into their course materials to augment traditional textbooks etc.

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[3] Disrupting College, How Disruptive Innovation Can Deliver Quality and Affordability to Postsecondary Education, Feb 2011

All of these developments have attracted the interest of private providers. It is likely that the number and range of private providers will grow in the years ahead. It is also likely that they will focus heavily on online learning as their mode of delivery because it frees them of many of the restrictive capital costs that constrain the campus-based public sector.

Finally, it is important to recognise two important points in relation to online learning. The first is related to the fact that in almost all campus based universities, there has been a trend towards increasing class sizes, particularly in the earlier years of a degree programme. This can have the effect of de-personalising the student learning experience in a way that has a negative impact on student success. Online learning, backed up with appropriate learning diagnostics, has the potential to deliver a highly personalised experience for the student even in very large classes.

The second point to note is that online learning can be very powerful when used in combination with traditional teaching methods in a blended learning approach. Many of the courses delivered in the University of Glasgow are already delivered in this way with traditional teaching being augmented with online quizzes etc. on the VLE. Glasgow is not unique in this respect with other comparator universities increasingly using blended learning approaches across their course portfolios.

1.2.2 Disruptive Technologies

There are two current trends which, when taken together, have the potential to make a major impact on the University sector. The first is the trend towards accessing the internet via mobile hand-held devices rather than via laptops and desk-based PCs. The second is the trend toward tablet computing. Taken together, they represent a shift in the kind of content that students can easily access while on the move. Smartphones are limited by screen size and so listening to audio content and viewing video content where detail is not a key consideration is at the limit of what they can do. The larger screens on tablet computers provide the opportunity to read complex documents and to watch video that contains detail almost anywhere, anytime. Through these, the potential now exists to watch a lecture or read a course text while on the bus or the train if the materials can be accessed over the internet. In this respect, their impact on the flexibility of study patterns should not be underestimated. This impact will be further enhanced over the next few years as the UK moves to a 4G network and download times become less of a consideration.

In response to the increasingly pervasive use of mobile technologies and their importance to the student experience, IT Services have developed “Glasgow Mobile”, our future mobile strategy (Appendix 3). It is important that we now progress the implementation of this strategy.

While recognising the importance of mobile and tablet computing it would be dangerous to consider these in isolation from other trends such as social networking, cloud services and the availability of new external content. Our IT

Services strategy recognises this and highlights the opportunities and dangers that the combination of these factors present.

"In isolation, each of these may be easily understood as they are now commonplace in other areas of peoples' lives, but their combination results in a scenario where end users will expect to have more control in constructing their own working models. No longer will students be limited to the Common Student Computing Environment as their only launch pad for work, instead they will utilise a combination of mobile, cloud and social technologies accessing a much wider range of information sources and collaborating in new and different ways with a more diverse range of contacts. This may be viewed as a change from the University pushing information and services out to the end user communities, to a model where end users are pulling selected services and information into environments and collaboration areas of their choice. Those Universities who move with the behavioural changes of students, and how they wish to interact with each other and their academic leaders, will greatly benefit from being correctly positioned as an integrated part of student life, rather than as an outsider looking in."

1.2.3 The Impact of the External Environment on Student Expectations and Staff Opportunities

The experience of students prior to entering Higher Education and in their use of technology in everyday life has a significant impact on their expectations and learning styles. Our own first year survey which tracks student attitudes towards technology shows a significant increase in the weekly use of technology for writing documents and making presentations between 2007 and 2011 whereas other non-educational uses, such as playing games, have either declined or remained static. This is consistent with the earlier observations on the student perceptions with respect to the benefits of technology. In addition, our NSS data show that question 17, which measures student satisfaction with IT resources, is the only question to have seen steadily decreasing scores since 2006. This is despite considerable investment in WiFi across campus and in student computing facilities generally. As students use enabling technology more and more in their daily lives, it is likely that their expectations in terms of its use in the learning environment will continue to grow.

Students are increasingly looking to have greater choice in creating a personalised learning environment rather than being forced to adopt a learning model prescribed by the University. In addition information sources are expanding rapidly, again introducing greater choice for the students. It is important that the teaching community is in a position to understand these changes and tailor content in a manner that enriches the overall student experience. Choice will become an ever increasingly important factor in the learning experience.

Choice is however not just a one way street where students are the sole beneficiaries. As the University's e-Learning strategy evolves it is clear that the

range of tools and techniques available to teachers will increase in number and diversity. Academics therefore will also be faced with choice and be able to select the most appropriate mix which suits the teaching style of the academic, the subject matter involved and the demands of increasingly demanding students. The University must ensure that staff are properly enabled and supported in doing this.

1.2.4 The evolution of the VLE

The pace of change in the student use of virtual resources increasingly mitigates against the single monolithic VLE which, by its nature, is relatively inflexible. Simple replication of a communication strategy or technique that has proved successful outside of the learning environment, within a VLE, is rarely successful. In addition, students are increasingly finding content from additional sources, or generating their own content, to supplement what they are provided with through the VLE. They will access this content on their own devices wherever they may be and whenever it is convenient for them. It is recognised that students will mix and match learning materials, blending together those things that work for them, in their personal learning space.

In this strategy, the use of the term "VLE" relates to the totality of the virtual environment in which our students engage in learning. The future evolution of the VLE we provide for our students will be aimed at creating a flexible environment of loosely coupled elements that can be swapped in or out and that can be increasingly personalised by students to support positive engagement with learning.

APPENDIX 2

HESA data

HE Students studying wholly outside the UK 2010-11 (Current Russell Group)

Sorted in descending order by Total

Institution	Overseas campus of reporting HEI	Overseas partner organisation	Other arrangement incl collaborative provision	Distance, flexible or distributed learning	Other arrangement	2010/11 Total
Liverpool	0	3380	180	5620	0	9180
Nottingham	7795	0	135	600	0	8530
Manchester	0	120	155	3320	0	3595
QMU	0	0	1925	160	0	2085
Oxford	0	0	0	1085	0	1085
Warwick	0	0	0	875	0	875
Birmingham	0	0	580	215	0	795
Southampton	0	0	660	65	0	725
Durham	0	0	0	600	0	600
KCL	0	0	35	425	0	460
Edinburgh	0	0	0	440	0	440
Sheffield	0	0	0	380	0	380
York	0	0	0	340	0	340
Cambridge	0	0	25	250	0	275
Newcastle	0	0	210	35	0	245
QUB	0	60	45	135	0	240
Cardiff	0	0	125	5	0	130
Leeds	0	0	35	85	0	120
Exeter	65	10	0	45	0	120
Imperial College	0	0	15	0	80	95
UCL	70	0	0	0	0	70
Bristol	0	0	55	0	0	55
Glasgow	0	0	0	25	0	25
LSE	0	0	0	0	0	0
Average of Russell Group 2010-11	**330**	**149**	**174**	**612**	**3**	**1269**

APPENDIX 3

Glasgow Mobile - a strategy and scope

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Background

In the UK it is widely predicted that some time in 2015 the majority of web access to content and services will be via mobile devices. Gartner analysts are very blunt about the trend:

> *"The release of the iPhone five years ago marked a shift towards a mobile-dominated future," said David Mitchell Smith, research vice president and Gartner Fellow. "With phones and tablets becoming a platform for the delivery of applications and information, and not simply a communications tool, the era of running applications solely on desktop and notebook PCs is rapidly being superseded by a fast-moving, diverse era of ecosystems that span consumer electronics, business computing, fixed-location clients and mobile clients."*

In higher and further education the access figures are much lower than in other sectors but there has been a dramatic increase in this area in recent years which we can only expect to continue.

The University web team have an on-going project to optimise the technology that delivers the University web pages for mobile delivery. However the real focus of the web is content and it is important to focus on information and services that can be delivered via mobile platforms that are useful and helpful to students at the place and time that they need them. It is clear that mobile 'apps' are a logical way to fill this need.

It is unlikely that the University of Glasgow could (or should) provide the resources required for creating and maintaining multiple native apps, but we do have experienced web designers and developers who already possess the skills required for creating HTML 5/CSS based 'apps' - which have the benefit of being cross platform. It is also relatively easy to change these 'apps' or even the underlying technologies used to deliver them as the 'app' itself resides on the server at a University URL.

There are already several projects using HTML 5/CSS technologies which are reasonably mature, for example JISC funded "Mobile Campus Assistant" from the University of Bristol, the Molly project from University of Oxford and JQUERY mobile - a touch optimized web framework. These and other similar projects are free to use and should be investigated with a view to leveraging experience and techniques already in existence. There are limitations to the HTML 5/CSS approach, largely based on the capability of devices, which should be considered and we should also at least examine other solution which are being provided in this market.

Strategy

The University's strategic plan emphasises core values of: Integrity, Credibility, Openness and Success and indicates that underpinning these values is responsiveness – "*our commitment to responding to the needs of our colleagues, students, research funders, sponsors and visitors in a helpful, timely and sensitive manner*".

What the mobile environment brings to information discovery and collaboration, between individuals or groups, is the possibility of improving responsiveness. Staff, Students and Visitors have devices in their pockets or bags, that can be used whenever or wherever information discovery or interaction is needed. To facilitate this responsiveness, the mechanisms that are used to provide information and services to mobile devices must themselves be responsive. What is required tomorrow will not be the same as what is required today and systems and development based on long lead-times and tied to particular version of devices will rapidly lose their usefulness. This is a lesson that industry analysts have noted as having been learned the hard way by organisations that have been early adopters of mobile technologies over the last two years.

Mobile applications should designed to deliver useful information at the point when it is needed, whether that be access to databases or corporate systems, to library catalogues or course materials, to room locations or cluster PC availability, to email or instant messaging or whatever is required for the task in hand. The strategy must be to get the information or facility to the user in a form that suits the device that they have and their need, at the moment when it is required.

Collaboration

Collaboration, whether it be amongst students, between students and staff, amongst researchers or in relation to administrative processes, is key to effective research, learning and teaching and administration. Whilst there are many channels for this activity, the increasing use of social networking tools and techniques in all areas of life provides opportunities for these to be used in imaginative ways within the University. This is not about forcing people to work in different ways, but making use of ways of interacting that are increasingly becoming a commonplace in daily fife.

Learning and Teaching

Support for and alignment with the University Learning and Teaching Strategy and the developing e-Learning Strategy are key objectives of this Mobile Strategy. Development of student feedback mechanisms and electronic voting can and should make use of the devices that students possess, rather than requiring more costly and time-consuming processes. Students have always engaged with their course materials on the move, though mostly on paper. Facilitating electronic access to written and the audio/video resources for courses via student devices is a key target in the development of learning and teaching.

Research

The research process is about gathering and processing information and collaboration. The fact that most of the people involved in them have mobile devices provides opportunities for new ways to support these activities to facilitate more flexible ways of working.

The Student Experience

Many organisations (including a significant number of universities) have started their mobile offerings by concentrating on information sources that are readily available and in the main these sources have been concerned with opening hours, locations and other useful information about what is happening in and around their buildings and campuses. Availability of information has been the key consideration, rather than asking the question "what would be genuinely useful to students (and others) on the move?". This strategy has at it centre that question and focuses it in different areas of University activity. It does seek to make use of what is easily available in the early stages, but have far greater ambitions in relation to seeking to answer the question, through informed discussion in as many areas of University life as possible.

Delivery

The strategy, and associated project to deliver information and services, will be managed by IT Services and jointly delivered, in collaboration with a range of information and service providers from across University Services and the Colleges. The project is not primarily about IT and will be strongly focussed on the information rather than the technology.

Goals

The delivery of staff, student and visitor services that fit into the context of mobile should be implemented in three stages: short, medium and long-term.

1. Provide information and services that already exist in other forms to in a mobile-friendly form.
2. Concentrate on narrowly focussed information or services which are most usefully delivered 'on-the-go'.
3. To deliver information and services in an agile, lightweight way which seeks to minimise development costs, avoid lock-in or over-reliance on a particular technology (or set of technologies)
4. Establish suitable mechanisms to identify new targets to be included by developing a matrix which would include:
    a. **Availability** – information that can be extracted from existing services and systems (both internal and external), that can be re-presented and/or re-shaped for convenient mobile delivery.
    b. **Suitability -** Not all content is suitable for mobile delivery. Guidelines should be developed which should be adhered to in order to provide the maximum benefit to staff, students and visitors whilst protecting the reputation and consistency of the University's mobile offering.
    c. **Benefit over cost** - Some services we might wish to include may prove too costly in to implement, for the benefit that may realistically be derived and this must be carefully considered in each case.

Services for inclusion

Identifying services for inclusion will be a dynamic activity, and the current position will be captured in a living document. The following starting point is based on current knowledge and capabilities. Further services can be included as we gain experience and begin to gather feedback and requests, taking into account suitability and benefit over cost.

Short Term

(Beta version as soon as practicable)

This can be done using existing content with little development and without any 'back end' i.e. the pages for the app can be created manually.

The following services are immediately possible and should be considered for mobile app delivery:

1. Student print credits – to allow students to pay for printing wherever and whenever they need it.
2. PC availability in the Library, Reading Room and Fraser Building – to allow students to find the free machines in public clusters without wasting time searching each location and to allow the facilities available to be used more efficiently.
3. A variety of Library services – to permit searching for learning materials anywhere even on the move.

If a pilot project goes ahead in the following area this would also be an immediate possibility for mobile app delivery:

1. MBclick (Voting system) – to remove the need for dedicated devices for electronic voting and all the associated organisational and maintenance issues, with students voting via their phones, or other mobile devices instead.

It is also important to include a feedback mechanism and collect stats so that we can add (or remove) services *according to their usefulness to the audience.*

The following services do not yet exist in a mobile friendly form but could be relatively easily adapted and so should be considered for inclusion in short term.

1. Opening hours of key services
2. Mobile accessibility to contacts and critical web forms.
3. Hospitality services menus
4. Possibly student Unions Twitter or RSS feeds.
5. An interactive map of the University so that students, staff and visitors can find teaching rooms and other key locations directly from their mobile devices, wherever they are on Campus.
6. The Moodle mobile interface is scheduled to be available for evaluation by the start of 2013, which will give access to course information, learning resources, formative and summative assessment activities and course evaluation mechanisms in classroom and not just in computer laboratories.

Medium term

(within 1 year)

We will consult widely with all who are interested in delivering mobile based services and develop coordination and integration mechanisms.

For longer term production it will be necessary to consider how this service will be managed, implemented and delivered. This may be done by using some ‘back end platform’. Choice of the platform should be made after investigation of the currently available options. However as the proposed app simple aggregates and integrates from existing services it may be possible to manage delivery via HTML mechanisms only.

In either scenario resources will be required, the nature of which would need to be more clearly defined.

The University project to allow the current website to be viewed via mobile will also allow existing content –where appropriate, to be easily leveraged into apps.

The following services do not, as yet, exist in a form which can be included in an app and so development work, including authentication mechanisms and web services, would be required in order to make them available.

1. Personal course and timetable integration including push alerts.
2. Exam results.
3. Course calendar.
4. Learning & teaching services e.g. Moodle.
5. Location based services e.g. buildings and rooms directions according to your current location.
6. Local travel information.
7. Sport and Recreation online bookings.

The main challenges will be accessing data in digestible forms and the capabilities of the app delivery service. We will need to consider how other services fit into this, for example SharePoint, MyCampus, etc.

Support and on-going development issues will also need to addressed.

Long term

(over the next two years)

Continue to evaluate, develop and enhance the ‘Student services’ apps based on student suggestions and requests, feedback, usage and collaboration with other University Services.

Other possibilities - on the horizon

- A University ‘ecosystem’ for apps which provides both centralised control and developer freedom.
- Augmented Reality. e.g. Point the device at a building and information is provided on services or function.
- Near Field Communications (NFC) services e.g. could replace ID cards for access to buildings and other services.
- Integration with University cloud based storage.

Conclusion

There are many areas of the University's Strategic Plans that provide opportunities for the development of a more comprehensive of approach to provision of information and services via the mobile devices that many staff and students carry around with them every day.

The technical infrastructure for delivery of mobile services is already established in the University via the wireless network and this will continue to develop for a range of purposes. This mobile strategy piggybacks on that to deliver information and services via this additional channel.

There are a number of existing services which can be used to provide content fairly quickly and cheaply using skills and resources already available.

In the medium term a number of issues will need to be addressed, including: ownership, approval, development and support of mobile apps - for which resources will be required and a business case will have to be constructed.

Comprehensive and inclusive guidelines should be created to provide guidance and consistency across the mobile app ecosystem, so as to produce an easy to use and easy to add to environment, whilst also allowing freedom for innovation.

There is a wide range of possibility in relation to producing mobile apps for students and the future directions that this approach to delivery might take. By establishing an initial service with a small number of very useful elements, the University and the student body can together build confidence in the approach and the reliability of mobile delivery as a viable option for service delivery. There are perhaps a range of stakeholders in the University who are not addressed in this initial strategy and an on-going task will be to identify both them and the range of further possibility for useful delivery of service via a mobile apps.