

Barriers to Access for Technology Enhanced Learning



Developing people
for health and
healthcare

www.hee.nhs.uk

Lead author:

Natalie Lafferty, University of Dundee

With support and contributions from:

Malcolm Teague, Jisc

Richard Price, Yorkshire Ambulance Service NHS Trust/Health Education England

Catherine Ebenezer, University of Sheffield

Mark Hellaby, North West Simulation Education Network Manager/Health Education North West

Susan Kennedy, Health Education England

NHS HEE/HEA Technology Enhanced Learning Enablers Group

Foreword

Health Education England (HEE) is the national body formed in 2012 to undertake leadership and co-ordination of education and training within both the health and public health workforce. This includes workforce development, planning and evolution in line with key changes, including the impact of technological advances. We are responsible for delivering a better health and social care workforce for England. We are the organisation responsible for the education, training and personal development of every member of staff and for recruiting for values.

Our Technology Enhanced Learning (TEL) Programme was established in 2013 with the vision that healthcare in the UK be underpinned by world-class education and training that is enhanced through innovation and the use of existing and emergent technologies and techniques. The Programme has a wide remit and has a number of ongoing projects, one of which is the Digital Literacy Project.

The Digital Literacy Project concerns itself with the ability of all within healthcare to become, and to remain, digitally literate. This is so that all are able to learn, work and develop effectively in a digital workplace and society. The project aims to promote the adoption of clear education, training and development strategies that will enable this and which will also promote and support the adoption and spread of new technologies and techniques.

This paper was undertaken as part of a separate project considering barriers to accessing technology enhanced learning but has been incorporated into the Digital Literacy Project as part of its scoping and review work of the current landscape, in terms of digital literacy in the UK.

Executive Summary

Introduction to the report

This paper is aimed at those commissioning, developing or delivering technology enhanced learning (TEL) to healthcare learners in the NHS and higher education.

It has been produced by Lead Author Natalie Lafferty, University of Dundee, with contributions from Health Education England (HEE) and Jisc, providers of digital solutions for UK education and research. It is supported by the HEE/HEA (Higher Education Academy) TEL Enablers Group.

Background

This paper has been produced, in part, in response to The Department of Health's 'Digital Strategy'¹, and 'A Framework for Technology Enhanced Learning'² papers, as well as the findings of a recent commission by Health Secretary Jeremy Hunt in which Martha Lane Fox identified ways to ensure there is more digital inclusion across the NHS³. A key finding of her report was that the digital skills of the NHS workforce must be built and cultivated.

This study was initially prepared for the HEE/HEA's TEL Programme during 2014 and early 2015, drawing heavily on the paper 'Web 2.0 and Social Media in Medical Education and Research'⁴, created in May 2013 by Natalie Lafferty. This original work responded to the difficulties encountered in providing e-learning to undergraduate students on NHS clinical placements, and the problems they – and clinical teachers – faced accessing curriculum resources and using social media tools/open resources to support their healthcare education. The early work focused on the technical barriers to providing TEL in the NHS, but it was soon realised that some of the issues related to the technical literacy of the user.

Therefore in addition to technical issues, this paper considers the barriers in terms of ergonomic issues, highlighting those most commonly encountered by NHS learners/staff in relation to the wider adoption of TEL, and the acquisition of appropriate digital capabilities, in both NHS and non-NHS locations. It also underlines the associated benefits and the risks that inform restricted access to a number of technologies that could otherwise greatly benefit education and training, as well as the best ways to address them. It also aims to inform the work of the TEL Programme's Digital Literacy Project.

¹ Department of Health – Digital Strategy - <http://webarchive.nationalarchives.gov.uk/20140522191340/https://www.gov.uk/government/publications/digital-strategy-leading-the-culture-change-in-health-and-care>

² Department of Health – A Framework for Technology Enhanced Learning - <https://www.gov.uk/government/publications/a-framework-for-technology-enhanced-learning>

³ See <https://www.gov.uk/government/news/martha-lane-fox-sets-out-her-digital-proposals-for-the-nhs>

⁴ Available at <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/document/web-20-and-social-media-education-and-research>

Barriers to Access for Technology Enhanced Learning

Drawing on empirical evidence and support for TEL, the report uses case studies to demonstrate how technologies are already benefiting the healthcare profession. It also suggests how, through local, regional and national training, support and mentorship programmes and digital skills cultivation, everyone working in healthcare can make the best use of the technology and data available, resulting in better outcomes for patients.

The appendices at the back of the report provide:

- Appendix 1: An expanded definition of 'digital literacy'
- Appendix 2: A comprehensive overview of Web 2.0 and social media tools that can be used to benefit healthcare and social care training
- Appendix 3: The minimum IT requirements for NHS learning spaces, as developed by Keith Wylde, ACT Officer at The University of Edinburgh School of Medicine.

Key findings

Using case studies and surveys, this report identifies, and elaborates on, barriers in the following areas.

1. Ergonomics/Digital Literacy

- Digital literacy capabilities and willingness to embrace TEL
- Time to undertake TEL
- Acceptability of devices.

2. Technical factors

- A suitable device
- A network of suitable speed to connect the device, whether wired or wireless
- Access to websites providing and supporting TEL
- A suitable browser
- Other software and hardware required by TEL
- Physical spaces for learning.

3. Collaboration and information exchange.

Recommendations

The report outlines the working group's recommendations for each of the above barriers, as follows.

1. Digital literacy capabilities and willingness to embrace TEL

Work towards Martha Lane Fox's recommendations for the NHS and the National Information Board Building a Digital Ready workforce remit including the implementation of the HEE Digital

Barriers to Access for Technology Enhanced Learning

Literacy definition and Capability Framework that can be used to support the development and implementation of digital literacy education and training.

2. Time to undertake TEL

Support organisations to allocate dedicated time for mandatory training/learning in job plans, supported by planned access to computers in a learning space, library or other dedicated room.

3. Acceptability of devices

Support organisations to implement 'Bring Your Own Device' (BYOD) policies, which enable access to systems and websites from outside corporate networks.

4. A suitable device

Where possible, any newly commissioned products should be developed so that they are device independent, i.e. working responsively across multiple devices, platforms and manufacturers.

5. A network of suitable speed to connect the device, whether wired or wireless

Those providing TEL should consider providing a fast Wi-Fi connection to learners in addition to patient Wi-Fi access, recommended by the Martha Lane Fox report.

6. Access to websites providing and supporting TEL

Support organisations to lift restrictions on access to websites that provide education, ranging from social media to video websites.

7. Suitable browser

Support the use of older versions of Internet Explorer to enable access to clinical and other in-house systems and a non-clinical browser to support access to TEL, such as Google Chrome or Firefox.

8. Other software and hardware required by TEL

Support organisations to incorporate software and hardware requirements into service level agreements with NHS IT departments and local IT strategies.

9. Physical spaces for learning

Incorporate into commissioning guidelines for new building projects and the refurbishment of existing learning spaces, the need for services suitable for education and learning, for example, plug outlets, Wi-Fi, heating and lighting.

10. Collaboration and information exchange:

Support organisations to lift restrictions on file sharing websites, such as WeTransfer, to allow sharing of files. Encourage the use of a national Learning Hub for sharing of learning content and materials.

Conclusion

Evaluating the proposed TEL against the likely barriers will help strike the right balance between using the latest technology and the difficulties the learners may encounter. Some barriers could be overcome with co-ordinated stakeholder planning; another approach is to increase accountability for how HEE (and its equivalents in the other home nations) funding is spent and accessibility of resources.

With technology changing so rapidly, it is also essential to keep abreast of developments and build in agile approaches to TEL development through horizon-scanning processes. Finally, sharing good practice and case studies that demonstrate the benefits of supporting video streaming, the accessibility of social media and approaches to supporting Wi-Fi provision, etc., may also help to inform change in areas which have been resistant to addressing the barriers to TEL.

Contents

Executive Summary	4
Introduction to the report	4
Background	4
Key findings.....	5
Recommendations	5
Conclusion.....	7
Contents	8
Introduction	9
1.0 Ergonomics/Digital Literacy	11
1.1 Digital literacy capability and willingness to embrace TEL.....	11
1.2 Time to undertake TEL	13
1.3 Acceptability of devices	13
2.0 Technical factors	14
2.1 A suitable device	14
2.2 A network of suitable speed to connect the device, whether wired or wireless	15
2.3 Access to websites providing and supporting TEL	18
2.4 Software and hardware add-ons to run the TEL effectively	20
2.4.1 Suitable browser	20
2.4.2 Other software and hardware required by TEL	21
2.5 Physical spaces for learning	22
3.0 Collaboration and information exchange	23
4.0 Recommendations	23
5.0 Conclusion	25
Appendix 1 – Digital Literacy Project definition	26
Appendix 2 – Overview of Web 2.0 and social media tools.....	27
Appendix 3 – Minimum IT requirements for NHS learning spaces.....	39

Introduction

The use of technology has become increasingly widespread over the past decade and driven significant change, particularly in relation to information management and in facilitating communication, networking and collaboration. Improvements in communication and the accessibility of information have, in part, been driven by the emergence of Web 2.0 technologies that enable individuals to not only consume content but also to participate in the creation, sharing and remixing of information. Increasing ownership of smartphones and tablets is allowing access to information and knowledge any time, any place, anywhere. The Department of Health's 'Digital Strategy'⁵ acknowledges the growing role of technology and aims to give staff 'the knowledge, skills, permission and confidence to embrace digital opportunities to deliver better health, better care and better value for all'. There is also recognition of the many benefits and opportunities that technology can bring to healthcare professionals' education and training, and to staff involved in the health sector, as evidenced in the Department of Health's 'A Framework for Technology Enhanced Learning'⁶. Further commitment to technology enhanced learning (TEL) is evidenced by NHS Health Education England's TEL programme⁷.

Most recently, in a commission by Health Secretary Jeremy Hunt, Martha Lane Fox was asked to look at ways in which there can be more digital inclusion across the NHS⁸. One of her four main recommendations to the National Information Board (NIB)⁹ is that we must 'build(ing) the basic digital skills of the NHS workforce to ensure that everyone has the digital skills needed to support people's health needs'. Martha Lane Fox suggests that, in order to ensure that everyone working in healthcare makes the best use of technology and data, digital skills are cultivated within the NHS through training, support and mentorship programmes that are rolled out locally, regionally and nationally.

The benefits that technology will have on education, training and NHS TEL strategies/programmes, plus the fact that essential digital training is necessary to ensure safe and effective use of data and technology when providing high quality patient care, is clearly recognised. Despite this recognition there are significant barriers affecting the realisation and implementation of these in and across NHS organisations. NHS staff and healthcare students and teachers in NHS locations may face different barriers depending on where they are based. These may be a result of a combination of many factors including local policy, infrastructure, skills and the pressures of time and delivering healthcare in times of limited resource. This

⁵ Department of Health – Digital Strategy - <http://webarchive.nationalarchives.gov.uk/20140522191340/https://www.gov.uk/government/publications/digital-strategy-leading-the-culture-change-in-health-and-care>

⁶ Department of Health – A Framework for Technology Enhanced Learning - <https://www.gov.uk/government/publications/a-framework-for-technology-enhanced-learning>

⁷ NHS Health Education England – TEL Programme - <http://hee.nhs.uk/work-programmes/tel/>

⁸ See <https://www.gov.uk/government/news/martha-lane-fox-sets-out-her-digital-proposals-for-the-nhs>

⁹ NIB works with the Department of Health and its role is to ensure that data and technology are put safely to work for patients, service users, citizens and the professionals who train and work in healthcare

Barriers to Access for Technology Enhanced Learning

paper highlights some of the barriers most commonly encountered by NHS staff in relation to the wider adoption of TEL and the acquisition of appropriate digital capabilities. It also underlines some of the risks that inform restricted access to a number of technologies that could greatly benefit education and training in NHS locations.

As further investment is made in planning the development and delivery of TEL across the healthcare landscape, it is clear that the likely barriers must be considered if the benefits are to be achieved. This paper is aimed, in particular, at those commissioning, developing or delivering TEL to learners in the NHS and outlines a number of key barriers that need to be addressed to help deliver improved patient outcomes, safety and experience. It also aims to inform the work of the TEL Programme's Digital Literacy Project [Appendix 1].

This paper was initially prepared for the Technology Working Group for the Health Education England/Higher Education Academy's (HEE/HEA) TEL Programme during 2014 and early 2015. However, it draws heavily on the paper 'Web 2.0 and Social Media in Medical Education and Research'¹⁰ that was created in May 2013 by the lead author, Natalie Lafferty. The original work was in response to the difficulties encountered in providing e-learning to undergraduate students on NHS clinical placements and the problems they – and clinical teachers – faced accessing curriculum resources and using social media tools/open resources to support education for healthcare professions. The early work had focused on the technical barriers to providing TEL in the NHS, but it was soon realised in the follow-up and wider consideration of the topic that some of the issues related to the potential user of the TEL. This paper therefore considers the barriers in terms of ergonomic issues in their wider sense, as well as technical issues.

¹⁰ Available at <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/document/web-20-and-social-media-education-and-research>

1.0 Ergonomics/Digital Literacy

Some of the problems concerning the adoption and use of TEL relate to individuals and human factors, which could perhaps be viewed as easier to overcome than some of the technical and policy barriers. The key challenges relate to:

- Digital competency and willingness to embrace TEL
- Time to undertake TEL.

1.1 Digital literacy capability and willingness to embrace TEL

In general, willingness to engage with TEL may be dismissed and no longer viewed as a barrier for many of the targeted learners; there is, though, always a percentage of more reluctant technology users. It may be that specific groups of learners are more prone to this and careful thought should therefore be given to the target group for whom a TEL intervention is being designed. For example, groups of learners from some staff groups may have limited exposure to technology at work because their role does not require it, and therefore their level of use of technology in general will be a matter of personal choice and affordability. Users have variable levels of digital literacy or competence, which need to be assessed and developed as necessary. Digital literacy itself is not straightforward and cannot be simply viewed as a skill to have or not have. Rather, digital literacy can be seen as a range of skills, competencies, attitudes and behaviours that can be acquired, through varying levels, in a range of domains.

The TEL Programme Digital Literacy Project is working on a digital literacy competency framework, in addition to an HEE definition of digital literacy. These will provide guidance on reducing barriers, in the shape of digital literacy/competence and confidence, to the use of technology and data in training, learning and work [Appendix 1].

Where social learning approaches are adopted and supported, digital literacy capabilities take on more importance. These capabilities as outlined in the HEE diagram below are also essential to support personal self-directed learning and the concepts of the personal learning network (PLN) and personal learning environment (PLE). Staff development may be needed to help develop these digital learning skills and ensure that staff can take advantage of digital learning opportunities and participation in online learning networks.

Increasingly, the digital skills needed to support self-directed learning are being acquired outside the formal learning and working context, and there may need to be drives to curricularise, recognise and further develop these self-acquired competencies with a view to blending learning in support of formal training and learning.

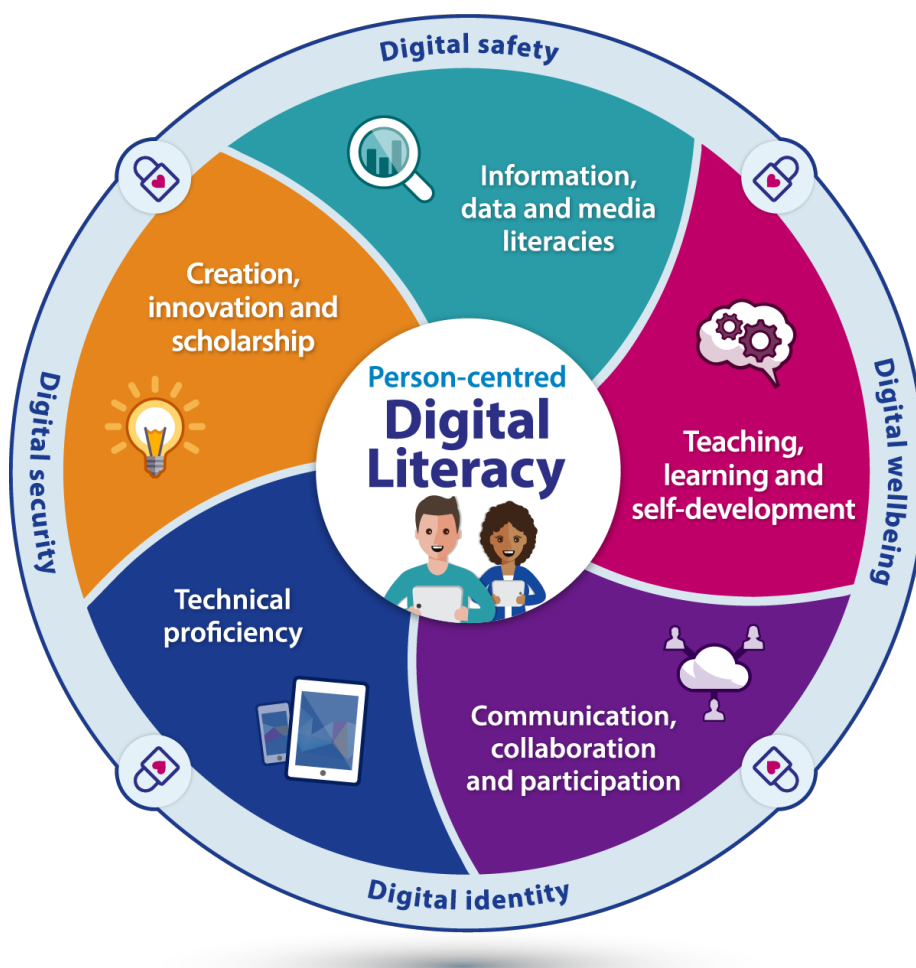


Figure 1. Health Education England's digital capabilities: the six domains

Case study: NHS Electronic Staff Record (ESR)

Trusts implementing ESR e-learning regularly have to overcome challenges associated with enthusing and motivating their staff to give e-learning a go. Sometimes learners are reluctant to admit to a lack of confidence in their IT skills. It is not uncommon to find that the barriers cited, such as lack of time, actually mask a whole layer of more complex issues that need to be identified and addressed.

Some of the measures implemented by Trusts that have successfully rolled out e-learning include:

- A carefully planned pilot with two or three disparate departments, to identify the sort of issues that are likely to arise and resolve them with a small group before rolling out across the organisation
- Facilitated launch sessions where staff can undertake their first one or two courses with learning and development (L&D) staff present to assist in the event of problems. They finish by enrolling on a further course so that, once back in the workplace, they already have an enrolment on their home page to follow
- Departmental champions – those with specific IT expertise or training, who can act as advocates for e-learning and support their colleagues in the workplace
- User guides with screenshots, preferably easily accessible on the Trust intranet
- Entering the names of all those who have successfully completed an e-learning course within the last month into a prize draw to win, for example, a tablet.

1.2 Time to undertake TEL

One of the perceived advantages of TEL is that it can save resource, in terms of travel time to attend training sessions and workshops, and allows staff to complete the training online in their work situation. E-learning resources are increasingly being developed to support these structured learning events and many of these have become mandatory for NHS staff. Where online courses form part of personal development it is generally understood that this will often be completed in the learner's personal time, whilst, where completion is mandatory, it is envisaged that these will be completed as part of the job. Many staff, however, have difficulty in securing time during work to undertake mandatory online learning as their job roles do not allow the time for this to happen within working hours, or requests to block out time to enable completion may not be granted. There may be additional barriers relating to access to a PC or appropriate device to complete the learning, which forces the user to undertake the TEL in their own time.

1.3 Acceptability of devices

Many NHS staff now own smartphones, which support access to the internet and increasing numbers of mobile applications including clinical guidelines, drug formularies and just-in-time learning. Whilst, in some settings, referring to a smartphone to check information or to aid communication with a patient may be acceptable, there is also evidence that some Trusts ban the use of these on information governance grounds or because it may appear unprofessional. Evidence also suggests staff may be unwilling to use personal devices in a professional context. Consistency of approach here would be welcome and has the potential to support improving patient safety where accessing mobile devices supports clinical decision-making. Consideration should also perhaps be given to the role that mobile devices might play in supporting communication with patients and patient education, thereby leading to their greater acceptance in clinical settings.

2.0 Technical factors

Many of the barriers affecting engagement with TEL are technology related. This may be due to the availability of a suitable device on which to view and work through the resources, infrastructure issues in relation to networks and Wi-Fi, the accessibility of websites or software issues which impact on whether the TEL can run.

2.1 A suitable device

Typically, learners will have some kind of access to an NHS device using NHS credentials but will also have their own personal mobile device as well as a home computer. Often it is difficult to update operating systems and browsers on NHS devices due to potential conflicts with clinical applications and this, in turn, leads to problems of access to TEL and online resources that can support on-the-job and just-in-time learning. Additionally, there is often a range of equipment specifications present with differing browsers and (potentially) operating systems. NHS L&D departments and teams are reporting that they are being provided with substandard PCs and equipment, meaning developers have to 'reverse engineer' educational materials to basic specifications, learners are being pushed to use their own devices where possible, or staff resort to working from a non-NHS network or at home. However, many staff working in the NHS do not have access to personal devices or may be unwilling to use them in a professional context.

Many staff and students on NHS attachments are increasingly bringing their own devices into the workplace to improve access to TEL but may encounter further problems accessing prescribed learning resources. Learners may wish to use a personal computer desktop, laptop or notebook, tablet or smartphone to support their learning and these devices can be Apple-, PC- or Linux-based for a desktop or laptop, and Apple-, Android- or Windows-based for tablets and smartphones. It is recognised that NHS staff are likely to have access to a personal Apple device (phone or tablet) and yet the NHS often does not support these devices. Certain products are only available on certain platforms – if this is a Mac-only product, organisational support is often poor and there may be difficulty in networking and updating products, for instance, via the Apple app store, which is often restricted. To be truly accessible, TEL approaches need to be developed to be deliverable and operable across a range of devices and operating systems with a balance sought between the cost of TEL development and the range of devices that will be enabled for its delivery. Given that this will be a trade-off, once this has been chosen there are likely to be some users who experience a barrier to TEL because they do not have easy access to the delivery mechanism selected.

The rapid growth in ownership and adoption of tablets and smartphones must be given important consideration in TEL. A key challenge in accessing TEL on these devices is legacy content including e-learning modules and websites. Historically, many online modules have

Barriers to Access for Technology Enhanced Learning

been delivered in Flash file format and some NHS organisations continue to develop Flash-based content, which is not supported by mobile operating systems. Additionally, the Flash Player frequently needs updating on computers to allow the content to be played and viewed; often this cannot be done at a user level. These resources require updating to HTML5, whilst websites designed for desktop delivery need to be redeveloped along responsive design principles so that they have improved accessibility and usability on mobile devices. Responsive design may also prove a better option to mobile app development for some TEL projects and bring financial efficiencies by reducing the need to develop apps for multiple platforms.

Case study: **Mobile learning for the NHS by South Central** ¹¹

Studies were undertaken in 2010 and 2012 involving 230 NHS staff to seek the potential benefits of mobile learning for the healthcare workforce. This included the pilot use of three apps, as well as desk research, surveys and focus groups. The findings suggest marked enthusiasm for mobile learning amongst this sample of NHS staff. Barriers to further uptake were also identified, and these included lack of connectivity in the workplace, lack of access to suitable devices and lower than expected levels of awareness that the apps were available as learning options. There are 22 recommendations including these, most relevant to this note:

- Consider formulating a 'Bring Your Own Device' (BYOD) policy (1)
- Consider investing in a managed device system (2)
- Ensure learning apps are available across multiple devices/operating systems (3)
- Align mobile learning strategies with strategies for using mobile devices in the workplace (6)
- Include guidance in training strategies about where and how mobile devices should be used (8)
- Consider including Wi-Fi access maps in publicity initiatives (15)
- Design e-learning to output to multiple devices (20).

2.2 A network of suitable speed to connect the device, whether wired or wireless

Most TEL will involve access to the internet and so getting network access with a link out to the internet is therefore critical but is known to be a significant barrier for many learners, especially from mobile devices at NHS sites, and particularly those being visited, for example, on a placement or as a locum.

Some groups of staff, based in a well-defined area in a major NHS site, whose work involves using a dedicated PC or mobile device, are likely to have good network access whilst at work. Issues are much more likely for staff that roam more widely at their own site or even visit other sites, or for staff who work out in the community or at much smaller NHS sites with limited network connectivity.

¹¹ Mobile learning for the NHS - <https://hee.nhs.uk/hee-your-area/wessex/our-work/wes-research-innovation/elearning/mobile-learning-nhs>

Barriers to Access for Technology Enhanced Learning

Whilst there has undoubtedly been an accelerating growth in the availability of wireless networks in the NHS, it still could be described as 'patchy'. Healthcare IT Adviser and General Hacktitioner, Marcus Baw, undertook a Wi-Fi survey in 2014 supported by Digital Health Intelligence¹² and the results showed that only 53% of those NHS staff responding could access Wi-Fi in their NHS place of work. This was, however, a significant improvement from the 28% recorded in the first survey only one year earlier. Of those who could connect, 60% could do so with their own device, demonstrating the growth of BYOD policies, and 54% with a work-provided device. Showing that Wi-Fi access is not always straightforward even for those with the facility, the Wi-Fi was free for only 77%, 42% reported that the Wi-Fi requires a log in on a web page after the device connects to the Wi-Fi network, and only 52% could say that the Wi-Fi access works in most areas of their workplace where they need it to. Of the 47% who did not have access to Wi-Fi at their NHS place of work, 28% said this was because there are no Wi-Fi networks at all, whilst 52% said their lack of Wi-Fi access was because access was only for those with a work device and they did not have one provided. Access to a good mobile data signal was also not a good alternative, with only 12% saying there was a good mobile data signal in their place of work, supporting the observation by many that newer NHS buildings, particularly hospitals, act as giant Faraday cages blocking mobile signals.

Given that wireless access from mobile devices to TEL and clinical decision-supporting resources is often a learner's route of choice, the issue of wireless access is a major topic of interest in terms of barriers. Those providing TEL will need to consider Wi-Fi access for those learners being targeted. Unfortunately, there is no standard reference point for Wi-Fi availability at NHS premises. One approach to improve the situation has been to encourage the logging of sites that offer free patient and visitor Wi-Fi, for example, NHS sites' Wi-Fi availability can be added by anyone at aboutMyHospital¹³, although this has not had the uptake and impact hoped for. There have, though, been attempts to list at least the hospital sites with free patient and visitor Wi-Fi using aboutMyHospital as a base and NHS Trust website searches and other means, for example, published freedom of information requests. It is, however, difficult to keep such lists up-to-date but there is, undoubtedly, a move for NHS Trusts to provide this and about 100 hospital sites already provide this facility; see, for instance, a comprehensive list at <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/article/list-uk-hospitals-providing-free-patient-and-visitor-wi-fi/>.

Digital Storyteller, John Popham, has been running a campaign to encourage free patient and visitor Wi-Fi¹⁴, and the draft roadmaps for taking forward 'Personalised Health and Care 2020'¹⁵ in England suggested that this was on the national agenda with the suggestion of 'making the NHS estate a free Wi-Fi zone'. Indeed, with the recent Lane Fox commission recommending that there be free Wi-Fi in every NHS building¹⁶, a recommendation that the Health Secretary,

¹² See <http://www.digitalhealth.net/news/ehi/9743/nhs-wi-fi-access-%27up-but-not-by-enough%27/>

¹³ See <http://ec2-54-237-33-114.compute-1.amazonaws.com:8080/ewd/aboutMyHospital/index.html>

¹⁴ See <https://www.facebook.com/groups/hospitalwifi/> See also <http://www.digitalhealth.net/features/43851/the-holly-and-free-wi-fi>

¹⁵ See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/384650/NIB_Report.pdf

¹⁶ Martha Lane Fox recommendations - <https://www.gov.uk/government/news/martha-lane-fox-sets-out-her-digital-proposals-for-the-nhs>

Barriers to Access for Technology Enhanced Learning

Jeremy Hunt, has said will be implemented¹⁷, there is cause for optimism that this barrier will be considerably eased, if not removed altogether.

For learners who are part of a research and education organisation such as a university, the de facto approach for gaining access to wireless networks is through [eduroam](#), where the site you are visiting is eduroam-enabled. eduroam provides automatic connection to the internet through a federation of trust, with the user's credentials being authenticated at the user's home organisation, for example, the university at which the student is enrolled. There have been many local initiatives to extend eduroam to NHS Trust sites to greatly improve network access for students on clinical placement and joint or visiting academics, see case study below for further details. There have been suggestions that the technology and federated approach could be adopted for healthcare and social care organisations so that roaming is more easily enabled across healthcare and social care sites.

Case study: **eduroam in the NHS**

Most universities in the UK now run eduroam¹⁸ but as it started as a European initiative it is also Europe-wide and increasingly worldwide. It is not a commercial product, but a service provided currently by National Research and Education Networks (NRENs) for their users. Jisc is the UK NREN and so manages the UK eduroam service.

There has been significant interest in extending the eduroam footprint into the NHS to support university students on clinical placement in particular, with over 100 hospital sites providing a visited eduroam service¹⁹. The standard model has been that the universities and NHS Trusts have a direct firewalled network link and then eduroam is advertised on the NHS wireless network. A user connecting to eduroam has both the authentication and internet access provided through the university link.

Not all NHS Trusts, however, are local enough to a university to have an affordable direct network link to enable this. Where an NHS organisation has its own internet connectivity separate from N3 or equivalent, then it can join the eduroam federation (free) in its own right and provide the 'visited' eduroam service to those who are eduroam-enabled from other organisations, such as clinical placement students from universities. A recent project in West Yorkshire has seen nine NHS Trusts provide eduroam as a visited site in this way and with great success.

There is more detail on eduroam in the NHS at <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/article/nhs-and-eduroamshared-use-wirelesspsnroam>

¹⁷ BBC Report, 21 December, 2015 - <http://www.bbc.co.uk/news/uk-35147380>

¹⁸ See <http://www.jisc.ac.uk/eduroam>

¹⁹ See <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/article/list-uk-hospitals-providing-eduroam>

Barriers to Access for Technology Enhanced Learning

Some community-based learners may only have internet access if 3G is available, so knowing the 3G footprint for the area the learners are roaming will be an important consideration. The question is then whether that will provide enough bandwidth to deliver the TEL required even if 3G is available. The availability of 4G is an opportunity for the future although there may be some learners with 4G-enabled devices already. 3G- and 4G-enabled access to TEL can be problematic in hospital sites due to the way in which the buildings are constructed. Staff and students who face difficulty with Wi-Fi access may also have problems accessing a 3G or 4G network signal in some locations, effectively cutting off access to TEL to support just-in-time learning on the job.

The bandwidth requirements of the TEL will need to be factored in. For instance, is streaming video involved and (where allowed, see below) will the network availability be of sufficient bandwidth to support this?

Some TEL may be hosted on the individual NHS Trust's network or within the NHS network N3 (the NHS's national internal private network). Where the TEL is hosted on the Trust's network then all learners will, of course, need a Trust IT account and access to a device whilst at the Trust. If they are to have the option of home or other remote access then they will need to be enrolled in a remote access facility employed by the Trust. Similar considerations apply for TEL hosted on N3 or similar NHS network (for example, SWAN in Scotland, PSBA in Wales) except that access should be possible via any NHS Trust connected to N3 or similar network. However, access will be difficult for any learners from outside an NHS Trust. Of course, hosting the TEL 'on the internet' and outside N3 can generate its own barriers, as described below, for example, potential for blocking at the Trust firewall.

2.3 Access to websites providing and supporting TEL

It is standard practice in the NHS to have a firewall at the edge of the NHS organisation's network, and in addition there may well be a secure web gateway, to enforce corporate and regulatory policy compliance. These will be set up to block particular websites and online facilities considered as a threat of some kind, including potential for malware, inappropriate content and facilities thought as unlikely to be core business. These potential threats could all significantly waste staff time and demand excess bandwidth that may affect other users, for example, with video streaming. The problem is that websites that provide or support TEL can be blocked in this way, by either oversight or design depending on the NHS organisation's information governance policy. Social media tools are a classic example where utility and benefit can be overlooked rather than balanced with the risks that come with these tools. Additionally, certain websites may have metadata tagging which is filtered, for example, some educational resources may be classed as games.

Whilst social media tools were not developed with the intention of supporting learning they have rapidly been adopted by many to support learning activities and are effectively being used to

Barriers to Access for Technology Enhanced Learning

support learning networks. For growing numbers of NHS staff social media tools are an essential element of personal learning environments and facilitate their participation in personal learning networks and online communities of practice. See Appendix 2 for an overview of Web 2.0 and social media tools, including their benefits and risks, as well as recommendations for use and access.

WeCommunities has emerged on Twitter as an umbrella for a variety of regular tweet chats run by healthcare professionals under the Twitter handles, such as @WeNurses, @CYPnurses, @WeCommissioners, @WePharmacists, etc. and using associated hashtags such as #WeNurses, #WePharmacists, #WeParamedics, etc. WeCommunities and other online communities/networks of healthcare professionals actively support learning and sharing of good practice, making use of Twitter, blogs, Pinterest and other social media tools, many of which are frequently blocked by NHS organisations. The NHS Employers organisation has highlighted that 'how the NHS embraces social media for the benefit of staff and patients will be crucial in creating a sustainable NHS'. Many social learning theories can be supported by the application of TEL, and social media in particular can contribute to TEL approaches aiming to support social learning. NHS Education Scotland (NES) has started to promote the use of social media to help evidence start to move into practice. Malcolm Wright, former Chief Executive of NES, stated that, "We know that published evidence does not translate into practice until people start talking about it and sharing practical examples. Social networking tools such as communities of practice, Twitter and Yammer can play a vital role in this socialising process." For these benefits to be realised and have an impact on improving outcomes for patients it is essential that access to these social media websites and tools is not blocked by NHS firewalls.

Another practical suggestion could be to register the website for your TEL with the 'Domains not to be blocked'²⁰ whitelist that was previously maintained by the NHS Library and Knowledge Services Leads for Information Management and Technology group. However, this list does not seem to have had the impact hoped for, and now that this particular group has disbanded, it is not clear whether it will continue to be maintained in the future.

Case study: Unblocking websites at Yorkshire Ambulance Service

The blocking of domains and websites used for educational purposes was a source of frustration for employees of Yorkshire Ambulance Service and one which was largely dictated by the ICT department. Yorkshire Ambulance Service is a large provider of emergency medicine and healthcare services in the United Kingdom, tending to patients at their time of greatest need. To satisfy the organisational requirement to have timely access to educational resources such as YouTube and social media, a decision was made to lift all restrictions (with the exception of sites that posed a virus risk or operational risk). Access is still monitored, but records of activity are only shared when requested by the HR team. Despite initial concerns, few, if any, employees abuse the unrestricted access to the internet and excess bandwidth concerns have been largely unfounded.

²⁰ See <http://www.libraryservices.nhs.uk/forlibrarystaff/information/technology.html>

2.4 Software and hardware add-ons to run the TEL effectively

With TEL so often being web-based, the use of an appropriate browser is a critical issue, and so this is considered below, separately from the barrier sometimes caused by the unavailability of other key software or facilities. Again, it is recommended the report by Natalie Lafferty be referred to in order to look at these issues in more detail²¹.

2.4.1 Suitable browser

A large number of NHS organisations are still using outdated versions of Microsoft Internet Explorer (IE), many of which are incompatible with educational tools, software and applications. This can be partly due to running older personal computers at the Trust but a typical key reason is that clinical applications have often been written on a particular version of the browser that is not possible to update easily. This issue is exacerbated by IE itself being lower in the pecking order for developments than other browsers that have emerged as alternative market leaders, such as Chrome and Firefox.

Issues with web browsers have been highlighted by NICE, which has written to all Trust IT Managers in NHS England requesting that library administrators have their web browsers upgraded to IE9 or that Google Chrome or Firefox be made available. This request was made in response to research undertaken by NICE, which highlighted that browser issues affected 70% of NHS library administrators.

In addressing the accessibility of TEL on mobile devices by developing resources and websites in HTML5, a new barrier emerges with this content not running on older versions of IE. A key consideration is therefore whether the browsers available to the user support HTML5, as this increasingly becomes the standard platform for building TEL.

The usual workarounds to browser issues include:

- Accessing the TEL from a personal device either at work, if allowed, or at home where which browser is used is the learner's choice
- To request use of an alternative up-to-date browser in addition to IE; however, this is often not something necessarily easily granted as it makes the device 'non- standard' for support
- To run portable versions of Firefox or Chrome from 'My Documents' or an encrypted USB drive.

Some of these solutions, though, are beyond basic users' understanding and serve only to confuse when moving from one browser to another. As with other barriers, assessing the level of these problems for those learners being targeted by the TEL will be important.

²¹ See <https://community.jisc.ac.uk/groups/nhs-he-forum-connectivity-project/document/web-20-and-social-media-education-and-research>

2.4.2 Other software and hardware required by TEL

Typical issues include:

- PCs typically need to have both video and audio cards to support viewing and hearing video or have them built-in to the motherboard
- Lack of access to standard media players (Windows Media Player, QuickTime, etc.) so that educational content can be viewed and used in teaching and learning
- Occasional lack of access to Adobe Reader enabling online documents to be read
- Downloading of podcasts being blocked
- In general, learners with at least an NHS device will not have the authority to download software as needed and will need to get the agreement and co-operation of the organisation's IT department to do this. Gaining support for the TEL from the IT department will be important
- USB, external drive and potential local drive restrictions can result in an inability to transfer presentations or larger files.

The approach often taken with these issues is to produce a set of documented minimum requirements to support the TEL, for example, as done by e-Learning for Healthcare and by Keith Wylde in consultation with key educational stakeholders from both the universities and NHS in Scotland [Appendix 3].

Case study: Oracle Learning Management system

The ESR programme has a comprehensive and regularly updated guide to the IT requirements needed for it to run. However, from questions regularly asked, we find that it is not always properly read and followed. Having the correct IT specification is the most basic prerequisite for ESR. The learners could be competent and enthusiastic, the learning content of excellent quality, the organisation wholly supportive, etc., but if the IT does not work, then the e-learning doesn't happen.

We have resolved some of the barriers in the following ways:

- Encouraging Trusts to undertake a carefully planned pilot, with two or three disparate departments, to identify the sort of issues that are likely to arise and resolve them with a small group before rolling out across the Organisation
- Providing further guidance for IT professionals, with diagrams, explaining how the system exchanges information in e-learning, and therefore why certain prerequisites are important
- Providing a summarised IT checklist that L&D departments can use to ask IT to sign off the completion of each individual prerequisite. This avoids the blanket 'we are sure it will be ok' response that usually signals the document has not been properly read and/or no testing has happened
- Surveying IT departments annually to ascertain current and planned software versions (OS, browser, Java, etc.) so that support can be focused on the most commonly used combinations now and in the future
- Collating and publishing a troubleshooting guide that covers the most common problems and how to solve them.

2.5 Physical spaces for learning

We have already considered access to Wi-Fi within learning environments; however, learners are often hampered by the ergonomics of physical spaces for learning. When designing environments for learning, it is important that consideration is given to ensuring there is sufficient and easy access to utilities and that the environment is comfortable and conducive to learning. As much as possible, learning spaces should be flexible and able to accommodate both current and evolving pedagogies and technologies that enhance learning. Increasingly, physical learning environments are designed to be future-proof in that they can be reallocated and reconfigured, depending on evolving needs.

Access to power outlets and sufficient Wi-Fi is essential to support learners with power-hungry smartphones, tablets and other devices. Many facilities do not provide sufficient or accessible power outlets to meet the demands of students and workplace learners. Flexible furniture and fixings support learning and learning styles in the use of technology.

Consideration should also be given to ensure the learning space is comfortable and supports access to learning, for example, through provision of basic amenities such as bathrooms and refreshments. In particular, adequate lighting and heating are essential when considering students undertaking controlled assessments. Consideration needs to be given to 24/7 access to digital resources and technologies. There is increasing recognition of more permissive approaches that recognise and encourage self-regulation so that often under-utilised spaces can be adapted or integrated for fuller use. Increasingly, social, informal and collaborative learning is being recognised and supported. Social areas that encourage learning through dialogue and interaction in conjunction with technology, for example, café areas that have Wi-Fi, power sockets and are suitable for easy laptop and mobile device use, are becoming more common. Such areas mimic real life social areas where learning and working already takes place.

Case study: #WeNurses

A Twitter chat was held in partnership with #WeNurses in October 2015 with the aim of canvassing opinion from nurses about their perceptions of the barriers to accessing learning in healthcare settings. The discussion attracted more than 160 participants, revealing that the nursing community faced similar issues to those experienced by the wider healthcare workforce. Issues raised included: restrictions to accessing websites, negative perceptions to using mobile devices in front of patients, professional use of social media for learning, access to Wi-Fi and access to learning resources at home. The chat attracted a wide variety of nursing staff from different backgrounds and demographics and resonated with all the participants, eliciting comments such as “insightful”, “exciting”, “thought-provoking” and “fab”.

3.0 Collaboration and information exchange

Collaboration across NHS sites and non-NHS sites, i.e. higher education institutions (HEIs) is problematic. Often, project management programs and websites will not function due to the browser version and firewall issues. Cloud-based storage solutions seem to be discouraged, leaving little solution for collaborative work, resource development or file sharing.

File limits on email systems mean that files above a certain limit cannot be shared. Certain file types, such as zipped files, become very difficult to move around the NHS.

4.0 Recommendations

1.0 Digital literacy capabilities and willingness to embrace TEL

Work towards Martha Lane Fox's recommendations for the NHS and the National Information Board Building a Digital Ready workforce remit including the implementation of the HEE Digital Literacy definition and Capability Framework that can be used to support the development and implementation of digital literacy education and training.

2.0 Time to undertake TEL

Support organisations to allocate dedicated time for mandatory training/learning in job plans, supported by planned access to computers in a learning space, library or other dedicated room.

3.0 Acceptability of devices

Support organisations to implement 'Bring Your Own Device' (BYOD) policies, which enable access to systems and websites from outside corporate networks.

4.0 A suitable device

Where possible, any newly commissioned products should be developed so that they are device independent, i.e. working responsively across multiple devices, platforms and manufacturers.

5.0 A network of suitable speed to connect the device, whether wired or wireless

Those providing TEL should consider providing a fast Wi-Fi connection to learners in addition to patient Wi-Fi access, recommended by the Martha Lane Fox report.

6.0 Access to websites providing and supporting TEL

Support organisations to lift restrictions on access to websites that provide education, ranging from social media to video websites.

7.0 Suitable browser

Support the use of older versions of Internet Explorer to enable access to clinical and other in-house systems and a non-clinical browser to support access to TEL, such as Google Chrome or Firefox.

8.0 Other software and hardware required by TEL

Support organisations to incorporate software and hardware requirements into service level agreements with NHS IT departments and local IT strategies.

9.0 Physical spaces for learning

Incorporate into commissioning guidelines for new building projects and the refurbishment of existing learning spaces, the need for services suitable for education and learning, for example, plug outlets, Wi-Fi, heating and lighting.

10.0 Collaboration and information exchange:

Support organisations to lift restrictions on file sharing websites, such as WeTransfer, to allow sharing of files. Encourage the use of a national Learning Hub for sharing of learning content and materials.

5.0 Conclusion

As demonstrated, there is a balance to strike between the technology to be used for the TEL and the likely barriers to be encountered. An evaluation of the proposed TEL against the likely barriers will help get the balance right between using the latest technology and the difficulties the learners may encounter. It may be possible to overcome some of these difficulties with coordinated stakeholder planning. Another approach is to increase accountability for how NHS HEE (and its equivalents in the other home nations) funding is spent and accessibility of resources.

With technology changing so rapidly, it is also essential to keep abreast of developments and build in agile approaches to TEL development. Finally, sharing good practice and case studies which demonstrate the benefits of supporting video streaming, the accessibility of social media and approaches to supporting Wi-Fi provision, etc. may also help to inform change in areas which have been resistant to addressing the barriers to TEL.

Appendix 1 – Digital Literacy Project definition

The following is taken from a paper entitled 'Towards a Digital Literacy Definition', produced by HEE for its TEL Programme.

Digital Literacy definition

The final draft definition was submitted to the TEL Steering Group and was agreed with no amendments.

In finalising the draft, the TEL Programme team has adapted a Joint Information Systems Committee (JISC) diagram in order to help visualise the definition and the domains behind it (see below).

Definition: Digital literacies are the capabilities which fit someone for living, learning and working, participating and thriving in a digital society.

Digital literacy domains: Becoming a digitally literate person involves developing those function skills plus attitudes, values and behaviours that can be categorised under the following elements or domains.

- Digital identity, wellbeing, safety and security
- Communication, collaboration and participation
- Teaching, learning and personal/professional development
- Technical proficiency
- Information, data and media literacies
- Creation, innovation and scholarship.

Being digitally literate across a range of domains to proficient levels helps us more easily acquire other skills and competencies in life.

Appendix 2 – Overview of Web 2.0 and social media tools

1. Social media websites and video sharing websites

Examples include YouTube, YouTubeEDU, Vimeo

Teaching and training resources are increasingly being shared on social media websites as many organisations, institutions and individuals use them to host their video resources. These videos can be viewed directly on these websites but can also be embedded on any web page and are common features on blogs and wikis.

Potential users include:

- Staff involved in teaching
- Students on NHS clinical attachments
- Staff engaged with postgraduate study, CPD and staff development
- Management/admin staff to view recordings of policy seminars, etc.

Benefits	• Free access to growing library of video resources • Channels include NHS, universities, medical charities, health organisations • Content can support: ○ Undergraduate teaching ○ Postgraduate and lifelong learning ○ Staff development, e.g. IT training ○ Patient education and health promotion • Videos can be reused by embedding in other web pages, PowerPoint, etc. • Easy way to share resources with staff and patients.
Risks	• Bandwidth – video sharing websites are typically blocked in NHS locations due to concerns about bandwidth and the effects on delivering clinical services such as PACS • Only one click away from a video of ‘a dog on a skateboard’ • Potential distraction • Staff could upload content which breaches copyright or patient confidentiality • Negative comments could be posted on uploaded videos • If access is available to all staff this could be open to abuse; however, these channels are available and accessible via smartphones.
Recommendations	• Work with L&D staff to identify useful and relevant content. As a default the education stream of YouTube should be accessible • If bandwidth proves to be a problem for the use of any video content, there should be an area where NHS staff can access this material at work, such as a library, teaching room or IT room • Where staff wish to use these channels to share video resources, raise awareness of GMC and JISC guidelines concerning reuse of clinical recordings and copyright legislation • Uploading of content should be allowed when authorised by L&D staff.
Access	Viewing – PARTIAL ACCESS – access should be made available on PCs in named locations, e.g. IT training suites, libraries, teaching rooms and to individuals with teaching roles. Uploading – PARTIAL ACCESS – authorised named individuals.

2. Presentation sharing websites

Examples include SlideShare, Prezi, SlideRocket, Google Drive, Haiku Deck

Increasingly, conferences and meetings post PowerPoint slides on presentation sharing websites such as SlideShare to support sharing with delegates and the wider community. Here, presentations can be viewed and downloaded directly from SlideShare but can also commonly be embedded on other web pages such as blogs. There is also growing interest in other presentation tools such as Prezi, SlideRocket and Haiku Deck, which also support online viewing and mobile accessibility.

Potential users include:

- Staff involved in teaching
- Students on NHS clinical attachments
- Staff engaged with postgraduate study, CPD and staff development
- Staff engaged in research to access conference presentations
- Management/admin staff to access presentations from policy seminars, etc.

Benefits	• Free access to growing library of presentations • Channels include NHS, universities, medical charities, health organisations • Content can support: ○ Undergraduate teaching ○ Postgraduate and lifelong learning ○ Staff development, e.g. IT training ○ Patient education and health promotion ○ Dissemination of research • Presentations can be reused by embedding in other web pages • Easy way to share resources with staff and patients • Increases accessibility of conference presentations relevant to education, research, management and leadership, etc.
Risks	• Staff could upload presentations which breach copyright • Presentations may include patient-identifiable data and breach data protection • Presentations could include commercially sensitive material.
Recommendations	• Uploading of content should be allowed when authorised by L&D staff • Staff development on copyright and IPR (intellectual property rights), reuse of clinical images and sharing data.
Access	Viewing – FULL ACCESS – universal access for all staff to view presentations. Uploading – organisations may wish to consider a policy for uploading content to presentation sharing websites and restrict upload access. It should be noted that Prezi and Haiku Deck presentations can be created on mobile devices.

3. Image sharing websites

Examples include Flickr, Picasa

Photo sharing websites are a rich source of images that can be reused under Creative Commons licences. Images can be downloaded and reused in presentations and publications where appropriate attribution is provided. Some academic and research conferences also share poster presentations on websites such as Flickr to support the wider dissemination of these communications. The British Library and Wellcome Images also share collections via Flickr.

Potential users include:

- Staff involved in teaching and learning
- Students creating presentations on clinical attachments
- Staff who deliver presentations in a variety of different contexts
- Staff engaged in research to access conference posters
- Staff involved in developing publications, handbooks, training resources, etc.

Benefits	• Free access to growing library of images • Creative Commons licences support reuse of images • Images can be used in a variety of presentations and resources that support: ○ Undergraduate education ○ Postgraduate education and lifelong learning ○ Staff development ○ Patient education and health promotion ○ A variety of publications, leaflets, booklets, etc.
Risks	• Staff may download and use images that are copyrighted and not available for reuse or have not been shared by the rights holder • Staff may upload images to which they do not own the right or that may be images with person-identifiable data • Staff wasting time on non-work matters.
Recommendations	• Uploading of images should be allowed when authorised by L&D staff • Staff development on copyright and IPR, reuse of clinical images • Staff development on how to search for reusable images • Restrictions on who is able to upload images.
Access	Viewing – PARTIAL ACCESS – • Staff involved in teaching, training and research should have access to these websites • They should be made accessible from computers in NHS libraries. Uploading – Organisations may wish to consider a policy for uploading content to photo sharing websites and restrict upload access. It should be noted that images can be uploaded and downloaded on mobile devices.

4. Audio and visual materials download websites

Examples include iTunes, iTunes U, iBooks

iTunes is a free application that helps to organise music, podcasts, iBooks and apps from the Apple store. Content can be viewed and listened to on a PC or Mac and on handheld devices, such as iPhones, iPads and iPods. Many universities are now distributing recordings of lectures, podcasts, videos and iBooks to students via iTunes U, as are publishers such as the BMJ. There are also growing numbers of health-related apps that can be downloaded from the iTunes App store, for example, NICE BNF app, SIGN guidelines, local prescribing guides, etc. Key issues include accessing iTunes on NHS desktops and Wi-Fi connectivity supporting updating of apps in the NHS environment.

Many healthcare workers are also capitalising on Apple's free iBook authoring tool and publishing learning resources to iBooks for easy and free publishing and distribution of learning resources.

Potential users include:

- Staff involved in teaching
- Students on NHS clinical attachments
- Staff engaged with postgraduate study, CPD and staff development
- Management training
- Clinical staff, pharmacists
- Patients and wider public.

Benefits	• Access to both free and paid-for content including lectures, podcasts, videos, apps, iBooks • Channels include NHS, universities, medical charities, health organisations • Content can support: ○ Undergraduate teaching ○ Postgraduate and lifelong learning ○ Staff development, e.g. IT training, management ○ Patient education and health promotion • A channel for the NHS to distribute: ○ Information to patients ○ Training to staff ○ Local policies and protocols to staff.
Risks	• Anyone with an Apple ID can upload content to iTunes and individuals could potentially post content which breaches copyright.
Recommendations	• Uploading of content should be allowed when authorised by L&D staff • Access should be made available on PCs in named locations, e.g. IT training suites, libraries, teaching rooms.
Access	Viewing – PARTIAL ACCESS – • Staff involved in teaching, training and research could benefit from access to iTunes, as videos could be used to support teaching activities and also incorporated into local teaching resources • Accessible from computers in NHS libraries and teaching rooms • Wi-Fi access to support downloading and updating of medical apps. Uploading – Restricted to L&D teams uploading to official institutional channels.

5. Blogging tools

Examples include WordPress, Blogger, Typepad, Weebly, Tumblr

Blogging tools such as WordPress, Blogger, Typepad, Weebly and Tumblr, etc. offer an easy way to set up a website and have become particularly popular in education. Individuals can subscribe to RSS feeds from these websites to keep up-to-date with new posts and information updates, or subscribe by email. Wiki tools, such as PBworks and WikiSpaces may also serve similar functions as blogging tools and support information sharing around specific subject areas and disciplines.

Potential users include:

- All staff may gain benefits from viewing blog websites relating to their area of work
- Staff involved in teaching and training may wish to use blogging tools to support their teaching
- Students may wish to access blogs to support their learning
- GPs and clinical departments may wish to use blogs to communicate and deliver information to their patients
- Supporting internal communication within different staff groups.

Benefits	• Simple way to set up a website that can be regularly updated with news and topics of interest for specific user communities, e.g. librarians can run a blog that keeps staff updated on new services, tips for searching the literature, new guidelines, etc. • Can be used to support education and training across a whole range of disciplines • Helpful tool to support communication with patients and the public • Video content from YouTube and presentations from SlideShare, etc. can be easily embedded • Useful for short-term projects to communicate details of meetings, outcome of meetings, etc. • Commenting features support community engagement • Ability to embed widgets and bring in RSS feeds from other websites allow websites to become information hubs • Content can be auto-posted to other channels such as Twitter and Facebook • Versatility • Blogs are proving a popular platform to support the delivery of free open access medical education #FOAMed, examples include #gasclass and #teamhaem • Can be used to create learning portfolios.
Risks	• Posting of copyright material • Publishing content which is unprofessional or breaches patient confidentiality • No quality controls on opinions or information posted, reliability may be questionable (however, other online material already accessible may also be questionable).
Recommendations	• Staff development on copyright, IPR and Creative Commons • Local hosting of WordPress and LDAP integration for closed websites • Staff development around issues of digital professionalism and digital identity • Increasing awareness of local NHS social media policies and guidelines from GMC, NMC, etc. • Development of good practice guidelines on the use of blogging platforms and responsible blogging, showcasing good examples.
Access	Viewing – FULL ACCESS Authoring – PARTIAL ACCESS It should be noted that individuals can post to, and comment on, blogs from mobile devices.

6. Social networking tools

Examples include Facebook, Twitter, Google+, LinkedIn

Some universities and NHS organisations are also using Ning and Yammer to create closed and open course groups to support collaboration and discussion amongst course participants.

Potential users include:

- Staff involved in teaching and training
- GPs and clinical departments who may wish to share information with patients
- Staff involved in supporting other staff, for example, librarians
- Staff wishing to professionally connect and communicate with others across other NHS Trusts and Boards and other institutions.

Benefits	• Facebook can play a helpful role in communicating with patients and the public. Many NHS Trusts and Boards have Facebook pages • Twitter can also be used to broadcast announcements to the public. It can also be a useful tool to support professional networking and is increasingly supporting discussions across a range of communities or practice around hashtags such as #WeNurses, #nhssm, #gasclass, #ukmeded • LinkedIn also supports professional networking, with helpful discussion boards and special interest groups • Specialist discussions may contain useful information and ideas and give access to new stakeholders • Trends and innovative practice can be identified early and exploited to bring business improvement • Open access to experts in other locations within the UK and internationally.
Risks	• Staff wasting time on non-work topics • Posting of inappropriate content, e.g. patient-identifiable information • Bullying and harassment.
Recommendations	• Staff development around issues of digital professionalism and digital identity • Increasing awareness of local NHS social media policies and guidelines from professional bodies, e.g. GMC and NMC • Development of good practice guidelines and acceptable use policy • Exploring the use of Yammer to support internal networking • Partial access might be provided in named location where access is freely available, e.g. libraries or IT rooms.
Access	Viewing – FULL ACCESS for work purposes – • Acceptable use policies could be developed and weekly allowances could be put in place • Access for teachers, researchers, librarians and students to support teaching, learning, research activity and collaborative working • Full access to LinkedIn. It should be noted that staff and students can access social networking websites on their smartphones via mobile networks, whether or not blocked on NHS networks.

7. Social bookmarking tools

Examples include Delicious, Diigo, Pinterest

Social bookmarking tools, such as Delicious, Diigo and Pinterest, allow individuals to save and access bookmarks via any web browser. These can be shared with colleagues and others via email and RSS feed subscriptions.

Potential users include:

- Staff involved in teaching and training
- Students to support information management
- GPs and clinical departments may wish to use social bookmarking to share useful websites with patients
- Any staff member may wish to use this to help manage their bookmarks.

Benefits	• Ability to build up shareable and searchable collections of online content • Could be used across many disciplines – clinical, management, policy, IT, etc. • Subscribe by email or RSS to new links added by users • Network with other professionals and subscribe to their bookmarks • Build collections of hyperlinks which can support patients, students or colleagues.
Risks	• Staff wasting time on non-work topics.
Recommendations	• Staff development on using social bookmarking.
Access	Viewing – FULL ACCESS

8. Rapid learning asset development tools

Examples include Audioboom, Screencast-O-Matic

Screencasts and podcasts can be helpful tools to support staff development. Audioboom is a free web-based tool, which can support the rapid development and sharing of these resources. Screencast-O-Matic is proving popular as a screen-recording tool and has free and paid-for versions.

Potential users include:

- Staff involved in teaching and training
- GPs and clinical departments who may wish to share information with patients
- Staff involved in supporting other staff, for example, librarians, training teams.

Benefits	• Support the development of just-in-time resources which can support: ○ Teaching ○ Training ○ Staff development ○ Patient education.
Risks	• Posting of inappropriate content, which may breach copyright or patient confidentiality.
Recommendations	• Staff development on learning resource development • Staff development around issues of digital professionalism and reuse of clinical recordings • Increasing awareness of local NHS social media policies • Development of good practice guidelines on content development • Make available on PCs in named locations, e.g. libraries, teaching rooms.
Access	Authoring/creating and uploading – PARTIAL ACCESS – • Staff involved in teaching and training to support learning resource development • Librarians. It should also be noted that mobile devices increasingly support the creation of learning resources with growing numbers of apps for screencasting, video, presentations, etc.

9. Collaborative working

Examples include Box, Dropbox, SugarSync

Tools that support collaborative working include Google Drive, Microsoft 365 and wikis. File storage websites, such as Box, Dropbox and SugarSync, also support file sharing, while apps such as Trello and Slack are being increasingly adopted to support project management.

With growing numbers of universities moving their email services to the cloud and subscribing to Microsoft 365, Google Mail and Google apps, access to these services for students and staff involved in teaching across the healthcare professions will become a growing issue. Many students on placements in NHS locations are unable to access university email whilst in the NHS, which makes it difficult for them to keep in touch with their host institution.

Potential users include:

- Staff involved in collaborative working, for example, collaborative research projects
- Students to support group working
- Staff involved in collaborative projects with colleagues outside their own institution
- Staff involved in teaching and learning liaising with university colleagues in the development of learning resources.

Benefits	• Tools such as Google Drive facilitate collaborative authoring of documents where authors, contributors and reviewers are distributed across multiple locations and institutions. They may be particularly helpful when developing funding proposals, writing research papers, etc. • Google Hangouts and Skype support virtual meetings and desktop sharing, while Google Drive allows synchronous editing of documents, helping to reduce travel costs and carbon emissions • With limitations on file size of email attachments, file sharing websites such as DropBox and Box support sharing of project documents. This can be particularly helpful to support the development of online learning resources, for example, when video content is being edited and shared back and forth between a university e-learning team and an NHS-based subject expert.
Risks	• Sharing of sensitive and/or inappropriate content and information • Leakage and fragmentation of institutional content and information, which may have implications in relation to data protection and responses to freedom of information requests.
Recommendations	• Access could be provided to staff or departments upon request to ensure good practice and information security issues are understood and followed • NHS organisations should work with HEIs to support secure file sharing and collaborative working. Possible options include paying for a commercial service and the potential for SharePoint hosted on NHS servers to be opened to university staff to support collaboration, and for virtual meetings to be supported by Microsoft Lync. This solution merits further investigation and case studies of successful implementation should be shared • Review and pilot the use of cloud computing to maximise the benefits and minimise potential risks.
Access	Viewing, authoring and uploading – PARTIAL ACCESS – Currently these websites are generally blocked in NHS locations, but websites like Dropbox may be accessible upon request. Staff with mobile and tablet devices will already be using these collaborative working tools and file sharing services.

10. Survey tools

Examples include Polldaddy, SurveyMonkey, Google Forms

With these websites, individuals can create free accounts on which to run surveys; larger scale surveys will require premium accounts.

Potential users include:

- Staff involved in teaching and training
- Staff and students involved in research
- Staff involved in service development, innovation and evaluation.

Benefits	• Support research • Rapid development of surveys and polls • Support rapid evaluation of new innovations.
Risks	• Lack of ethics approval for research • Inappropriate requests for personal data.
Recommendations	• Staff development on using survey tools • Clear policy on use of tools with checks on appropriate use to ensure individuals are not trying to obtain personal data.
Access	PARTIAL ACCESS • Authoring access for those running surveys • Viewing access for those completing surveys.

11. Reference tools

Examples include CiteULike, Mendeley, Zotero and Colwiz

Potential users include:

- Staff involved in teaching and training
- Staff involved in research
- Library staff.

Benefits	• Free reference management services could support financial savings • Support collaborative research • Support research networking • Support collaborative research across institutions and international collaboration.
Risks	• None identified.
Recommendations	• Staff development on use of reference tools.
Access	FULL ACCESS

12. Content curation tools and RSS readers

Examples include Netvibes, Scoop.it, Pinterest

Potential users include:

- Staff involved in teaching and training
- Librarians
- Staff involved in research
- Students
- GPs and clinical departments who may wish to share information with patients
- All staff who want to remain up-to-date in their professional area and to curate and share information with colleagues.

Benefits	• Collate and combine information relating to specific subject areas • Support development of online information hubs • Support content curation for teaching • Ways of sharing validated information to patients.
Risks	• Curated video content embedded in these websites could use valuable bandwidth.
Recommendations	• These websites offer considerable benefits to staff and many are being developed by library and information services • Recommend open access • As an absolute minimum, work with local librarians to identify locally developed websites and others of particular professional use.
Access	FULL ACCESS • Access to curate and view content.

With all of these Web 2.0 technologies and social media tools there are concerns about where data may end up, given that many of these websites and services are hosted outside EU territories. This could cause issues if things should go wrong.

The use of all of the tools and technologies detailed above may benefit from being included in NHS local social media policies. NHS organisations should also consider developing acceptable use guidelines for each, rather than simply blocking access, given that staff can use and access these services from personal mobile devices. Local guidelines may also benefit from the inclusion of case studies that can serve as models of good and effective practice.

Appendix 3 – Minimum IT requirements for NHS learning spaces

This set of minimum requirements was developed by Keith Wylde, ACT (Additional Cost of Teaching) Officer at The University of Edinburgh School of Medicine, in consultation with colleagues from the Scottish Deans Medical Education Group IT/e-learning subgroup, members of the Deans Group and colleagues in NHS Education Scotland and General Practice.

The table below represents the recommended national guidelines. Local/regional specifications can be agreed to fit with existing policies and operational arrangements. Please note that most requirements are marked M = Mandatory or D = Desirable for H = Hospital and GP = General Practice teaching locations. If a requirement is just marked M or D this applies to both GP and Hospital locations.

NATIONAL IT INFRASTRUCTURE REVIEW			
Proposed minimum requirements for PCs in learning, teaching and study locations (non-clinical) used by students/trainees on attachment at NHS locations			
	Details of software, tools, access to networks, ratio of PCs to students/trainees and hours of access/IT support available at NHS sites for attachments	Proposed National Hospital and GP minimum agreed requirement (agreed by all ACT regional groups)	M = Mandatory D = Desirable GP = General Practice H = Hospital
1	Ratio of PCs per student/trainee	To be decided on a regional/site basis to take into account the need for flexibility. Provision should be adequate to allow student numbers fair and reasonable access that does not hinder timely completion of learning tasks requiring computer access	N/A
2	'Non-clinical' browser	Current (~12 months old) version of Chrome, Firefox or Internet Explorer	M – H D – GP
3	Adobe Flash Player	Current (~12 months) version to be updated as per manufacturer release schedule	M – H D – GP
4	Audio-out hardware	(Minimum: access to headphone socket)	M
5	Audio-in hardware	(Minimum: enabled onboard microphone)	D
6	Java, JavaScript and cookies to be enabled in non-clinical browser	N/A	M
7	Open or parallel networks (ideally eduroam)	To allow sufficient bandwidth for data transfer without compromising NHS data transfer protocols. There are excellent examples of work between Medical Schools, such as Dundee, and health boards where eduroam or reciprocal Wi-Fi works well in terms of security and cost savings	D
8	Inclusive device access to network – inc. tablets, smartphones	N/A	D

Barriers to Access for Technology Enhanced Learning

9	Full office application suite (e.g. MS Office/OpenOffice)	To include word processing, spreadsheet, presentation, database and publishing functionality	M – H D – GP
10	PDF creation software	N/A	D
11	Access to NHS network for UG students – inc. access to relevant clinical systems, e.g. TRAK	N/A	M – H D – GP
12	USB port (if encrypted then all students require a key, or pre-configured drive)	N/A	M
13	Hours of access	H: 7 am-11 pm and GP: 9 am-5 pm	M
14	Minimum time to be issued with login	Within one working day of a student's arrival on site	D
15	Minimum requirement for hours of IT support	9 am-5 pm	M – H D – GP
16	Firewall ports open		
	80 (HTTP)	N/A	M
	1935 (RTMP)	N/A	M
	443 (HTTPS)	N/A	M
17	Allow streaming video	N/A	M – H D – GP
18	Web-based video conference support (Skype, Adobe Connect, Blackboard Collaborate)	N/A	D
19	Up-to-date and maintained directory of Health Board IT contacts shared on a national basis with all Scottish universities, focusing on those individuals at an appropriate level to offer quick response to HEI IT requests	N/A	M
20	Enable restricted access to popular web-based learning resources that may be blocked in clinical settings (e.g. YouTube)	N/A	D
21	Bookable access to PCs in appropriate locations	To restrict risk of sensitive documents being viewed by other parties	D
22	Internet sites that students/trainees need to access	<i>To be added by schools; could also use the national whitelist that is available:</i> http://www.libraryservices.nhs.uk/forlibrarystaff/information/technology.html	M – H D – GP