An investigation of digital diagnostic tools to introduce NHS staff to digital capabilities

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Executive summary

Key findings and recommendations

During this project we identified and reviewed tools that could act as a light introduction to digital capabilities for NHS staff, with a particular focus on nurses and ward-based staff working in large hospitals. User testing suggested that a lightweight digital diagnostic might be popular, but that it may need to be mandatory in order to be used.

We visited two large hospitals to interview all staff working on a ward and so obtain a holistic ward-level picture of individual opinions regarding the use of digital technologies. We focused in particular on aspects of digital confidence, experience and motivation (digital CEM). We discovered that individuals’ self-reported digital CEM scores differ from one another, and that the average scores differ between job roles.

Our visits revealed the following key issues:

- Whilst our trial of questions relating to confidence and motivation were broadly successful, our questions about experience in terms of the use of generic, widely used devices, software and apps were not a reliable indicator of self-reported ‘digital experience’ in the workplace. For NHS employees the digital hardware and software in use is so very diverse, and the concept of ‘digital technologies’ is so nebulous, that questions about experience and frequency of use needed to have a very local resolution in order to have real meaning
- When it comes to using digital technologies, seniority, job role identity, and cultural expectations influence what people feel they should do
- The cultural and technological environment in which a person works influences their individual confidence, motivation and skills: the opinions and actions of managers and team members have a profound impact, and the quality and reliability of digital infrastructure can drive or block the evolution of individual digital capabilities
- It is important to measure aspects of the environment (digital infrastructure and culture) when considering individual digital capabilities in a job role context
- Change is a constant backdrop to the working environment. Most initiatives involve the use of a new digital technology platform or software. This means that staff often consider the abstract concept of digital capabilities in the context of the latest digital initiative. In addition, healthcare experts sometimes feel that digital initiatives hamper their workflow or might even endanger patient welfare. This can impact negatively on their motivation to use other digital technologies
- Some people are ready to volunteer to be digital champions. When those people are also senior ward-based leaders they have the potential to drive change across teams and cultures

There is the potential to create a lightweight digital diagnostic tool for individuals. If this decision is taken, then we recommend aiming it towards a holistic view of all ward-based staff. We also recommend the inclusion of questions that focus on the environment and culture. We have introduced the possibility of creating a tool that allows individual self-reflection alongside collective data that is fed to e.g. hospital information officers, and which could even allow them to benchmark their hospital data at a national level (so identifying whether key blockers to digital change relate to infrastructure, culture, training etc).

In summary, this research obtained a large volume of high-quality data that has led to important insights into the digital capabilities of ward-based NHS staff. We recommend further discussion with HEE in order to determine the best way to proceed.
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Background

Health Education England (HEE) define digital literacies as ‘the capabilities that fit someone for living, learning, working, participating and thriving in a digital society’. HEE have developed the ‘Health and Care Digital Capabilities Framework’ that identifies six qualitatively different capability domains. Their aim is to use this to support the improvement of the digital capabilities of everyone working in health and care.

The Building a Digital Ready Workforce (BDRW) programme of the National Information Board and Health Education England’s Technology Enhanced Learning programme are working in partnership to improve the digital capabilities of the health and care workforce. Part of this work is to promote the widest use across the health and care landscape of the HEE definition of digital literacy and the digital capabilities that sit within that definition. The need for this important work was also identified as part of HEE’s mandate from the Department of Health.

Following the creation of this framework, shown in Figure 1 below, there is a desire to convert it into some form of interactive, online digital diagnostic tool which allows users to (a) explore the domains, and (b) self-assess their capabilities in some way (e.g. by level).

Figure 1: The Heath and Care Digital capabilities Framework, showing the six domains of digital literacy

The NHS recently launched the Health and Care Digital Capabilities Framework (HCDC Framework) which is intended to meet the needs of all employees within the NHS. The Framework document introduces the concept of digital capability and identifies six domains of digital capability practice relevant to healthcare settings.
Health Education England (HEE) are now keen to use this Framework as the basis for an online self-diagnostic tool.

Research carried out by Timmus Limited in 2018 included secondary analysis of survey data collected by a previous contractor. This identified three possible user personas in relation to their response to questions about digital activities and digital skills. These were named positive, neutral or negative. Persona was independent of the amount of digital technology used and of job role. This suggested that individual attitude and motivation were as important as experience when it came to engaging with digital activities and feeling positive about engaging in professional development in the area of digital skills.

People working in the NHS with a ‘neutral’ or ‘negative’ persona were, it was hypothesised, unlikely to engage with a complex and time-consuming online experience involving self-diagnosis and follow-up with specific development resources. Our experience with similar projects confirms that digital self-assessment tools tend to be taken up voluntarily only by those already engaged and interested in digital opportunities (summarised in Figure 2 below).

![Figure 2: The relationship between digital motivation and digital experience](image)

If the NHS wants to engage the majority of staff with assessing and progressing their digital capabilities (and not just preach to the converted) then we recommended that this should be a two-step process, as follows:

**Step 1: Introducing digital professional development as a positive opportunity and signposting next steps.**

- Via a short, lightweight experience that offers minimal friction of use and is designed to engage as many people as possible with minimal disruption to their other activities (we called this ‘Tool 1’).
- Engaging with this tool should encourage users to:
Recognise that digital skills are required in all healthcare professions
- Recognise themselves as having digital skills and able to acquire new ones
- Feel more positive about acquiring new digital skills (e.g. because it may support their career, professional identity, or ability to support patients and colleagues)
- Feel supported, and able to ask for support, with acquiring digital skills
- Reflect on how, when and where they might find time to engage with digital professional development

Step 2: Engaging with the elements of the digital capabilities framework and assessing their own capabilities in each domain.
This is a more complex technical build and needs more user investment and more log-in stages in order to collect relevant user data (we called this ‘Tool 2’). Because this tool will help users assess their actual digital skills, and because we know these are very dependent on their healthcare role and the specific technologies used in their context of employment, there are challenges around making the content of this tool relevant to all users.

The initial persona analysis cannot, on its own, predict the number or percentage of each persona in the population of healthcare professionals. However, the hypothesis is that the combination of ‘neutral’ and ‘negative’ persona groups is larger than the ‘positive’ group, and therefore that the Tool 1 approach is a vital part of the process of engaging NHS staff with their own digital development, and with the value and relevance of digital skills to the work of healthcare.

Following discussions with HEE, we recommended a second stage of data collection in order to:
- Identify and review other tools that could act as a light introduction to digital capabilities
- Carry out user tests to identify reactions to a Tool 1-style experience as shown by the Tool 1 mock-up, together with two tools identified in step 1 above
- Better investigate digital personas in the workforce, in particular for nurses in hospital settings (using a bespoke survey methodology)
- Better understand how and when a diagnostic tool might be completed within the working day

The outcomes of this research form the basis of this report.
Part 1: Identifying and testing tools that could act as a light introduction to digital capabilities
Section 1: Reviewing tools and resources that could act as a light introduction to digital capabilities

Background

There is an extensive literature on how professionals develop their in-work skills. This can be divided into a number of research areas of potential relevance to the design and dissemination of a digital capabilities tool for healthcare workers, as follows:

Topol Review

The demand for digital skills in healthcare is laid out clearly in the Topol Review (Feb 2019). Over 90% of healthcare roles will require specialist digital skills, and there will be a particular need for upskilling in the areas of genomics, patient data management, AI and robotics. Presently, however, there are significant differences in workforce readiness linked to age and place of work.

Personal motivation

More studies have been undertaken of education than of healthcare professionals. However, the literatures converge in many of their conclusions. Both engagement in and outcomes of professional learning are powerfully determined by:

- Motivation (intrinsic or extrinsic, endogenic or exogenic)
- Beliefs, especially self-efficacy (the belief that investment in learning will lead to positive outcomes) and, in digital settings, digital confidence (the belief that engaging with digital systems will lead to positive outcomes that are under the users’ control)
- Situational support (i.e. the time, space and encouragement to develop – borne out by the place-based differences found in the Topol Review)
- Collaborative opportunities – found in some studies

Indicative references: Salamonson et al. 2009; Stitzmann & Ely 2011; Chiu & Tsai 2014; Milligan & Littlejohn 2016; Durksen et al. 2017; Schneider & Preckel 2017

The literatures also point to substantial difficulties in diagnosing personal motivation and belief. Many widely-used measures are mutually validating but lack external verification (e.g. Self-regulated Learning Scale, Motivated Strategies for Learning Questionnaire, Learning and Study Strategies Inventory, e-Learning Readiness). Many of these scales resolve into factors such as ‘self-direction’, ‘self-regulation’, ‘self-efficacy’ and ‘motivation’ which are poorly distinguished from one another.

**Attitudes to change**

Similar difficulties emerge from the literature on the adoption and diffusion of innovations. A variety of personality traits have been explored for their impacts, but with little agreement. Motivation is (once again) a primary determinant: this can be impacted by a range of factors including:

- the meaning attributed to the innovation
- the level of challenge to current professional practices/identities
- the overall connectedness of a potential adopter (more connected individuals adopt innovations earlier)
- and perceived agency (individuals adopt more readily if they perceive they have a choice)

In highly sociable professions such as education and healthcare, networks of change agents may be more successful than individual incentives to adopt.

**Indicative references:** Rogers 2003; Aitken et al. 2015; Johnson & May 2015

**EAST**

NESTA recently reported on an international study of motivation to develop digital skills, concluding that for interventions to be adopted into practice they must be informed by behavioural insights, particularly insights into motivation. Inclusive adoption requires interventions to be ‘Easy, Attractive, Social and Timely’. In a healthcare context, this might translate into:

- **Easy:** free, with low barriers to access (e.g. no complex sign/log-in process), self-paced, clear and well-structured, with rapid and motivating feedback, and available in safe spaces (ideally where users already have a learning mindset, e.g. libraries, common rooms)
- **Attractive:** gamified, intuitive, playful, aesthetically pleasing
- **Social:** incorporating peer-to-peer spaces or networks to encourage commitment, persistence and collaborative learning; community owned
- **Timely:** identifying career shifts, as well as short-term changes and challenges (new roles, locations, systems etc) that encourage staff to think about acquiring new skills

**Digital CEM (confidence, experience, motivation)**

In an earlier report, we analysed data from the Research Base study ‘Discovery for a self-diagnostic tool for the health and care workforce’. We found through multivariate analysis that three factors we termed ‘confidence, experience and motivation’ existed independently in the data. We further identified three broad categories of survey respondent: the ambivalent (neutral on all measures), the engaged (who are motivated, confident about their digital skills and tend to spend more than 30% of their day working with digital technologies), and the disengaged (low motivation and low skills but higher levels of daily use than the ambivalent respondents). We confirmed that respondents tend to identify themselves as either digitally skilled or digitally less skilled, with little discrimination among different areas of practice. Taken together with the evidence that self-report is an unreliable indicator of skilled practice, we have considered self-assessment reports to be a broad indicator of ‘confidence’ rather than performance.

**Digital CEM and professional development**

We have previously developed self-diagnostic ‘digital capability’ tools for students, academic staff, general professional staff and educational leaders at national and European level. In the course of developing and evaluating these tools we have learned that:

- Professionals strongly prefer to be in control of their own participation
Professionals are reluctant to engage with questions if they suspect that their responses may be used to assess performance.

As a corollary, professionals are reluctant to provide detailed sign-on data that could allow their responses to become part of a professional record.

Professionals generally engage most enthusiastically with material presented as ‘tips and tricks’ for performing digital functions relevant to their role.

Professionals are more willing to engage with digital skills they perceive as relevant to their work role than with digital skills they perceive as generic, personal or social.

**Digital CEM in related NHS projects**


**Conclusions**

- Inclusive adoption requires interventions to be ‘Easy, Attractive, Social and Timely’
- *Ambivalent* and *disengaged* digital users require interventions that excite personal interest and remove anxiety.
- *Engaged* digital users become more engaged when they have opportunities for collaboration and self-directed discovery, and when they feel empowered to choose the direction and speed of change.
- A sensitive and evidenced-based approach to user-centred design may be more successful than attempts to diagnose different attitudinal profiles.
- Most professionals need to be convinced of direct, role-related benefits to enhancing their digital skills: only a minority will be motivated to develop their digital skills *per se*.
- The interface including first user contact and sign-on must be carefully designed to reassure users that they are not being judged and performance data is not being collected.
Review of available tools and resources

Fourteen known tools for diagnosing and/or developing the digital capability of different groups of users were reviewed (see Tables overleaf). Online searches were conducted using search terms drawn from these tools' descriptive materials and any evaluation reports, to discover further tools that were not previously known to the authors. Tools were included for review on the basis that they were:

- Available to UK users at zero or minimal cost
- Aimed at non-expert, non-specialist users
- Concerned with developing digital skills or capabilities
- Robust in use, and available at a stable URL
- Currently updated and maintained
- At least minimally interactive (on-screen interactivity, and/or quizzing)

In addition, searches were carried out to identify self-assessment tools in the areas of motivation, self-efficacy, readiness to learn (online), and openness to innovation. Only one suitable tool was identified for review. Reasons were:

- A very high number of proprietary tools have been developed by individual providers, but these are not publicly available and have not been independently verified;
- A large number of scholarly reviews were found, each claiming to provide definitive measures and scales for assessment of these factors, but none had resulted in a usable, freely available instrument;
- Zimmerman/Bandura’s Generalized Self-efficacy Scale, though narrowly scoped, was the only instrument found to be in widespread use.
- Other psychometric tests were even less relevant to the issues of interest and/or to the user group for this study.

The following pages summarise the reviewed tools and resources.

Recommendations

Further exploration and evaluation is recommended for the following three tools, that each in their own way aim to introduce people to the concept of digital capabilities:

- The JISC Digital Discovery tool, as one of only two examples of a self-assessment tool linked to training resources. Compared with the ETF tool it has had a longer development cycle, and the evidence base is openly available for review. Compared with the EU equivalent it is lightweight and usable.
- Learn my way, as an example of a serious digital literacy development programme with widespread uptake and inclusivity built in: the GTF has an existing partnership with the NHS.
- iDEA, despite its focus on enterprise and making, could also be reviewed for its partnership approach to content development and its highly appealing, gamified design ethos.
### Digital tools and resources to introduce learners to concepts of digital capabilities

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<td>Digital Wings</td>
<td>Barclays Bank</td>
<td><a href="https://digital.wings.uk.barclays/">https://digital.wings.uk.barclays/</a></td>
<td>No direct cost</td>
<td>Yes, after registration</td>
<td>No</td>
<td>Yes</td>
<td>No, but users earn in-system 'points'</td>
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<td>Learn my way</td>
<td>Good Things Foundation</td>
<td><a href="https://www.learnmyway.com/">https://www.learnmyway.com/</a></td>
<td>No cost to end user (organisations work in partnership with GTF)</td>
<td>Yes</td>
<td>No, but low levels of prior engagement can be assumed</td>
<td>Yes</td>
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<td>Addresses the digitally disengaged, so overall the materials are designed to motivate and engage</td>
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<td>Inspiring Digital Enterprise Award (IDEA)</td>
<td>Duke of York</td>
<td><a href="https://idea.org.uk">https://idea.org.uk</a></td>
<td>No cost</td>
<td>Yes, after registration</td>
<td>No, but self-selection</td>
<td>Yes</td>
<td>Digital badges, with a well thought out progression structure</td>
<td>Yes, within each of the four areas</td>
<td>Motivation is addressed in some places as a study skill</td>
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*This is intended for self-selecting, non-specialist but digitally connected users, originally with a focus on online banking and financial management. Currently it offers a rather odd mix of items, almost all non-interactive ‘chapters’ (other than a final quiz to receive a digital badge). The usership is not clear, e.g. the most basic course, ‘a beginners’ guide to the internet’, starts with a history of the internet that is unlikely to be of interest to new users. The 'managing your money' module, which you’d expect to be highly responsible, has more about voucher sites than online banking and nothing about potential pitfalls (though there are separate chapters on security). The course on 'google' is all about the company and not about searching, and quite a few courses are 'in association with' specific corporations, which is presumably the (hidden) business model for providing this content. The content itself does not seem to have been comprehensively user tested or thought through as a developmental programme.*
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<tr>
<td><strong>Brief review</strong></td>
<td>Very usable, high production value, content-and-test materials. Designed for users with more confidence than Learn My Way, and with more emphasis on knowledge and know-how than functional skills. Though working in collaboration with other providers on some materials, there is a pleasing consistency in the look, feel and quality - this is not simply a content platform. Despite the apparent focus on enterprise, content can be accessed in the areas of digital citizen, maker, worker and entrepreneur. There is also a progressive logic to the contents of each area. Worth considering from a UX perspective, but too focused on creating/making and enterprise to translate directly to the needs of nursing staff, and unlikely to appeal to the ambiguous or disaffected.</td>
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<tr>
<td><strong>Range of digital skills videos</strong></td>
<td>Lynda.com</td>
<td>A selection here: <a href="https://www.lynda.com/search?q=digital+literacy">https://www.lynda.com/search?q=digital+literacy</a></td>
<td>Subscription needed (depends on organisation size)</td>
<td>No - requires institutional subscription.</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Brief review</strong></td>
<td>Video-only skills offer, popular in corporate environments and higher education as a self-help option for IT support. Has gone from being a content creator/provider to being a content platform, so many excellent resources are available, but quality and audience are mixed, and the right video can be difficult for users to discover. The videos are often well made and are ideal for just-in-time, how-to learning: they suit already-confident learners with visual skills. Developers have in the past produced playlists mapped to specific curricula or frameworks (e.g. the Jisc framework) and may be interested to do so again.</td>
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<tr>
<td><strong>Learn digital with google</strong></td>
<td>Google</td>
<td><a href="https://learn.digital.withgoogle.com/digitalskills">https://learn.digital.withgoogle.com/digitalskills</a></td>
<td>None to access: certification may cost?</td>
<td>Yes, with sign-up. Assumed user is business manager, but anyone can sign up.</td>
<td>No</td>
<td>Yes</td>
<td>Yes, 'google digital skills certification'</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Brief review</strong></td>
<td>Aimed at business leaders, especially in Africa, these modules offer bite-sized content - typically animations with voice-over - in marketing, advertising and selling. Later modules look at digital business strategy and using data. Each lesson is followed by a test which simplistically revises the content - there is no attempt to embed tasks and concepts into the context of the user. Not relevant enough.</td>
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<tr>
<td><strong>Applied digital skills</strong></td>
<td>Google</td>
<td><a href="https://applieddigitalskills.withgoogle.com/">https://applieddigitalskills.withgoogle.com/</a></td>
<td>Currently free to single users, without accreditation</td>
<td>Yes, though the main approach is to recruit teachers to the program</td>
<td>No</td>
<td>Yes</td>
<td>Designed to build towards G-Suite certification (must be)</td>
<td>Loosely, yes. Completely different curricula for students at</td>
<td>No</td>
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<tr>
<td>Brief review</td>
<td>Mainly video-based but with much longer 'lessons' than other resources, focused on projects that learners complete with the help of google tools. This is well-designed for classroom use - with teacher support - and foregrounds authentic, extensive digital tasks. Though focused on the google suite, this provides a very comprehensive introduction to digital tools in use. Mindset issues such as internet safety, online identity etc are not covered and nor are basic concepts such as computational thinking, other than as they are required to use the G suite. Motivation, safety and anxiety issues not addressed.</td>
<td></td>
<td>No cost</td>
<td>Yes, though the main approach is to recruit teachers to the program</td>
<td>No</td>
<td>Yes</td>
<td>Digital badges</td>
<td>Only in that suggested projects are offered according to age range.</td>
<td>No</td>
</tr>
<tr>
<td>Brief review</td>
<td>Focus on making and coding, with challenges based on commercially available coding languages and kits (micro.bits, lego, Cue, arcade, chibi chip etc) and materials for teachers and parents to support skills development. A number of discrete making challenges with associated badges. Schools focus: unlikely to be of interest to most nursing staff.</td>
<td>Microsoft</td>
<td><a href="https://www.microsoft.com/en-gb/athome/digitalskills/">https://www.microsoft.com/en-gb/athome/digitalskills/</a></td>
<td>No cost</td>
<td>Not really - this is a learning program for teachers</td>
<td>No</td>
<td>Yes</td>
<td>Presumably digital badges are available, but it isn't clear from the web site</td>
<td>Yes, to an extent (beginner and intermediate level)</td>
</tr>
<tr>
<td>Brief review</td>
<td>Challenging projects in a similar vein to MS Discover for school students working a mediator/teacher, many of them in Mozilla's own Thimble environment or using their x-ray goggles. Worth noting that a 2015-16 effort to develop a more extensive range of content for '21st century skills' seems not to have been taken any further (<a href="https://docs.google.com/document/d/114jsCeQUwMFFyELFlCztGQQmL521knZ9VhOMIoZRExg/edit">https://docs.google.com/document/d/114jsCeQUwMFFyELFlCztGQQmL521knZ9VhOMIoZRExg/edit</a>) and this remains largely a coding/making offer.</td>
<td>Mozilla</td>
<td><a href="https://learning.mozilla.org/en-US/activities/web-lit-basics/">https://learning.mozilla.org/en-US/activities/web-lit-basics/</a></td>
<td>No cost</td>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
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<tr>
<td>ICDL</td>
<td>ICDL</td>
<td><a href="http://ecdl.org/workforce">http://ecdl.org/workforce</a></td>
<td>No cost for the outline syllabus but the courses are expensive</td>
<td>No - this is a syllabus</td>
<td>Possibly - unclear from syllabus</td>
<td>Yes</td>
<td>Yes, well recognised qualification</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Brief review</td>
<td>This is in fact a syllabus for delivering the ECDL and ICDL qualification in an 'instructor led classroom environment'. Probably of most value for the work they have done (and public reports written) on the problems of assessing and measuring digital skills. Self-assessment is shown to be deeply problematic in most cases.</td>
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<tr>
<td>Being Digital</td>
<td>Open University</td>
<td><a href="http://www.open.ac.uk/libraryservices/beingdigital/activities">http://www.open.ac.uk/libraryservices/beingdigital/activities</a></td>
<td>No cost</td>
<td>Yes, no log-in required</td>
<td>Yes, four-part self-assessment 'pathway'</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Brief review</td>
<td>The four-part self-assessment tool (<a href="http://www.open.ac.uk/libraryservices/beingdigital/pathways/13/14">http://www.open.ac.uk/libraryservices/beingdigital/pathways/13/14</a>) is extremely basic and unlikely to offer any insights to users. The activities are most text-based instructions though there are some reflective/active elements such as case studies and (described) activities to try.</td>
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<tr>
<td>Enhancing your personal digital skills</td>
<td>ETF</td>
<td><a href="https://www.foundationonline.org.uk/course_files/digital-skills/DSSelfAssessment/home">https://www.foundationonline.org.uk/course_files/digital-skills/DSSelfAssessment/home</a></td>
<td>None for self-assessment</td>
<td>Yes for S/A tool - after registration</td>
<td>Yes</td>
<td>Yes</td>
<td>Digital badges and mapped to professional standards framework</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Brief review</td>
<td>Self-assessment tool covers working with text, data, presentations, communications and the internet. Clear progression logic from need support to can support others (works better for some issues than others, but generally works well). Pop-up window, 30 questions, a few badly worded but much better than first few iterations. Not clear how scoring translates into recommended courses.</td>
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<tr>
<td>Digital discovery tool</td>
<td>Jisc</td>
<td><a href="https://digitalcapability.jisc.ac.uk/our-service/discovery-tool/">https://digitalcapability.jisc.ac.uk/our-service/discovery-tool/</a></td>
<td>Subscription needed (depends on organisation size)</td>
<td>Only via organisation subscription: advice is that access should be mediated</td>
<td>Yes</td>
<td>Yes, via playlist of recommended resources</td>
<td>No</td>
<td>Potentially with repeat iterations</td>
<td>No</td>
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<tr>
<td>Brief review</td>
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<tr>
<td>Digital Skills Accelerator</td>
<td>EU</td>
<td><a href="http://www.digitalskillsaccelerator.eu/learning-resources/">http://www.digitalskillsaccelerator.eu/learning-resources/</a></td>
<td>No cost</td>
<td>Yes</td>
<td>Yes</td>
<td>No - but in development</td>
<td>Yes, notionally</td>
<td>Yes, with levels described in detail</td>
<td>No</td>
</tr>
<tr>
<td>Generalized self-efficacy scale</td>
<td>Openly available</td>
<td><a href="http://userpage.fuberlin.de/%7Ehealth/engscal.htm">http://userpage.fuberlin.de/%7Ehealth/engscal.htm</a></td>
<td>None</td>
<td>No - the scale needs to be implemented in a diagnostic system</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Brief review</td>
<td></td>
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</table>

Brief review

Self-assessment tool mapped to Jisc framework, lightweight and usable (compared with DigComp), leads to a personalised report with resources to follow up. Free online access for individuals, with more resources available via organisational subscription. Closest in conception to the NHS project, and includes some attitudinal questions. Iteratively and carefully evaluated over three years of development, and offers the advantage of full access to the development process and lessons learned, both from individual users and organisations.

Digital Skills Accelerator

EU


No cost

Yes

Yes

No - but in development

Yes, notionally

Yes, with levels described in detail

No

Brief review

Self-assessment tool is very comprehensive, and mapped to the DigComp framework at every level. However, it is very densely worded, and remains challenging for the average user to understand or complete. Clear progression logic. The resources are still in development. Advantage of some access to the development process and emerging evaluations in use.

Generalized self-efficacy scale

Openly available

[http://userpage.fuberlin.de/%7Ehealth/engscal.htm](http://userpage.fuberlin.de/%7Ehealth/engscal.htm)

None

No - the scale needs to be implemented in a diagnostic system

Yes

No

No

No

Yes

Brief review

Originally developed by Bandura and updated by Bandura and Zimmerman, the self-assessment scale covers only self-efficacy and would need considerably more items added (or alternates) to be used to assess the more specific issues of interest with professional healthcare users i.e. motivation, attitudes and self-efficacy in relation to developing digital skills at work. Useful as the only example in regular use.
Section 2: User testing interviews to better understand the response to ‘Tool 1’ style online experiences

We carried out user testing of Tool 1 plus two other ‘digital literacy’ e-learning tools (as identified by the review in Section 1) with six members of NHS staff, based in Bristol and Plymouth. Each session lasted 40-50 minutes and were either carried out face-to-face, or remotely via Skype (using screen sharing).

We interviewed NHS staff with the following job roles:

- Trainee echocardiographer
- Surgical registrar
- Critical care nurse
- Nurse endoscopist
- Enhanced Recovery CNS
- Theatre porter

Test materials

The digital resource we looked at were:

1. The ‘Tool 1’ prototype

https://preview.uxpin.com/5a7ffbf0ac9bbbd7fccc66ec071e42d7a237d4#/pages//simulate/no-panels?mode=i
2. A prototype mockup based on the Jisc Discovery Tool

https://preview.uxpin.com/e964266fdddb83a1cb8fa54b88ba7f3b97e2a8309#/pages/106936339

The Jisc Discovery Tool targets staff and students in HE/FE institutions and is “an empowering first step for staff and students to reflect on their digital capabilities and to identify current strengths and areas for development” (see https://digitalcapability.jisc.ac.uk/our-service/discovery-tool/ for further information)

![Mockup of the Jisc Discovery Tool](https://preview.uxpin.com/e964266fdddb83a1cb8fa54b88ba7f3b97e2a8309#/pages/106936339)

3. Learn My Way

https://www.learnmyway.com/subjects

Learn My Way, from the Good Things Foundation, is a set of free, online resources that support people in developing basic digital and online skills. While Tool 1 and the Jisc Discovery Tool are diagnostic, Learn My Way provides more conventional e-learning materials.

![Learnt My Way screenshot](https://www.learnmyway.com/subjects)
Tool 1 feedback

Participants liked the design and approach of Tool 1

- The simple layout, graphic design approach and scenario-based questions were positively received

  “I like how it looks”

The benefits and use of the tool weren’t all that clear on the opening screen

Participants found it quite hard to conceptualise exactly what they were about to do and how long it might take. It was unclear what ‘Your Digital Self’ was.

We should provide (1) a visual representation of the output, (2) a clearer statement of what the tool does and what the outputs are, and (3) a clear indication that it only takes 2 minutes or so to complete.

Questions needed to be tailored more to job roles

There were several issues relating to the relevance of question text and images to job role.

1. Some participants were looking for the image to provide context (whereas the intention was to make them quite generic to make them applicable to a broad range of scenarios/users).

   “Who are the people in the picture?”

2. Questions resonated most when they were specific to the job role of the person doing them.

   “That’s not really a nurse’s job”

Questions are therefore likely be most effective when tailored to specific job roles, rather than attempting to provide a more generic set of questions.
Question options didn’t always reflect the realities of the job

The options presented on some questions did not always reflect the realities and constraints of real-world scenarios. For example, when asked whether they’d take on a digital role, the motivation for the role was hugely outweighed by the practical consideration that they wouldn’t have the time to take on such a role even if they wanted to.

"I could do it but I’ve got enough on already so I wouldn’t"

As the main goal of the question is to uncover motivation towards supporting digital, the constraint of time needs to be removed from the question “If you were given the time....”

Some terms weren’t understood by participants

Some terms in the questions, such as ‘Slack’ and ‘Infographics’ were not understood by all participants.

Ensure that all options are known to the job roles using the tool.
Questions relating to digital champions or digital professionals made participants wonder what the motive behind the tool was.

Motivation questions could be misinterpreted as recruitment questions.

- “You become a bit nervous – am I volunteering?”
- “Digital professional’ makes it sound like it’s not voluntary

Ensure that the introductory screen of the tool manages expectations surrounding this.

Participants had to work quite hard to understand what the report showed.

Not all participants knew what they were looking at initially. Part of this stemmed from not fully understanding the aim of the tool from the outset.

- “Is it about my digital learning or willingness to teach others?”

As before, setting the context and managing expectation for the tool from the outset is very important.
Once the understand the broad aims of the report, the content was seen as well-presented and useful

- Participants liked the donut charts, and found them quite easy to interpret
- Participants liked the simplicity of the display
  - “Make sense - seems fairly self-explanatory”
  - “The charts look good. Simple and obvious”
- The idea that you use the tool then get guided to relevant materials was seen as very positive.
  - “Could be useful for a lot of people”

Overall perceptions

- Participants generally found that using the tool was quite fast and simple
  - “Quick and easy - that’s great!”
- However, those that felt it could help them also indicated that they probably wouldn’t do it unless it was required of them
  - “I wouldn’t do it unless it was mandatory”
- Those that were more digitally competent (e.g. surgical registrar) tended to see the least benefit in the tool.

Metrics

Participants were asked to rate the overall user-friendliness of the tool. 4/6 participants considered that it was ‘excellent’.
We also created a tag cloud of free-response adjectives used to describe the tool. These were generally very positive (quick, colourful, easy, useful…)

Jisc Discovery Tool Feedback

We showed the Jisc Discovery tool to two of the six participants. However, it quickly became clear that the level of knowledge required and the context of the question text meant that it was too specialised to be relevant to most of the participants in our research. As such, we stopped using it in subsequent sessions.

💬 “Too expert for nurses”
💬 “We won’t be allowed to do many of these things in the NHS”
💬 “There’s a bit of buzzword bingo - I have no idea what my digital identity is”
‘Learn My Way’ Feedback

The design of Learn My Way was really well received!

“Very polished. More polished than your average NHS induction - it feels nicer”

“Feels modern. Bizarrely, feeling more modern makes it feel like less of a chore”

“This format would be great for NHS online systems!”

Participants liked the simplicity of the menu system for accessing learning

Everything was clearly laid out and people could see the progress they had made

“Nice and clearly defined by topics with course titles listed underneath”

“Tracking progress is good too”
The content itself was generally too basic, but people liked the general approach

The approach felt elegant and different from the e-learning that participants were used to.

💬 “This is really good. It assumes nothing”

💬 “Too basic, but I like the question and answer approach”

Overall, Learn My Way was very favourably perceived

While the content may be too simple for most NHS staff, there was still a sense that it could be useful to some staff members who were struggling. The overall approach, though, could serve as an example of how to deliver e-learning content in an engaging, effective way.

💬 “User friendly. Very easy”
💬 “There’s definitely a place for it”
💬 “Not needed for most nurses, but those you don’t want to alienate can have a go”

Metrics

Participants were asked to rate the overall user-friendliness of Learn My Way. 5/6 participants considered that it was ‘excellent’.
Overall summary

Tool 1 and Learn My Way were both well received, but it is clear that effective management of learner expectations is the critical factor for diagnostic tools and e-learning content like this to be a success.

Providing content that resonates because it is tailored to job role is important too; questions can easily feel irrelevant.

Two participants, without prompting, suggested the idea that Tool 1 could be used to suggest relevant content presented in a ‘Learn My Way’ style of presentation. This was reassuring as it captures the underlying philosophy for developing the tool in the first place.

😊 “For nurses on a ward it’s very hard to say one size fits all. You almost need to the first one to triage”
Part 2: Visiting wards, viewing digital in the workplace context
Section 3: Investigating the ‘digital personas’ of hospital ward staff

This section of the report summarises the data collected during three days of afternoon visits to two hospital wards in two large hospitals in Bristol.

We aimed to collect data from a ‘closed population’ so that we avoided a biased sample. Here we defined the closed population as a ward, and we ensured that we obtained responses from over 95% of all employees within (or visiting) that ward during 2pm and 4pm on three weekday afternoons.

The initial aim was to collect data from nursing staff, but ultimately, we succeeded in collecting data from all (nearly) staff on the ward. This allows us to better understand digital confidence, experience and motivation (which we shorten to ‘digital CEM’) opinions between job roles.

We asked everyone to complete a short (15 question), anonymous survey that aimed to collect data relating to four themes:

- Three digital confidence, experience and motivation (CEM) questions that asked people to broadly rate their confidence, motivation and experience with digital devices and software at work (abstract questions, 0 to 10 answer scale)
- A question that asked people whether they felt they were early, average or late adopters of new technology at work (four answer options)

1 A copy of the survey questions is provided in the appendix
Six questions (each relating to an activity from one of the areas of the HEE digital capabilities framework) that asked people to rate the frequency with which they completed each activity (four frequency options).

Nine Digital CEM questions which were created as suggested questions for a ‘Tool 1’ (see previous report for details). These questions attempt to provide a score of digital confidence, motivation and experience. (Three questions that focus on digital confidence, three for digital motivation and three for digital experience. Questions use example scenarios and have either three or four answer options).

In this way we aimed to answer the following questions:

- What are the Digital CEM scores of ward staff, and do they differ within and between job roles?
- What are the proportions of people who consider themselves to be early, in-line and late adopters of technology at work?
- Is there variation in a person’s answers across the six digital capability framework areas (as measured by our six example questions)?
- Do the nine Tool 1 Digital CEM questions reliably measure what they aim to measure? (i.e. do they correlate with the single rating Digital CEM rating scores?)
- Are there any trends in the data that are revealed with multivariate analysis?

The answers to each of these questions are summarised below.
A. What are the Digital CEM scores of ward staff, and do they differ within and between job roles?

The 15-question survey was asked to all staff seen working at Southmead Hospital (ward 9b, complex care) and University Hospital Bristol (UHB, ward 800, GI post-surgery) during our afternoon visits (carried out between 2-4pm). This methodology was chosen in order to survey everyone within a ‘closed population’ and so ensure we attempted to gather all opinions, and not just surveyed those with an interest in issues pertaining to digital.

On both occasions we spoke with the ward sisters to ensure we located all nursing staff, however there was one member of staff at Southmead and another at UHB (both junior nurses) who we were unable to obtain data from. Otherwise, we managed to ask all nursing staff as well as any visiting therapists and doctors who were present during our visits. There were more staff working on Ward 9b in Southmead than on Ward 800 at UHB, and we assume this is due to the nature of the ward patients. In addition, we visited Southmead ward 9b on two consecutive afternoons, hence we managed to gather the opinions of some staff who were not on shift during our first visit.

We classified staff into the following job role categories:

- **Doctors** (in most cases these were student doctors in their first year of training)
- **Senior nursing staff** (staff nurse, senior staff nurse, matron, alcohol specialist ANP, stroke ANP, or ward sister)
- **Junior nursing staff** (healthcare assistants, nursing assistants, trainee nurse associates, or student nurse)
- **Housekeepers**
- **Therapists** (occupational therapist, physiotherapist, or dietitian)
- **Administrative staff** (discharge coordinator, ward receptionist, ward clark)
- **Pharmacist**

To create a ‘Digital CEM’ score everyone was asked three questions (scores ranged 0-10):

How confident are you at using digital devices and software at work?
How motivated are you to learn how to use new digital devices and software at work?
How much experience do you have at using a variety of digital devices and systems at work?

The self-assessed Digital CEM scores for staff on the two wards, as measured by the three rating scale questions, are shown in Figures 3 and 4. The three individual scores were then combined to provide a total Digital CEM score.

It is immediately clear from the individual data (Figures 3 and 4) that Digital CEM scores differ both **within** and **between** job roles. **Confidence** at using digital devices and software at work tends to be quite high across most individuals, with the exception of one or two senior nurses. **Experience** of using work-based digital devices and systems is high other than for one or two nurses, and for admin’ staff.
Figure 3. Digital CEM (confidence, experience and motivation) profiles of individuals on Ward 9b, Southmead Hospital, self-scored on 0-10 scales. Each column represents one person.
Figure 4. Digital CEM (confidence, experience and motivation) profiles of individuals on Ward 800, University Hospital Bristol, self-scored on 0-10 scales. Each column represents one person.
Motivation to want to learn how to use new digital devices and software at work tends to be high across most individuals. This was of interest given that both hospitals are in the process of embedding new systems and processes that involve new digital devices and/or software (notably, the move to paperless systems).

<p>| Ratings for confidence, experience and motivation when using digital devices and software at work (0-10 scale) |</p>
<table>
<thead>
<tr>
<th>Sample size</th>
<th>Average Confidence</th>
<th>Average Experience</th>
<th>Average Motivation</th>
<th>Average CEM total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>7</td>
<td>8.4</td>
<td>7.6</td>
<td>7.7</td>
</tr>
<tr>
<td>Senior nursing staff</td>
<td>19</td>
<td>7.6</td>
<td>7.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Junior nursing staff</td>
<td>13</td>
<td>7.2</td>
<td>7.1</td>
<td>8.2</td>
</tr>
<tr>
<td>Housekeeper</td>
<td>2</td>
<td>8.0</td>
<td>6.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Therapist</td>
<td>12</td>
<td>8.6</td>
<td>7.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>3</td>
<td>4.0</td>
<td>3.0</td>
<td>5.3</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Sample size and mean average confidence, experience and motivation (CEM) scores by job role

The sample size and mean Digital confidence, experience and motivation scores for each job role are shown in Table 1 and Figure 5.

Excluding the pharmacist (sample size of only one), the highest average Digital CEM scores by job role are from Therapists, followed by Doctors and then Senior nurses. These individuals are moving between wards (and sometimes between hospitals) and we hypothesize that this breadth of experience provides them with the awareness of various different systems, and therefore the confidence to report themselves as relatively digitally confident, experienced and motivated.

The lowest Digital CEM scores are from administrative staff, who often spend a significant amount of time using computers to e.g. upload patient notes into various hospital systems. Despite their frequent use of computers and software, it is interesting to see that they still rate their confidence, experience and motivation as low in comparison with those in other job roles. Admin’ staff on both wards we visited were working in the middle of communal areas where they could view others completing their paperwork and job tasks. We suggest that they see many different people using many different systems, whilst their role is specific to one or two systems. Hence this may give them the impression that they are relatively inexperienced. The important message here is that regular use of a digital system does not make someone think that they are digitally capable; the digital environment at work - and issues surrounding personal confidence and motivation – create a far more complex notion of what ‘digitally capable’ is.
Figure 5. The mean average confidence, experience and motivation (CEM) scores by job role.
B: What are the proportions of people who consider themselves to be early, in-line and late adopters of technology at work? Can we use this to make a broader workforce estimate?

One survey question asked people whether they felt they were early, in-line or late adopters of technology at work. They were grouped into two answer categories:

- I am usually among the first to adopt new technologies / I tend to be an early adopter where I see clear benefits
- I tend to adopt new technologies at / after the pace of my peers

The percentage of each job role who consider themselves to be early adopters of technology is shown in Table 2. Across all 56 people, 70% considered themselves to be early adopters of new technologies at work.

Over 85% of the therapists and doctors that answered the survey consider themselves to be early adopters. We suggest that this is, at least in part, because the independent nature of their job roles require them to take solo responsibility for adopting and using new technologies. In contrast, ward-based staff are very much part of a local team and can use this team as a source of learning and shared responsibility.

<table>
<thead>
<tr>
<th>Job Role</th>
<th>Percentage of Early Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>86%</td>
</tr>
<tr>
<td>Senior nursing staff</td>
<td>63%</td>
</tr>
<tr>
<td>Junior nursing staff</td>
<td>62%</td>
</tr>
<tr>
<td>Housekeeper*</td>
<td>50%</td>
</tr>
<tr>
<td>Therapist</td>
<td>91%</td>
</tr>
<tr>
<td>Administrative staff*</td>
<td>33%</td>
</tr>
<tr>
<td>Pharmacist*</td>
<td>100%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>70%</strong></td>
</tr>
</tbody>
</table>

* indicates low sample sizes of below 4 individuals.

*Table 2. The percentage of each job role who said they were early adopters of new technologies at work.*
C: Is there variation in a person’s answers across the six digital capability framework areas (as measured by our six example questions)?

Six questions in the survey aimed to represent each of the HEE Digital Capabilities Framework areas, by asking people how often they carried out each activity (daily, weekly or more, monthly or less, or never).

The six questions (‘how often do you …?’) and the associated framework area are as follows:

- **Technical proficiency** … use specialist digital or technical systems?
- **Information, data and content** … find information using software? (e.g. internet or databases)
- **Teaching, learning and self-development** … access digital learning or training?
- **Communication, collaboration and participation** … share information with a virtual network of colleagues?
- **Creation, innovation and research** … create or adapt digital resources? (e.g. video or presentations)
- **Digital identity, wellbeing, safety and security** … develop your online identity or reputation?

Individual answers varied across the six framework areas. As with the CEM scores, individual answers differed both within and between job roles. Across all 56 hospital staff surveyed, over 90% use specialist digital/technical systems and find information using software at least weekly. About 60% access digital learning and share information with a virtual network of colleagues at least weekly. Only about 20% create/adapt digital resources and develop their online identity at least weekly.

People in certain job roles carry out certain digital activities more often than others; for example all doctors surveyed use specialist digital systems, find information using software, and share information with a virtual network of colleagues at least weekly (see Tables 3, 4 and 5).

We can therefore conclude that these questions, as proxy-indicators of the six HEE capabilities framework areas, show that there is both individual and job-role specific variation across the six areas when we ask questions relating to the frequency of actions. This is not that surprising: we would expect most people to search for information online more often than develop their online identity or adapt digital resources.

The question is, does it help people to reflect on how often they do these kinds of activities? And if not, how can the digital capabilities framework be used in order to feel relevant, useful and actionable to NHS employees?

Alternatively the framework may be better used as a way to reflect on the workforce at a strategic level, rather than being used as a tool with staff.
The percentage of people who answered “weekly or more”

<table>
<thead>
<tr>
<th></th>
<th>…use specialist digital or technical systems?</th>
<th>… find information using software?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Senior nursing staff</td>
<td>95%</td>
<td>100%</td>
</tr>
<tr>
<td>Junior nursing staff</td>
<td>85%</td>
<td>77%</td>
</tr>
<tr>
<td>Housekeeper</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Therapist</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>93%</td>
<td>95%</td>
</tr>
</tbody>
</table>

* Table 3. The percentage of each job role who chose to answer ‘weekly or more’. * indicates low sample sizes of below 4 individuals.

The percentage of people who answered “weekly or more”

<table>
<thead>
<tr>
<th></th>
<th>… access digital learning or training?</th>
<th>… share information with a virtual network of colleagues?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>86%</td>
<td>100%</td>
</tr>
<tr>
<td>Senior nursing staff</td>
<td>53%</td>
<td>74%</td>
</tr>
<tr>
<td>Junior nursing staff</td>
<td>77%</td>
<td>54%</td>
</tr>
<tr>
<td>Housekeeper</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Therapist</td>
<td>27%</td>
<td>55%</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>0%</td>
<td>67%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>57%</td>
<td>66%</td>
</tr>
</tbody>
</table>

* Table 4. The percentage of each job role who chose to answer ‘weekly or more’. * indicates low sample sizes of below 4 individuals.

The percentage of people who answered “weekly or more”

<table>
<thead>
<tr>
<th></th>
<th>… create or adapt digital resources?</th>
<th>… develop your online identity or reputation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>14%</td>
<td>29%</td>
</tr>
<tr>
<td>Senior nursing staff</td>
<td>21%</td>
<td>26%</td>
</tr>
<tr>
<td>Junior nursing staff</td>
<td>15%</td>
<td>23%</td>
</tr>
<tr>
<td>Housekeeper</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Therapist</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16%</td>
<td>20%</td>
</tr>
</tbody>
</table>

* Table 5. The percentage of each job role who chose to answer ‘weekly or more’. * indicates low sample sizes of below 4 individuals.
D: Do the nine Tool 1 Digital CEM questions reliably measure what they aim to measure? (i.e. do they correlate with the single rating Digital CEM rating scores?)

During the first contract we identified the concepts of a Tool 1 digital diagnostic tool (light, short, fast introduction to digital capabilities, focusing on confidence, experience and motivation) and a Tool 2 tool (a more complex online space allowing users to investigate the six areas of the capability framework).

As part of that work we also investigated different ways to ask questions and wrote nine questions that we felt were potentially useful for the Tool 1 concept. The nine questions were grouped such that three aimed to measure elements of confidence, three experience, and three motivation (so creating a CEM score).

We used this second project as an opportunity to test this Tool 1 CEM question set. The nine questions are shown in the appendix (numbers 7 through to 15). We aimed to discover whether these questions:

- Created enough variation between individual scores to be able to differentiate between people in terms of their confidence, experience and motivation towards various aspects of digital
- Created a confidence, experience and motivation score that correlated with the rating scale questions that directly asked about user confidence, experience and motivation (numbered 2 to 4 on the survey in the appendix)
- Made sense to users, specifically nurses (our intended primary audience)

We found that the nine questions did create sufficient variation between people to suggest that it might be possible to create Digital CEM ‘persona types’ from the overall scores.

The three questions that were written to measure motivation strongly correlated with the single motivation rating question, suggesting that they were a good indicator of digital motivation. The three questions that aimed to measure confidence showed a trend (but not statistically significant) to correlate with the single confidence rating scale. However, the three questions that asked about general digital experience activities bore no relation at all to the single ‘experience’ rating scale (which asked specifically about experience of digital devices and software at work). This suggests that asking people three clear questions asking them to rate their confidence, experience and motivation with digital at work is a more accurate and shorter way to measure their job-relevant digital CEM than asking a higher number of more ambiguous (although perhaps more fun) questions.

The largest concern we had with these questions came when we asked people whether the themes in the questions made sense to them. Whilst all nine questions made general sense to people, we identified some important problems with them:

- Examples in the questions were often not specific enough to local digital issues, and/or related to generic issues that were just not job-relevant
- Examples in some of the questions focused on actions and activities that were outside of some job roles (for example, a question about searching for medical history notes revealed that senior staff may be motivated and confident but answer negatively because they expect more junior staff to do that task. Conversely, very junior staff may be motivated but answered negatively because they do not have the training to do that task)
- Some questions asked ‘can you do activity X’ when some users answered in terms of ‘do you regularly do activity X’
In summary, we felt that using this opportunity to test Tool 1 questions was extremely useful in order to identify pitfalls early. From our experience the general concept of creating some sort of self-evaluation tool is a great one which can often fall down when it comes to the writing of questions that feel relevant enough to end users. This test showed that writing relevant questions that reflect digital capabilities at work – especially about digital experience – is very difficult\(^2\). It is easier to write questions that correctly identify aspects of digital motivation and confidence, but one might suggest it is faster to ask the direct questions (as per the individual rating scale confidence, experience and motivation questions).

The question then becomes: why build a digital diagnostic? Is the primary intention to help people measure their digital capabilities in the context of their job role? Our data suggests it would be a very difficult task, and one that users may not feel is relevant enough for them to engage with. In addition, a solution that is itself delivered digitally is more likely to be ignored by the very people who would benefit from becoming more digitally CEM.

Alternatively, are may be other ways to expand the digital CEM of the workforce, for example by:

- Finding small moments in the working day where employees can be offered potentially useful ‘digital tips and tricks’ that take little effort and time to engage with
- Identifying individuals more likely to have the skills and motivation to act as local digital champions

\(^2\) The issue of questions not feeling relevant enough to local digital issues was also a clear finding from the user tests
E: Are there any trends in the data that are revealed with multivariate analysis?

During the first contract we analysed some survey data collected by another company in order to see if we could identify clusters individuals based on their digital attitudes and experiences. This identified three broad ‘persona types’ that were positive, neutral and negative about digital. It looked as though this was independent of their job role or the amount of time they spent using digital technologies at work.

However, we were not entirely happy with the original data, particularly because it mainly included nurses and not other roles, so it was hard to identify trends that were individual versus job-role specific.

We therefore designed our survey to collect data that we could more reliably use to further investigate digital persona types. The variables we included in this multiple correspondence analysis (MCA) are summarised in Table 6.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt</td>
<td>Which best describes your approach to adopting new digital devices or software at work?</td>
<td>Weekly or more (+) Monthly or less (-)</td>
</tr>
<tr>
<td>Con</td>
<td>How confident are you at using digital devices and software at work?</td>
<td>Calculated interquartiles, the higher the number the more positive the rating score: Con1 (0 to 7), Con2 (7 to 8), Con3 (9) Con4 (10)</td>
</tr>
<tr>
<td>DigChamp</td>
<td>Would you take on the role of digital ‘champion’ for your team, helping everyone with their digital skills?</td>
<td>Yes, I would volunteer (+) Yes, if asked (0) No (-)</td>
</tr>
<tr>
<td>DigTrain</td>
<td>At work, how often do you access digital learning or training?</td>
<td>Weekly or more (+) Monthly or less (-)</td>
</tr>
<tr>
<td>Exp</td>
<td>How much experience do you have at using a variety of digital devices and systems at work?</td>
<td>Calculated interquartiles, the higher the number the more positive the rating score: Exp1 (0 to 6), Exp2 (7 to 8), Exp3 (9) Exp4 (10)</td>
</tr>
<tr>
<td>JobRole</td>
<td>Please tell us your job title</td>
<td>Doctor, Senior nurse, Junior nurse, Housekeeper, Admin, Therapist, Pharmacist</td>
</tr>
<tr>
<td>Mot</td>
<td>How motivated are you to learn how to use new digital devices and software at work?</td>
<td>Calculated interquartiles, the higher the number the more positive the rating score: Mot1 (0 to 7), Mot2 (7 to 8), Mot3 (9) Mot4 (10)</td>
</tr>
</tbody>
</table>

Table 6. The variables used in the MCA analysis

This second MCA analysis again grouped people into three broad ‘persona types’ but this time we could see that there was a relationship between job role and group, and more importantly that this could have implications for whether and how to communicate and support change within a ward environment.

We have described the three persona groups as follows (see Figure 6):

- **Independent experts**: these people have the highest Digital CEM scores. They are doctors or therapists and are passing through various wards rather than based on a single ward within a team. They would consider being digital champions, but only if asked.
• **Group facilitators**: these people have the second highest Digital CEM scores. They are senior nurses and so tend to be based on a single ward (although some specialist nurses will move across wards).

• **Receivers**: these people have low Digital CEM scores and are in jobs that usually keep them based on a single ward (junior nurses, housekeepers, admin staff).

**Who wants to volunteer as a digital champion?**

In addition there is a cluster of responses around the answer DigChamp+, which relates to those people who said they would be happy to volunteer as a digital champion. This was a very discrete group of individuals who fell between the independent experts and group facilitators, suggesting that they were a very specific type of person that tended to be in senior job roles from one of those two groups. They identified themselves as the first to adopt new technologies at work, and typically used digital training materials at least once a week.

This suggests that the people who would volunteer to act as digital champions have an interest in digital outside of their working life. It was interesting to see that they tended to have high digital motivation but had a range of self-reported confidence and experience (indeed, DigChamp+ is as close to a Con2 and Exp2 score as it is to a Con4 and Exp4 score; see Figure 6). Based on previous experience with these issues, we suggest this might be because these individuals are self-aware and experienced enough to know that there is much more to learn about digital above their current knowledge level.

Interestingly, from this research, the people willing to volunteer as digital champions are not the junior, ‘digital natives’ but those in more senior roles. The fact that a minority of people in more senior positions are prepared to act as digital change agents is of great benefit; they may not have grown up having embedded technology within their lives, but they should have the critical thinking and theoretical knowledge necessary to put digital in the context of improvements in healthcare. There is, after all, no point in embedding technology into the NHS if it makes processes and healthcare worse, or hampers workflows.

We would suggest that - based on these findings - fostering a change in mindset around use of digital at work is best achieved at ward-level, using those individuals who are keen to act as volunteers. Typically they are senior staff, who may not rate their confidence and experience at the highest levels, but we suggest would make good digital champions because:

- They have the knowledge and experience of understanding the theory behind healthcare, and therefore can be confident in identifying the context where digital adds the greatest benefit (and indeed the confidence to identify where the technology is not, in their opinion, going to add value)
- They have leverage to lead more junior staff towards better use of digital in the workplace
- They have local permanence, such that they are based e.g. on a ward where they can manage a team through a period of change over time, embedding and monitoring new practice
Figure 6. The multiple correspondence analysis (MCA) plot showing the variables and the clusters of traits.

**Group facilitators**

- High CEM score
- Ward-based
- Senior nurses

**Willing to be a digital champion**

- High CEM score
- First to adopt new tech
- Use digital training often
- Tend to be in senior job roles
- High motivation, medium confidence

**Receivers**

- Low CEM score
- Ward-based
- Slow to adopt new tech
- Junior nurses, housekeepers, admin staff
- Don’t want to be digital champions

**Independent experts**

- Highest CEM score
- Transiting through several wards
- Senior doctors / therapists
- Neutral about being digital champions
**Section 4: Understanding digital in the working environment**

We carried out face-to-face depth interviews with 9 members of staff at two Bristol hospitals - Southmead Hospital and the Bristol Royal Infirmary. Each interview lasted 20-40 minutes (depending on availability and disruptions). The interview focussed on two core areas:

- Attitudes and experience of using digital devices and systems within the workplace
- Processes, experiences and attitudes towards training delivered in the classroom and via e-learning

We interviewed NHS staff with the following job roles:

- 2x Senior staff nurses
- 2x Sisters
- Occupational therapist
- Health Care Assistant
- Staff nurse
- Trainee nurse associate
- Nurse on secondment as Perform coach

**Emerging themes and insights**

Our interviews identified a number of key themes that emerged from the interviews:

**Staff are starting to use their own smartphones more but there is a tension**

- Almost all had their own smartphone
- While staff were not supposed to be using their devices, the boundaries were beginning to blur; WhatsApp and Facebook were widely used as communication tools, and in some cases staff were asked to install work-related apps on their phones
- There was a reluctance among staff to use their own devices too much in order to maintain a healthy separation of work and personal life. This was particularly true with regard to email
- Some tools (e.g. rostering) were seen as beneficial to be able to access on their own phones

**It can be hard to push back against technology, even when it may not be fit for purpose.**

- One Ward Sister felt that she couldn’t voice concerns about the potential impacts of new technology when it impacted patient care

> “They just say that other wards have started using it so why can’t we?”

**Ad-hoc innovation can happen**

- In a critical care unit, QR codes were placed next to locations where staff often found themselves waiting around for a few minutes (e.g. next to a machine analysing blood
samples). While they were waiting, they could scan the QR code with their smartphone camera and be directed to some contextually relevant training materials

**Staff are time-limited and disrupted**
- Because of the unpredictable nature of the job, staff were often being disrupted. Sitting down at a computer (even if they were doing e-learning) could be interpreted as taking it easy, so they were often called away
  - “Being seen to be at a computer looks like you are slacking”
- Staff are very busy and very time-limited in terms of applying themselves to tasks that are not part of their core duties

**Peer support networks are really important**
- Informal support networks are important and common. However, there may be some individuals who express negative attitudes if they find themselves struggling
  - “There’s always someone who can help”
  - “There’s quite a lot of help out there… people just like to moan about it”
- While there weren’t many ‘champions’ for specific systems or processes, when they did exist they were viewed positively
  - “Having Champions really works” [for the Lorenzo patient record system, which is very complicated]

**Digital skills may be age-dependent**
- It was reported that nurses who have qualified in the last 10 years have degrees, which tends to make them much more comfortable with technology and using digital tools. Older nurses would tend to be self-taught

**There are lots of problems with basic IT systems and services**
- Staff intranets contain a lot of content but it can be very hard to find things
  - “Our intranet is terrible!”
- In one hospital there were major problems with connecting Apple devices to the wifi
- Some wards have many more computers/tablets than others (we heard of wards where there is 1 machine per staff member, and where there were 4 terminals between 50 staff)
- Networks can be frustratingly slow
- Systems are very diverse in look and feel
- Users often have to log on to different systems with different accounts (there is no Single Sign-On)
- Some systems (e.g. APPS) don’t save progress so you can’t stop and go back to it later
- Current systems have poor usability
“You take a system that works as a surprise!”

- iPads are good in theory but they’re actually quite awkward to carry round
- Technology (e.g. iPads) can go missing easily. Doctors often walk off with them

**Digital Communication – email is the core, but WhatsApp is more responsive and real-time**

- Nurses are fundamentally a highly communicative group of professionals
- Email is the core tool for official NHS communications e.g. for notifications to complete mandatory training
- WhatsApp is used a lot for real-time, informal communication e.g. asking questions or filling staff shortages. Some groups also have Facebook pages
  
  “Everyone has a group chat” [e.g. Band 6 nurses]
- There’s a huge reliance on high quality communication, especially when new systems are being introduced (e.g. EPMA electronic system)

**Good managers drive success**

- Senior nurses and sisters are extremely important - if they have a vision and are highly competent others will respect them and buy into their ideas
  
  “Oh, well I’m in if [Ward Sister] is in charge of it!”

**Current e-learning isn’t engaging and staff can end up resenting it**

- Staff don’t currently get general digital skills training – any IT training they do get is based on specific systems
- Training isn’t always where it needs to be. e.g. patient info might be entered by nurses using iPads, but Doctors can’t access the information because they haven’t done the necessary training
- Staff tend to like training workshops – they get time set aside to do them and they have lots of person-to-person communication. This is usually true or new IT systems
  
  “I can call someone over if I get stuck”
- E-learning is seen as a tedious, box-checking exercise for mandatory training. Mostly it’s of a pretty variable quality and not particularly engaging
- Optional e-learning may occasionally be done if it’s particularly relevant to that ward e.g. providing e-learning about dementia on a palliative care ward
- Being tested can act as a motivator
  
  “Because I know I’m going to be tested I know I’m going to pay attention!”
- Staff resent e-learning when they are forced to do it in their own time
  
  “It makes it a grudge”
IT systems can be overwhelming but staff who need the most help can be stubborn

- Staff can find the number of different digital systems and tools overwhelming at first
- Those who want to get on their career may be more likely to learn new things and get on (e.g. digital tools)
- There is a focus on using existing systems more effectively; there was no evidence that pointed to a desire among staff to ‘more digital’ in general
- There’s a general feeling that the more technologically ‘stubborn’ tend to be a little older than most
- Although unclear whether it is true or not, there is a perceived sense that age is an issue when it comes to digital

💬 “The older ones would shy away from it”

- ‘Stubbornness’ seems to be a key characteristic among those who are less digitally literate

💬 “I don’t think the old boys would find it difficult but they’re stubborn as mules!”
💬 “Lots of nurses find it too confusing so find others to do it. They tend to be pretty stubborn”
Part 3: Summary, insights and recommendations
Section 5: Summary

Aims of this project

**HEE need to support and enhance the digital capabilities of staff**

As JF said: “We want to set up something that works and is provable, scalable, affordable and sustainable with regards to delivering ‘digital literacy’ to a diverse workforce of 3.1 million people over many organisations in many settings. Our expectation of ‘digital literacy’ is around skills, knowledge, attitudes and confidence to operate in a 21st century society. The biggest things here are … recognising I am a lifelong learner, feeling in charge of my own destiny, wanting and feeling empowered to solve problems for myself and others, knowing what there is to learn and how to find and critically appraise knowledge.”

This project focussed on four elements of research …

- To identify and review other tools that could act as a light introduction to digital capabilities
- To user test four examples such tools, including our Tool 1 prototype
- To investigate digital personas in the workforce, in particular for nurses in hospital settings
- To better understand how and when a diagnostic tool might be completed within the working day

Summary of findings

**Reviewing the literature reminded us that …**

- Personal motivation and confidence are a function of the individual and the environment around them (e.g. as also identified in the Topol Review)
- Attitudes to change need to be considered in terms of clear benefits to self, team and/or patients, to how much this might affect current professional identities, and in the context of an environment consistently in a state of change, responding to a myriad of local and national new processes and initiatives

**A review of possible Tool 1 online resources revealed that …**

- There are 14 possible tools that are available at minimal cost, some of which have an online self-assessment diagnostic, and others which are a collection of resources
- Three were considered relevant enough to move to user testing, alongside our Tool 1 prototype
User testing the Tool 1 options (outside of the work environment) showed …

- Users liked the Tool 1 prototype in terms of being short, fast, and simple to complete, but several questions did not feel relevant enough to both local issues and/or job role expectations to act as a good judge of digital capabilities from the user’s perspective
- The Jisc Discovery Tool was immediately discounted as being too long and complex
- Users liked Learn My Way in particular the menu structure and design of the tool, although the content itself was often considered too basic
- Overall, users suggested a combination of the Tool 1 prototype and Learn My Way would be a good solution
- However, it was clear that effective management of learner expectations, and questions that feel relevant to job role and the local working environment were required in order to make the experience feel valuable and accurate
- Most users felt they would not use any of these tools unless it was mandatory, or was recommended by colleagues whom they respected

Asking ward staff about their digital confidence, experience and motivation (CEM) revealed that …

- It is immediately clear from the individual data digital CEM scores differ both within and between job roles
- Regular use of a complex and specialist digital system does not make someone think that they are digitally capable; the digital environment, and issues surrounding personal confidence and motivation, creates a complex notion of what ‘digitally capable’ looks like
- Measuring the frequency of actions in each of the six areas of the capabilities framework showed that some activities are completed more often than others
- It did not feel relevant enough to expose the capabilities framework areas to staff: they did not feel relevant, useful and actionable enough at this stage, hence it felt more like a reflective process for those keen on digital technology rather than something for all
- Writing questions that aimed to act as proxy-indicators of digital CEM worked for motivation, had some success for confidence, and failed when it came to questions of experience
- Generic experience questions about the use of mainstream digital devices, platforms or software did not correlate to individuals’ abstract rating of their digital experience; in order to feel relevant and measure accurately, questions about using digital tools have to have a local and job-specific lens
- Those individuals willing to be digital champions were not young people in junior roles, but those in more senior roles who either felt interested in the role, or who felt it should be part of their job role
- Senior ward-based staff willing to act as digital champions are likely to be the most successful change agents

Visiting staff on wards to view “digital” in practice identified the following issues …

- Most nurses now use their mobiles at work, often via large Whatsapp groups, to communicate e.g. shift changes
- There are lots of local problems with basic IT systems and services and these affect the digital confidence and motivation of staff
- In the eyes of some staff, local initiatives can place ‘going digital’ as more important than quality of healthcare, and this can lead to tension e.g. when professionals feel that some digital initiatives will make healthcare worse for patients (as seen with our ward sister in UHB, who was very happy to champion the use of digital devices for all patient observations except
fluids because in their specific (post-operative) situation the fluid charts needed to be easily to hand and visible to all for patient safety – and at present their digital systems didn’t support this. Yet she was the one being told off for not complying with the hospital-wide directive to go paperless)

- **Change is constant**: new initiatives and new technologies are always being introduced to staff, and digital capabilities should be considered as one of these (usually embedded as a component of each). As such it feels awkward to consider digital capabilities training as a separate entity; it needs local context

- **Strong local leadership makes the difference** when it comes to implementing change; good managers who can see the benefits will drive the fastest change through teams of people
Section 6: Insights and recommendations

Key insights

*Digital capabilities are a function of the individual AND their working environment*

All of our research shows that the digital capabilities of an individual working on a hospital ward are heavily influenced by job role and local context and are constrained or empowered by the quality of local infrastructure and the opinions and actions of their manager and the team around them. It is unfair to consider their capabilities in isolation; it can inadvertently lead to feelings of being monitored, and a ‘blame game’ … when in fact their attitudes to digital at work could be borne of poor local infrastructure or weak leadership. In addition, data suggests that one individual may have various digital ‘personas’ depending on where they are (work, home) and who they are interacting with (team dynamics, leadership, quality of digital infrastructure etc).

*Any digital diagnostic should consider environment as well as individual traits, and avoid specific experience questions (unless it can be customised locally)*

Our data suggest that building an online tool that aims to help individuals to measure their digital capabilities at work needs careful thought.

There are large concerns around making it feel locally and job relevant, especially with regard to trying to identify whether or not people are using specific devices, software or other technologies.

Capabilities are highly affected by the working environment (digital infrastructure, management and team dynamics). In addition, a solution that is itself delivered digitally is very likely to be ignored by the very people who would benefit from becoming more digitally confident and motivated.

We therefore suggest that any digital diagnostic needs to consider environmental factors (both digital infrastructure and team/manager dynamics) as well as individual digital confidence and motivation.

When it comes to questions about experience of using digital technologies at work, the range of device and software use is so broad and varied that generic questions are too often considered a poor indication of true digital experience. This probably highlights the ambiguity around what “digital technologies” are, and how they might be interpreted in different job identities and environmental settings. For these reasons, questions about experience need either to be a single overall abstract scale (like our 0-10 scale) without named examples, or need to be customised locally.

*Change agents and digital champions can work*

Targeting hospital staff makes sense because there are large numbers of staff in one place, working in teams, where change initiatives can become embedded into practice. Staff on hospital wards are sociable and communicative, hence the social mechanisms are there to embed change if it is well explained and has clear benefits.
Our research shows that are people out there who will volunteer to be digital champions, either because they are interested or because they feel it should be part of their job role. Targeting those people, especially those in more senior roles and who manage a team in a static geographical area (e.g. on a ward) can help to manage and drive change across a team.

They may also be able to identify other ways to expand the digital CEM of the workforce, for example by finding small moments in the working day where employees can be offered potentially useful ‘digital tips and tricks’ that take little effort and time to engage with.

We suggest, from our visits, that these individuals are often change agents for other initiatives at a local and national level (e.g. in Southmead hospital they are embedding a new service management process of patient care that is being implemented by PWC via a network of well-trained hospital change agents; see Figure 7). Perhaps digital capabilities training / up-skilling should be merged within other change initiatives that provide local context?

**The digital CEM measurement needs to evolve**

Interviews and question trials have allowed us to confirm that confidence and motivation are important when it comes to describing digital capabilities. However, we felt that when it came to measuring digital capabilities at work our CEM model missed environmental elements that were important, for example:

- **Confidence** relates to prior experience, job role identity and expectations, and seniority (and possibly age)
- **Motivation** is affected by the experience of current and past digital initiatives, the quality of local infrastructure and the opinions and actions of managers and key team members. It is also affected by the perceived relevance and benefits of a new system: will it make the job easier? Will it allow me to do the job better? Will it improve healthcare of patients? Will it threaten my job role identity, or the expectations of others?
- **Experience** was so varied and diverse that it was near-impossible to quantify at a generic level, even within a broad job role area. Instead we considered ‘capability’ – a measure of individual aptitude together with aspects of the work environment in terms of (a) technical resource availability and reliability, and (b) the culture of the management and team around you

**It might be worth considering ways to measure the digital capabilities of the environment as well as the individual**

The findings of this research bring to mind some diagnostics that we have helped to build over the past five years and which, in different ways, aim to measure the digital capabilities of an organisation or system rather than of an individual.

The EU’s SELFIE project (see https://www.youtube.com/watch?v=8_6hVoYXCAI) allows senior leaders, teachers and pupils to various rate aspects of digital (from teaching and learning to quality of infrastructure) using online questionnaires in order to give a holistic picture of the capabilities of the school. Not only that, but schools can then compare their data with a national average in order to identify where their specific weaknesses and strengths lie. For this project the EU built and designed their own digital diagnostic tool which looks great but was expensive to build and maintain.

The Jisc insights service https://www.youtube.com/watch?v=8_6hVoYXCAI allow university and college students, teaching and support staff to comment on aspects of digital infrastructure,
teaching and learning, and institutional support via online surveys that are then analysed locally and can be compared with national averages across all other participating organisations. This was built in Online Surveys (which was bought by Jisc) which has the unusual ability to offer benchmarking, and which is relatively inexpensive to use (but visually not as visually appealing).

This research has made us consider this method as potentially relevant for HEE; would it help a digital champion (or information officer) if they could ask individuals questions about digital confidence and motivation, provide a judgement on the current quality of infrastructure, and add customisable questions about local digital initiatives, then compare generic questions with others nationally? Would this be one way to empower individuals, monitor digital change locally, and gather national data?

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**Figure 7.** The poster about the new North Bristol NHS Trust Perform initiative, improving flow of patients through the system, and managed by PWC. This model is being championed by well-trained local change agents who can explain why it adds value to staff and patients as well as saving money.
What not to do

- Don’t try to solve problems relating to individual digital capabilities by building expensive technical things, because the problems are more to do with people than technology, and lower capabilities are not the sole responsibility of the person – they are also a function of the environment.
- Don’t think of a person has having only one digital persona – in fact they may have several (e.g. in their personal v working life, and depending on their work team environment, manager or digital infrastructure of their working location).
- Don’t focus (at least initially) on the digital capabilities framework as a structure for training materials, because it is more detailed than users need, can feel disassociated from the reality of a working environment, and would require the writing of questions about experience that often feel irrelevant to the job role context. Also because such a tool would be expensive to build.

Suggested next steps

- If a decision is made to build a digital diagnostic tool, questions should consider elements of the environment as well as individual confidence and motivation.
- We suggest that, if designed correctly, a digital diagnostic could collect data to be used at a local level, for individuals and for managers (e.g. identifying conflict between skills, practice, training and quality of infrastructure; offering national benchmarking).
- Focussing initial trials in hospitals, with a focus at ward level (and the individuals working within them) appears to be an efficient location for trialling any future diagnostic tool.
- Senior nurses can make good gatekeepers and change agents: they would need to buy into any scheme in order to adopt it and drive ongoing change.
Appendix 1: Confidence, Experience and Motivation survey

Below is a copy of the questions that were asked to all ward staff during the hospital visits (see Section 3 for details).

Please answer 15 short questions about your use and opinions of digital technologies (i.e. devices and software) at work. We will use your anonymous feedback to design useful and relevant training about digital capabilities. Thanks for your help.

1. Please tell us your job title (this helps us to put your answers in context, whilst keeping you anonymous):

THREE CEM RATING SCALES

2. How confident are you at using digital devices and software at work?

<table>
<thead>
<tr>
<th>Not at all confident</th>
<th>Neutral</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

3. How motivated are you to learn how to use new digital devices and software at work?

<table>
<thead>
<tr>
<th>Not at all motivated</th>
<th>Neutral</th>
<th>Very motivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

4. How much experience do you have at using a variety of digital devices and systems at work?

<table>
<thead>
<tr>
<th>No experience</th>
<th>Neutral</th>
<th>Lots of experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

RATE OF ADOPTING NEW DIGITAL DEVICES/SOFTWARE AT WORK

5. Which best describes your approach to adopting new digital devices or software at work?

<table>
<thead>
<tr>
<th>TICK</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I am usually among the first to adopt new technologies</td>
</tr>
<tr>
<td></td>
<td>I tend to be an early adopter where I see clear benefits</td>
</tr>
<tr>
<td></td>
<td>I tend to adopt new technologies at the pace of my peers</td>
</tr>
<tr>
<td></td>
<td>I tend to adopt new technologies after my peers</td>
</tr>
</tbody>
</table>
INVESTIGATING THE SIX AREAS OF THE CAPABILITIES FRAMEWORK

6. At work, how often do you …

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Several times a week</th>
<th>Monthly or less</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>…use specialist digital or technical systems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… find information using software? (e.g. internet or databases)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… access digital learning or training?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… share information with a virtual network of colleagues?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>… create or adapt digital resources? (e.g. video or presentations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… develop your online identity or reputation?</td>
<td></td>
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<td></td>
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</tbody>
</table>

We want to test how well the following nine questions work. Please answer them as honestly as you can. At the bottom you can comment on wording etc if you want.

TESTING POSSIBLE TOOL 1 QUESTIONS THAT WERE DEVELOPED IN FIRST CONTRACT

7. Your colleague is really busy and asks you to show a new member of staff how to set up a spreadsheet for patient observations. What would you do?

- Step in confidently
- Try your best
- Make an excuse to get out of it!

8. Which of these can you do? (tick those that apply)

- Organise files on a shared drive
- Share bookmarks or journal references on a healthcare topic
- Read a data security update – and explain what it means for your role
- Generate a chart to show your team’s performance

9. Would you take on the role of digital ‘champion’ for your team, helping everyone with their digital skills?

- Yes I’d volunteer
- Only if asked
- No
10. Your manager mentions it would be useful to have an eye-catching poster to help patients understand the new clinic arrangements. They ask you if you’d make it. How would you react?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Say yes, confident you could do a good job</td>
</tr>
<tr>
<td>Say yes, and try your best</td>
</tr>
<tr>
<td>Make an excuse to get out of it!</td>
</tr>
</tbody>
</table>

11. Which of these do you use for communicating, in or out of work?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skype</td>
</tr>
<tr>
<td>Slack</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td>WhatsApp</td>
</tr>
</tbody>
</table>

12. Your team needs someone to research a healthcare issue from a patient perspective. Will you step up to the challenge?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes I’d volunteer</td>
</tr>
<tr>
<td>Only if asked</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

13. A patient’s emergency treatment depends on finding their medical history quickly. Do you offer to search for it?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, I’d volunteer straight away</td>
</tr>
<tr>
<td>I’d do it if no one else volunteers first</td>
</tr>
<tr>
<td>I’d make an excuse not to do it</td>
</tr>
</tbody>
</table>

14. Which of these have you created?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital video</td>
</tr>
<tr>
<td>Infographic</td>
</tr>
<tr>
<td>Blog post</td>
</tr>
<tr>
<td>Presentation</td>
</tr>
</tbody>
</table>

15. Would you like to be a recognised ‘digital professional’ who others can go to for advice?

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes I’d volunteer</td>
</tr>
<tr>
<td>Only if asked</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
Appendix 2: Acknowledgements

Our thanks go to all staff at Ward 9b in Southmead and Ward 800 in UHB, in particular Emma and Mandy the Ward Sisters. Also, to the various information officers from the Bristol area who championed this project and opened doors that we could not. Finally, to Nicola Bailey for all of her help both with data collection, UX interviews and for creating the infographics.