hfma

Digital technologies resources map

A tool that supports good practice in delivering value with digital technology

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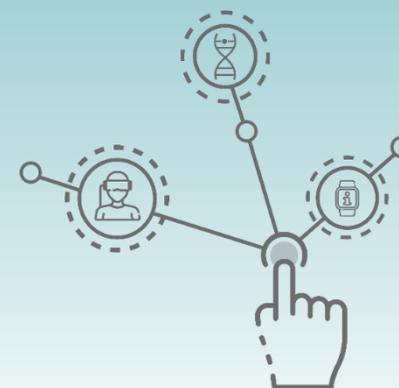
The HFMA, supported by Health Education England (HEE), is delivering a programme to increase awareness amongst NHS finance staff about digital healthcare technologies, and enable finance to take an active role in supporting the use of digital technologies to transform services and drive value and efficiency - *Delivering value with digital technologies*[1].

Digital technologies such as digital medicine, artificial intelligence and robotics have a huge potential to transform the delivery of healthcare. These technologies can empower patients to participate actively in their care, with a greater focus on wellbeing and prevention. They also support the prediction of individual disease risk and personalise the management of long-term conditions.

The use of digital technologies within healthcare is evolving, with the scope of available technology increasing significantly over the past few years and developments set to continue apace in the future. Advances in technologies have coincided with increased public awareness and a willingness from both professionals and patients to embrace new methods of healthcare. The Covid-19 pandemic accelerated digital transformation that might have otherwise taken much longer to implement.

Digital technologies can be an enabler for increasing productivity, addressing capacity constraints and improving patient experience and outcomes, playing a significant role in transforming services and driving value and efficiency across the NHS.

All material produced as part of the HFMA programme can be accessed via the delivering value with digital technologies landing page and is also signposted in relevant sections below.

The role of finance

Due to the innovative and emerging nature of digital technology, each implementation project is different and requires input from multiple stakeholders including clinical teams, patients and carers, informatics professionals, change management experts and finance staff. This may also involve working across traditional organisation boundaries.

Finance teams have a key role in all stages of the project lifecycle working collaboratively with other stakeholders. Understanding the problem and coming up with the best solution will be followed by an assessment of the resource impact of the new care model. Finance also have a role in ensuring that those delivering the project are held to account. Finally evaluating how successful the investment has been in meeting its objectives is an essential part of any project cycle.

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[1] HFMA, *Delivering value with digital technologies*

Where the technology is new and/ or innovative finance teams may need to employ different skills and knowledge than those traditionally required within the NHS. Assessment of accounting and resource impact, including both capital and revenue considerations, may not be as straightforward as with non-digital investments. The traditional way of creating business cases driven by single year funding cycles may not work for digital where the time frames for accruing the benefits can be longer than one year and will not necessarily be cash-releasing. Evaluating the success of a project may need analysis from a wide range of data sources and may not be directly identified from financial analysis alone.

Using this map

The increase in digital technologies affects all areas of the NHS and there is an ever-growing source of reference material available. The purpose of this map is to provide a reference point for tools and resources most relevant to finance teams supporting these developments. The map will also help those clinical and informatics teams who want to understand how to make the case for digital investment and the associated challenges.

The map starts with general information for staff who are unfamiliar with digital technologies or wishing to enhance their general knowledge of the subject. The next sections follow an expected project lifecycle. Finally, there are example case studies to highlight some recent uses of digital technologies within healthcare.

Most of the resources in the map are freely available. FutureNHS workspaces require a log-in as detailed in the note below.

The map is not intended as an exhaustive list of resources but to give an overview of available material. It will be regularly updated. Please email policy@hfma.org.uk if you have suggestions for additions to the map.

FutureNHS workspaces

There are multiple references to FutureNHS workspaces throughout the map. FutureNHS is a virtual collaboration platform that is separated into workspaces. It supports people working in health and social care to make change, improve and transform across organisations, places and professions. There is also a FutureNHS case study hub which can be searched for relevant material across the platform. Access to the platform is available via self-registration to anybody with an @nhs.net email address or can be requested via the home page *www.future.nhs.uk*. Members of the platform can join workspaces which ensures access to all material on that workspace. Some material is available without joining the workspace.

Introduction to digital technologies

This section includes resources to introduce readers to the scope of digital technology in healthcare and how innovations can drive and support transformation.

National funding guidance

The guidance included in this section details how organisations can access central funding for digital innovation.

Links to tools and guidance	Resource	Last updated
2022/23 Revenue finance and contracting guidance Includes details of arrangements for allocating technology funding to systems, covering both revenue and capital allocations (paragraphs 161-170)	NHSE&I[2] strategic document	April 2022
Who pays for what Resources outlining current and proposed funding streams for investing in digital technology and addressing how the health and care sector are overcoming identified barriers	NHSE&I (formerly NHSX) website	August 2021
MedTech funding mandate policy 2022/23 Outlines the NICE approved digital technologies that commissioners are expected to fund whenever clinically appropriate	NHSE&I strategic document	March 2022
MedTech funding mandate workspace Hub for all information and updates on the MedTech funding mandate policy including guidance, briefing documents, FAQs, links to events, and other information relevant to the policy	*FutureNHS workspaces*	n/a
The MedTech funding mandate and removing barriers to innovation The policy lead for the MedTech funding mandate at NHSE&I, discusses how finance and commissioners can utilise the mandate, and examples of the innovations already implemented	HFMA podcast	April 2022

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[2] NHS England and NHS Improvement (NHSE&I) have worked together as a single organisation in the management of England's National Health Service since 2019 but retain separate status as legal entities until the statutory body status until the *Health and Care Act 2022* is enacted on 1 July 2022.

Links to tools and guidance	Resource	Last updated
Social care digital innovation fund Details the funding available to support digital innovation in social care, including case studies from previously funded projects	Local Government Association website	n/a

Other national guidance

There is a wide range of national guidance to support all aspects of digital innovation. The resources included in this section provide an overview specifically relevant to finance teams.

Links to tools and guidance	Resource	Last updated
Putting data, digital and tech at the heart of transforming the NHS Independent review considering how to ensure a coherent approach to digital transformation in NHS national bodies	HM Government	November 2021
What good looks like Framework for NHS leaders building on established good practice of digitisation that transforms services safely and securely	NHSE&I (formerly NHSX)[3] website	October 2021
Information governance Ensuring that information is managed and shared safely and securely is key to digital technology implementation and ongoing management	NHSE&I (formerly NHSX) webpage	n/a

[3] NHSX was created in 2019 to drive the digital transformation of the NHS and social care and to ensure that guidance was in place to make digital transformation a reality for individual organisations and systems. Responsible for developing key strategic documents and funding streams, NHSX is now part of the transformation directorate of NHS England and NHS Improvement.

Links to tools and guidance	Resource	Last updated
Digital and technology assurance Assurance process to independently review and assess all digital and technology projects against mandatory standards	NHSE&I (formerly NHSX) webpage	n/a
Evidence standards framework (ESF) for digital health technologies Standards ensuring that new technologies are clinically effective and offer economic value and detail the level of evidence required to meet these tests	National Institute for Health and Care Excellence (NICE) webpage	April 2021
Digital primary care Tools and resources for GP practices and primary care networks developing access to online GP services, ensuring that they are safe, convenient and personalised for all patients	NHSE&I webpage	n/a
The Green Book Leading source of guidance and polices to apply when undertaking option appraisals, developing business cases and evaluating large scale projects which will be funded from public sector resource	HM Treasury	March 2022

Scope of digital healthcare technologies

The scope of digital technologies available to support transformation in healthcare is vast and constantly evolving, as is the associated language and terminology. This section signposts introductory resources for staff who have limited knowledge of the technologies used in digital transformation. A glossary of common terms is included in a separate section.

Links to tools and guidance	Resource	Last updated
Introduction to digital healthcare technologies Introduction to the role of digital technologies in healthcare transformation	HFMA briefing	July 2021
Transforming healthcare with digital technologies Introduction to some of the technologies available and the opportunities they provide to reimagine how care is delivered	HFMA webinar	July 2021
Harnessing the potential of automation and AI in health care 15 recommendations for how policymakers can get the best out of automation and AI in health care	The Health Foundation	February 2022
Introduction to digital transformation Exploring what digital technology is and how it can transform healthcare services	HFMA bitesize course	January 2022
Innovation Collaborative workspace Established by NHS Transformation directorate and national Academic Health Science Network (AHSN), providing a connected network to rapidly share learning and best practice in digital transformation across the NHS and care sector	*FutureNHS workspaces*	n/a
Reimagining care Presentations from professionals at the forefront of driving digital innovation in healthcare introducing how digital technologies can transform the delivery of healthcare	HFMA annual conference presentation	December 2021
The digital revolution: Eight technologies that will change health and care Detailed report into emerging technologies that could represent an opportunity to achieve better outcomes or more efficient care and improve patient experience	The King's Fund	November 2020
Blueprinting workspace Detailed blueprints available for a range of digital investment projects across the NHS enabling digital transformation to be carried out quickly and cost effectively based on existing evidence	*FutureNHS workspaces*	n/a

Links to tools and guidance	Resource	Last updated
AI virtual hub workspace Resources to support the development and deployment of safe, ethical AI in health and care including case studies	*FutureNHS workspaces*	n/a
Using artificial intelligence to unlock health records How natural language processing is being used to structure the large volumes of unstructured data in electronic patient records, so that the data can be used to support the delivery of high-quality care and clinical research	HFMA briefing	March 2022
Brain power How artificial intelligence and robotics are being used to transform the delivery of healthcare services	HFMA magazine	March 2022
Artificial Intelligence: How to get it right Analysis of the challenges and opportunities associated with data-driven technologies in the health and care system	NHSX report	October 2019
Genome map Introduction to the science of genomics seen as one of three major technologies that will lead to digital transformation of the NHS	HFMA magazine	December 2021
Switching it up Examining the part that digital technology can play in NHS recovery from Covid-19 and the role finance teams will play in supporting the agenda	HFMA magazine	September 2021

The digital workforce

A digital workforce is often taken to mean a team of software robots that works alongside human employees to undertake manual processes and allow humans to focus on value-adding tasks. However, it can also refer to the skills and knowledge required by the human workforce to support digital transformation.

Links to tools and guidance	Resource	Last updated
Unlocking efficiencies with digital workers The role of robotic process automation in achieving digital transformation	HFMA briefing	November 2020
Building and enabling digital teams A guide for board members on what a good digital team looks like and how to build digital capability into organisations	NHS Providers report	November 2020
Building our future digital workforce Resources to support organisations to address the challenges around building capacity and capability in the health and care digital technology workforce	HEE website	n/a
Topol review and Topol digital fellowships Report on preparing the healthcare workforce to deliver the digital future and details of the digital fellowship programme	HEE website	n/a

Making the case for investment

Before investing in digital technologies, a business case needs to be developed that sets out what the problem is and how the proposed solution will deliver value for the NHS and patients.

Understanding the problem

A clear understanding of the problem at the outset and how technology might help is vital to ensuring that effective investment decisions are made and that the benefits of a digital solution are realised.

Links to tools and guidance	Resource	Last updated
Making a difference with digital technologies: identifying and evaluating benefits Includes a section on understanding the problem that needs solving	HFMA briefing	April 2022
Best Possible Value decision framework Reference guide for organisations making value-based decisions for healthcare services	Future Focused Finance[4]	June 2017

Identifying benefits

The business case needs to set out a compelling case for investment, clearly articulating what the anticipated benefits (both financial and non-financial) are.

Links to tools and guidance	Resource	Last updated
Making a difference with digital technologies: identifying and evaluating benefits Includes a section on making the case for investment by identifying potential benefits	HFMA briefing	April 2022

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[4] Future-Focused Finance (FFF) is a national programme designed to support staff by engaging everyone in improving NHS finance and is part of One NHS Finance (*www.onenhsfinance.nhs.uk*).

Links to tools and guidance	Resource	Last updated
Delivering the benefits of digital health care Sets out the possibilities of transforming healthcare with digital technologies, including examples of how early implementers have identified the benefits arising	The Nuffield Trust report	February 2016
Digital productivity Addresses how the adoption of evidence-based digital tools can improve productivity across the NHS and social care, including case studies	NHSE&I (formerly NHSX) webpage	n/a
Benefits and health economics Tools, resources and examples of benefits management and how data is evidencing impact of digital health and care services and being used to measure improvement enabled by technology. Specific resources are signposted below. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a
Data sources for monitoring benefits realisation Highlights the range of data available to support benefits realisation studies and how to access it. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a
Guidance for monetising benefits National best practice to support local teams in considering approaches they can take to measure improvements arising from digital innovation. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a
EQ-5D instruments Established method of measuring patient-reported health outcomes used for quantifying the quality of life improvements from investment decisions	EuroQol webpage	n/a
Benefits workshops and masterclasses (benefits planning) Originally developed to support submissions to the national innovation collaborative, the workshops provide useful insight for identifying and recognising benefits across all digital transformation regardless of funded sources. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a

Links to tools and guidance	Resource	Last updated
Striving for sustainability through digital innovation Explores the positive impact on the environment of recent NHS Digital programme developments	National Health Executive article	January 2022

Procurement

This section outlines resources to support organisations when procuring digital technologies. It provides details of current legislation and best practice to ensure that procurement practices are safe, efficient and effective.

Links to tools and guidance	Resource	Last updated
Digital Technology Assessment Criteria (DTAC) Toolkit that can be used by organisations to assess suppliers and ensure that new digital technologies meet minimum baseline standards	NHSE&I (formerly NHSX) webpage	n/a
Procurement frameworks Suite of frameworks for commonly procured digital solutions to enable a quicker, easier and more informed procurement process for NHS organisations	NHSE&I (formerly NHSX) webpage	n/a
Digital care services catalogue Catalogue of approved suppliers and technologies which are related to primary care and provide assurance of high technology and data standards	NHS Digital webpage	n/a
A buyer's guide to AI in health care Sets out the questions you need to consider to ensure decisions about buying AI products are well-informed	NHSE&I (formerly NHSX) webpage	September 2020

Accounting for digital investment and resource impact

Accounting for innovative digital technologies is complex and organisations need to be aware of the key funding and accounting issues before committing to invest. Funding and accounting issues can only be considered once the resource impact of decisions has been assessed.

Links to tools and guidance	Resource	Last updated
Accounting for revenue and capital: implications for the digital age Explores the key funding and accounting issues that NHS finance teams need to consider when developing business cases for digital transformation projects	HFMA briefing	December 2021
Getting to grips with the funding and accounting challenges facing digital investment Highlights what board members need to be aware of in relation to the funding and accounting challenges facing digital investments	NHS Providers blog	January 2022
IFRS 16 leases: practical application Investment in digital technologies may take the form of a lease in which case accounting standard IFRS16 is relevant and applicable to all investments from 1 April 2022	HFMA briefing	February 2020
Accounting for joint working arrangements Joint arrangements are expected to increase with the introduction of integrated care systems and allocation of capital funding at system level. Thiis briefing outlines the legislation and guidance that NHS bodies need to take account of in these circumstances	HFMA briefing	June 2017
Making a difference with digital technologies: identifying and evaluating benefits Includes a section on understanding the resource impact of new care models	HFMA briefing	April 2022
Calculating return on investment of remote monitoring projects Outlines approaches that can be taken to calculate and measure expected return on investment from investment in digital technologies. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a

Business cases

A business case brings together in a single document all the factors relevant for organisations to review when deciding whether to invest.

Links to tools and guidance	Resource	Last updated
The art of the digital business case Factors to be considered when building a compelling digital business case	HFMA blog	December 2021
A guide to good practice for digital and data-driven health technologies Details the evidence required for business cases including the need for a value proposition	Government report	January 2021
Making the right technology decisions A guide for board members on how to make technology investment decisions	NHS Providers report	December 2021
Business case guidance Guidance for health and social care organisations writing business cases for investment in digital technologies. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a
Business case reviewers checklist Based on the requirements of HM Treasury Green Book, provides a detailed checklist for assessment of large-scale projects	HM Treasury	March 2022

Implementation and change management

Collaborative working

Successful implementation of digital technologies requires collaborative working between a range of professionals with appropriate skills and experience. The overall team will require representation from finance, informatics, procurement, clinical and change management staff.

Links to tools and guidance	Resource	Last updated
Roundtable: Digital role Finance leaders, clinicians and informatics specialists discuss how finance professions can support the digital transformation agenda	HFMA roundtable	May 2021
Improving efficiency The role of finance in supporting the use of digital technology to transform services and drive value and efficiency	HFMA annual conference presentation	December 2021

Change management

Successful implementation of digital technologies is not possible without robust change management

Links to tools and guidance	Resource	Last updated
Change management Explores the definition of change and the process of change management	HFMA bitesize course	n/a
A guide for how to successfully integrate new technology to improve a process within your organisation Outlines the behavioural change that is vital for successful digital transformation. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a

Links to tools and guidance	Resource	Last updated
Change management toolkit Produced by NHS Digital, this toolkit details a framework for change with typical phases and associated tasks and activities of a change project, including the people side of change. Part of the Change Management workspace.	*FutureNHS workspaces*	n/a
Improvement capability building and delivery team Resources to support organisations and systems to build improvement capability in teams	NHSE&I webpage	n/a
Quality, service improvement and redesign (QSIR) tools Describes a six-stage approach to project management supported by a library of tool and resources	NHSE&I webpage	n/a
Project management – an overview Guide to the role of project management and tools available	NHSE&I briefing	n/a
Managing projects Tools, techniques and examples of project management	HFMA webinar	February 2021

Evaluation

Evaluating the effectiveness of the digital investment following implementation is key to ensuring that resources are used wisely in the NHS. Have the benefits set out in the business case been realised?

Links to tools and guidance	Resource	Last updated
Making a difference with digital technologies: identifying and evaluating benefits Includes sections on defining metrics and evaluating the effectiveness of digital investment	HFMA briefing	April 2022
Making data count Introduction to statistical process control (SPC), an analytical technique that plots data over time that is widely used in the NHS to understand whether change results in improvement	NHSE&I webpage	n/a
Making data count workspace Interactive workspace to share best practice in use of statistical process control (SPC) as an analytical technique	*FutureNHS workspaces*	n/a
Benefits workshops and masterclasses (evaluating impact) Workshops provide theory and practical examples of rapid evaluation and rapid insight associated with digital innovation. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	February 2021
Evaluation planning toolkit Practical guide for project evaluations. Part of the AnalystX Data and Analytics workspace	*FutureNHS workspaces*	n/a
Measuring for improvement in digital health Infographic to support local teams measure improvements arising from implementing digital technologies. Part of the Innovation Collaborative workspace	*FutureNHS workspaces*	n/a
Near me: assessing the financial impact of Scotland's video consultation service With specific reference to introduction of video consultation in Scotland, this briefing considers how the financial impact and value of investment can be assessed at national and patient level	HFMA briefing	March 2022

Examples of delivering value with digital technologies

There is a growing body of evidence supporting the value-adding benefit of using digital technologies to support service transformation and ensure efficient, effective delivery of care. This section provides examples of the innovation taking place across health and social care. In addition, a library of case studies can be found on the FutureNHS innovation collaboration[7] workspace.

Topic	Links to tools and guidance	Resource	Last updated
Pathway redesign	**Digital playbooks** How to use digital ways of working to improve patient outcomes, by reimagining and redesigning care pathways	NHSE&I (formerly NHSX) tools	n/a
Elective Recovery	**Elective recovery tech fund** Examples of systems using digital technologies to speed up elective recovery and tackle waiting lists	NHSE&I (formerly NHSX) website	n/a
Cardiology	**Remote monitoring of implantable cardiac devices** Describes how digital technologies have supported remote monitoring of implantable cardiac devices to improve patient safety and reduce face-to-face appointments	HFMA case study	March 2022
Primary care	**Access to and delivery of general practice services** Report demonstrating growing patient preferences for non face-to-face consultation where digital tools are available and used effectively	The Health Foundation	March 2022
Wellbeing and prevention	**Using digital technologies to prevent stroke** How one organisation has implemented community pharmacy-based monitoring for atrial fibrillation to promote early detection and reduce the number of acute hospital admissions of patients having a stroke	HFMA case study	January 2022

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[7] *FutureNHS workspaces*, *Case Studies and Evaluations - Innovation Collaborative*

Topic	Links to tools and guidance	Resource	Last updated
Population Health	**Case study: Dorset Integrated Care System** How the system is working together in using data and digital health to influence decision making and has designed pathway changes to empower people and improve health outcomes	HFMA webinar	December 2021
Chronic obstructive pulmonary disease (primary care)	**Pulmonary rehabilitation enabled by virtual reality and artificial intelligence** Explores how the use of virtual reality headsets, wearable devices and AI allows the delivery of pulmonary rehabilitation in a patient's home, increasing access to the service, reducing drop-out rates and improving outcomes for patients with chronic obstructive pulmonary disease	HFMA webinar	December 2021
Gastroenterology	**Gastroenterology digital playbook** Highlights a range of digital solutions which can help solve common challenges in the delivery of gastroenterology services	HFMA webinar	December 2021
Mental health	**The mental health digital playbook** Examples of how mental health services are implementing digital technologies into care pathways	HFMA webinar	November 2021
Social care	**Improving assessment for home adaptions using smartphones** Explores the potential for smartphone technology to support rapid assessments for adaptions of client's homes to meet increasing demand for the service against a backdrop of high staff vacancies.	Local Government Association case study	March 2021

Glossary

This section defines the terms that are commonly used in relation to digital technologies, including acronyms and abbreviations.

Term	Definition
Artificial intelligence (AI)	An umbrella term encompassing approaches (such as machine learning) where tasks can be digitised using software that replicates functions that have, until recently, been synonymous with human intelligence. Examples in the finance function include the scanning and processing of invoices. In patient care, there are many more potential uses in areas such as record transcription, virtual nurses, and image analysis.
Applied artificial intelligence	Embedded in IT systems, applied AI provides the ability for machines to take in information, reason within a rules-based structure to reach conclusions and take action. An applied AI system can also learn from the decisions that it is making as it takes in more information. As a consequence a system can correct itself based on any unsuccessful actions. As an applied AI systems learns from the information it is fed and the rules that it is taught, it is important that the information and the rules do not contain biased data.
Application programming interface (API)	This is a computing interface between multiple software programmes. Unlike robotic process automation (RPA), API does not access the programmes in the same way that a human would but is programmed into both systems to allow them to interface.
Augmented reality (AR)	Presents digital information, objects, or media in the real world through a mobile device or headset. These elements can appear as a flat graphical overlay or can behave as a seemingly real '3D' object.
Automation	The process of taking the human out of a process – replacing it with a software robot that does the process automatically.
Cognitive technology	This is a broad term that encompasses algorithms, RPA, machine learning and artificial intelligence.
Deep learning	Deep learning is a type of machine learning in which multiple layers of processing are used to extract progressively higher level but more abstract features from data.

Term	Definition
Digital medicine	Products and services that are intended for use in the diagnosis, prevention, monitoring and treatment of a disease, condition, or syndrome. It includes technologies such as telemedicine, smartphone apps, wearable devices and software used in clinical settings (such as e-prescribing).
Digital worker	A software robot that is undertaking work that would otherwise be done by a person. RPA and intelligent automation are examples of digital workers.
Electronic health record/ electronic patient record (EHR/EPR)	Digital records of a patient's health and care.
Electronic referral service (eRS)	A computer system that is used to refer patients from their GP, or local surgery, into the hospital or another healthcare service.
Extended Reality (XR)	An umbrella term encapsulating augmented, virtual and mixed reality technologies.
Information artefact	Any data item on a screen, page or form that can be used to provide information about the transaction or process under review, examples include, names, dates, amounts, hours, rates, bands, authoriser.
Information management and technology (IM&T)	The management, procurement and maintenance of computer hardware and software as well as the design of IT systems.
Intelligent automation	A combination of applied AI and RPA where RPA follows the processes usually done by a person and applied AI simulates human intelligence. Processes that do not have a rules-based structure can be automated as the digital worker can handle unstructured data and provide answers based on subjective probability.
Internet of things	A term that has been adopted to refer to any everyday object that has the ability to connect to the internet to provide additional functionality. Examples include smart home technology, such as smart thermostats, smart televisions or other connected devices.

Term	Definition
Interoperability	Sharing of data so that all parties understand it the same way. Interoperability between IT systems sometimes requires system-to-system integration that can be achieved using automation or APIs.
Machine learning (ML)	A specific subset of AI that focuses on learning, reasoning, and decision-making. The technologies use statistical models to make predictions (or decisions) without being explicitly programmed to perform the task. The computer 'learns' as it increases its data reference points – this is also referred to as predictive analytics.
Mobile computing	Refers to wireless communication and carry-around computers, such as tablets or smartphones. Increasing mobile computing power supported by an ever-growing network of broadband provision presents new ways of providing access to care and information.
Mixed reality (MR)	A form of augmented reality where physical and digital objects co-exist. Digital objects appear anchored to the real-world environment.
Natural language processing (NLP)	Natural language processing (NLP) refers to the branch of computer science – and more specifically, the branch of artificial intelligence (AI) – concerned with giving computers the ability to understand text and spoken words in much the same way human beings can. NLP combines computational linguistics – rule-based modelling of human language – with statistical, machine learning, and deep learning models. Together, these technologies enable computers to process human language in the form of text or voice data and to assign 'meaning', and thereby work towards 'understanding' the speaker or writer's intent and sentiment. Everyday uses of NLP include chatbots on commercial websites, spam email filters and smart assistants like Apple's Siri and Amazon's Alexa.
Personal and wearable devices	An extension of mobile computing where the device is in direct contact with the wearer for long durations and can generate large quantities of data on specific biometrics or behaviours. These devices include smartwatches, fitness trackers, implants or patches with the ability to connect to other devices.
Robotic process automation (RPA)	Software robots that carry out tasks and activities within systems or applications using the same interfaces that a human would use. The robot can work with several different systems in a process so manual repetitive tasks that would otherwise have to be done by a person can be automated.

Term	Definition
Structured data	Data that is organised and formatted in a standard way – it is therefore easily searchable and moved from system to system. It is usually found in databases and spreadsheets. RPA deals with structured data as it is straightforward to process.
Unstructured data	Unstructured data has no pre-defined format or organisation. Examples include letters, handwritten patient notes or information in free text fields. RPA can also deal with unstructured data using machine learning and natural language processing, but it will need to be given data sets to 'learn' from.
Virtual reality (VR)	Immerses users in a fully digital environment through a headset or surrounding display. This environment can be computer-generated or filmed in 360-degree video.

About Health Education England

Health Education England (HEE) is part of the NHS, and we work with partners to plan, recruit, educate and train the health workforce. HEE exists for one reason only: to support the delivery of excellent healthcare and health improvement to the patients and public of England by ensuring that the workforce of today and tomorrow has the right numbers, skills, values and behaviours, at the right time and in the right place.

HEE's Digital Readiness Programme, commissioned by NHSX, aims to uplift digital skills, knowledge, understanding and awareness for all our health and care workforce. This includes:

- Supporting the right culture and environment, for example by ensuring digital is understood, embedded and championed at trust and ICS board level.
- Professionalising the digital workforce through support for professional bodies, regional Informatics Skills Development Networks, and collaborative community networks.
- Establishing learning and development through the NHS Digital Academy and specific learning and development initiatives, for example the Florence Nightingale Digital Nurse Scholarship, and through access to tailored, appropriate online learning for all.
- Building our future digital workforce by undertaking workforce analysis and demand forecasting, and sustainable models to recruit talent, for example through graduate schemes, as well as opportunities for nurturing existing talent, for example through the Topol Digital Health Fellowships.

For more information visit the Digital Readiness Programme website or follow the programme on Twitter @HEE_DigiReady.

About the HFMA

0The Healthcare Financial Management Association (HFMA) is the professional body for finance staff in healthcare. For over 70 years, it has provided independent and objective advice to its members and the wider healthcare community. It is a charitable organisation that promotes best practice and innovation in financial management and governance across the UK health economy through its local and national networks.

The association also analyses and responds to national policy and aims to exert influence in shaping the wider healthcare agenda. It has particular interest in promoting the highest professional standards in financial management and governance and is keen to work with other organisations to promote approaches that really are 'fit for purpose' and effective.

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