EMERALD POINTS

QUESTIONING TECHNOLOGY

Addressing Divisive Data in Research and Practice

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For Coles and Fria
The strongest, most impressive women you keep me going without knowing.

For Nan Edna and Grandad Tom
Gone – but forever in my heart.

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INTRODUCTION: DO HUMANS MATTER IN A TECHNOLOGICALLY RELIANT SOCIETY?

Technology moves at a rapid pace (Gartner, 2024). There's new technology and terminology every other month, and it can be overwhelming to try to keep up with the technology that is available to us. We're told we need all the new technology and applications for our everyday life. Without applications and your device, can you access the doctor, banking, television, utility bills, talking to friends and family, learning at school and university or applying for a job?

These are all valid questions and raise concerns about our connectedness to each other and the way in which we use technology in our lives. How do we identify, value and decide which technology is important to us and our lives? (World Economic Forum, 2024). These are not straightforward questions to ask or answer. The complexity of technology solutions is not explicitly taught at school or at work, and often the purpose of a technology solution is not revealed to its buyers or users. Instead, third-party online service providers (OSPs) utilise terms and conditions, subscription fees and legal updates.

This handbook looks to unravel and layout the ways that we can confidently question technology.

WHO WOULD BE INTERESTED IN THIS HANDBOOK?

We want to include as many people as possible in the pages of this handbook. Technology is said to reflect the world around us; however, how can this be accurate if the evidence suggests technology doesn't include everyone (NDIA Definitions, n.d). This handbook introduces and highlights the importance of

technological choice for small to medium enterprises (SMEs), IT industry practitioners, academic researchers and, of course, individuals in society interested in knowing more about the technology that guides our lives (*Fixing the Digital Divide | Good Things Foundation, n.d.*).

WHAT WILL BE COVERED IN THE HANDBOOK?

This handbook will introduce and answer questions that should be considered as part of technological solutions before they are even built. For example, this chapter title, 'Do humans matter in a technologically reliant society?' will be addressed using sociological concepts, terminology, theories, evidence and actions.

To support the audiences in the handbook, Chapter 4 is aimed at SMEs, Chapter 5 is aimed at IT industry practitioners and Chapter 6 is aimed at academic researchers. The terminology, characteristics and business examples will introduce the breadth of ways technology solutions are used. We introduce a selection of cohesive terminology through which confidence in how to independently navigate your way within technology solutions can be addressed. To do this, we will address the factors that influence choice of technology and its impact on society (Progress, 2023). The purpose of this handbook is to move past the limitations of good and bad technology so we can fully see the breadth of technology in our lives and how we can best challenge technology.

We are a society that can and does independently select and use the tools of technology to build better. Build better awareness of data use, data protection, inclusive government services, accurate digital identities and a reduction in technology that excludes those who haven't built it, this can be referred to as implicit bias (World Economic Forum, 2024). We are asked to trust technology with our personal identifiers and details, our money, our legal documentation, our contact information that is a direct link to us at any time of day (ICO, n.d).

We are asked to trust that the terms and conditions we accept when using each of these services, that they are written in our best interests and will protect our personal and special category data. However, technology does not discern what is legal and what is not. In Chapter 7, there is an introduction to technology activism and technology regulation in the United Kingdom and European union. It is suggested that a challenge for regulation is that

regulation struggles to keep pace with technology development going to market (Couldry, 2018).

WHAT WILL THIS CHAPTER COVER?

In this chapter, we will introduce some key concepts such as digital equity, digital literacy, digital inclusion, data transparency, artificial intelligence (AI) and automation. These terms can be used to interpret the technology you use and technology solutions around you. Terminology will support you to make confident technology-related choices that make your life and the lives of those around you more meaningful (Hunter, 2013).

The first question for discussion is contextual, for us to understand where we are now. The question is, do humans matter in a technologically reliant society? This question can be broken down into context-focused questions to support us in answering a complex question.

- What is a technologically reliant society?
- Are humans important to technology?
- What impact does technology have on society?

In the following sections, as we introduce and discuss these questions, we ask you to take some time to think about yourself, your family and/or chosen family and the importance and impact technology has had in your lives. Consider the changes, benefits, costs and challenges that have come with your choices and interconnectedness to build towards digital inclusion. (NDIA Definitions, n.d.).

WHAT IS A TECHNOLOGICALLY RELIANT SOCIETY IN THE CONTEXT OF THIS BOOK?

Reliance as a concept can be intriguing, as subjectivity exists in the interpretation of words and the context in which they are used. This interpretation is based on geography, culture, religion, psychographics, effectuation and risk taking (Matalmaki, 2017), motivational origin and intent (Hunter, 2013), access to opportunity, networks, finance and educational attainment.

An example of this trust is the mobile phone device that you carry with you, which has become part of your everyday life. The device is made up of several components: the physical device (hardware), iOS or android (operating system), email and social media apps (application software), 02, Vodafone, Tesco (an internet provider) and the internet. These components appear to consumers as one product rather than a product made up of multiple components, all of which are needed for us to use the device so it can perform tasks for us as individual consumers. The trust we have in a device with multiple components we are not fully aware of demonstrates how reliable organisations are on tracking our information and our reliability on organisations to be responsible with our personal identifiers so that we can benefit from devices (Foster, 2023).

Data have become the centre of commercialisation for organisations (Couldry, 2018). It is good practice to interrogate the lack of transparency surrounding our reliance. This question is not to address a business driving revenue for a profit for providing a service or selling a product. However, the way the practice is performed and to what extent society is aware of the impacts of business practices should be a priority for organisations (Matalamäki, 2017).

ARE HUMANS IMPORTANT TO TECHNOLOGY?

In short, yes. Without humans and our adoption of technology to complete tasks, machine learning (ML) and AI would not have a rich dataset on which to train, process and imitate human decision-making. '*AI was founded as an academic discipline in the mid-1950s, and is now found in myriad everyday applications, including virtual assistants, search engines, navigation apps and online banking*' (The Alan Turing Institute, n.d.). For example, the cookie statement. Cookie statements are visible when you first enter a website, and they should disclose the categories and types of tracking the website performs, as well as the vendors, which become a dataset.

Consider the cookie statement from the perspective of our individual motivational origins (Hunter, 2013). The experience of the cookie statement is that it appears upon entering the website. While this is a compliance requirement, it also tracks the decision behaviour of the user. We are presented with options for consent to tracking: accept, reject, manage preferences.

Cookie statements are a simple but important functional e-commerce, e-development and regulatory activity that is required by organisations in the European Union and the United Kingdom (Wolford, 2024). The data gathered from our tracking choice can be used to maintain an organisational competitive advantage by leveraging our user information. For example, an organisational activity is to understand how users find information on a website and what they do once they have found the information. This user activity can be tracked by using heatmap tracking. Heatmap tracking is a third-party software that can be used on a website to understand where users spend their time clicking.

Different organisations and industries have different objectives and key performance indicators for tracking actions on their websites. For example, within higher education in the public sector, citation of published papers is a key performance indicator. In the private sector, an e-commerce company like boohoo or Pretty Little Thing gauge success on items per transaction and transaction value. Whereas streaming services like Netflix, Prime and Disney define success as subscriptions and minutes watched. These objectives are relevant to the organisation, yet they all have the cookie statement as per regulation for tracking their user actions.

INTRODUCTION TO TERMS

This section introduces terminology that will be addressed in context throughout the following chapters of the book. The habit of using words in a subjective manner has increased the confusion of their meaning in wider society. Identifying the way in which the terms are used interchangeably, how they can be used in different contexts and defining their meaning and value across these contexts can support more clarity when questioning technology ethically (Floridi & Taddeo, 2016).

The terms are categorised into sociological terms, technical terms and technological solution terms. Understanding which primary category a term belongs to can afford us the opportunity to identify the relevant context and application of the term to connect the meaning and value in a wider setting. This can increase the translation of research capabilities and business objectives across researchers, SMEs and practitioners. In turn, there is greater opportunity to reduce research time frames and more steadily publish underpinned and industry relevant evidence.

SOCIOLOGICAL TERMS

The following terms support sociological discourse and can be used in an interdisciplinary manner when talking about technological solutions. The sociological terms focus on the abstract nature of the application of technology from the perspective of a task to be completed. It is worth noting, however, that these concepts can have a more general purpose. The aim of the handbook is to align our audiences with a common language that affords readers the language, context and confidence to further their discourse.

The below sociological terms have been chosen as they best align with the technical terms in the following section and the concept of digital equity. It is reasonable to consider that as technology and research evolve, these terms may become tired or perhaps obsolete.

Social Capital, as defined by Scrivens and Smith (2013), '*refers to the productive value of social connections, where productive is here understood not only in the narrow sense of the production of market goods and services, but in terms of the production of a broad range of well-being outcomes*'.

Digital Inclusion is defined as '*equitable, meaningful, and safe access to use, lead, and design of digital technologies, services, and associated opportunities for everyone, everywhere*' (NDIA Definitions, n.d.).

Digital Equity is defined as '*a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy*' (NDIA Definitions, n.d.). The importance of this term is to expand the definition to include data government policies and mechanisms for data transparency. Digital equity asks what the best way is to support people so they will confidently engage with digital concepts that impact society. Digital understanding goes further than technical skills to data commercialisation, which permeates societal support systems such as digital identity (Couldry, 2018).

Digital Identity, according to Rowland and Estevens (2024), falls into three categories: identification, self-presentation and datafied self. Below is context on each category based on literature researched by Rowland and Estevens (2024).

- Identification can be considered as how we are categorised when using online digital channels.
- Self-presentation can be considered as the actions we share across digital channels that can be seen by others.

- Datafied self can be considered as a person's identity constructed based on their uses of the online digital platforms.

TECHNICAL TERMS

To facilitate discourse around technology, its challenges and where there can be opportunities, it is useful to engage with terms that can be used by non-specialists. This is important so that decision-making isn't reliant on specialists who may have a holistic approach to the development of a solution when affording their knowledge and experience of technology. Terms can be used interchangeably in the development of technology, to sell technology solutions, as part of marketing copy and in niche ways across industries often without context or specificity.

These terms will appear again in the audience-specific Chapters 4, 5 and 6. For now, an introduction is provided to give you more context. However, keep in mind that these are not the only definitions available and are subject to change due to the nature and speed of technological development (Gartner, 2024).

Consider the perspective of each of the sources below as they will have different intent, funding, reach and stakeholders. Source characteristics impact the validity and credibility of the definitions. The sources referenced below are the Alan Turing Institute Glossary, Gartner and TechTarget, due to their different audiences, perspectives and uses in society.

Algorithm is defined by the Alan Turing Institute Glossary (n.d) as '*A sequence of rules that a computer uses to complete a task. An algorithm takes an input* (e.g. a dataset) and *generates an output* (e.g. a pattern that it has found in the data).'

Software Application is defined by Hashemi-Pour & Contributer (2024) as '*A set of instructions, data or programmes used to operate computers and execute specific tasks. Software is a generic term used to refer to applications, scripts and programmes that run on a device.*'

Generative Artificial Intelligence (Gen AI) is '*An artificial intelligence system that generates text, images, audio, video or other media in response to user prompts*' (The Alan Turing Institute, n.d.).

Artificial Intelligence is '*The design and study of machines that can perform tasks that would previously have required human (or other biological) brainpower to accomplish*' (The Alan Turing Institute Glossary, n.d).

Automation Bias is '*an overreliance by human operators on automated systems, such as computer hardware, software and algorithms, to make decisions, even when the machine-generated output is incorrect or contradicts human judgment*' (Richards, 2025).

Machine Learning is '*A field of artificial intelligence involving computer algorithms that can 'learn' by finding patterns in sample data*' (The Alan Turing Institute Glossary, n.d).

Solution is defined by Gartner (n.d) as '*an implementation of people, processes, information and technologies in a distinct system to support a set of business or technical capabilities that solve one or more business problems*.'

TECHNOLOGY SOLUTION TERMS

Taking the Gartner (n.d) definition above, the term solution can be separated into three parts, which may be of benefit to add further context to the sociological and technical terms.

Take Part 1, '*People, processes, information and technologies*', there is an interrelation between people within an organisation, the operation of the organisation, the capabilities and skills that allow information assimilation and the technology chosen and implemented by those with decision-making influence within an organisation.

Part 2, '*in a distinct system*', the people, processes, information and technologies are specific to the organisation and the success of the selected technologies implemented by an organisation is dependent on the finance available for procurement, the confidence decision-makers have in the information available to them and the way in which the technology can support the business objectives.

Part 3, '*to support a set of business or technical capabilities that solve one or more business problems*', the distinct system should offer the functionality and experience that allow an organisation to upskill their employees, make administration and data collection simpler and safer as well as solving business problems.

For this handbook, three solution examples are detailed below.

I. **Software as a Service (SaaS)** is defined as '*Software as a service (SaaS) is software that is owned, delivered and managed remotely by one or more providers*' (Cloudflare, n.d).