Digital Mindsets - Project Summary

1. Introduction

This project aims to develop our understanding of digital mindsets. It is part of a wider project undertaken by the Materials Made Smarter Centre (funded by Made Smarter Innovation), a community of researchers developing exciting advances in digital research and making them accessible to industry partners.

The project has two main aims:
- To create ways to **measure** digital mindset
- To create ways to **modify** digital mindset, helping individuals and managers develop action plans for moving towards more positive digital mindsets

It is well recognised that many digital transformations often struggle to deliver on their aims because people may be reluctant to accept and use technological innovations. Enabling people to develop a more positive digital mindset will help improve inclusion of different people in digital transformations. It will also allow organisations who are making greater use of technology to identify those in need of support and help them to deal more effectively with changes associated with introducing new technologies.

2. Methodology

The first stage of this research has been conducted by researchers at the Institute of Work Psychology in collaboration with Affinity Health at Work.

Stage One: Evidence review

A systematic review of the academic literature was undertaken across four search engines (ABI, Academic Search Complete, Business Source Premier and PsychInfo) to search papers published from 2016 to Jan 2022 (to focus on literature related to a similar technological landscape as currently experienced in organisations) using three sets of search terms to capture i) interest area (digital or technology and mindset or attitudes), ii) context (occupational, organisational and business settings) and iii) individual responses (e.g. adoption, engagement or resistance). The search resulted in 2,078 articles. Duplicates were removed and all titles were screened, after which 132 papers remained. Abstracts of the remaining papers were then screened, and 29 papers were reviewed in full. 11 papers were identified through hand searches and pearl growing. 40 papers were reviewed, and findings synthesized.

Stage Two: Interviews with stakeholders

15 interviews were conducted with stakeholders recruited through the Materials Made Smarter Centre and through open calls for participation. All stakeholders had experience of the implementation of new technology within organisations – some directly within implementation or project teams and others as end users. Stakeholders also represented different levels of seniority within their organisations and a range of industries. Interviews were transcribed and subjected to a thematic analysis to develop key themes.

Stage Three: Survey development and conceptual validation

A model was developed from the data collected in Stages One and Two setting out the concepts relating to digital mindsets and resources that help individuals to engage with technological changes. This was developed into a survey which was reviewed by a broad group of subject matter experts, and completed by seven participants who were then interviewed about their understanding of the items and responses. This information was used to refine the survey.

Stage Four: Survey of individuals

The final survey was based on these items combined with demographics and established wellbeing measures. The survey was distributed via Prolific, a data collection service, to generate a large gender-balanced sample of data to test the utility of the digital mindset and resources measure.

3. Measuring digital mindsets

The evidence review and the interviews revealed a number of factors that can inform our understanding of digital mindsets. These were used to develop the survey measure for individuals.

3.1.   Elements of a Digital Mindset – Based on the research, the following attitudes and beliefs were identified as key elements that inform how individuals engage with new technology in general and specifically in a workplace setting:

- **Growth mindset related to technology** – Whether you believe you can improve your skills with technology or whether you consider these to be fixed, drawing on the work of Dweck (2017)[1]
- **Resource beliefs** – An element specified by Solberg and colleagues (2020)[2] drawing on Game Theory, this refers to whether you believe developing technology within an organisation means that employees will lose out as there is only a fixed amount of resource available (zero-sum), or whether win-win scenarios are created by technology where new digital tools lead to wider gains in resources. Based on stakeholder interviews, this element was highly contextual, depending on the approach taken by the organisation and the technology in question, therefore it is recommended these questions are adapted to specific circumstances to understand the beliefs of employees related to specific technologies in the context of their organisation.
- **Computer self-efficacy** – A belief in your own ability to use technology successfully
- **Personal innovativeness with technology** – A desire to explore new technology
- **Experience** – Your personal history with technology, particularly based on opportunities to experience and work with new technology and of implementation of new technology in a workplace setting
- **Perceived threat or opportunity** – Whether you believe new technologies are likely to harm or benefit your work, either in terms of job loss, positive or negative changes to your role or how you interact with your colleagues

3.2.   Individual differences – The following characteristics relate to individual use of technology and their relationship with digital mindset will be further explored in Stage Four:

- **Personality** – differences in personality, as measured by the Five-Factor model[3] of Openness, Conscientiousness, Extraversion, Agreeableness and Emotional Stability are related to technology adoption behaviours in the workplace
- **Optimism** – a general positive outlook relates to overall digital mindset
- **Global growth mindset -** your general belief in your ability to learn new skills is related to your specific belief in your ability to learn new technological skills
- **Learning goal orientation –** the degree to which you set challenging personal goals for yourself and look for opportunities to learn influences your digital mindset

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[1] Dweck, C. S. (2017). Mindset: How you can fulfil your potential. Constable & Robinson, London.
[2] Solberg, E., Traavik, L. E. M., & Wong, S. I. (2020). Digital Mindsets: Recognizing and Leveraging Individual Beliefs for Digital Transformation. *California Management Review, 62*(4), 105–124. Business Source Premier.
[3] McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of personality*, *60*(2), 175-215.

4. Modifying digital mindsets

The evidence review and interviews identified a number of resources that can support and promote positive digital mindsets. These are summarized below to show how resources can be built at different IGLOo levels – individual, group, leader and organisational levels - to support individuals through digital transformation.

4.1. **Individual resources** – Many individual factors relate to the elements of having a digital mindset, drawing on past experiences and overall attitudes and behaviours. For individuals looking to improve their own digital mindset, some recommendations based on the evidence would include:

- **Learn about new technologies** and take time to explore the opportunities these present for your work, including attending relevant training programmes
- Look for opportunities to **embed the use of new technologies into your everyday working patterns** so that you can gradually become more familiar with them
- **Get involved** in change programmes in the workplace to have an opportunity to shape change and learn by doing

4.2. **Group resources** – At a team level, a number of opportunities to collaborate were identified:

- **Identify and support the pioneers** within the team and encouraging them to share what they find out with others as they explore the use of new technology
- Regularly **share best practice** within the team so people can learn from each other
- Share problems openly and **support each other** to solve them

4.3. **Leader resources (line managers)** – For people who support teams, key actions include:

- **Create a safe environment** where teams can challenge how things have been done before, learn lessons from any problems and mistakes and try new things
- **Maintain momentum** during change by regularly discussing new technology and encouraging people to use it
- **Support team learning** by making time available and helping people learn things one step at a time or in manageable stages

4.4. **Leader resources (project managers)** – For people responsible for leading digital programmes or projects, some recommendations for successful delivery include:

- **Focus on the end goals** throughout the process, including providing products that are easy to use and make life easier, while achieving business goals, and remembering successful change is about more than just the technology, including considering impacts on people and culture
- **Provide clarity** for users through realistic timelines and being transparent about progress
- **Engage people** by making things real through positive case studies, involving them in development, considering different priorities for different stakeholders, using accessible language, and providing two-way opportunities for communication

4.5. **Organisational resources** – For organisations looking to further their digital development, some key areas for support include:

- **Ensure the infrastructure is in place** so that basic elements of your technology work successfully before attempting to engage people with more sophisticated tools
- **Encourage individual adoption** by providing appropriate training and being clear on the tools people should use for certain tasks
- Be prepared to **adopt new ways of working** more widely as greater use of technology is likely to require different approaches to how you work overall

5. Future directions

The digital mindsets measure and resources are now being tested to identify which are related to positive digital mindsets and wellbeing outcomes, allowing organisations that use the toolkit to plan their digital projects in light of these recommendations. A series of interventions will be developed to examine how organisations can use the digital mindset measure and resource mapping to best support individuals and teams implement new digital technologies.

For more information or to get involved with the next steps of the Digital Mindsets project contact the lead researcher, Professor Carolyn Axtell, c.m.axtell@sheffield.ac.uk