

Empathy-led Readiness Toolkit for Digital Adoption

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Abstract. The paper aims to demonstrate the value of an empathy-led toolkit that categorises individuals' digital adoption readiness levels. The toolkit is a self-diagnostic measure for individuals within any organisation to check their readiness to adopt digital technology and seek support as technology reshapes their roles. The web-based toolkit is built to understand and measure an individual's emotional readiness level towards a transition before the introduction of digital technology. This toolkit is created by combining four key methods from the disciplines of design, psychology and computing, i.e. empathy-based storytelling, perception-action model, empathy mapping and empathy algorithm. The paper highlights the value of such a toolkit for the manufacturing and built environment sectors, where emerging technologies are implemented in day-to-day processes. The toolkit's research and development has been funded by InterAct (Economic Social Research Council, UK), and the toolkit has been tested with the global community of professionals and students at the Building Information Modelling in Series at Leicester.

Keywords. Transdisciplinary engineering, design thinking, empathy, people-led, digital adoption

Introduction

Understanding individual readiness for technology adoption is critical to ensuring successful implementation in an era of rapid digital transformation. This paper introduces an empathy-led readiness toolkit to assess and support individuals navigating digital transitions within their organisations. Unlike traditional technology adoption frameworks that focus primarily on technical skills and perceived usefulness, this toolkit places human emotions at the centre of the process, recognising that emotional responses significantly shape an individual's willingness to embrace new technologies.

The paper aims to demonstrate how empathy can trigger and extract readiness emotions for digital adoption by focusing on human emotions and the values individuals attach to emerging digital technology. The toolkit provides a structured self-diagnostic measure by integrating design, psychology, and computing methodologies—including empathy-based storytelling, the perception-action model, empathy mapping, and computing. The analysis uses empathy-based logic to give out four readiness levels: embracing, receptive, intrigued, and apprehensive. This approach enables individuals to

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assess their digital adoption readiness levels and seek targeted support based on their emotional responses to technological change.

This paper focuses on empathy as a catalyst for digital adoption. It demonstrates how an emotion-driven approach facilitates smoother transitions, improves engagement, and enhances individuals' confidence in integrating new technologies into their work environments. The findings contribute to the broader discourse on digital transformation, emphasising the importance of addressing technical and emotional readiness in technology adoption strategies. Ultimately, technology adoption is not merely a rational process but a deeply emotional and psychological journey. By expanding current models to incorporate a more holistic and dynamic understanding of emotions, this paper demonstrates how researchers and practitioners can develop strategies that enhance adoption rates and promote user well-being in an increasingly digital world.

1. Theoretical Foundations

The role of emotional responses in technology adoption has been widely acknowledged, with various theoretical frameworks offering insights into their influence. Beaudry & Pinsonneault's [1] emotional framework provides a structured approach to categorising these responses, distinguishing between emotions that facilitate or hinder adoption. While useful, this model does not fully capture the evolving nature of emotional engagement with technology over time. The domestication of technology literature extends this perspective by illustrating how emotional adjustments occur as individuals integrate technology into their daily routines [2]. Notably, Koskinen [3] emphasises the necessity of empathy and interpretation in design research, arguing that emotional engagement should not be static but a fluid process requiring continuous reassessment.

1.1. The Role of Digital Self-Efficacy in Emotional Reactions

A critical determinant of emotional reactions to technology adoption is digital self-efficacy. Bandura's [4] work highlights that individual with high self-efficacy experience emotions such as achievement and challenge, which drive engagement. In contrast, those with lower self-efficacy are more prone to feelings of loss or deterrence. While this perspective remains influential, it does not fully address how targeted interventions can cultivate or improve self-efficacy, especially if they are done early in digitalisation. Venkatesh et al. [5] expand on Bandura's work by linking self-efficacy to technology's perceived ease of use and usefulness. However, this view overlooks contextual factors such as organisational support, training, and cultural influences, which may mediate these emotional responses. Furthermore, empirical studies such as Compeau and Higgins [6] have shown that self-efficacy is a precursor to adoption and an outcome of prolonged technology use, creating a reciprocal relationship between confidence and engagement.

1.2. Achievement and Challenge Emotions as Drivers of Adoption

The literature draws attention to positive emotions, such as excitement and curiosity, which drive technology adoption [7, 8]. Employees who exhibit these emotions in workplace environments are more likely to embrace digital transformation. However,

this focus on positive engagement risks neglecting the complexity of mixed emotional responses. For instance, individuals may feel excitement about new opportunities and anxiety about potential disruptions. This duality suggests that simplistic classifications of emotions into binary categories of “positive” and “negative” may be insufficient [9]. Recent work by Bagozzi [10] suggests that emotional ambivalence—experiencing both positive and negative emotions concurrently—can create a more nuanced understanding of technology adoption, particularly in contexts where users must balance personal and professional concerns.

1.3. Loss and Deterrence Emotions as Barriers to Adoption

Conversely, fear, anxiety, and resistance to change are commonly cited barriers to adoption [11, 12]. These deterrence emotions are particularly prevalent among individuals with low digital self-efficacy or those who perceive technological change as threatening job security. While existing research acknowledges these negative emotions, it often treats them as obstacles to be overcome rather than as signals of underlying concerns that warrant deeper investigation. Future research should consider how organisations can proactively address these fears through supportive policies and engagement strategies rather than merely attempting to counteract resistance. Furthermore, research on technology-related stress (technostress) by Ayyagari et al. [13] has shown that excessive digital transformation can lead to burnout and decreased productivity, highlighting the need for a balanced approach that accounts for both technological benefits and psychological well-being.

1.4. Theoretical Models of Technology Adoption and Emotion

Several theoretical models offer valuable perspectives on technology adoption but also reveal certain limitations. The Technology Acceptance Model (TAM) [14] and the Unified Theory of Acceptance and Use of Technology (UTAUT) [15] prioritise ease of use and usefulness. Still, they provide limited insight into the emotional and psychological dimensions of adoption. Regulatory Focus Theory [8] offers a more nuanced understanding by distinguishing between promotion-focused individuals, driven by achievement and challenge emotions, and prevention-focused individuals, more susceptible to loss and deterrence emotions. However, this theory does not adequately address how shifts between these orientations may occur or how external factors, such as organisational culture, influence these motivational states.

Affect Events Theory [16] introduces a dynamic perspective by examining how workplace events trigger emotional responses, shaping attitudes toward technology. This framework is instrumental in explaining how emotional reactions evolve in response to external stimuli. Yet, it lacks specificity regarding how individuals cognitively process these events concerning long-term technology adoption. Similarly, the Technology Readiness Acceptance Model (TRAM) [17] integrates individual differences. However, its reliance on pre-existing readiness traits limits its applicability to contexts where users’ attitudes are still forming.

The domestication of technology theory [2] provides a more comprehensive view by emphasising the iterative nature of technology integration. This approach aligns well

with emotional models by illustrating how initial resistance may give way to gradual acceptance through repeated exposure and adaptation. Beaudry & Pinsonneault's [1] framework builds on this by categorising emotions into achievement, loss, deterrence, and challenge, linking them to perceived control and situational evaluation. While this categorisation offers clarity, it may oversimplify the interplay between these emotions, which are often experienced simultaneously rather than in isolation.

1.5 Addressing Emotional Complexity

Given these insights, empathy-led adoption research moves beyond static models. It explores more adaptive frameworks that capture the complexity of emotional responses before technology is put in the hands of the people (pre-adoption). Additionally, the research presses for greater emphasis on interventions that can mitigate negative emotions and foster positive engagement in digital transitions. As advocated by Koskinen [3], empathy-led methodologies provide a promising avenue for achieving this by prioritising user experiences and emotional narratives early so these can influence the design and implementation strategies.

2. Empathy-led Methodologies in Research

This research project provided us with two distinct methodological challenges,

1. Enabling the participants to record their feelings as they perceive a technology's usefulness and ease of use before its implementation.
2. Ensuring the accurate categorisation of feelings in summation of readiness personas as an outcome for each participant.

The challenge is to identify 'how' emotional reactions from end users can be triggered using an empathy approach and 'what' categories of readiness can be concluded.

There are several empathy-led methodologies stemming from design, psychology subjects which could be relevant for this study; however, the key requirement was for the methodology to provide data that is fit for industry and practitioners. Aftab et al. [19] describe the criteria of selecting three out of 11 empathy-led methodologies. These criteria focused on the usability and ability to trigger and extract emotional values and enable the measure and categorisation of the emotion data into 4 readiness personas:

Category 1

Embracing – Enthusiastic, confident, and proactive users adopting new technology.

Category 2

Receptive - Users who feel confident and see the technology as beneficial.

Category 3

Intrigued - Users who experience mixed emotions, balancing curiosity and caution.

Category 4

Apprehensive - Users who feel overwhelmed, anxious, or threatened by the technology.

The section below summarises the storytelling, perception action model and design empathy

2.1. Empathy-led Methodologies

Storytelling and Empathy Mapping - Recent studies have highlighted the importance of using empathy-led methodologies to capture emotions related to technology adoption. Brown et al. [18] demonstrated that storytelling techniques help participants articulate their emotional experiences, while empathy mapping allows researchers to categorise emotions effectively.

Perception-Action Model - According to Aftab et al. [19], perception-action models offer a structured way to elicit emotional responses in workplace settings. By simulating real-world scenarios, participants can experience and report their emotional reactions, aiding in classifying readiness personas.

Design, Empathy, and Interpretation - Koskinen [3] emphasises the role of design, empathy, and interpretation in understanding how individuals relate to technology. This perspective suggests that technology adoption should be studied through behavioural and cognitive lenses and users' emotional and interpretative experiences. Koskinen argues that empathy-driven research approaches help reveal more profound insights into how individuals emotionally connect with technological change.

3. Empathy-led Methodology – Pilot

A pilot test was conducted with 23 individuals working within the built environment sector, which is comprised of architecture and construction firms in the UK. This pilot used storytelling, empathy mapping and perception-action models to trigger emotional responses from the participants, capture them and then analyse the data into personas of readiness. The analysis presented by Aftab et al. [19] unveils nuanced insights into individuals' perceptions and emotions surrounding technology integration in the workplace. Furthermore, the study identifies key positive emotions, such as excitement, curiosity, and hope, which can drive technology adoption and innovation. Conversely, negative emotions like anxiety and overwhelm accentuate the complexity of navigating technological change and its implications for individuals' roles and career trajectories.

4. Data Analysis: Self-assessment toolkit

The following paragraphs demonstrate how, in 4 phases, the toolkit gathered emotional data and formulated the categorisation based on using four measures representing four phases in the digital toolkit survey: Phase 1: Participants' self-efficacy towards essential, intermediate, and advanced technologies; Phase 2: Scenario 1 focuses on intention to use technology; Phase 3: Scenario 2 focuses on emotional reaction to the usefulness of such technology; and Phase 4: Individuals' reasons to use or not use technology.

4.1. Phase 1: Self-Efficacy Classification

In the first phase, digital self-efficacy (DSE) was evaluated based on the type of technology the individual used, ranging from simple to intermediate and advanced, and their self-efficacy levels in using such technologies on a Likert scale (S) where 0 was low confidence and 10 as high confidence. Participants then rated their competence with

these technologies, classifying them into low (L), moderate (M), good (G), or high (H) digital competence.

$$DSE(S) = \begin{cases} L, & 1 \leq S \leq 3 \\ M, & 4 \leq S \leq 6 \\ G, & 7 \leq S \leq 8 \\ H, & 9 \leq S \leq 10 \end{cases} \quad (1)$$

4.2. Phase 2: Intention to Use

Following this, a scenario prompt is shared to elicit an emotional response focused on the participants' intention to use (ITU) advanced technology, typically involving advanced technology within a workplace setting. Participants are given 20 emotions to choose from. These comprise independent, moderating, and mediating emotional variables, 10 positive emotions (P) and 10 negative emotions (N). The initial analysis divides the range of emotions participants experienced into two primary groups, including positive or negative emotions.

$$ITU(E) = \begin{cases} H, & \text{if } E \subseteq P \\ L, & \text{if } E \subseteq N \\ C_{R_2}, & \text{otherwise} \end{cases} \quad (2)$$

The third group consists of participants who show ambiguity—mixed emotions. The scoring of such an emotional state was measured by the individual's perceived level of control and whether they viewed this scenario as an opportunity or threat. The sub-categorisation was based on four dimensions of emotional response (Beaudry & Pinsonneault): achievement emotions, loss emotions, deterrence emotions, and challenge emotions. Additionally, the frequency or predominance of either positive or negative emotions listed by an individual was considered.

There were four ambiguous sub-categories: category with more positive emotions (AC2P2), Ambiguous category 3 with fewer positive emotions (AC3P), ambiguous category 2 with more negative emotions (AC3N), and ambiguous category with fewer negative emotions (AC2N).

$$C_{R_2}(R_2) = \begin{cases} H, & R_2 \geq 8 \\ AC2P, & 5 \leq R_2 \leq 7 \\ AC3P, & 1 \leq R_2 \leq 4 \\ AC2N, & -4 \leq R_2 \leq 0 \\ AC3N, & -7 \leq R_2 \leq -5 \\ L, & R_2 \leq -8 \end{cases} \quad (3)$$

The final readiness level for phase 2 was confirmed by combining the results of digital self-efficacy (DSE) and ITU sub-categorisation ($C_{(R_2)}$ (R_2)).

$$C_{Phase2}(DSE, ITU) = \begin{cases} C1, & \text{if } DSE \in \{H, G\} \text{ AND } ITU \in \{H\} \\ C1, & \text{if } DSE \in \{H\} \text{ AND } ITU \in \{AC2P\} \\ C2, & \text{if } DSE \in \{M, L\} \text{ AND } ITU \in \{H\} \\ C2, & \text{if } DSE \in \{H, G\} \text{ AND } ITU \in \{AC3P\} \\ C2, & \text{if } DSE \in \{G, M\} \text{ AND } ITU \in \{AC2P\} \\ C2, & \text{if } DSE \in \{H\} \text{ AND } ITU \in \{AC2N\} \\ C3, & \text{if } DSE \in \{H, G\} \text{ AND } ITU \in \{L\} \\ C3, & \text{if } DSE \in \{M\} \text{ AND } ITU \in \{AC3P\} \\ C3, & \text{if } DSE \in \{L\} \text{ AND } ITU \in \{AC2P\} \\ C3, & \text{if } DSE \in \{H, G\} \text{ AND } ITU \in \{AC3N\} \\ C3, & \text{if } DSE \in \{G, M, L\} \text{ AND } ITU \in \{AC2N\} \\ C4, & \text{if } DSE \in \{M, L\} \text{ AND } ITU \in \{L\} \\ C4, & \text{if } DSE \in \{L\} \text{ AND } ITU \in \{AC3P\} \\ C4, & \text{if } DSE \in \{M, L\} \text{ AND } ITU \in \{AC3N\} \end{cases} \quad (4)$$

4.3. Phase 3: Perceived Usefulness

For phase 3, a second-story scenario was used to elicit emotions. This scenario focused on the participants' perceived usefulness (PU) of technology by placing the individual as an employee in an organisation where these technologies were implemented. The participants were asked to imagine themselves in a job where they would use a technology they had heard of but had not seen or used. How would they feel? The same set of 20 emotions were provided, of which 10 were positive and 10 were negative. The participants with all positive or negative were given the category high (H) or low (L).

$$PU(E) = \begin{cases} H, & \text{if } E \subseteq P \\ L, & \text{if } E \subseteq N \\ C_{R_3}, & \text{otherwise} \end{cases} \quad (5)$$

Similar to phase 2, in phase 3, a third group of participants show ambiguity—mixed emotions. The scoring of such an emotional state is again measured by the individual's perceived level of control and whether they viewed this scenario as an opportunity or threat. Following on the same philosophy as in phase 2, there are four ambiguous sub-categories: category with more positive emotions (AC2P), Ambiguous category 3 with fewer positive emotions (AC3P), ambiguous category 2 with more negative emotions (AC3N), and ambiguous category with fewer negative emotions (AC2N).

$$C_{R_3}(R_3) = \begin{cases} H, & R_2 \geq 8 \\ AC2P, & 5 \leq R_2 \leq 7 \\ AC3P, & 1 \leq R_2 \leq 4 \\ AC2N, & -4 \leq R_2 \leq 0 \\ AC3N, & -7 \leq R_2 \leq -5 \\ L, & R_2 \leq -8 \end{cases} \quad (6)$$

These emotional reactions were then compared across the phase 1 category, phase 2 sub-categorisation, and phase 3 sub-categorisation scenarios. The comparison revealed distinctions in how individuals responded to different technological environments.

$$C_{Phase3}(C_{Phase2}, PU) = \begin{cases} C1, & \text{if } C_{Phase2} \in \{C1, C2\} \text{ AND } PU \in \{H, AC2P\} \\ C2, & \text{if } C_{Phase2} \in \{C1\} \text{ AND } ITU \in \{L, AC3P, AC3N, AC2N\} \\ C2, & \text{if } C_{Phase2} \in \{C2\} \text{ AND } ITU \in \{AC3P\} \\ C2, & \text{if } C_{Phase2} \in \{C3\} \text{ AND } ITU \in \{H\} \\ C3, & \text{if } C_{Phase2} \in \{C2\} \text{ AND } ITU \in \{L, AC3N, AC2N\} \\ C3, & \text{if } C_{Phase2} \in \{C3\} \text{ AND } ITU \in \{AC3P, AC2P, AC3N, AC2N\} \\ C3, & \text{if } C_{Phase2} \in \{C4\} \text{ AND } ITU \in \{H, AC3P, AC2P, AC2N\} \\ C4, & \text{if } C_{Phase2} \in \{C3\} \text{ AND } ITU \in \{L\} \\ C4, & \text{if } C_{Phase2} \in \{C4\} \text{ AND } ITU \in \{L, AC3N\} \end{cases} \quad (7)$$

4.4. Phase 4: Final Readiness Category

The final analysis drew on regulatory focus theory, which states that emotional responses shape individuals' reactions to events, particularly about personal goals. Individuals were asked 6 questions which examined the external events that may shape their emotional decision.

$$RC(C_{Phase3}, R_4) = \begin{cases} C1, & \text{if } C_{Phase3} \in \{C1, C2\} \text{ AND } R_4 \geq 3 \\ C1, & \text{if } C_{Phase2} \in \{C1\} \text{ AND } 2 \geq R_4 \geq -2 \\ C2, & \text{if } C_{Phase3} \in \{C3\} \text{ AND } R_4 \geq 3 \\ C2, & \text{if } C_{Phase3} \in \{C2\} \text{ AND } 2 \geq R_4 \geq -2 \\ C2, & \text{if } C_{Phase3} \in \{C1\} \text{ AND } -3 \geq R_4 \\ C3, & \text{if } C_{Phase3} \in \{C4\} \text{ AND } R_4 \geq 3 \\ C3, & \text{if } C_{Phase3} \in \{C3\} \text{ AND } 2 \geq R_4 \geq -2 \\ C3, & \text{if } C_{Phase3} \in \{C2\} \text{ AND } -3 \geq R_4 \\ C4, & \text{if } C_{Phase3} \in \{C4\} \text{ AND } 2 \geq R_4 \end{cases} \quad (8)$$

5. Conclusion

The Empathy-led Readiness Toolkit for Digital Adoption is a novel and necessary approach to understanding and facilitating digital transitions in organisational settings. This research contributes to a more nuanced understanding of technology adoption by centring on human emotions and employing empathy-driven methodology. The toolkit is the interdisciplinary solution to understanding how individual emotions influence digital adoption. The toolkit measures emotional responses and categorises individuals into four readiness levels: embracing, receptive, intrigued, and apprehensive. This categorisation provides a structured pathway for individuals and organisations to address emotional barriers and leverage positive emotional drivers in digital transformation processes.

This research's primary contribution is demonstrating the effectiveness of empathy as a mechanism to assess digital adoption readiness. Unlike traditional models focusing on technical competencies and usability, the toolkit recognises that emotional responses

significantly influence individuals' willingness to embrace technological change. By integrating well-established theories such as the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Affect Events Theory (AET), this research provides a robust framework for categorising emotional reactions in workplace technology adoption.

The findings have significant implications for digital transformation strategies. Organisations often prioritise technical training and infrastructure development while overlooking emotional and psychological factors. This research highlights the need to address these aspects by designing an intervention that identifies low readiness and engages participants in understanding and pursuing higher confidence for technology adoption. For example, individuals with receptive readiness exhibiting deterrence emotions may benefit from targeted training and mentorship programs, whereas those displaying embracing readiness emotions can serve as champions for digital initiatives.

Moreover, the research contributes to the broader discourse on the domestication of technology, emphasising that technology adoption is not merely a cognitive process but an iterative and emotional journey which needs to be coached, mentored and supported early. By incorporating empathy-led methodologies, organisations can create a more inclusive and supportive digital adoption framework that accommodates diverse emotional responses and fosters a culture of continuous learning.

In conclusion, this research highlights the critical role of empathy in digital adoption. The Empathy-led Readiness Toolkit offers a groundbreaking approach to supporting individuals and organisations in digital transitions by developing a structured methodology to assess and categorise emotional readiness. Integrating multidisciplinary theories and methodologies provides a comprehensive framework for understanding how emotional responses shape technology adoption behaviours.

As digital transformation continues to accelerate, organisations must recognise that successful technology implementation is not solely about systems and infrastructure but also about people and emotions. By leveraging empathy-driven strategies, businesses can foster a more inclusive and resilient workforce, ensuring that individuals are equipped with the necessary technical skills and emotionally prepared for change. This research lays the groundwork for future innovations in digital adoption, advocating for a more human-centred approach to technology integration in the modern workplace.

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