



Mindset matters: how mindset affects the ability of staff to anticipate and adapt to Artificial Intelligence (AI) future scenarios in organisational settings

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Received: 19 May 2020 / Accepted: 28 October 2020
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Abstract

Any first step in organisational adaptation starts with individuals' responses and willingness (or otherwise) to change an aspect of themselves given the transcontextual settings in which they are operating (Bateson in *Small arcs of larger circles: framing through other patterns*, Triarchy Press, Axminster, 2018). This research explores the implications for organisational adaptation strategies when Artificial Intelligence (AI) is being embedded into the ecology of the organisation, and when employees have a dominant fixed or growth mindset (Dweck in *Mindset: changing the way you think to fulfil your potential*, Robinson, London, 2017). Research participants were supplied with a single scenario based in 2030, where—as a result of Artificial Intelligence technology implementation—employees were going to be displaced. Using Torbert's (*Organizational wisdom and executive courage*, New Lexington Press, San Francisco, 1998) 'first, second and third person' research theory, participants were asked to independently review their thoughts, sense, and image of the future from a fixed mindset position (considered to be the worst case), then from a growth mindset perspective (best case), and then do the same collectively. Five key findings are outlined which support the principle that having a growth mindset is a key component of adaptive capacity and futures literacy. The five key findings conclude that AI adaptation processes need to include compassion and authenticity, embodiment, fundamental needs and motivations, mutual learning and considering what lies beyond the edges of the organisation (Bateson in *Small arcs of larger circles: framing through other patterns*, Triarchy Press, Axminster, 2018).

Keywords Growth mindset · Fixed mindset · Futures literacy · Adaptive capacity · Artificial intelligence · Organisations

1 Introduction

The process of “creating and describing alternative images of the future encourages the extension of thoughts and perceptions beyond the confines of the present” (Masini 1998, p. 344). Engaging and anticipating the future in emerging or volatile transcontextual settings is challenging both to individuals and the collective. Transcontextual description as defined by Bateson (2018, p. 79) is “a starting place (that) opens up the possibilities of better understanding the interdependency that characterises living (and arguably non-living) systems”. Organisations and those that work within them are transcontextual settings and a wide variety

of literature suggests that, by 2030, there will be an expected replacement or loss of jobs across a number of industries of between 21–38% globally due to automation and Artificial Intelligence (AI) (Husain 2017; Gillham et al. (2018)); Brynjolfsson and McAfee 2018). Thus transcontextual impacts are likely that ripple out beyond the defined boundaries of organisations. There is also a predicted increase in new roles and industries to be created as a result of the shift in opportunity provided by these technologies. The gap between jobs lost and those gained is unclear, with some commentators suggesting disadvantages may exist for some workers, which would then require some form of Universal Basic Income (UBI) to fill the void (Brynjolfsson and McAfee 2018). The COVID-19 pandemic, manifested at the time between the data being collective and the finalisation of the analysis. The current context cannot be ignored, as it has affected the nature and speed of worker displacement more quickly than any AI implementation. COVID-19 not AI has fast tracked in some countries UBI models to support the millions affected

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as whole industries slowed, stopped or becoming virtualised due to physical distancing measures.

One of the first personal responses to a challenging situation is how we perceive, understand, and act in relation to that challenge. This human adaptive process is amplified in social systems and structures, in particular organisational sub-structures as a result of technology implementation. Given the evolutions in AI over the last 15 years, particularly driven by for-profit corporate contexts where economy and efficiency have been the primary value drivers to date, organisations are attracted to the benefits from the efficiencies and insights these technologies provide (Brynjolfsson and McAfee 2018). AI is beginning to augment human endeavour in more and more industries and has the potential to be a tremendous opportunity as well as tremendous threat, given those who will be displaced will often be from process oriented or manufacturing roles varying from truck drivers in high risk mining environments, to meat packing or other food processing or growing functions, to accounting or medical diagnosis or treatment. Drawing on adaptation theory and resilience literature, the organisations that are the most adaptable and able to learn will be those that thrive in the future (Bussey et al. 2012, Rogers 1957, Darwin 1859). The theories underpinning adaptive capacity and adaptation have their roots predominantly in scientific and operational research fields including biology, evolution, cultural anthropology, psychology, behavioural development, complexity science, learning, and more recently neuroscience (Abatecola 2012; Darwin 1859, Change Management Institute 2013, Dweck and Leggett 1996; Dweck 2017). Those organisations that have a limited adaptive capacity will find themselves without the resilience and endurance to transition.

Bussey et al. (2012, p. 387) state that “adaptive capacity is a measure of the human ability to respond to threats and stimuli in the social and natural environment”. Adaptation in social environments, such as organisational contexts, starts with the individuals’ response, the establishment of trust and willingness to change an aspect of themselves, their relationships and the systems in which they are operating (Darwin 1859; Bateson 2018). Dweck (2017) and Dweck and Leggett (1988) have contributed much to the organisational theory of adaptation in particular the concept drawn from Dweck’s (2006, 2017) work around the ‘fixed and growth mindsets’.

This research explores the implications of Dweck’s (2017) ‘mindset theory’ for organisations wishing to deploy AI. Research participants in four different workshop settings were supplied with a single scenario, based in 2030, in which—due to AI implementation—employees in an organisation are going to be displaced. Using Torbert’s (1998) ‘first, second and third person’ research framework, participants were asked to review their thoughts, sense, and image of the future from a fixed mindset position (considered to

be the worst case) and then from a growth mindset perspective (the best case) and, subsequently, to share these views via small group participatory processes to generate action and insight. This article outlines the participatory methodology undertaken for this research, followed by an outline of the key findings which will be useful to leaders and teams deploying AI in organisational settings. It ends with an outline of the limitations of the research and future areas of research as well as a set of discussions and conclusions, that can be applied to other forms of organisational disruption.

2 Research methodology

Futures scenario methodologies are highly relevant in situations when there is a high degree of uncertainty or ambiguity (Bussey et al. 2012); they have been used as the basis for this research. As more uncertainty and concern for the future exists in individuals, communities, and organisational settings, more people are actively seeking ways to be more prepared for that lack of predictability. The area of concern selected as the focus for this research was ‘AI replacing humans in an organisational context’. At the time of data collection in late 2019, this topic was predicted to be the biggest disruptor to organisational operating and functional models.

The methodology used to collect the data took place via a participatory workshop process that combined two dimensions of Schwartz’s (1991) scenario categorisation model of ‘best, worst, business as usual and outlier’, combined with Reason and Bradbury’s (2008, 6) interpretation of Torbert’s (1998) ‘first, second and third person’ research framework. Reason and Bradbury’s (2008) work expanded on Torbert’s (1998) original framework and enables individual reflection and opportunities for participation and collective insight generation. ‘First person’ relates to having an “enquiring approach” to an individual’s life and then “act(ing) choicefully and with awareness”. ‘Second person’ analysis comes through dialogue and the development of “communities of inquiry and learning organisations”. The ‘third person’ is more impersonal approach, and “aims to create a wider community of inquiry involving persons who, because they cannot be known to each other face-to-face ... including writing and other reporting”.

Societal, organisational and individual implications in relation to the use of AI is considered to be of increasing importance (Brynjolfsson and McAfee 2018). Practical research into the use of futures techniques has been growing in prominence (Wildman and Inayatullah 1996; Ramos 2004). Participation and mutual learning was a key underpinning epistemology of this research Dweck’s (2017). Mindset research is participatory in nature (in terms of the researcher to subject or between groups of subjects).

Participatory approaches correspond with the base knowledge domains of Torbert (1998) and Reason and Bradbury (2008).

Examining the difference between Dweck's (2017) 'growth and fixed mindset' theory on employees in response to AI has not been researched to date. Nor have any examples been provided of doing this whilst focussing on an anticipated or future-based scenario, rather than on short- to medium-term performance changes. Fixed and growth mindset research has often related to culture, learning and leadership, particularly in student and teacher educational and learning contexts (Canning et al. 2019; Dweck 2015, 2018; Job et al. 2012, Murphy and Dweck 2010). The basic premise of Dweck (2015, p. 10) theory on fixed and growth mindset is that "in a fixed mindset, people believe that basic talents and abilities are fixed traits ... in a growth mindset, people believe that basic abilities can be developed through hard work, good strategies, and good mentoring. People can have different mindsets in different areas".

3 The workshop process

The research was conducted in four participatory workshops. Participants were asked to explore a scenario related to AI in an organisational setting. One hundred and twenty-six participants (see Table 1) were involved in the research, and 589 responses for data analysis were collected in four different settings (predominantly in Australia. Workshop participants were provided in advance with a description of the workshop process, and invited to self-nominate to attend and participate in:

- Workshop 1: conducted in a global futures conference in Mexico. Participants were either academics, students, or consultants working in the fields of foresight, strategy and futures. Representatives' place of origin were: Australia, Canada, Finland, Germany, Mexico and the United States of America.
- Workshop 2: conducted in a local government organisation in Australia. Participants were either policy, technologists, or implementation managers. All participants were employees or temporary contractors. The local government was trialling AI in a number of service settings including its call centre, and engineering and data

Table 1 Participant numbers and data collected

Participant/category	Workshop 1 N=	Workshop 2 N=	Workshop 3 N=	Workshop 4 N=	TOTALS N=
Total participants	16	70	25	15	126
Gender:					
Male	9	43	15	0	70
Female	7	25	10	15	56
Prefer not to say	0	2	0	0	0
Age:					
20–39	4	30	15	9	58
40–64	8	35	9	6	58
65-upwards	4	5	1	0	10
Industry:					
Government	1	70	8	3	84
Academia	2	0	2	1	5
Private/commercial	5	0	12	8	26
Non-profit	3	0	3	2	8
Other	4	0	0	1	5
Workshop discussion					
Groups	4	10	5	4	23
Total data collected:					
Fixed base description	16	70	25	15	126 (164)
Fixed image/word	16	70	25	15	126
Growth base description	16	70	25	15	126 (173)
Growth image/word	16	70	25	15	126
Total data items					504 (589)

analytics centres. Though there was diversity amongst the participants, this was not specifically recorded due to the size of the group and what was agreed ethically with organisational stakeholders.

- Workshop 3: conducted with project managers, in particular those who use agile or incremental deployment methodologies in Australia. Many participants at this workshop had had an exposure to technology project deployment, including a number who were experienced in AI programming or installations. Representatives' place of origin were: Africa, Australia, Brazil, China, India South America and United Kingdom.
- Workshop 4: conducted at a conference that was targeting women working in technology in Australia. Participants were either entrepreneurs, consultants, technologists, or students. All participants were either from European, Middle Eastern, or Asian-Pacific countries.

The data collection workshops were about one hour in duration, and included eight agenda items facilitated by the researcher:

1. Education piece on AI, futures research and Dweck (2017) fixed and growth mindset theory.
2. Setting the first state (fixed).
3. Scenario setting and first individual data collection (fixed mindset).
4. Change state (shake it off).
5. Scenario setting and second individual data collection (growth mindset).
6. Remain in state (growth).
7. Transcontextual discussion and sharing of mindset similarities and differences (small group setting)
8. Plausible actions identification (user story generation not reported in this article).

A number of participants had come across the growth and fixed mindset concept before. In Australian organisational settings, 'mindset' theory has been a regular part of organisational cultural and professional development since Dweck (2017) first released her book *'Mindset: Changing the way you think to fulfil your potential'* in 2006. The educational components included preliminary information on the genealogy of AI technologies (Farrow 2019), current developments and the theoretical base of futures research, and Reason and Bradbury's (2008) three-layered model. To set up the data collection processes, example traits of fixed and growth mindset were provided to all participants (Dweck 2017; NeuroLeadership Institute 2018; Wilson 2014):

- Fixed Mindset—I'm either good at it, or I'm not; When I'm frustrated, I give up; I don't like to be challenged;

When I fail, I'm no good; Tell me I'm smart; My physical response is congruent with my attitude (down); If you succeed, I feel threatened; My abilities determine everything.

- Growth Mindset—I can learn anything I want to; When I'm frustrated, I persevere; I want to challenge myself; When I fail I learn; My physical response is congruent with my attitude (up); If you succeed, I'm inspired; My effort and attitude determine everything

The researcher reinforced the difference through embodied practice including role playing of posture and tone change, i.e. fixed mindset—slumped shoulders, closed posture and a slight frown; growth mindset—taller and open-chested with shoulders back and a more relaxed, happier facial expression. Embodied participatory approaches require changing individual or group dynamics to be monitored constantly to ensure any issues, concepts or effects are worked through as they arise (Ramos 2004; Bussey 2014). Other research in mindsets and embodied or role play practices has documented a similar approach (Job et al. 2012; Murphy and Dweck 2010; Polak 1973): participants received information on the two mindset states before experiments or data collection occurred. This pre-education means that there is a potential risk of framing too rigidly or biasing the result by over emphasising particular traits. This research managed this risk by focussing not on assessing which mindset participants were in, but rather exploring the difference in response, based on a personalised experience, 'within' a particular mindset. The framing of each mindset was neutral to any specific organisational or industry setting, with each participant having the power to document their own response confidentially. This ensured all participants (regardless of previous exposure to the concept, industry experience, gender or culture etc.) had full agency over their own personalised response.

Prior to capturing the response, the researcher asked each participant to briefly embody the mindset being examined. Then, using Reason and Bradbury's (2008) 'first person' lens, participants were asked to step into the relevant mindset and document their 'immediate personal response, feeling or sense' to the following scenario:

In 2030 your manager says: AI is already smarter and faster than humans. This means that from now on process and predictive focused jobs, including yours, will be replaced. If you are not technically capable or [do not] offer a unique 'value add' you will be unemployed.

The year 2030 was chosen for the scenario due to the date featuring commonly in reported research about the impact of AI on the workforce (Husain 2017; Gillham et al. 2018; Brynjolfsson and McAfee 2018) as well futures research

needing to include a degree of anticipation (traditionally beyond the limitation of a 3–5-year strategy horizon). Immediately after the first documented response, participants were asked, again using Reason and Bradbury's (2008) 'first person' lens, to draw an image or write a description of their image of the future when in that mindset state (see Fig. 1). Polak (1973, 3) suggests that "art is a medium par excellence for transposing images from the other world into this world". The fixed mindset was completed first, and the researcher acknowledged that this space might be not comfortable for some participants. This discomfort could be due to the emphasis on positive psychology yogic spiritual and/or mindfulness practices which are popular in many western urban contexts.

The process was completed with the same scenario from a growth mindset lens. The shift between states commenced with a 'shake off' of the fixed mindset, i.e., an invitation was presented to participants to stand up and move their body about (shake hands/shoulders in front or similar) before embodying the growth mindset physiology and cognitive state.

The next stage of the process was in line with 'both the second and third person' components of Reason and Bradbury's (2008) approach. It involved the collective sharing and generating of meaning in small groups. This activity was in the comfort levels and full choice of participants. Each of the groups (n: 23) was asked to discuss and collate the participants' perceptions and images and note any similarities and differences. See example in Fig. 2:

From discussion in each small group, the transcontextual space required for a growth mindset to be sustained in adaptation was discussed as part of comparing the similarities and differences in their personal response. To conclude, additional discussions took place whilst the participants were still in a growth mindset lens, to design collective or

'third person' actions specific to each workshop context. These insights and actions are not part of this article.

4 Mindset matters: base themes analysis and summary

Results have been combined across all four workshops rather than comparing specific workshops given that, on an initial analysis, there were not large differences amongst responses. As much as possible in line with participatory processes, commentary was kept in its original phrasing, as collected in each workshop (the comments are displayed in quotation marks). A number of the base responses had multiple data elements to them. In some cases, for a more straightforward thematic analysis, these responses were split and number variants noted in brackets in Table 1. The base data were analysed firstly via Leximancer concept explorer software (Leximancer 2020) for thematic identification. Insight from the correlating image of the future (see Fig. 1 was overlaid across the themes to confirm the theme and provide rich additional depth and texture to the initial response.

The images of the future included a mix of actual images drawn by participants or a written description of the future state. The 'first person' interpretation of each image was not confirmed with participants. The interpretation of images came from the researcher's own perspective, and the most obvious interpretation was selected aiming to reduce the loss of the original intent. Future research would ideally have the time allotted to it to record a qualitative descriptor of the image, but in the case of this research this was impossible. One hundred and twenty-six fixed image participant responses were recorded for each mindset, of which 32% of responses were image only, 48% of were in narrative form, and 20% were a combination of image and word. Figure 3



Fig. 1 Examples of images of the future fixed (pink and left) and growth (green and right)

Fig. 2 example of base data collated from 2 of the 23 groups

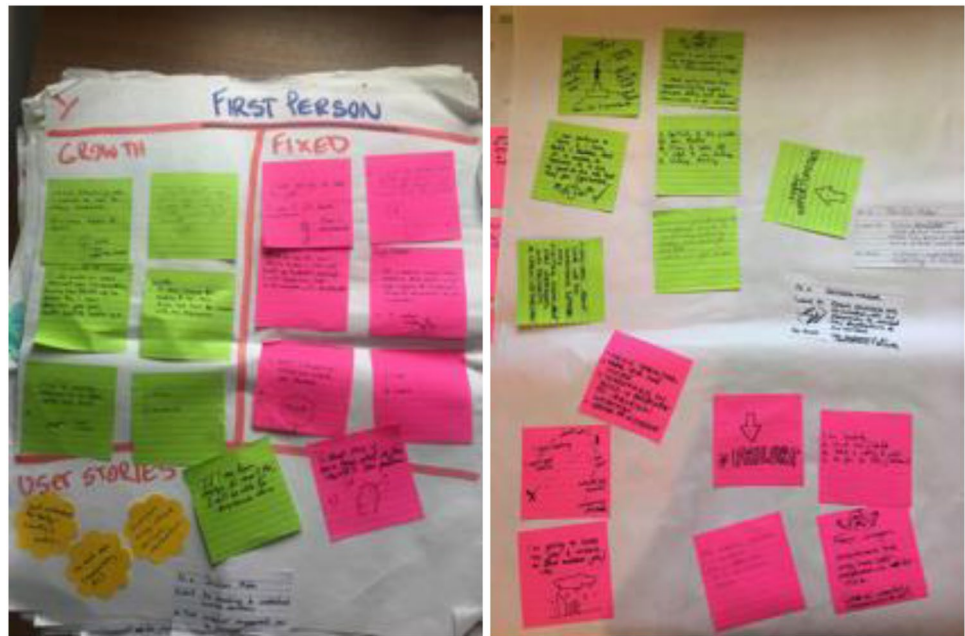
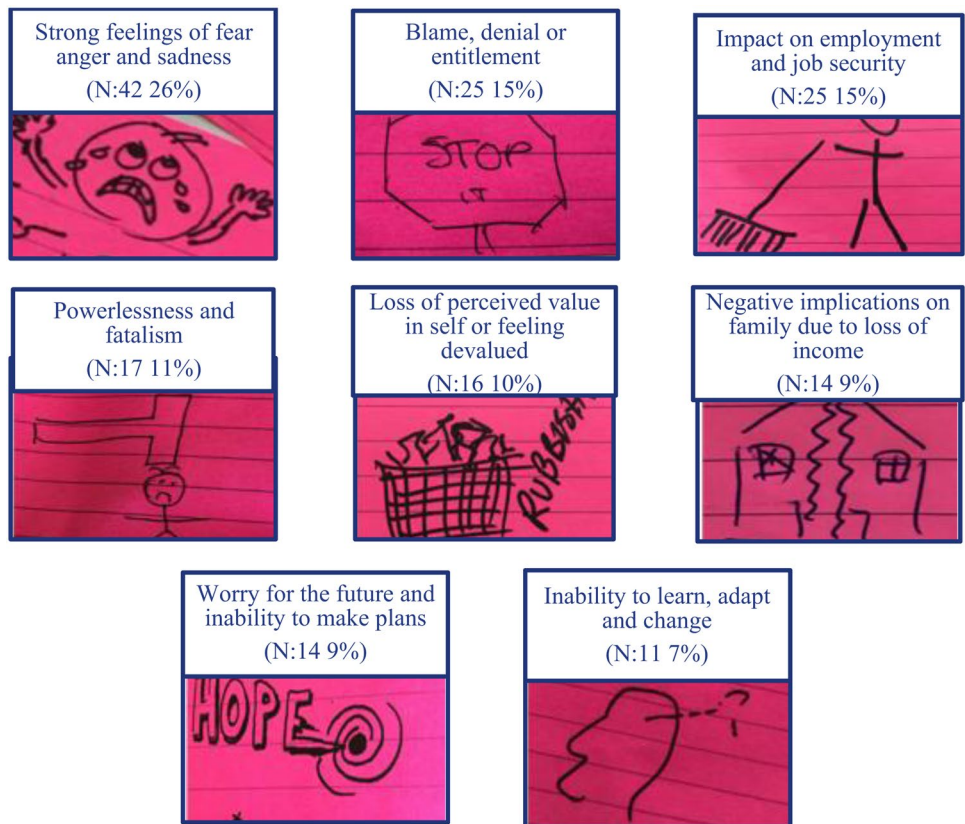


Fig. 3 Fixed Mindset Data Summary



outlines the eight primary themes which are accompanied by an associated image from a fixed mindset perspective (number and percentage—n: %).

The dominant components of the fixed mindset responses were strong expressions of “fear”, “anger”, and “loss of

self-worth”. Expressions were also externalised to express anger or blame towards the leader or stated feelings of “betrayal by the organisation”. A sense of entitlement was expressed when respondents stated that the organisation was to “fix the situation” as “workers were owed for previous

loyalty and sacrifice”. A very small number of participants wanted to “actively resist”, “hack AI” or “cling to the old ways until forced to do otherwise”.

Fatalistic narratives highlighting the scenario as portending “the end”, “death” or “doom” were scattered throughout all four workshops as well as an expressed “feeling of powerlessness” and resignation to the system. The base scenario was set in an organisational setting, and the vast majority of participants were in permanent or contracted employed at the time of data collection. The first response related to “not having job security” or needing to take a “role of a lower level in an overcrowded job market”. For a number of participants who were employed in government roles, which in Australian contexts are often seen to be ‘more secure’, their narrative reflected “how immoral” or “inhumane” the scenario was.

The fixed mindset tapped into a “loss of purpose”, “identity”, and “status”. People questioned “how to support families” and the broader possible effects, including “mental health” impacts and possible “separation of relationships”. “Social isolation” from work colleagues due to the “loss of connection” that could come with the loss of the social aspects implicit in a work environment also were mentioned. The fixed mindset data showed negativity and “inability to make plans for the future” and “what the human relevance is now” in work contexts. Fixed mindset responses reflected a narrative of “not being able to learn” or, for older participants, whether it was “too late to start the adaptation process”.

Analysing the fixed mindset future images enriched the depth of feeling. Many images for the fixed mindset projected “sadness”, “stormy skies” and, in some cases, “graves” and images of people dying, i.e., the loss of what participants perceived to be their ‘comfortable normal’. Other images showed the process of dying, including people falling off cliffs, wandering on unending pathways, being eaten by sharks or “being paralysed”. Images related to sadness and broken homes and family units. One of the most powerful images was that of the “word hope being sucked into a black hole”. A very small percentage of attendees refused to participate in the space of a fixed mindset (5%). These participants had positive growth mindset entries for both parts of the workshop process.

There was not a large difference amongst the workshop results for the fixed mindset. There was some tendency in workshop 2, which took place in a local government setting, for there to be a greater range of responses that connected to family and community. In workshops 3 and 4, which had participation from a greater number of private sector individuals, the focus was slanted more towards an impact on employment or income levels.

Embodiment—i.e. the experience of representing the mindset in a physical form—deepened the expression of the

future response; participants were placed in this fixed state for just a short period of time (under 3 min). The group members then shifted their thinking, without debriefing their ‘first person’ response’, onto the growth mindset. When this shift occurred there was a positive lift in energy and mood in the room in the researchers opinion. Figure 4 shows the shift to much more ‘positive’ and ‘happier’ responses in the images of the future.

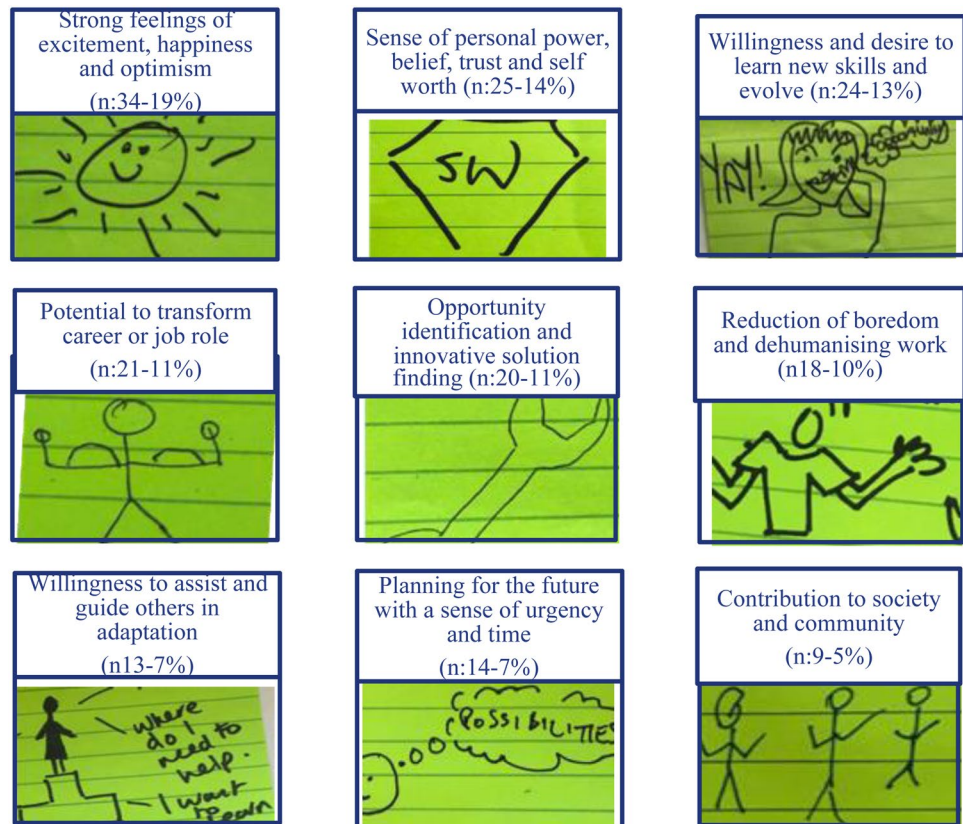
Dweck (2017, 6) states that “...the view you adopt for yourself profoundly affects the way you lead your life”. The main data confirmed by narrative and image via an embodied growth mindset expressed “excitement”, “happiness”, “feelings of inspiration”, and people being “energised” with the opportunity awarded to them. Much of this relates to “self-belief”. Participants expressed a “strong sense of self”, “determination”, and “self-belief in the ability to adapt and find solutions”. A number of participants articulated being part of organisational futures, and suggested that they could “offer something that AI would not” replicate in the foreseeable future such as “connection”, “physical touch”, and empathy.

A number of participants expressed enthusiasm for the “reduction of boring” or “dehumanising” work. They could instantly see “opportunities to be more creative”, “value add”, and “let AI do the boring stuff”. In the growth mindset, some participants “thanked the manager for the challenge” to experience and “trust themselves to live their true purpose”. There was a strong desire and “willingness to learn new skills”. Many participants expressed the motivation to act on their own sense of curiosity and “explore AI technically.” There were examples given of mutual learning, “seeking out new mentors” or courses of study. One participant in particular wanted “AI to be their new best friend at work”. The growth mindset narrative suggested that there was a smaller percentage of participants who wanted to “help transform the organisation” and “be part of the co-design and co-delivery”.

“Following one’s passion” and being able to “plan for the future” was a common theme. Statements described a “sense of pace” to getting prepared and informed for the future. Some participants saw the possibilities of value creation from a financial and economic perspective, either for themselves in terms of their own skills “being more marketable” or for the organisation’s own market share. There was excitement to contribute to something bigger, to “bring better outcomes to the community” and the world not just through the “implementation of AI in the right places” but by ensuring that it was “positive AI” that had the “right verification and validation processes in place”.

The images designed were supportive of this narrative, such as open spaces with “trees and the sun shining”, “a happy dog” and “flying wings”. Other images descriptions related to people “with arms up in celebration” and lots of

Fig. 4 Growth Mindset Data Summary



“smiling faces”. There were many images of positive slogans or icons, including “thumbs up” and “we can do this”. Other participants described their learning journeys as “bridges,” “pathways”, and “tools”. One participant described their image as “me fixing AI when it breaks”. There was imagery around upward movement, “a cape with super woman initials”, “flying towards the sun” or “flexing big muscles”. Images described nature and life flourishing with a “stronger human connections with each other”.

In the case of the growth mindset response, there was not a huge variance between workshops. However, participants working closer to the community from Workshop 2 had a tendency to look beyond the straightforward organisational benefit and towards a larger community contribution. There was only one participant who retained a fixed mindset, and whose response highlighted “a feeling of apprehension about the challenge they would face in redefining and adapting their career and professional value proposition.”

5 Discussion: key findings and implications for organisational adaptation to AI

Dweck (2017, p. 15) suggests that “when you enter a mindset, you enter a new world. In one world—the work of fixed traits—success is about proving you’re smart or talented.

Validating yourself. In the other—the work of changing qualities—it’s about stretching yourself to learn something new. *Developing yourself*. The findings from this research demonstrated that, when considering an AI organisational future, there was a material difference in energy, attitude, image and embodied response depending on what mindset participants held. This difference was reflected in both the initial response to a scenario and the future image that corresponded with that base response.

To deepen the analysis using Reason and Bradbury’s (2008) ‘third person’ (community insights), the thematic analysis from both mindset perspectives in column 2 and 3 have been synthesised into column 1. This led to five key findings being identified that are applicable to entities embarking on the longer term design and deployment of AI and automation strategies (Table 2).

Table 2 above will now be explored in detail in what follows.

5.1 Finding 1—compassion and authenticity are required for healing and enacting personal power

In each workshop setting, the depth of feeling expressed in this research was rich in detail and tended to follow the change curve originally developed from work related to

Table 2 Findings to inform AI strategy design and deployment

Key finding	Associated fixed Mindset themes	Associated growth Mindset themes
Finding 1: Compassion and authenticity are required for healing and enacting personal power	Strong feelings of fear, anger and panic (N: 42–26%) Loss of perceived value in self or feeling devalued (N: 16–10%)	Strong feelings of excitement, happiness and optimism (N: 34–19%) Sense of personal power, belief, trust and self-worth (N: 25–14%)
Finding 2: Mindset embodiment enriches the ability to anticipate, plan and action future scenarios	Impact on employment and job security (N: 25–15%) Negative about the future and inability to make plans (N: 14–9%)	Potential to transform career or job role (N: 21–11%) Planning for the future with a sense of urgency (time) (N: 14–7%) Willingness to assist and guide others in adaptation (N: 13–7%)
Finding 3: Mindset selection affects activation of higher order motivations and needs	Blame, denial or entitlement (N: 24–15%) Powerlessness and fatalism (N: 17–11%)	Opportunity identification and innovative solution finding (N: 20–11%) Reduction of boredom and dehumanising work (N: 18–10%)
Finding 4: Open and willing frames of mind enable shared learning and insights	Inability to learn, adapt and change (N: 11–7%)	Willingness and desire to learn new skills and evolve (N: 24–13%)
Finding 5: Adaptation is affected by what lies beyond the edges of the organisation and into society	Negative implications on family due to loss of income (N: 14–9%)	Contribution to global community and society (N: 9–5%)

grief and loss by Kübler Ross (1969) and later adapted to organisational settings (Parker and Lewis 1981; Miller 2011, p. 29). Initially in the fixed mindset, respondents expressed “shock”, “denial”, “anger”, blame/bargaining. Whilst in the growth mindset, respondents expressed thoughts that reflect later stages of psychological adjustment, more to do with adapting, testing, acceptance. Adapting, testing and accepting would reveal participants being able to “see themselves in a new state”, think outside of their current industry experience and “be clear on how to ultimately move forward” to a new future (whether that be a new role, organisation, or a completely different life goal).

Husain (2017, p. 169) suggests that “today, our sense of identity is...intrinsically tied up in our ability to produce economic output”. AI is designed to achieve some form of advantage, more often connected to power, position or economy, for organisational shareholders (Farrow 2019). AI replacing human workers brings out strong feelings, that require a compassionate and authentic response in the adaptation approach. Organisational systems, particularly in western contexts, have been designed for survival, competition and productivity. Human workers may be involved in changing the business, but often are disempowered from the process of change. Often when a threat or a traumatic event occurs, people typically experience an automated response (fight, flight or freeze). This response varies based on the personal experience, the ecology of support, their power in the circumstance, the resources the person has in and out of work, and the adaptive capacity of the individual. Being in the growth mindset provided a high sense of

“relief”, and strong feelings of “excitement”, “happiness” and “optimism”.

Given this first workshop experience was an individual (first person) reflection activity and not a collective one, responses demonstrated an internal experience, story, or world view. The extrapolation (where all participants were able to shift state just by embodying a growth mindset) demonstrated that, within minutes, participants could be open to a solution and flexible thinking regardless of the personal power they held. Mindset adjustment became a key contributor to individuals’ maintaining a sense of personal power and being able to anticipate the future and be ready for it. The depth of feeling expressed suggests that any organisational adaption approach to AI needs to make space for the expression and healing in individual responses. AI is affecting work and will bring uniquely personalised impacts and traumas in some contexts for those people who are either unsupported or are unable to adjust to the mindset and skills required as systems and indeed society adapt.

This research demonstrated that participants were able to shift their mindset states with appropriate collective support and framing. Empathy needs to be enmeshed into any adaptation approach. Both empathy and adaptive capacity (including mindset awareness and resilience capabilities) need to be embedded in not only the people leading the adaptation to AI, but designed into the adaptation implementation approach itself. Considering the entrenched power structures and systems in organisational and societal settings that typically are designed to benefit the few, this more enabling adaptative approach will be a new capability for

leaders to master and factor into the ecology of the organisation (Farrow 2019).

5.2 Finding 2—Mindset embodiment enriches the ability to anticipate, plan and action future scenarios

Miller (2018, 2) describes “the future does not exist in the present, but anticipation does. The form the future takes in the present is anticipation”. In times prior to turmoil come a unique moment for scenario development and anticipatory readiness. Those who practice risk management and business continuity processes realise a risk can be an unrealised threat or an unrealised opportunity. The research demonstrated that those participants who are in fixed mindsets tend to default towards considering future scenarios as a threat, with a high percentage of responses indicating their immediate response was a reactive “fear response”. Some participants expressed an “inability to engage” in any form of anticipation or active planning to mitigate the possible “impacts on employment” or degradation of “self-worth”. Within a growth mindset, participants could show the ability to engage and adapt and responses became increasingly “optimistic” and “solutions focussed” and rich in positive imagery.

Dweck (2015, p. 10) states that “her research has shown that people’s mindsets play a significant role in their achievement”. Thus, this research has supported Dweck’s (2015) view. The insights generated revealed a link to enriching the ability to anticipate and plan for longer term aspirations. Futures literacy enhances participants’ adaptive capacity. Miller (2018, p. 2) suggests that “using-the-future, for different reasons and in a variety of ways is called Futures Literacy”. Futures Literacy, as a dedicated area of capability, has been part of the futures research field for some time, and made progress through a Global Futures Literacy Network facilitated by UNESCO (2019). UNESCO (2019) defines futures literacy as “important because imagining the future is what generates hope and fear, sense-making and meaning. The futures we imagine drive our expectations, disappointments and willingness to invest or to change”.

Expanding futures literacy and adaptive capacity are essential in the complexity in which we are living (Miller 2018). Today’s experiences provide an opportunity to grow futures literacy and therefore our anticipation and planning to respond to possible futures, through mutual and inter-sectorial learning opportunities. The fixed mindset data demonstrated the worst case view of the future (death, powerlessness, hopelessness), but it also offered valuable information on where organisational leaders and the individual themselves can respond and lessen the likelihood of the worst case scenario taking place. To have the ability to make plans, people need to progress through their pain as a

first reaction towards a psychological space where they can “be open” and “ready to research and plan futures”.

Miller (2018, p. 2) suggests that “people’s fictions about the later-than-now and the frames they use to invent these imaginary futures are so important for everyday life, so ingrained and so often unremarked, that it is hard to gain the distance needed to observe and analyse what is going on”. The workshop process enabled participants to reach into the future and generate collectively combined future images and actions using Reason and Bradbury (2008)’s ‘second person’. The growth mindset, combined with the layering up of the insight, broadened the lens from the individual viewpoint to a more collective or shared future. Birkinshaw and Ridderstråle (2017, p. 31) suggest that “we need the ability to work collaboratively, so that our fragments of knowledge can be combined effectively with the knowledge of others”. 13% of participants expressed “willingness to assist and guide others in the adaptation journey” to the shared and positive future state.

5.3 Finding 3—Mindset selection affects activation of higher order motivations and needs.

Maslow (1943) created the concept of humans having a ‘hierarchy’ of base needs. The model starts at the base level of physiological needs (water, shelter and food), before moving progressively to higher needs of safety or security (from emotional and physical harm), social or love (for belonging, friendship and acceptance), esteem (including autonomy, achievement, status and recognition) and the need for self-actualisation (to transcend or live one’s passion or potential). Maslow’s (1943) work suggested that people are motivated to satisfy these needs. If the lower needs are threatened, it is more difficult for people to maintain achievement of the higher order needs.

The workshop data indicate that, within a fixed mindset, participants tend to focus on responding more to the lower levels of the Maslow’s (1943) hierarchy of needs (food, shelter, safety, security of self and family). Whilst in the growth mindset, these base needs are not mentioned, and instead the focus is more on “learning”, “growth”, “living one’s passion”. These growth mindset responses were more attuned to the higher levels of Maslow’s (1943) needs of relationship, esteem, self-worth and self-actualisation. Growth mindset reframed the anticipation of the future. Thus the perceptions and images being described were of a higher order in nature as if the base needs were “taken care of”.

Personal adaptation often goes through a period of discomfort. Changing habits and patterns means that people are adjusting and readjusting. In our ‘normal’ state, we are comfortable in our roles; we are competent; we are habitual and form attachments with the people we work with. Moving into a combined AI and human working relationship

will impact on our attachment to our workplace. In a fixed mindset, a change to an attachment, makes people feel that their base needs (and attachments both social and physical) are threatened.

In some cases, workshop participants held on to the ‘old future’ or the cultural norms or the memory of the past, with sentimentality or nostalgia (Ramos 2004). Those attachments were in relation to the “income received”, the feeling of security, and the known social and political dynamics of the human dominated organisational setting. In a growth mindset, there was instead a suggestion of “confidence” and “guarantee of income due to taking opportunities”, participants could consider the potential outside of “the boring or dehumanising work”. People could “live their passion” (akin to Maslow’s self-actualisation), build a “brighter new future” and have time for creativity and innovation. Without the guarantee of systems such as a Universal Basic Income (UBI) or other social or economic safety nets, base physiological needs are challenged. In adaptation processes, there will need to be a degree of acknowledging that people’s current attachment to lifestyle and income will be threatened, so alternative forms of economic and financial arrangement will need to be considered.

5.4 Finding 4—Open and willing frames of mind enable shared learning and insights

The deeper and wider the change, the greater the amount of learning is required. Davenport (2018, pp. 189–190) suggests that “projects employing cognitive technology are not just about technical change, but also about changes in organisational culture, processes, behaviour, and attitudes”. Therefore, the willingness to challenge existing scripts and have the energy and growth mindset to rewrite new narratives is paramount. Dweck (2017, p. 141) suggests that in “creating a growth-mindset environment in which people can thrive, involves presenting skills as learnable...and giving feedback in a way that promotes learning and future success”. The findings of this participatory research, combined with the themes around opportunity identification and self-belief, support Dweck’s (2017) notion: they reveal that mindset choice and embodiment of that mindset will be either a catalyst or inhibitor for transformation and adaptation.

Wildman and Inayatullah (1996, p. 729) state that in anticipatory learning processes, “we consciously and unconsciously use our ‘maps of the world’, i.e. our mental paradigms or mindscapes, to help make the world real for us”. The data provided by the workshops, particularly showed the ability of participants to shift state quickly, and then be able to maintain that state with the right environment and modelling from the workshop leader (in this case, the researcher/facilitator). Participants demonstrated the ability to stretch to the polar opposite ends of worst case (fixed mindset) and

best case (growth mindset). This demonstrated that the ability to ‘stretch and shake off’ a more negative, biased, paralysed state was possible for the vast majority of participants (note especially that 5% of the participants were not able, however, to demonstrate the fixed state even for a few minutes). Adaptive capacity is a key aspect of resilience and anticipatory futures literature (Bussey et al. 2012). Bussey et al. (2012, p. 387) state that “adaptive capacity is historically specific. It is a measure of the human ability to respond to threats and stimuli in the social and natural environment”.

Each participant has their own ‘map of the world’. A person’s own personal learning journey has included learning and growth experiences at home, school, in some cases university, and in the workplace. One of the key findings of this research was the variance in intensity of desire and willingness (that mindset shifts caused) to embark on learning into an AI organisational future scenario. In a fixed mindset, despite only 7% of data entries specifically mentioning learning, most comments related to finding an excuse not to learn. Comments such as ‘I’m too old to learn’, ‘this is all I know’. The correlating images related to winding pathways, a person locked in a box, and comments related to people being ‘weighed down’. The growth mindset data were the third most responded-to theme (13%) after feelings of happiness and strong belief in self. Images related to a positive reflection, a smiling person working with a robot, positive messages about growth, and images of reflective practice.

Polak (1973, p. 5) describes that ‘the future not only must be perceived; it also must be shaped’. A key theme expressed via the growth mindset was an anticipation for, willingness and ability to plan and prepare for the future, for not only the self but also for the wider community. The gloom, danger and doom in response to the future-based scenario, when in a fixed mindset, would have implications for the approach to adaptation and the layers of learning required to enable an actionable future to be nurtured. Growth mindset in these workshops appear to enabled more positive feelings and energy, which was evidenced by increased motivation, positive noises such as laughter and participants working together. In the researcher’s opinion, this could be felt across the workshop settings and seemed to bring greater output in both identifying opportunities as well as participatory problem-solving. Dweck (2017, p. 21) suggests that “People in growth mindset don’t just seek challenge, they thrive on it. The bigger the challenge the more they stretch”.

5.5 Finding 5—Adaptation is affected by what lies beyond the edges of the organisation and into society

For-profit organisations and corporations are often described as having agency and personalised power (Ramos 2004).

Legal structures often create a ‘hard edge’ to an organisation; thus, the people in that organisational structure (whether it is distributed or centralised) contribute to making the organisation sustainable and profitable. Contemporary economic and market forces and competition structures reinforce these principles further. However, to those participants, especially in workshop 2 from a local government context, work, family, life and community were expressed as enmeshed concepts, unable to be separated (Bateson 2018). The insights from this research suggest that adaptation to AI in an organisational setting, does not just affect the individual worker in that organisation, but flows into the other ecosystems of which that person is a part. 9% of responses, whilst in fixed mindset, had an immediate personal concern (outside the boundaries of the organisation in particular) to impacts on stability of home, family, social connection, health and lifestyle.

There was no mention of family specifically within the growth mindset dataset. However, 5% of responses connected to fulfilling a broader community or global purpose. A broader contribution to a broader purpose included consideration of impacts on ecology and biology. The suggestion that an impact on humans is an impact on nature, and vice versa (Bateson 2018). A change to one part of the system flows to other dimensions. AI will have the potential to profoundly affect how people work, interact, and live together. Organisational adaptation approaches, to be truly sustainable, need to consider the impacts outside of the walls of the organisation to levels that are “transcontextual ... liminal or the space in between” (Bateson 2018, p. 79). These contexts, identified by participants as part of their third person discussions, are summarised in Fig. 5 that can be used as a lens for impact analysis.

Adaptive capacity has a strong relationship to concepts such as individual capacity, personal endurance and individual or community resilience. According to Bussey et al. (2012, p. 387) “adaptive capacity (is) determined by the level of social and financial capital and if low, their resilience is compromised as a result”. Exploring mindset perspectives has created transparency to a participant’s broader ecosystem: that is, “I am not ‘just’ a worker in one organisation. I am a person, worker, parent, friend, neighbour, provider, living being, part of nature, part of the planet.”

Any effect on an individual person in the organisation automatically has an effect on the systems of which they are part and the subsystems that they then interact with societally. A classic “butterfly effect” in accordance with chaos theory where one change that seems immaterial has a large effect elsewhere (Bateson 2018). Impact analysis and environmental scanning tools often do not consider this. Figure 3 shows why adaptation to AI may for some be challenging. Exploring both mindsets have made this contextual illumination possible. Each context would impact on the willingness

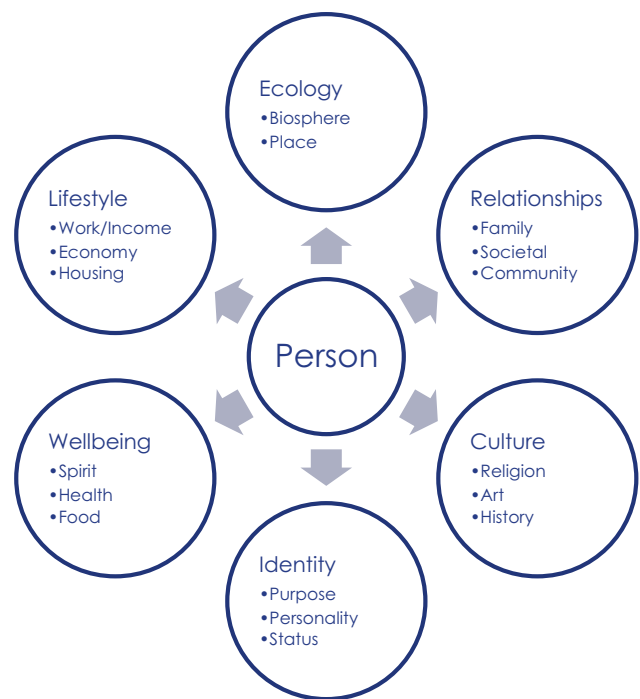


Fig. 5 Contextual analysis streams

and ability of a person to engage with the adaptive process in a sustainable manner.

6 Limitations of the research

As in all qualitative research processes there are limitations within the research that should be outlined. Firstly, the research was based on gathering information from participants who were from varied organisational environments. Thus, some unique organisational cultural norms, power structures and possible bias from previous exposure to both mindset concepts and AI may have influenced individual perspectives. Given a large proportion of participants were from government settings, and the remainder predominantly from academic and consultancy, there may have been a bias to those from government and/or public policy settings.

Future research would benefit from a comparison of response from particular audiences such as other government agencies; or an expansion to those specifically from the AI community (AI companies, AI research labs etc.) or those workers in future ‘smart factories’ to see if mindset matters to the same extent by those in a powerful position of creating AI algorithms. Future research would assess if the same themes and correlations in both growth and fixed mindset would remain.

Secondly, another possible limitation is that a physical workshop interaction is likely to play a role in influencing

the data and individual experience. Those in the same organisation, may have chosen to dilute their true response to the scenarios provided due to the lack of being power-free in the social discourse. The staff engagement and satisfaction levels which were not assessed as a pre-cursor to the workshop could have an affect on the individual response. Future research could explore how shaping the future would be tackled through social and ideally ‘power-free’ contexts. This would add challenge to the design given power structures are particularly strong in more corporate organisational settings who may be early adopters of AI or automated forms of technology.

Thirdly the limitation of this research is that the workshop was a one off, unique collection of participants, thus the ability to check for sustainability of a more positive mindset post workshop process and when actual AI staff impacts occur rather than a scenario or hypothetical situation was not possible. It would be useful to test if the in a virtual setting if the texture achieved in the recorded images (drawings in particular) of the future may not have been achieved. Future research should examine the nature and depth of responses received in a virtual workshop setting, and perhaps have this aided by some front loading of the virtual drawing software skill of participants.

Finally given the workshop had a component of education as part of the framing, there was a potential risk of the researcher framing too rigidly or biasing the result by over emphasising particular traits in her embodied role play. This research study managed this risk by focussing not on assessing which mindset participants were in, but rather exploring the difference in response, based on a personalised experience ‘in’ a particular mindset. All participants in the workshop setting had the power to document their own response confidentially and share within the scope of their personally assessed comfort level. This ensured that all participants (regardless of previous exposure to the AI, mindset or organisation and, industry setting etc.) had full agency over their own personalised response. For future research this potential risk of bias could be mitigated via a video recording to script of both mindsets in the embodied role play, rather than a possible shift that would come given this aspect was less scripted.

7 Conclusion

Polak (1973, p. 3) suggests that “The more sophisticated man’s (sic) time consciousness becomes, the more skilled he (sic) is at finding paths to the Other”. Global economic contexts have for many years reinforced a dominant capitalist economic lense to the definition of what is of value, who has the power and who has not. During the writing of this article the COVID-19 pandemic impacted the world and all

of its systems and structures. At the time of conducting the data collection for research in late 2019, however, the greatest perceived risks in corporate settings were global market volatility, the rising disparity between the haves and the have nots, unclear possibility of ecological disaster and the drive by corporations to be financially efficient and effective. AI replacing human labour in organisations to achieve a number of economic benefits was a valid value proposition. Turn the clock forward a few months, and the COVID-19 pandemic offers the situation of an uncontrolled event with wide reaching systemic consequences. In some industries AI is a salvation, assisting in saving lives, especially in workplace settings where close proximity is essential for current production practices and people want the choice to be physically distant from danger.

This research collected one hundred and twenty-six people’s perspectives on the base scenario of a ‘machine taking a human’s role’. In the scenario provided as the basis of this research, there was a decision made. There was also a limited range of choice and control in the timing needed to prepare for any impacts of AI on individual employment. Participatory futures research can trigger insights that will enable organisations and individuals to be prepared for any major changes. Organisational and societal implications identified in this research range from having a contingency strategy in place, a business continuity plan, employee retraining schemes, personal psychological support and the need for government controlled societal income safety nets.

Using mindset as a scenario overlay was innovative and unique to futures research processes. The growth mindset was the best case, and the fixed mindset, the worst case, with the acknowledgement that there is a scale between the two that people will slide between based on their personal power in the situation. The research does not suggest that adopting the ‘right mindset’ is the only option for those who have no power in a change like ‘AI taking my job and leaving me jobless’. The research suggests in finding 1, that regardless of the power and control a person has in a adaptation process ‘compassion, empathy and authenticity is required for supporting people to a positive outcome’ that does not have larger societal ramifications.

Fixed mindset reflected sadness, incredible loss and fear. Growth mindset data offered positive displays of kindness, practical problem-solving and mutually learning. There is always loss in letting go of old patterns. Finding 2 supported this through the evidence showing that where people were in growth mindset, they were likely to positively influence ‘their ability to anticipate, plan and action future scenarios’. Essentially act to create a future they personally and collectively are interested in pursuing.

Another insight connects to focussing on what is ‘really’ valued and finding 3 indicated that, base needs were focussed on collectively, via willing people wanting to support their

colleagues and support those who were heavily disrupted. AI in the growth mindset context was not seen as a frightening concept, but offered hope. Finding 4 was implied ‘open and willing minds from different knowledge domains (science, technology, humanities) coming together and enabling and sharing insight’ around common aims. The groups in growth mindset changed the dialogue from AI being a front of mind threat to loss of job, to be an enabler and tool to speed up a solutions, to assist in predicting and diagnosing patterns for better supply chain, and saving lives by providing robotic or augmented remote distancing support in health care or in high risk manufacturing or production contexts (Gent 2020; Knight 2020; Wakefield 2020). All use of AI however comes at a cost, and that cost may be to service the base needs that would still require some form of currency or UBI to meet.

The key findings from this research can be applied to all forms of disruption. The “first, second, and third person” research approach utilised, overlaid with Dweck’s (2017) fixed and growth mindset theory, was a participatory and generative approach to inquiry (Torbert 1998; Reason and Bradbury 2008, 6). Having a personal exploration first and then being able to share and come to common themes with others in a learning environment, enabled participants to find a clearer space for problem-solving and purposeful, higher order thinking. What is needed now, is for this ‘switch in mindset and attitude to be sustainable ‘beyond a workshop’ and in more challenging settings, a subject for further research. Finding 5, challenges people to consider the impacts beyond the walls of the organisation and connect to societal impacts society. This research demonstrated that, within minutes, with the appropriate motivation, framing and mutual supportive environment, participants are able to switch from a fixed mindset, that was quite individualistic to a growth mindset with more ‘self actualised’ societal or humanitarian considerations.

In conclusion, this research highlights that developing and sustaining a growth mindset supports a more energised adaptive capacity. The opportunity of widening of the research to other forms of disruption (such as the COVID-19 pandemic) would enable these themes to be expanded into more societal setting. What having a growth mindset in these participation workshops showed was that there is no better time than to focus on the opportunity people have, collectively, to visualise positive images of the future and co-create new systems that sustain positive change. Organisations considering AI or automation strategies, will get better results if they hold a safe open space in which staff can be vulnerable, express feelings and doubts, and then be supported into moving forward with purpose. Today, an open creative and problem-solving mindset is needed to bring forth multiple scenarios, explore complexity, and make decisions about how AI fits into new or impacted structural and societal models. Bringing in the transcontextual context of

nature, family, community, biosphere and organisational is critical to make sure we support our society to be resilient, aware and adaptive in shaping our futures (Ramos 2004; Bateson 2018).

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