

Figure 1. Pedagogical Strategies from Art and Design

Strategy	Description	Learning modes	Useful Sources
<i>Playfulness</i>	Open, positive experimentation with a broad (or specific) goal in mind.	Thought experiments; ‘pretend’ scenarios; possible futures; rapid-response activities with non-serious failures and low-stakes restarts; doing an activity under special condition - i.e. in the dark / in a home kitchen / outdoors; role play; immersion in a narrative or game.	Barrios-O’Neill 2019; Candy & Dunagan 2017; Debord 1958; Dunne & Raby 2013; Sun et al. 2021; Herodotou et al. 2019; Kangas 2010; McGonigal 2011; Rhisiart et al. 2015; Staley 2019.
<i>Making</i>	Creating actual things, with the aim of contributing to a solution/response.	Brainstorming and concept development leading to testing; physical making, building, drawing, or crafting; digital creation on simple platforms; writing; prototyping; testing with random users or audiences.	Bell et al. 2013; Burnett & Merchant 2020; Dewey 2008; Ellsworth 2005; Jandric et al. 2019; Jorgenson et al. 2022; Snaza et al 2014, 2016.
<i>Distributed intelligence</i>	Finding ways to connect and collaborate without a central controller.	Gigamapping; devising communication platforms or norms across communities; knowledge building through wikis and shared forums; non-hierarchical team-building.	Barrios-O’Neill & Hook 2021; Jandric et al. 2019; McGonigal 2011; Sevaldson 2018; Snaza et al. 2014; Vervoort et al. 2010.
<i>Interdisciplinarity</i>	Boldly crossing (or ignoring) subject or discipline boundaries.	Challenge-led approaches; partner and group work combining diverse expertise; consultation with discipline experts in multiple fields to synthesise knowledge; translation processes between fields; critical boundary interrogation	Blevis & Stolterman 2009; Bremner & Rodgers 2013; Brown et al. 2015; Haraway 1988; Horst & Gladwin 2022; Jones et al. 2010; Loveless (ed.) 2020; McGregor 2015;

		and redefinitions; interdisciplinary wayfinding.	Olid-Pena 2012; Pschetz, Ramirez- Figueroa & Revans 2022.
<i>Criticality</i>	Sustained interrogation of claims, arguments, and assumptions (especially your own).	Deconstructing or dismantling an existing argument or idea; creating a logical argument with evidence; close reading and discussion of peer- reviewed research; validation of research through testing; challenging internal perceptions through perspective shifting; examining biases; mapping implications in time and space.	Barad 1998; Bardzell et al. 2012; Contanza- Chock 2020; Bardzell & Bardzell 2013; Latour 2004.
<i>Groundedness</i>	Willingness to try out ideas ‘in the wild’: outside the classroom, studio or conversation space.	Prototyping; speaking to people outside the experience; developing ways and routines to apply an idea; site visits; field recordings and data gathering for analysis; consulting with experts for feedback to refine an approach.	Barrios-O’Neill & Hook 2021; Bussey 2014; Bentley 2012; Constanza-Chock 2020; Dunne and Raby 2013.
<i>Adaptability</i>	Openness to informed change, whether in aims, direction or approach.	Role play or scenario work with changing conditions or disruptions; challenging interventions to spawn new responses; using failures or failure scenarios as inspirations for innovation and creativity; embracing different forms of uncertainty, such as chaotic principles, branching possibilities, or random events.	Hayles 2012; Inayatullah 1998; Le Feuvre (Ed.) 2010; Sevaldson 2011; Sharples et al. (Eds.) 2016; Springett 2015; Vidergor 2018.

<p><i>Ontological openness</i></p>	<p>Considering other-than-self and other-than-human perspectives and lifeworlds in responding to scenarios or challenges.</p>	<p>Role play; method acting; speculative exploration of other species' sense experience, social or emotional lives, or intelligence structures; creating narratives from other perspectives; experimenting with altered physical conditions; improvisation games; speculative 'interspecies panel' or jury to assess approaches.</p>	<p>Barrios-O'Neill & Hook 2021; Bazzul 2022; Berger 2008; Bogost 2012; Braidotti 2019; Constanza-Chock 2013; Ingold 2013; Leander & Burriss 2020; Sandahl 2015; Wilson 2016.</p>
<p><i>Resilience orientation</i></p>	<p>Valuing systemic health over individual gain, in-group gain, or growth for its own sake—leading to a more resilient overall system.</p>	<p>Deep mapping of whole systems involved in scenarios; data gathering across whole systems or diverse sampling across wide environments; philosophical discussion of impacts at different scales in space and time, for different entities; critical reevaluation of 'resilience' in different contexts.</p>	<p>Dishon & Gilead 2021; Evans & Bahrami 2020; Marenko & van Allen 2016; Seginer 2008; Vervoort et al. 2015.</p>