



# Artificers, satisficers and optimisers: Echoes of Simon and ‘ways of being’ in Design and Technology Education

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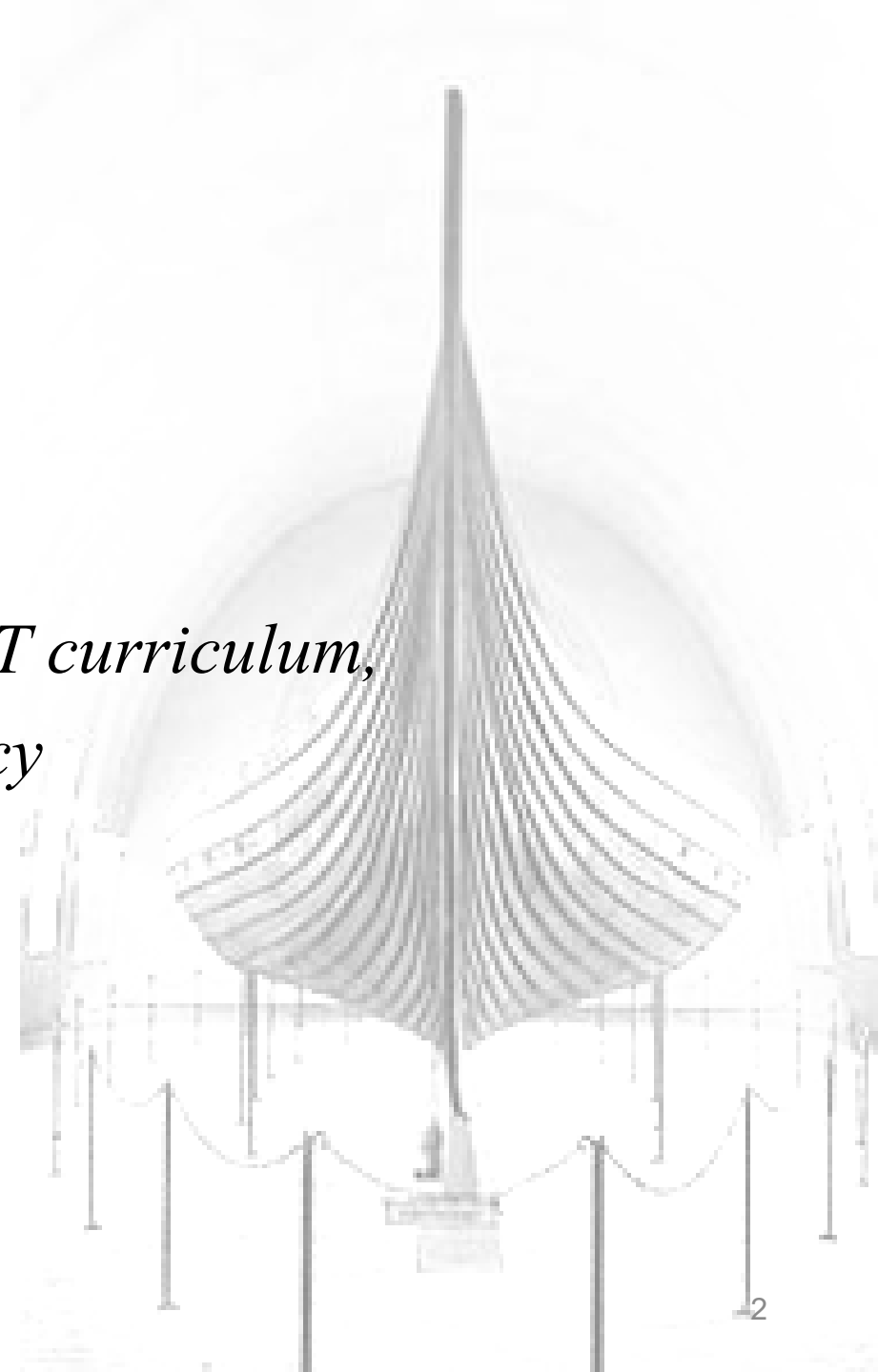
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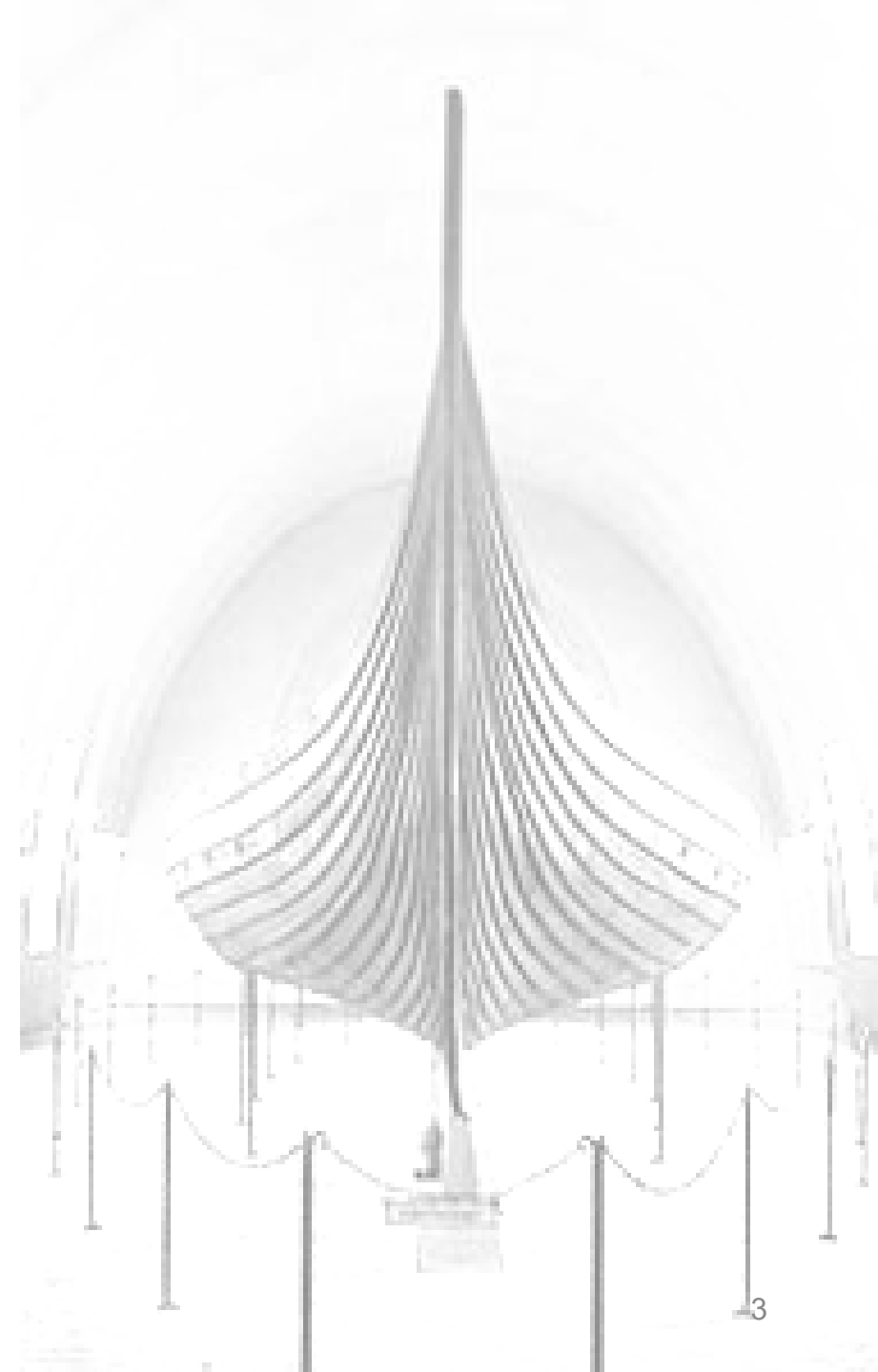
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*Satisficing, Design history, D&T curriculum,  
the Artificial, Climate emergency*



Simon, H.A., (1969/1996),  
*The Sciences of the Artificial*,  
(3<sup>rd</sup> Edn.), The MIT Press.



# Starters

- All technologies (the Artificial) are designed.
- Design is intentional action on the world.
- Examples of technologies include governments, countries, education systems, etc.
- ‘Artificial’ often is used in a negative sense of phony or fake. For Simon (and this paper) ‘artificial’ is used in as neutral sense as possible meaning human-made as opposed to natural (a not-unproblematic dualism).

# History

1950s

- A period of technical rationality with huge developments in social and natural sciences, technological creativity, capitalist growth and consumerism, alongside great optimism about what could be achieved globally.

1960s

- “...(the) design science decade.” (Buckminster Fuller). The trend being to ‘scientise design’.

1972

- “There are professions more harmful than industrial design, but only a very few of them. And possibly only one profession is phonier. Advertising design, in persuading people to buy things they don’t need, with money they don’t have, in order to impress others who don’t care, is probably the phoniest field in existence today.” (Papanek, 1972).

2005

- “Many of the troubling situations in our world are the result of design decisions. Too many of them were bad decisions...The parlous condition of the planet, our only home, is a good example. Eighty percent of the environmental impact of the products, services, and infrastructures around us are determined at the design stage...we designed our way into the situations that face us today.” (Thakara, 2005)

## Herbert Simon (1916-2001)

- Extensive research addressing (amongst others) artificial intelligence, organisation theory, decision-making, cognitive science, information processing and complex systems.
- Theorising of problem solving and decision-making across organisations, engineering and emergent computer science.
- His problem-solving theories; ‘...provided a framework for (an) extension in the scope of design studies...within the paradigm of technical rationality...(as well as providing)...a sound, rigorous basis for much of the existing knowledge in design methodology.’ (Dorst & Dijkhuis, 1996).

“Synthetic or artificial objects, and more specifically prospective artificial objects having desired properties – are the central objective of engineering activity and skill. The engineer, and more generally the designer, is concerned with how things *ought* to be - how they ought to be in order to *attain goals*, and to *function*.”

(Simon, 1996. Original italics)

# Simon's neologisms

- Simon points out that, try as we might to get the best possible result when designing the 'artificial', we can rarely achieve this. We seek the optimal (he calls it optimisation) but we can only compare 'better' or 'worse' or "... (we accept) 'good enough' alternatives, not because less is preferred to more but because there is no choice." (Simon, 1996).
- "Since there did not seem to be any word in the English language for decision methods that look for good or satisfactory solutions instead of optimal ones, ... I introduced the term "satisficing" to refer to such procedures." (Simon, 1996:119).
- His term combines two words, *satisfy* and *suffice*, to create the verb *to satisfice*.



# Bounded rationality

No matter how rational our decision-making may be, when applied to multiple variables (in what he calls the *problem space*), our rational options are necessarily limited if success is to be achieved.

Thus, we satisfice rather than optimise.  
He describes this as *bounded rationality*.

He offers two examples of ‘triumphs of bounded rationality’:

- the writing of the American constitution;
- the landing of humans on the moon.

‘...(B)ounded rationality...is most comfortable with clear-cut and limited goals.’ (Simon, 1996).

# Further context on Simon – alternative paradigms

- Dorst & Dijkhuis (1996) compare Simon's 'rational problem-solving paradigm' with Schön's 'reflection-in-action paradigm';
- Schön (1983) resisted the positivist-analytic framing of 'problems' and 'solutions' ("Technical Rationality") and took a human-centred approach, seeing design as a reflective conversation with the situation and calls for "...an epistemology of practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict." (Schön, 1983)
- Archer witnesses the 1990's shift and the 'semantic turn' (Krippendorff & Butter) away from: "...designers' blind submission to a stable functionalist social order, towards the individual and cultural meanings of things."
- "(The) producer-product-profit logic dominated decision-making during the industrial era...an era of scarce material resources and hierarchical social structures, coupled with an unwavering belief in technological progress..." (Krippendorff, 2006)

# Simonian 'ways of being' in Design and Technology education:

## Three suggestions:

- Satisficer: operates on a spectrum from 'that'll do' (minimalist approach) to a 'that is the best that can be done' (maximalist approach); and, in the game of 'design as the weighing-up of competing variables', the satisficer is ever-challenged to treat all variables symmetrically.
- Optimiser: strives for the (usually impossible) optimum for all variables (and is thus, naïve?); or perhaps...applies optimism/positivity that enables a vision or a goal and works beyond utility from 'that'll do' and into risk-taking.
- Artificer: a skilled craftsperson, someone clever at devising things, possibly an inventor; delivers a product, process or system to the highest possible standard.

Please consider for pupils, students and teachers alike.

Echoes of Simon in D&T Curriculum design – *four groups of issues*:

(‘Curriculum,’ here, embracing far more than the immediacy of the classroom)

Design and Technology education’s role in:

- improving the damaged world that our children are inheriting - and for which they will be responsible;
- general education and in supporting designing as a way of *being human*;
- raising public awareness of the centrality of design to any technological development;
- deepening public participation in design decision-making.

# Design and Technology education's marginalisation by:

Instrumental-functional economic and educational policies;

OECD/PISA-driven testing regimes (Organisation for Economic Cooperation and Development/Programme for International Student Assessment);

STEM agendas.

# Design and Technology education's identity issues:

The case for dropping/maintaining the 'D&' in D&TE;

The value, or otherwise, of trying to locate D&T around a defined body of knowledge;

'Subject'; 'discipline'; 'field of education'; 'learning area'; or, 'a literacy' .....

# Design and Technology education's pedagogical challenges:

Holistic rather than reductionist approaches to learning;

Positivist valorising of technological 'problems' to be 'solved';

The problem of teaching singular design 'processes' that do not mirror the realities of designing – epistemologically or practically;

Child or system first?

On Simonian terms, we could say that none of the above can be satisfied because any associated rationality is un-bounded.

However, I subscribe to international curriculum theorist Pinar's position that curriculum is a 'complicated conversation'. Dialogue, politics and philosophy all contribute when technical-rational approaches preclude design strategies that are open and messy.

Enlightened teacher-satisficers who have the professional freedom and judgment to be the arbiters of curriculum and learning are better placed than those teachers operating under dictated curriculum constraints.

Against positivist 'problem-solving', positivist education models and positivist politics, design offers multiple alternative genres using *human-centred* methodologies, including:

ecological design, speculative design, participatory design and critical design.





## THANK YOU!

This paper arose from seeds sown by Howard Middleton (1998) and colleagues (e.g. Stevenson, 2003) in the Australian Technology Education Research conferences of the early 2000s.

An itch has been scratched!