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Mitcham's Fourth: a case for foregrounding volition when framing Design and Technology Education.

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Abstract

In his 1994 text "Thinking Through Technology: the path between engineering and philosophy", Carl Mitcham presented a typology of four 'modes of manifestation of technology': as object; as knowledge; as activity; and, as volition. In line with Mitcham's own position at the time (and more recently), this paper takes as a premise that the first three of these dominate Design and Technology (D&T) curriculum in traditional and restrictive ways.

The paper first presents a brief overview of the text and the first three modes; second, presents some philosophical context to the concept of volition; third, reflects in greater depth on 'technology as volition'; and, fourth, sketches a case for foregrounding volition in D&T educational thinking and practice. On its journey, the paper explores concepts of (free) will, choice, decision-making, motivation, intention, human expression, individual and social enterprise, technological (non-)neutrality and incontinence (in Mitcham's sense of the word).

The paper is a contribution to the general education case for D&T curricula to take dynamic, humanistic and holistic forms rather than restricted technical-instrumental or purely realist forms.

Introduction

Technology, or the making and using of artifacts, is a largely unthinking activity. It emerges from unattended-to ideas and motives, while it produces and engages with unreflected-upon objects. We make dinner, sew clothes, build houses, and manufacture industrial products. We use tools, turn on appliances, answer telephones, drive cars, listen to radios, and watch televisions. In our technological society, all this happens mostly by habit... (Mitcham, 1994:1)

These opening lines of Carl Mitcham's text reflect its engaging title: "Thinking Through Technology: the path between engineering and philosophy". The book offers both a comprehensive overview of the field of technology and an articulation of the case for maintaining a humanities engagement with technological theory and practice. As the book approaches its quarter-century the philosophical, sociocultural and political understandings of technology and its practices have developed hugely. However, just as it is a challenge for Design and Technology (D&T) education to 'keep up' with technological developments (if it really needs to) so it is the case for educators to deepen their understandings of how the phenomenon of technology is at once shaped and world-shaping.

Simplistic understandings of ‘technology’ hold back qualitatively rich curriculum formulations of D&T education – whether at the policy or classroom level. Those who would constrain the field to uncritical, values-free making and skilling, or to techno-positivist design-poor alliances of the STEM (science, technology, engineering and mathematics) kind not only fail to advance what constitutes ‘education’ for students themselves but also fail their publics. Mitcham’s text takes up the challenge of properly situating technology in existential, socio-cultural, political and moral philosophies.

Mitcham contends (p.12) that the philosophy of technology should: a) be aware of its own history (Part One of the book); and, b) be able ‘to articulate a set of systematically integrated issues’ (Part Two). He works a rich discussion between *engineering philosophy of technology* and *humanities philosophy of technology* and points out that the term ‘technology’ is used in both narrow and broad senses by engineers and humanities scholars alike. He defends the broader connotations but distinguishes *four modes of the manifestation of technology* in the broad sense. Because, ‘(t)echnology is pivotally engaged with the human’ he suggests it should be considered ‘...in relation to the essential aspects of a philosophical anthropology – with differences drawn between its manifestations in the mind, through bodily activities, and as independent objects...’ (p.159). From these he posits technology *as knowledge*, technology *as activity*, and technology *as object*. However, he acknowledges that such a conceptual framework constitutes an oversimplification: that the construct of ‘mind’ should not be restricted to cognition. ‘The will is an equally real if subtle aspect of the human.’ Thus, he adds technology *as volition* as his fourth mode of the manifestation of technology.

The concern of this paper is that much Technology Education research and practice currently defaults to the first three modes at the expense of “Mitcham’s Fourth”. The paper proceeds with a brief sketch of each of the three ‘modes’ as presented by Mitcham (he devotes a chapter to each). Technology-as-volition is then given greater scrutiny and key aspects along with some additional philosophical background are assembled for reflection on the educational scene. Finally, a case for foregrounding technology as volition in Design and Technology education is sketched out.

Technology as object

Whilst it may be fairly obvious to see types of technology as material objects, Mitcham reminds us that technological objects can also originate from other species and he notes how classifying objects by materiality ‘...excludes sociotechnical systems from being technological objects in a primary sense...’ (p.161). Drawing on Mumford (1934) he offers a ‘spectrum of artifacts’: clothes; utensils; structures; apparatus; utilities; tools; machines; and, automata (p.162). He expands with other possibilities: tools for doing or performing (letters, numbers, musical instruments); objects of art or religion; and, toys. His investigations embrace animal artifacts; the human experience-shaping nature of artifacts; the social dimension of artifacts; and, the phenomenology of artifacts.

Technology as knowledge

At a base level, Mitcham contrasts technological knowledge with ‘knowledge of nature’ – the one of artifacts, the other of natural objects. He then posits that technological knowledge might be considered on a disciplinary basis e.g. architecture and the multiple forms of engineering: mechanical; civil; electrical; chemical; etc. However, no such approaches reveal anything ‘...about the unique epistemological structure of technology as knowledge.’ (p.192). Towards this, he offers a range of distinctions from the least to the most conceptual: i) *sensorimotor skills*; ii) *technical maxims, rules of thumb or recipes*; iii) *descriptive laws*; and, iv) *technological theories* (p193-194).

Different epistemologies of technology and epistemologies of different technologies debate the interaction and relative weights of these various types of technology as knowledge. These are further subject to realist, instrumentalist, pragmatic and other interpretations, although engineers, like scientists, readily assume the realist stance. (p.194)

Technology as activity

Noting that the modes of technology as object and as knowledge are ‘...the two most philosophically analysed forms’ Mitcham states: ‘Technology as activity is that pivotal event in which knowledge and volition unite to bring artifacts into existence or to use them; it is likewise the occasion for artifacts themselves to influence the mind and will.’ (p.209). He shows how technological activities manifest themselves across many human behaviours and that they can occur in individual, personal forms or those of the group or institution. As examples of behavioural engagements of technology as activity he offers: crafting; inventing; designing; manufacturing; working; operating; and, maintaining. On deeper examination, the history, politics, economics and socio-cultural relations of each of these begin to open up technology’s rich, problematic and contested nature.

Volition and related concepts

To step away from Mitcham for a moment, it’s worth exploring (in an admittedly lightweight way) the philosophical context of *volition*, that is, *the power of willing* or *the exercise of the will*. The idea of ‘free will’ has remained one of the great challenges to philosophy for millennia. It is arguably, like technological capability, a key trait of what constitutes being human or...human ‘being’ (concepts under ever-increasing scrutiny as technologically-driven posthuman and transhuman scenarios present themselves [see e.g. Bostrom, 2009]). Simply put, *freedom* (in Western cultures) can be considered in two broad ways – freedom *from* and freedom *to*. The first refers to the kinds of circumstances that facilitate freedom – such as political liberty and protection of our rights to act as *free agents*. The second refers to using that agency (or not) – having and applying conscious choice and control over one’s actions. *Will* refers, at a basic level, to the psychological capacity of most humans for decision-making. Thus, being free to act is one matter but the application of our will to that freedom is what constitutes our decision-making, which includes our *freedom to act otherwise*.

Intimately related to any consideration of our decision-making and acting come *ethical questions*: How should I act? How should we live? What is the right, or best, thing to do? And, in turn, issues of *responsibility* arise. Thus we talk of acting ethically or acting responsibly when we make our technology-related choices in this world. Moral consideration of others matters; whether ‘others’ are people, species, environments or, increasingly, technologies (e.g. Verbeek, 2005, 2006). Bound up with this is the rich concept of *intention*.

Standing against concepts like volition is (*causal*) *determinism*: at a general level, the view that all events without exception are the effects of prior events. However, when we turn to the personal level the argument is that: ‘...all our choices, decisions, intentions, other mental events, and our actions are no more than effects of other equally necessitated events.’ (Weatherford, 1995:194). Warnock (1998) points out that the determinist argument is anathema to ethical theory. As she argues, ethics implies choice and that is illusory for determinists. In philosophical terms the seeming mutual exclusivity between freedom and causal determinism is framed as *incompatibilism*.

Technology as volition (returning to Mitcham...)

‘Engineering includes distinctive perspectives on and analyses of technology as object, as knowledge, and as activity. It has, however, nothing to say about technology as volition.’

(p.247). Thus Mitcham opens his chapter on his fourth mode noting that its exploration calls for a philosophical rather than an engineering approach – one which acknowledges what he calls the protean (variable or versatile) character of volition. Drawing on extensive literature he documents how technologies have been associated with ‘...diverse types of will, drive, motive, aspiration, intention, and choice’ giving these examples:

- the will to survive or satisfy some basic need;
- the will to control or power;
- the will to freedom;
- the pursuit of or will to efficiency; and,
- the will to realise the *Gestalt* of the worker or almost any self-concept (p.247-248).

He cites many will-oriented authors: Spengler on ‘technics as the tactics of living’; Ferré’s seeing ‘technology as practical implementations of intelligence...(where)...practical intelligence is “mental self-discipline in the service of the urge of life...(as a tradition of)...the will to live and to thrive” ’; Mumford and others on the will to control and power as potentially antithetical to Ferré’s stance; Skolimowski’s view of ‘technology as a form of human knowledge concerned with *what is to be*’ (as opposed to scientific knowledge’s concerns with *what is*); Junger, Ortega and Sartre on self-realisation and our existences from whom Mitcham concludes ‘Whatever is willed calls forth its appropriate technology’; White’s finding ‘technology grounded in Christian charity and temperance or what might otherwise be described as an altruistic, disciplined will’; Grant on the dangers of distancing ourselves from our technologies (technology as objects i.e not me/not us) ‘Technique comes forth from and is sustained in our vision of ourselves, as creative freedom, making ourselves, and conquering the chances of an indifferent world.’ (all pp.248-250).

Opening up a critique of volition in relation to technology Mitcham argues that, of the four modes of manifestation, volition is the most individualised and subjective. He points to the ‘problem of correspondence’ between subjective and objective intentions, that is, while we might know our own acts of willing, we can only infer *from their actions* (including speech) the intentions of others. Here, he discusses *will and ideas* and *will and knowledge* relationships. He also criticises the ‘vacuous’ nature of much discussion around ‘technology and values’ precisely because ‘...it assumes that technology as object, as knowledge, and as activity is value- or intention-neutral’ (p252).

Following Pfänder, Mitcham points to ‘the problem of self-understanding and levels of the will’ which, at a weak level amounts to ‘striving’ as a kind of biological urge or instinct e.g. a hope, wish or desire. Such striving becomes willing when it is strongly ego-centred and we understand our goals can be realised by our own actions. Here, consciousness of self is key. In turn, Mitcham offers Ricoeur’s three levels of what “I will” can mean, namely: “I desire”; “I move my body”; or, “I consent” which he transposes to technology-as-volition as: technological desire; technical motivation or movement; or, consent to technology (pp.253-255).

Mitcham also presents an Arendt extract that reminds us of the temporality of design and technological practices:

(T)he will, if it exists at all...is as obviously our mental organ for the future as memory is our mental organ for the past. (But) the moment we turn our mind to the future we are no longer concerned with ‘objects’ but with *projects*...And just as the past always presents itself to the mind in the guise of certainty, the future’s main characteristic is uncertainty. (Arendt cited in Mitcham 1994:254)

While any discussion of volition invites discussion of ethics, Mitcham shows that traditional ethical assessments of how best to live *only begin* to engage with technology as volition. He

identifies what he believes to be two principal shortcomings of traditional approaches. First, they don't give adequate account of '... those technological volitions described by phrases such as "will to control" or "will to power" or even "the pursuit of efficiency" '. Second, in general, they fail to begin to '...address the correspondence between different understandings of the good and of technology' (p.259).

Mitcham devotes his final section of the technology-as-volition chapter to the matter of the *weakness of the will* problem (in traditional philosophy, *akrasia*). However, he specifically chooses the term *incontinence* (the absence of *continentia* or self-control) to 'indicate a hiatus between knowledge and action' (p.259). Why is that despite *knowing* what is the right course of action to take that we are capable of doing the opposite? Or, why, despite all our better judgment do we choose to act in ways that are illogical, unreasonable or ethically indefensible? (Here, 'we' may be individual or collective.) He says: 'If power or the ability to act increases, then so must intelligent control – otherwise power will eventually lead to disaster.' He sets out three preconditions for the full exercise of such intelligent control:

1. knowing what we *should do* with technology, the end goal toward which technological activity ought to be directed;
2. knowing the consequences of technological action before the actual performance of such actions; and,
3. acting on the basis of, or in accord with, both types of knowledge: 'in other words, translating intelligence into active volition' (p.260).

Mumford points out that most discussions concerning the responsible use of technology focus on (1) and/or (2) and that (3) is subsumed under questions of societal organisation (cultural lag) or seen as a psychological pathology (e.g. alienation). When (3) is not met then the issue of incontinence presents itself. He notes that the overcoming of incontinence is a matter of:

...education and moral training (and perhaps the restructuring of society). The "artifice" of the polis is a better teacher of ethics than is nature. Incontinence loses its force as a conundrum and becomes merely an indicator of the need to transcend nature with culture. (p.262).

In concluding his chapter, Mumford highlights '...an incontinence-related volitional contradiction at the heart of the modern technological project'. He argues that the modern period has seen the valorisation a) of the will over the intellect as the highest aspect of humanity and b) of freedom over justice as the primary aim of politics. Thus, as the technological project is arguably grounded in maximising freedom it, at the same time, presumes the impossibility of incontinence – an at-once-both binary (Keirl, 2015) of freedom set against power/control. Thus the individual (or collective) wishing to exercise free will against/within rationalised technological circumstances, consciously chooses to act against that very rationale.

Bringing *technology as volition* to Design and Technology curriculum

It would seem that the case for foregrounding volition in D&T education can be articulated as three groups of considerations. The first is philosophical. Design and Technology education, if it is about anything, is about action on the world and any theory of action, as with philosophy of technology, must engage questions around not only volition itself but also around its philosophical relatives. Clearly, matters of values clarification and ethical debate (respectively, *axiology* and *moral philosophy*) are key to discussions of any sense of technology-as-volition. Equally, our will-technology relations introduce *ontological* considerations of our being-in-the-world - the *existential* and the *phenomenological* are engaged. Such philosophical work challenges *determinism* and any ideas of *neutrality* of technologies (in whatever mode). All such explorations illustrate the complexity and holism

of the phenomenon of technology and, as a result, the orthodoxies of instrumental rationalism and any claims to technology having a simple positivist-realist knowledge base are turned on their heads. The *epistemology* of D&T education is necessarily dynamic rather than static.

The second set of considerations is curricular and political. If a curriculum is to truly educate about technologies then valorising a particular form of knowledge, or objects/things, or activity (e.g. skilling) as D&T's *raison d'être* is simply not enough. If students' understandings about their own (and others') technological being, efficacy, agency, choice-making, critiquing are to develop then technical 'problem'-solving and making things will be inadequate. A curriculum for sustainability, for democratic technological engagement, for considerations of consequences, for social enterprise will engage the vocabulary of volition that Mitcham espouses. This means the centring (rather than the marginalisation) of *design* where competing values, futures-orientation, agency, and choice education are celebrated.

Third, come classroom considerations where critical pedagogies of critiquing and designing are the norm. Here, students learn about their own efficacy; about design as weighing-up of competing variables; about choosing *not* to design in particular ways; about affording respect to other people, other species and to the planet; about choice-making and consequences; about being critical 'consumers'; and about design as a change-making, futures-oriented practice. To return to the opening quotation of this paper, Design and Technology education manifests as a *largely thinking activity of attended-to ideas and motives*.

As Mitcham made his case in 1994, it still holds strongly for D&T education today. Twenty years later he maintains his call for engineering education to engage closely with the humanities saying: 'How about engineers who can think holistically and critically about their own role in making our world and assist their nonengineering fellow citizens as well in thinking that goes beyond the superficial promotions of the new?' Noting that we are moving from the human to the *techno-human condition* with dissolved boundaries between the natural and the artificial, between the human and the technological, he calls for engineers to engage '...the ultimate Grand Challenge of self-knowledge, that is, of thinking reflectively and critically about the kind of world we wish to design, construct, and inhabit in and through our technologies...The engineering curriculum should be more than an intensified vocational program that assumes students either are, or should become, one-dimensional in their lives.' (Mitcham 2014:19-21).

As things currently stand, rich concepts such as Mitcham's technology-as volition remain at the margins (if at all) in D&T curricula. A curriculum that privileges particular objects, making and knowledge leaves no air for the many concepts that can contribute to a truly thinking D&T educational experience for all students. All such concepts warrant foregrounding because they speak to and interplay with each other to constitute a dynamic, holistic curriculum. If we consider education itself to be a technology then perhaps education-as-volition should become a centrepiece of our deliberations.

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