From Tim Ingold "**Beyond Art and Technology: The Anthropology of Skill**"

'Art' and 'technology' are mere words. And as with all words, their meanings are not fixed but have changed significantly in the course of their history. They are still changing. But I believe it remains true of modern - if not post-modern - thought, that the meanings of art and technology are held to be somehow opposed, as though drawn from fields of human endeavour that are in certain respects antithetical. This opposition, however, is scarcely more than a century old, and would have seemed strange to Anglophone ears as late as the seventeenth century, when artists were still considered no different from artisans, when the methods of working in any particular branch of art could be described as 'technical', and when the term 'technology' had just been coined to denote the scientific study of these methods (Williams 1976:33-4). Etymologically, 'art' is derived from the Latin *artem* or *ars*, while 'technology' was formed upon the stem of the classical Greek *tekhnē*.
Originally, *tekhnē* and *ars* meant much the same thing, namely *skill* of the kind associated with craftsmanship (see Chapter Fifteen). The words were used, respectively in Greek and Roman society, to describe every kind of activity involving the manufacture of durable objects by people who depended on such work for a living, from the painter to the cobbler, from the temple architect to the builder of pigsties. This is not to say that customers failed to distinguish between aesthetic and utilitarian criteria in their estimations of the objects produced. But in every case, it was the craft skill of the practitioner that was supposed to ensure a successful outcome (Burford 1972:13-14).

The connotation of skill is preserved in many words derived from the same roots and that remain in common currency today. On the one hand we have 'technics' and 'technique'; on the other hand such terms as 'artless' - meaning clumsy or lacking in skill - and, of course, 'artefact'. Yet the apparent continuity masks an important shift, towards abstracting the components of intelligence, sensibility and expression that are essential to the accomplishment of any craft from the actual bodily movement of the practitioner in his or her environment. Thus the technique of the pianist comes to refer to the practised ability of his fingers to find their way around the keyboard and to hit the desired notes, as distinct from the inherent musicality of the performance. 'A player may be perfect in technique', wrote Sir Charles Grove, 'and yet have neither soul nor intelligence'. Likewise, we have come a long way from the days when, as in the year 1610, it was possible to eulogise a certain composer as 'the most artificial and famous Alfonso Ferrabosco' (Rooley 1990:5). As David Lowenthal has observed, 'time has reversed the meaning of artificial from "full of deep skill and art" to "shallow, contrived and almost worthless"' (1996:209). By the same token, the artefact is regarded no longer as the original outcome of a skilled, sensuous engagement between the craftsman and his raw material, but as a copy run off mechanically from a pre-established template or design. This debasement of craft to the 'merely technical' or mechanical execution of predetermined operational sequences went hand in hand with the elevation of art to embrace the creative exercise of the imagination (Gell 1992b: 56). As a result, the artist came to be radically distinguished from the artisan, and the art-work from the artefact (Coleman 1988:7).

The decisive break, according to Raymond Williams, came in the England of the late eighteenth century, with the exclusion of engravers from the newly formed Royal Academy, which was reserved for practitioners of the "fine" arts of painting, drawing, and sculpture (Williams 1976:33). It was, of course, symptomatic of a general tendency to distinguish intellectual from manual labor, along the common axis of a more fundamental series of oppositions between mind and body, creativity and repetition, and freedom and determination. But the more that "art" came to be associated with the allegedly higher human faculties of creativity and imagination, the more its residual connotations of useful but nevertheless habitual bodily skills were swallowed up by the notion of technology. For by the beginning of the twentieth century this term, too, had undergone a crucial shift of meaning. Where once it had referred to the framework of concepts and theory informing the scientific study of productive practices, technology came to be regarded as a corpus of rules and principles installed at the heart of the apparatus of production itself, whence it was

understood to generate practice as a program generates an output. Technology, now, did not discipline the scholar in his study of techniques, but rather the practitioner in his application of them. He became, in effect, an operative, bound to the mechanical implementation of an objective system of productive forces, according to principles of functioning that remain indifferent to particular human aptitudes and sensibilities.

Here, then, lies the source of the now familiar division between the respective fields of art and technology. An object or performance could be a work of art, rather than a mere artifact, to the extent that it escapes or transcends the determinations of the technological system. And its creator could be an artist, rather than a mere artisan, insofar as the work is understood to be an expression of his or her own subjective being. Where technological operations are predetermined, art is spontaneous; where the manufacture of artifacts is a process of mechanical replication, art is the creative production of novelty. These distinctions can be multiplied almost indefinitely, but they are all driven by the same logic, which is one that carves out a space for human freedom and subjectivity in a world governed by objective necessity. It is a logic that operates as much in the field of exchange as in that of production (Ingold 1995:15-16). Thus the modern distinction between the true work of art and the replicated artifact has its parallel in that between the "pure gift" and the market commodity: the former given spontaneously and motivated (at least in theory) by personal feeling; the latter exchanged in line with impersonal calculations of supply and demand, following the laws of the so-called "market mechanism." In both fields, of production and exchange, fine art and pure gift delineate a residual space for the free expression of individual selfhood in a society dominated by the machine and the market. But in both fields, too, the distinctions are recent, and closely tied to the rise of a peculiarly modern conception of the human subject.

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In other words, the assessment task must emphasise learning as an individualised accomplishment, and in this context it is helpful to note Levi Strauss's (1966) distinction between 'engineering' and 'bricolage'. Engineers, says Levi Strauss, produce their structures by operating within a fully preplanned, closed system of concepts, procedures and components; whereas 'bricoleurs' (DoItYourself enthusiasts) consult what they happen to have in the shed in order to improvise new structures from materials that were originally part of something else. They 'engage in a sort of dialogue with [the various tools and materials they have 'to hand'] to widen the possible answers… to discover what each of them could 'signify' (Levi Strauss, 1966, 1718). And it is this notion of 'bricolage', rather than engineering, which, as Derrida says, best characterises most of human discourse (Derrida, 1976, Preface), and which seems to underpin Lave's general statement on the nature of learning:

> *Doing and knowing are inventive…They are open ended processes of improvisation with the social, material and experiential resources at hand.*
>
> (Lave, 1993, 13)

So, unless we make explicit in our assessment tasks that we want students to construct their own learning, and that this includes improvising with the resources they already possess, they will think that 'engineering' is the name of the game, go for a readymade kit 'off the shelf', and discover that, as usual, they cannot really understand or follow the technical instructions.

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**James Dyson (asked “What is the one thing you would like engineers to achieve in the next 50 years? How would that have an impact in shaping the future?)**

““Perhaps surprisingly, my answer to the question has to be a slightly-dull-but-honest 'I don't know.' And why not? You see, despite the millennium-old myth of Archimedes which still lingers today – you know, the one with the mad hatter scientist jumping naked from the bath as the flash of inspiration finally strikes down - well, despite this popular notion of inventors crying ‘Eureka’, I have to disappoint you. Engineering has little to do with crystal ball gazing.

“Science fiction is just that - fiction. Engineering, meanwhile, is about looking at the world, its systems and objects, with a critical eye and having an inkling of an idea. And then testing that idea out, failing, and then experimenting again. That's how it was with my first vacuum cleaner and the thousands of prototypes I made; and that is how it is for the hundreds of engineers who work with me at Dyson today (though I try and encourage them to be a bit quicker!).

“So although I may not be able to predict a vision of the world in 2057 (who in 1957 would have imagined the World Wide Web or some of the extraordinary medical techniques now available to us?) this is not to underrate the engineer. The creativity and inventiveness of the engineer has the capacity to shape the future. Think for example of Sir Alec Issigonis, inventor of the Mini. His diminutive design nearly got stopped in its tracks when market researchers declared that the public thought the car ‘silly’. The ‘silly’ car became the best selling British car in history, with 5.3 million cars rolling off the production line.

“Half a century on, however, the number of engineers – in the UK at least - is in decline. Why is this? Perhaps because the engineers are seen as the doers rather than the thinkers. Indeed we are, but this is not a pitfall.”