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# On Legitimacy: Designer as Minor Scientist

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## Abstract

User experience research has recently been characterized in two camps, model-based and design-based, with contrasting approaches to measurement and evaluation. This paper argues that the two positions can be constructed in terms of Deleuze & Guattari's "royal science" and "minor science". It is argued that the "reinvention" of cultural probes is an example of a minor scientific methodology reconceptualised as a royal scientific "technology". The distinction between royal and minor science provides insights into the nature of legitimacy within contemporary HCI research practice.

## Keywords

Deleuze; Guattari; Design; Legitimacy; Cultural Probes; User Experience.

## Introduction

Over the last decade the focus of study in the field of Human Computer Interaction (HCI) has shifted from usability to user experience [e.g. 16, 2]. Effie Law [16] recently divided user experience research (UX) into "roughly" two catchments, "model-based UX research[ers]" and the "design-based UX research camp" (p. 4). The former utilise intellectual methods derived from usability practitioners when interpreting qualitative human data for measurement [16]. The latter (who Law also terms the "holistic camp") "defy the measurability of UX" (p. 1). Researchers associated with the former group "include Hassenzahl, Mahlke, Sutcliffe, Tractinsky, and van Schaik"; practitioners grouped with the latter "include [the second author], Cockton, Forlizzi, Gaver, McCarthy, Monk and Wright" (p. 1). Law, along with the majority of UX researchers, belongs to the model-based camp [16].

This paper argues that the model-based and design-based groups can be constructed as being analogous to the philosopher Gilles Deleuze and the psychotherapist and semiotician Felix Guattari's [5] "minor science" and "royal science" respectively. There follows a brief summary of Deleuze & Guattari's theory.

## Royal and Minor Science

Deleuze & Guattari's [5] work covers a vast range of intellectual territory. Their difficult and provocative text "A Thousand Plateaus" narrates the relationship between royal science and minor science. These schemas can be thought of as "worldviews" presenting dichotomous readings of notions as diverse as space, time and matter. Consequently, problems concerning theory and practice are "brought out and resolved in an entirely different way" (p. 405) in both structures.

Royal science is the dominant model and is legitimised through being “established by history” (p. 398). Its endeavours are functions and expressions of the “State”; Deleuze & Guattari thus also refer to it as “state science”. Royal science continually attempts to order and homogenise heterogeneous space and exists to “extract [...] constants from variables” (p. 407). It measures everything, marking it with increments developed through utilising maxims of its own creation. Deleuze & Guattari’s term for this process is “striation”, stating royal science “striates all of space in all of its directions” (p. 408). Deleuze & Guattari propose two kinds of space in their writing, the striated, as opposed to smooth.

Royal science homogenises matter to make it fit into specified theoretical models. Through this it ultimately aims to construct universal laws. In contrast, minor science retains the variation of variables and thus heterogeneous space. It occupies an expanse “without ‘counting’ it” (p. 409). Deleuze & Guattari characterise this space as being “smooth”. Unlike the processes of royal science, its models do not reduce matter, and instead of attempting to create universal laws, minor science conveys its singularities.

Deleuze & Guattari describe minor science as “nomad” or “ambulant” because its processes decree the idiosyncratic flow of matter should be “followed”. Space, for the minor scientist “can be explored only by legwork” (p. 409). An artisan wishing to craft a wooden object must “...go to find the wood where it lies, and to find the wood with the right kind of fibers” (p. 451). This “pursuing” continues when he is back in his workshop. He cannot plane across the grain of the timber; he must instead work with it. Thus, rather than forcing timber to submit to models of his discipline’s creation, the artisan must “...follow the wood, fibers of the wood” (p. 451).

Royal science persistently imposes itself on the processes of minor science, “submit[ing] them to its own model, and allow[ing] them to exist only in the capacity of “technologies” or “applied sciences” (p. 411). However, Deleuze & Guattari claim factions of the ambulant sciences refuse to be internalised by royal science – this notion is significant to discussions related to legitimacy in contemporary HCI discourse and will be expanded upon later on in this paper.

As well as artisans, miners are practitioners of minor science. Proponents of royal science include individuals usually identified as “scientists”, such as chemists [5]. For Deleuze & Guattari, objects under consideration (e.g. disciplines or methodologies) do not necessarily permanently belong to either the royal or minor science model. As an example, “chemistry” once conformed to the minor science model and ([5], p. 408),

“became a royal science only by virtue of a whole theoretical elaboration of the notion of weight”.

The concept of flux between Deleuze & Guattari’s sciences will become important when this discussion turns to notions of legitimacy in UX research.

Through spotlighting the important areas of “reduction”, “re-prioritising” and “following”, the following sections argue (1) that the model-based UX research community can be constructed as practitioners of royal science and (2) that design-based UX researchers can be constructed as minor scientists.

## **Design-Based UX Researchers as Minor Scientists**

In the 1980s and 90s, the notion of “usability” grew in influence in design research and practice [15]. This movement was underpinned by a focus on empiricism: for Norman [22], usability “takes root in the cognitive sciences [...and...] prides itself on its scientific basis and experimental rigor” (p. 38). This stance is derived from evidence that measuring human data leads to successful interventions. Dix, Finlay, Abowd & Beale [6], for example, note that “the human ear can hear frequencies from about 20 Hz to about 15kHz” (p. 24). For these authors, a failure to consider human factors causes design failure. Accepting that differences exist in levels of cognition inside a population, Dix et al. recommend categorising humans, for “the majority of people” (p. 52) fall within a certain range of observed values.

As previously noted royal science measures and marks all space with increments. Through this process, Deleuze & Guattari [5] argue it “extract[s] constants from variables” (p.407). As also noted, these increments are developed through utilising maxims of royal science’s creation. Deleuze & Guattari term these maxims “forms”, stating royal science’s models signify “a form that organizes matter” (P.407). Earlier, it was also stated that royal science homogenises matter in an attempt to make it fit into specified theoretic models. Deleuze & Guattari argue this matter “is prepared for the form” (p.407). For the usability movement, human data can be perceived as *matter*. The usability model is concerned with measurement, statistical analysis and “organising” human data into its constructs of “normal” and “abnormal”. These constructs can be thought of as *forms*. Consequently, in the usability model, *matter is prepared for the form*. The precepts of usability can be seen as analogous to those of royal science.

The shift towards user experience followed criticism of approaches solely concerned with usability. Usability designers were, for example accused of ignoring emotional factors in the creative process and in-so-doing tolerating the development of unattractive objects [22]. The “Experience Economy” [24] has influenced the shift away from a concentration on pure functionality in user-centred design [14]. UX researchers claim to have moved beyond a reliance on the precept of functionality through considering felt aspects such as enjoyment or fulfillment [28]. In an attempt to elicit more relevant data relating to users, qualitative methods have become a prominent feature of UX research [2]. However, UX’s evaluative methodology is predominantly derived from usability models [27, 32]. It follows that for the model-based UX research community, “measurability” provides a central link with its predecessor. Sharp, Rodgers & Preece [28] for example, promote the value of cognitive science in describing capabilities and limitations of users. Model-based UX researchers claim the measurability of “ambiguous” qualities such as beauty [17, 12] and trust [9]. Beyond this, Law [16] claims that all “...qualitative data can be coded, counted and, so, quantified, being conducive to computational manipulations” (p. 6).

Royal science aims to create constructs with universal applications [5]. The model-based camp’s belief in the measurability of all human data suggests a parallel with this imperial science. It is worth returning to Deleuze & Guattari’s [5] claim that the royal science model specifies a “form that organizes matter and a matter that is prepared for the form” (p. 407). Royal science’s model relies on the reductive processing of data [18]. For model-based UX researchers, human experiences can be perceived as *matter*. In model-based research, the method of reduction via quantification can be considered as the *form* organising this matter. For model-based researchers, all human experiences are *prepared for the form* of reduction via quantification. Thus, the precepts of the model-based camp can be considered as being analogous to those of royal science.

Evaluative techniques which utilise “rationally deduced metrics” dominate in HCI ([27], p. 4). Their efficacy is questioned by design-based UX researchers. McCarthy & Wright [20] criticise the elevation of rationality in the study of UX above “being and participating” (p. 24). In their work on cultural probes, Gaver, Boucher, Pennington & Walker [10] caution against scientific analysis of user

data for fear of 'blunt[ing]' (p. 56) the connection between designer and user. Indeed, Gaver co-developed cultural probes in part to subvert normal HCI research practice [3]. Koskinen, Zimmerman, Redstrom, & Wensveen [15] caution against reductionism, arguing that "design and design research will fail if they are reduced to a formula" (p. 42). For Forlizzi & Battarbee [8], human emotions are "hard to understand, let alone quantify" (p. 265). Swallow, Blythe and Wright [30] argue quantitative measures "can miss some of the insights available in accounts that resist such reduction" (p. 92). Similarly, Olivier and Wallace [23] argue that reducing users' experiences to a set of immutable data can diminish the value of human heterogeneity. Going further, Matthews, Stienstra & Djajadiningrat [19] claim felt experience contains "no core platonic essence" (p. 59) and is thus irreducible to evaluation via rationally deduced metrics.

From such perspectives human experience cannot be "boxed in". It is matter that is not *prepared for the form* of reduction via quantification – the model stipulated by royal science. Unlike the homogeneous space of state science, Deleuze & Guattari [5] argue, "heterogeneous...space" is open to a "nonmetric" construction for it inhabits territory "without 'counting' it" (p. 409). Design-based researchers can be construed as claiming to *preserve the singularities and heterogeneity of human experience*. In this sense, design-based researchers can be considered in Deleuze & Guattari's terms as minor scientists. This is of more than academic interest. For a number of academic and industrial researchers royal science tends towards determinism which conceives of progress primarily in terms of technological advances.

### Re-prioritising

"Technological determinism" is an approach to product or service development which privileges the position of technology [19]. Calling this an "invention-centric approach", Presterio [31] summarises the process,

"the inventor begins by specifying the technology that they think will solve the problem...[.]...they then go in search of a specific user group or market segment for which the product is a match" (n.p.).

In HCI, a technocentric approach has been seen as underpinning the usability model. Sengers [27] argues that "technoscientific reasoning" (p. 4) is prevalent in HCI and claims the field still perceives progress in terms of technological advancement. In Deleuze & Guattari's terms people for whom products are created can be perceived as *matter*. Rules determined by a technocracy can be thought of as *forms*. As a function of technological determinism, people for whom products are created can be considered as being *fitted* into the stipulations generated by technocratic rule. Consequently, the technological determinism precept can be suggested as correlating with Deleuze & Guattari's [5] description of royal science as a model that "implies a form that organizes matter" and "matter that is prepared for the form" (p. 407).

Philips Design ([11], p. 10) argue that rather than benefitting humans, technological determinism has contributed to a reduction in "personal happiness" in society. Sengers [27] questions the legitimacy of technological determinism and the "universalist models" predominantly utilised by the HCI community. According to Bardzell [1], dominant HCI models have produced notions of the "ideal user" and pressurize people in to adopting identities they do not want in order to use design interventions successfully. For Satchell [26], this model-based approach denies the heterogeneity of female users of digital technology. In "making people unhappy", "pressurising users" and "denying difference" the above arguments suggest HCI – through privileging technology over people – has got its priorities wrong.

Dunne [7] believes that design can disrupt the technocracy consumers find themselves in and that through this endeavour, they can be re-humanised. Good design, according to Wright & McCarthy [34], does not begin with precepts. Rather than being initiated through specifying technology, Prestero, ([31], n.p.) claims that good design “starts with the user and then goes in search of the technology”. Similarly, according to Holt [13], an approach which begins with users challenges the model-based approach and “deinstitutionalizes” (p. 153) the design process. In claiming that people should come first in product development, design-based researchers suggest a need for re-prioritisation in HCI.

The notion of putting people first *and then hunting* for appropriate technology necessitates *following technological matter*. “Following”, as already noted, is important to the call driving the nomad scientist. Deleuze & Guattari [5] position minor science as recognising,

“...the vital state of matter...[.]...a material vitalism that doubtless exists everywhere but is ordinarily hidden or covered unrecognizable, dissociated by the [...royal science...] model” (p. 454).

The next section will outline how the notion of “following” is significant in the construction of the design-based UX research camp.

### Following

Suchman [29] argues ethnography has been introduced in design practice to counteract reductionism. Design agencies began employing ethnographers in the 1970s [33]. According to Wasson [33], “by 1997, every major design firm claimed to include ethnography as one of its approaches” (p. 382). A form of what Millen [21] terms “rapid ethnography” is “cultural probing”. Gaver et al. [10] describe the process for recruiting participants for a research study employing probes below,

“We made no attempt to control demographics, but our volunteers came from a wide range of circumstances: from ages 18 to 80, rich and poor, families, single people, and housemates; they represented a wide range of the home lives of people in today’s society” (p. 54).

Through giving up control of the study demographic, Gaver et al. can be seen as distancing themselves from royal science, a practice which persistently strives to “striate all of space in all of its directions” ([5], p. 408). Gaver et al. [10] criticise “researchers’ tendency to apply their own conceptual frameworks to the phenomena they observe” (p. 54). In-so-doing they can be posited as opposing royal scientists’ tendency to create “a form that organizes matter” and to understand matter as an entity “that is prepared for the form” ([5], p. 408). Gaver et al.’s stated unwillingness to dictate the demographic of participants or to impose order over the evaluative framework suggests an interest in pursuing the heterogeneous flow of material. Their philosophy can thus be compared with that of minor scientists who operate through “following a flow of matter” ([5], p. 451).

There are then a number of ways in which Law’s opposing camps of UX researchers mirror the philosophical distinctions outlined by Deleuze & Guattari in terms of royal and minor science. The comparison illustrates that the current debates in HCI are not new and further, provide insight into the nature of legitimacy within contemporary HCI research practice.

## On Legitimacy

Cultural Probes are now so commonly used in HCI that they are almost the default mode for researchers gathering qualitative data. They are seldom however deployed purely as “cultural probes” but rather adapted in some way [3]. Gaver et al. [10] warn against the loss of attributes such as “uncertainty” and “ambiguity” which are central to the inception of probes through their incorporation into the repertoire of this community. Going further, Boehner, Vertesi, Sengers, & Dourish [3] claim this appropriation can easily dismantle their true purpose,

“The subversive nature of the original probes is often lost, however, when they are seen as a reproducible method and explained within traditional accounts of knowledge production in user-centered design. What we see, then, is the probes being adopted within the frame of existing HCI approaches, and particularly in light of a traditional conception of the relationship between users, requirements, designers, and designs” (p. 1081).

In Deleuze & Guattari’s terms, the tendency to remove “uncertainty” from the probes process parallels royal science’s fondness for “extracting constants from variables” and the subsequent “homogenisation” of space and matter. As probes become a less ambiguous method, they can be considered as becoming *forms*. As such, probes take on a royal scientific description, becoming “a form that organizes matter” (5, p.407).

For Deleuze & Guattari royal science appropriates the inventions of minor science to enforce its dominance. These creations are “always formalized” by state science which allows them to “exist only in the capacity of ‘technologies’ or ‘applied science’” ([5], p. 411). The “reinvention” of cultural probes is an example of a minor scientific methodology re-conceptualised as a royal scientific “technology”. For design-based researchers, this process robs probes of their legitimacy. However, the opposite is true for their model-based counterparts – for it is only by making probes submit to their model that it can become a truly legitimate tool.

UX research practitioners are not necessarily lifelong members of either the model-based or design-based camps. According to Law [16], the movement of individuals does not occur with equal frequency in both directions: “migration between the two camps, especially from the former to the latter, seems on the rise” (pp. 4-5). This may suggest a glut of “holistic” UX researchers have, upon studying disinterested, evidence-based observations, realised that their philosophy is incorrect and accordingly switched sides. There may however be other explanations for this phenomenon. UX researchers are concerned with disseminating findings. The majority of papers in leading HCI conferences and journals feature the presentation of empirical data [see, 16]. It is sensible to suggest this statistic may aid some design-based researchers’ decision to incorporate traditional HCI data evaluation methods into their repertoire and thus to move towards affiliation with the model-based camp.

This interplay between UX camps parallels that seen between royal and minor science.

The royal and minor sciences do not share similar statuses [5]. Royal science dominates, “continually impos[ing] its form of sovereignty on the inventions of nomad science” ([5], p. 400). State science,

“deprives...[.]... [the minor sciences] of their own model, submit[ting] them to its own model” ([5], p. 411).

Through setting parameters for dissemination, it can be argued that the model-based camp may be “imposing their sovereignty” and requiring design-based researchers to “submit to their own

model". In HCI then, it can be argued that an overarching sense of legitimacy is dictated by the model-based camp. Though writing before the advent of UX research, Deleuze & Guattari [5] may have foretold the predicament for minor scientists in the field:

"It is as if the "savants" of nomad science were caught between a rock and a hard place, between [... what...] nourishes and inspires them and the State that imposes upon them an order of reasons" (p. 400).

Despite its dominance, royal science cannot dissuade all minor scientists from their practice [5]. In some instances it acquiesces, "even going so far as to propose a minor position for them within the legal system of science and technology" (p. 411). This might be termed a "seat at the table" approach. Does this mean that methods such as cultural probes have given design-based researchers a high level of legitimacy in the eyes of the dominant model? Deleuze and Guattari's [5] work suggests that the answer is not at all straightforward,

"...smooth space is constantly being translated, transversed into a striated space; striated space is constantly being reversed, returned to a smooth space" (p. 524).

It is important to remember that cultural probes began as a means to subvert normal HCI research practice [3]. They can thus be constructed as a type of smooth (minor scientific) space emerging from a striated (royal scientific) one. As cultural probes are becoming translated in to a "striated space" through their appropriation by model-based researchers it is understandable that the design-based camp is making efforts to "smoothen" them. Is it possible that a time might come when it is impossible to smooth the space occupied by probes to a desirable degree. In this case the design-based contingent may focus on emerging "unmarked" methods giving rise to new vehicles through which the notion of legitimacy in HCI can be debated. Finally, if Law [16] is correct in arguing that the UX field is becoming populated with model-based practitioners, then one cannot escape the implication that this research space is becoming increasingly striated. In such an event, the design-based contingent may ask "what smooth space lies beyond UX"?

## **Conclusion**

It is easy to caricature the two camps of user experience research. Model-based researchers are quick to point out that they are well aware of the difference between the map and the territory, the menu and the meal. Similarly, design-based researchers know very well that the world in which they live and the technologies they use depend on model-based development.

Rather than a rigid dichotomy in HCI research practice there is flux. And as Jay Vidyarthi pointed out in a review of this paper "20 years ago, we might have considered model-based UX as the minor science relative to a purely engineering approach". This paper has neither criticized the model-based approach nor celebrated the design-based method. The aim has been to consider the debate in contemporary UX circles through the lens created by Deleuze & Guattari. The paper has argued that there are currently close parallels between the two camps of UX research and royal and minor science. It has also been argued that the analogy helps contextualise the recent debate about the ways that HCI adopts and adapts cultural probes.

The interplay between the minor scientist and her imperial counterpart allows a useful insight into the nature of legitimacy within contemporary UX research practice and may enable the community to foresee the emergence of future movements.

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