PROVOKE submission
Pre-publication version

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The Knowledge Creation Spectrum

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Latour begins his critique of laboratory life by noting that "scientists often have an aversion to what non-scientists say about science" (Latour & Woolgar 1986: 11). This not only criticises territorialism in science, but also reveals that knowledge creation is not just a univocal means-to-an-end but an activity that can be observed and critiqued in its own right. I have chosen the term "knowledge creation" deliberately because I declare myself from the outset to be a constructivist: I believe that knowledge is principally constructed or made, rather than discovered or found. However, there is a spectrum between construction and discovery, and this chapter investigates this knowledge spectrum in order to ask what the present interest in practice-based research reveals about contemporary approaches to knowledge creation. Considering knowledge creation as a practical constructive activity has the advantage of integrating practice-based research and artistic approaches, and offers a new perspective on the activity of scientific knowledge creation too.

The Classical Model of scientific inquiry, which Latour had in his sights as something that is not as it seems, asserts that empirical science has developed a methodology, i.e. a series of procedures, that when carefully followed can tell us what the external world is really like. It identifies both true facts about the world, and generalised statements about relationships between those facts, such as causes and effects. These descriptions, or the ability to produce them, have been called "naive realism" (Pronin, Gilovich, & Ross 2004), and are so culturally embedded that they correspond to what is often regarded simply as "common sense" (Moore 1925). In everyday life we interact with objects as though they are really there and that at an everyday level the laws of physics allow us to anticipate what is going to happen next. The apparent coincidence of the results of the scientific method with the common sense view has

led to the basic laws of physics and other scientific principles being taught in school, and to it becoming fundamental to our Western secular culture. However, over many centuries, there have been doubts about the legitimacy of some of the *a priori* logic of the scientific method and therefore doubts about the claims made by science. For example, Hume argued persuasively that we cannot conclude the existence of causes and effects from the repeated coincidence of events (Hume 2011 [1748]: Book 4). These arguments have never been successfully refuted but in modern times they have been supplemented by additional procedures to keep the scientific method alive (Boltzmann 1902; Mill 2009 [1843]; Popper 2002 [1959]).

The unresolved problems with the underlying logic of the scientific method seem to be made irrelevant by the general usefulness of its findings, giving rise to what has been called the Pragmatic Model. Pragmatism (Mill 2009 [1843]: Book III) sidesteps the issue of whether the claims of science are true, in favour of whether the claims of science are useful. According to this theory of knowledge creation, the scientific method enables us to interact with the world in effective ways, to predict and control in certain circumstances, and to create interventions that will achieve useful goals. Science, it turns out, is better described as a method of getting things done, than of finding out what the world is really like. Latour & Woolgar claim that the Pragmatic Model is the version of common sense that is generally held by contemporary scientists (1986: 19). Thus the principal benefits of the scientific method now rest on prediction and control rather than truth-claims. The shift from the Classical Model to the Pragmatic Model reveals that our concept of what we know can shift from Realism, in which we know the truth about the external world, to more hermeneutic claims that we know something about relationships within our model. This change of focus from extrinsic claims to intrinsic claims was finally brought into the foreground by Boltzmann who introduced

Model Theory, in which scientific knowledge claims were further reduced from pragmatism. Model Theory merely claims that the outcome of scientific inquiry simulates behaviours that are analogous to what we observe happening in reality (Boltzmann 1902).

There are a few specific points to note from this brief history of several centuries of knowledge creation. First, I claimed that the naive realism of the Classical Model corresponds to the common sense view of the person in the street, but the common sense view of the practising scientist is more akin to the Pragmatic Model. The difference between these two models is that the Classical Model makes truth-claims about the nature of the external world whereas the Pragmatic Model makes utility-claims. This difference is significant for the cultural role that the scientific method, and science in general, has in society. Societally, scientists are held in high esteem because it is believed that they are finding out about what the world is really like. On the other hand, scientists themselves believe they are merely contributing to our ability to live in the world as we find it (Pew Research Center 2015), which perhaps merits less societal valorization than more practically beneficial activities such as psychoanalysis.

Second, it suggests that there is a scale or spectrum that is best viewed from outside both positions, i.e. by adopting neither the view of popular common sense nor listening too much to the claims of scientists themselves. This perhaps explains Latour's observation regarding the aversion of scientists to what non-scientists say about science, i.e. that neither recognises the descriptions of other. But Latour's sociology of science goes a step further. It adopts neither the naive realist position nor the pragmatic position of scientists, but instead establishes a perspective from which the activities of knowledge creation amongst scientists is

regarded as an activity undertaken by a community of like-minded individuals in pursuit of a

common goal and set of beliefs.

Third, described in this way we start to see scientists as a community; establishing and

reinforcing beliefs, identifying territory, and behaving as a kinship group within the larger

society (Cohen 1985). Science, according to Latour and using terminology that Cohen would

recognise, is a social activity. Its principal function is neither to make truth-claims about

reality nor to identify pragmatic ways in which we might cope with the world, but rather to

reinforce the values and beliefs of the members of the group, to identify territory – in this case

of the intellectual kind – and to fight border skirmishes with territorial invaders such as non-

scientists and sociologists. This description shifts the emphasis away from the truth or benefit

of the scientific method, towards seeing the activities of academic research and knowledge

creation as a set of procedures almost like a choreography to which the participants conform

(Bourdieu 1988 [1984]). Nor can the pragmatist offer an overwhelming refutation of this

sociological explanation. If one argues that science must be finding out something valid

because technological and medical innovation have produced tangible benefits that must be

related to reality in some way, one can also argue, conversely, that there are many issues in

the world such as war, hunger, and oppression, etc., to which science does not seem to have

made any contribution at all. This reveals a fourth point, that the measures of success are

themselves selective, and have been chosen to favour the apparent benefits of the system as

perceived by the members of that system.

The historical shift from absolute to relative or relational claims is not something restricted to

science. There has been a comparable shift in aesthetics from claims about intrinsic qualities

(Baumgarten 2009 [1758]; Kant 2015 [1790/93]) to contextual claims (Collingwood 2013

[1923]). Nowadays, the ideas of artistic research and collaborative meaning-making have replaced both Classical and Contextual aesthetic theories, lending "more depth to discussions on quality, expanded concepts of knowledge, and forms of publication and communication" (Dyrssen 2015: 23).

It is not the objective of this paper to either confirm or refute the claims of a single method or model. Its purpose is to reveal the scientific method as just one method of knowledge creation that sits on a spectrum of valid possibilities that extends to socially created and artistically created knowledge. It has both strengths and weaknesses, as do the other approaches to knowledge creation to be found on this spectrum. The hegemony of the scientific method, and the popular belief in its truth-claims, means that the scientific method appears to have a special authority in what Bourdieu calls "the field of power" (Bourdieu & Wacquant 1992). This chapter discusses the alternatives that lie elsewhere on the spectrum and considers what they contribute to our understanding of the process of knowledge creation as a whole, and how the field of power will shift as these alternatives became more mainstream.

The critique of knowledge creation in science has tended to proceed from an explicit critique of the scientific method owing to the role it has in Western culture as the principal means for the discovery of true knowledge. Bloor (1991 [1976]) chose to criticise the scientific method in terms of its discretionary emphasis on certain data and procedures. According to Bloor there are many irregularities and inconsistencies in scientific procedures, amongst the most apparent being the simplification and idealisation of data. We have all encountered this at school where we were taught experimental procedures in the laboratory, along with some of the basic tricks of science. For example we have probably had the experience of undertaking an experiment, recording data and plotting it on a graph. The trick is to draw a straight line

that connects all of the points plotted on the graph. However there is never a straight-line that connects these points because the exact position of the points has been influenced by practical features of the experimental apparatus and the conditions under which the experiment was undertaken. The line, we are told, represents what the result would have been like had the conditions been ideal. But of course there is no such thing in reality as ideal conditions. The purpose of making this idealised simplification is to enable us to form general rules and principles, a "white lie" that can be used to understand the complexities of actual lived experience.

Bloor's purpose is to point out that at a fundamental level the procedures of knowledge creation that are employed in science have no greater claim to validity than many alternatives. His target is the perceived authority of the scientific method as a procedure, and in common with Latour he instead emphasises the limited objectives of the method and the extent to which goals are set that the procedures are able to satisfy. In an activity theory of research such as Bloor and Latour share, despite their public disagreement about its motives (Bloor 1999; Latour 1999), the participants create knowledge through a series of shared activities based on common beliefs and attitudes about the benefits and purpose of the inquiry being undertaken. This diminishes the extrinsic claims for the activity in favour of the harmonisation of the beliefs and activities within the group. It is a form of anthropology in Cohen's terms, and this diminution serves not to diminish the benefits of the outcome but instead to reposition our understanding of how knowledge creation works. In particular it diminishes our common sense assumption or desire for truth-claims and instead highlights the notion of satisfaction (Biggs & Büchler 2011), i.e. questioning generally stops when participants are satisfied with an answer or response. It also recognises that by setting the targets themselves, the group's claims for performance are based on self-selected criteria. As a

member or participant in an activity, one is satisfied when the activities of the members are

harmonious with the collective belief set, and this applies as much to feelings regarding

knowledge creation as it does to any other kind of mutual reinforcement.

It is a claim of practice-based research that our shared beliefs can focus not only on belief sets

about the external world or on notions of shared beliefs, but also on shared practices. Such

practices include a shared societal valorisation of the production of visual art, theatre

performance and dance, music, etc. Such artistic activities were previously seen as distinct

from the activities of science (e.g. Snow, 1959). Under my proposed knowledge creation

spectrum, they are part of a continuum of possible knowledge creation activities. Although

the word "knowledge" is not usually applied to the outcomes of artistic activity – where terms

such as "insight" and "understanding" are used instead (AHRC 2015) – I argue that this is

pedantry based on an artificial division between technical and social knowledge as described

by Latour (Latour & Woolgar: 23ff.). If one accepts Latour's description of the scientific

method as just one example of the practices that are legitimised by society, one can compare

quantitative, qualitative, a/r/tographic, performative and other modes of inquiry as equally

viable sites on the knowledge creation spectrum, generating discrete bodies of knowledge

with the added possibility of knowledge exchange between them.

Biggs and Büchler (2008) proposed an intrinsic set of conditions in which knowledge and

knowledge production, its evidence, methods and argumentation, all occur within the context

of an audience of users and evaluators who are peers of the knowledge producers. However

they also proposed that the processes of legitimation and valorisation occur within a more

general audience who can perceive their relationship to other forms of knowledge in academia

or in the arts. It is therefore clear that there is no significant difference between the

description of practice-based research in the arts, and knowledge creation in other fields. The advantage of their analysis is that it avoids cultural prejudice that favours certain methods and procedures that arise from the hegemony of the scientific method in Western culture, and replaces them with a meta-view of knowledge creation as a set of procedures undertaken by societally authorised groups, based in a range of activities including empirical observation, the pursuit of practical interventions, the reinforcement and development of shared understandings, and the reinforcement and development of shared practices.

Having identified a number of separate activity-based approaches to knowledge creation we can now reflect upon the relationship between the characteristics of the activity and the characteristics of the knowledge produced. The main activities have been the observational approach that underpins the Classical and Pragmatic Models of science, the sociological approach that underpins Latour's and Bloor's models, and the practices and activity theory (Engeström, Miettinen, & Punamäki 1999) that underpin the model of Biggs and Büchler. Contemporary practice-based research in the arts highlights the possibility of activity or performance as a means of knowledge creation. This has been described elsewhere in terms of the fundamental performativity (Haseman 2006) and materiality (Carter 2004) of all types of research and knowing.

The observations of scientific inquiry are underpinned by practices in the form of experimentation. Experimentation is not merely the creation of certain real world conditions but a filtering process in which these conditions are abstracted with varying degrees of success from the surrounding complexity of the real world. The objective of these practices is to try to isolate the subject of scientific inquiry from its practical manifestation, or in terms of the present argument: to isolate the evidence that supports the interests of the field of power.

The degree to which this cannot be achieved in practice is the degree to which certain simplifying and compensating activities must be included in the inquiry. It is these simplifications and idealisations that form the focus of Bloor's criticisms. The acceptability of these simplifications is an example of the kind of social cohesion and collusion that is criticised by Latour and constitutes the activity of belonging and kinship that would be recognised by Cohen. The results of scientific inquiry arise every bit as much as a consequence of a selective, choreographed performance, as occurs in theatre or performance-based art. The principal difference, I claim, is merely a preference for the use of "knowledge" in the case of the former and "insight" or "understanding" in the case of the latter. This in turn appeals to our cultural understanding that we have inherited from Plato, that knowledge should be something deeper, less contingent, more certain and therefore more meritorious, than insight, understanding and belief. Science is merely a series of performances in which physical experiments are staged and the data is analysed according to a selective choreography that highlights certain accounting practices. The process is stage-managed through the presentation of the activity as a research report (performance documentation) that exposes the insight and new understanding of the topic under investigation.

Knowledge creation, and the issue of "what is research" in any field, can be answered by the concept of "satisfaction" and not by appeal to truth-claims or productivity-claims. Productivity-claims are not satisfying in a world dominated by the Classical Model, just as truth-claims are viewed with suspicion in a world dominated by the Pragmatic Model. Satisfaction emerges as a unifying principle when one abandons the idea of a hegemonic model in favour of a spectrum of knowledge creation. Within any one domain, such as science, aesthetics, or studio art, what validates a research methodology is that the community is satisfied that the research methods used have the capability to add meaningfully to the body

of discipline-specific knowledge. Each domain uses its own methods, validated according to quite different criteria. For example, neither "truth" nor "utility" are normally criteria within art; whereas "insight", "understanding" and "artistic ways of knowing and being research" (Springgay, Irwin, & Kind 2005) are criteria that are used. By stepping outside all of these domains and observing what they have in common despite using different criteria, it becomes apparent that each is operating at a meta-level to satisfy the members that new knowledge has indeed been created.

In 2008, Biggs and Büchler already identified that the risk of such an approach is that individual communities could adopt completely idiosyncratic criteria that alienated their production from integration into the wider knowledge community. They therefore proposed that all academic knowledge creation occurs within a wider context of public scrutiny. These days one would describe this scrutiny in terms of "stakeholder engagement" that ensures the potential for "impact" by the research. The emerging popularity of relational aesthetics ensures that artistic research meets this requirement. Indeed, art is often co-opted by science owing to its commitment to stakeholder engagement (e.g. Wellcome Trust 2009) leading to shared satisfaction by the communities of both knowledge creators and knowledge consumers.

What is changed by the replacement of hegemonic notions of knowledge creation based on criteria derived largely from the sciences, with the notion of "satisfaction" based on regarding knowledge creation as an activity? Instead of having to reconcile or legitimise disparate knowledge paradigms, the knowledge creation spectrum reveals that knowledge creation methods do not have intrinsic worth, only worth in relation to satisfying broader community, societal or educational objectives. It also has the effect of "deterritorializing" the field of

power (Coessens, Crispin, & Douglas 2009) and authorising minority communities to

legitimise methods that are locally meaningful, and moderating the authority of the traditional

academic gatekeepers to act outside their field of expertise. As a result, artistic research does

not need to legitimise its activities using alien criteria but instead needs to demonstrate that

not only is its own community is satisfied, but also that producers elsewhere on the spectrum

can be satisfied by it too.

The curator Maria Lind once said to me that she would only be interested in artistic research

when it produced good art. Perhaps the greater challenge is not to satisfy other knowledge

producing communities, who are already feeling the benefits, but to satisfy the field of art that

artistic research methods have the capacity to produce knowledge.

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