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# Specialized, systematic and powerful knowledge

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## Abstract

This article starts with a comment on John White's article published in 2019 in the *London Review of Education*, 17 (3), entitled 'The end of powerful knowledge?', and particularly on the point made about specialized knowledge and its relation to powerful knowledge. It is argued here that it is important to clarify the distinction between specialized knowledge, systematic knowledge, and what Young and Muller mean by powerful knowledge, as, while these are related, they are not equivalent. Not all specialized knowledge is codified and systematized, and not all systematic specialized knowledge is necessarily powerful. It is suggested that some of the characteristics attributed to powerful knowledge by Young and Muller, in particular 'systematic revisability' and its enactment in specialized communities, are crucial for understanding what they mean by powerful knowledge.

**Keywords:** specialized knowledge, systematicity, powerful knowledge

## Introduction

In an article published in the *London Review of Education*, 17 (3), John White (2019) advocates an end to powerful knowledge and recommends that academic debate about knowledge in education could focus instead on specialized knowledge, acknowledging a suggestion made in my earlier article that 'related ideas such as specialized knowledge' (Hordern, 2019a: 34) could be further discussed. He notes that powerful knowledge is emotive, implying that it has the capacity to distort academic debate, whereas specialized knowledge 'more accurately describes the kind of knowledge that mathematicians and historians have and that the person in the street may lack' (White, 2019: 436) and 'opens the way to more rigorous discussion of curriculum content' (White, 2019: 437). According to White (2019: 437), using specialized knowledge enables us to employ 'terminology appropriate to impartial scholarly investigation', as opposed to 'language more at home in the world of product promotion' (by which he means powerful knowledge).

In this article I argue that specialized knowledge is *not an appropriate substitute* for powerful knowledge, despite its relatedness. In fact, powerful knowledge (as set out by Young and Muller, 2013) is a *subset* of specialized knowledge. It arguably only attains its power in certain conditions of systematic revisability. While specialized knowledge and powerful knowledge may be related terms, this does not mean that they are equivalent. The specialization that leads to specialized knowledge is discussed here, and this is distinguished from important processes of codification and systematization. It is suggested that, to follow the Young and Muller (2013) definition of powerful knowledge, what is required is not only specialization of knowledge, but also its codification, systematization and its systematic revisability in specialized

communities. It is not absolutely necessary, however, to stick to the term 'powerful knowledge'. It is acknowledged that the term may be problematic as a consequence of its emotiveness, but the important points made by Young and Muller (2013) should not be obscured in the debate about the term itself.

## What is specialized knowledge?

In *The Elementary Forms of Religious Life*, originally published in 1912, Durkheim (2001) sets out a theory of the relationship between knowledge and society, based on reflections on anthropological studies of indigenous societies in Australia. By explaining how totemic symbols become invested with sacred meaning, Durkheim (2001) shows how symbolic resources can represent 'the social', and therefore become the means by which a society recognizes itself. Social bonds, social memory and notions of collective identity are generated through the development of the 'sacred' or symbolic. In undifferentiated social groups, where the division of labour is less pronounced and each community member is more directly occupied in a range of subsistence activities, there may be limited impetus for knowledge specialization. What persists are forms of the symbolic that have resonance for the community as a whole, and therefore combine with ritual activity to maintain a sense of the 'collective', the (mechanical) solidarity of the community (Durkheim, 2001). Eventually, the hegemonic control of these symbolic forms or 'collective representations' may be challenged as a consequence of new ideas or technologies that start to affect the lives of community members. The solidarity is disrupted, and new forms of differentiation and specialization may emerge as a challenge to the established order.

So, if we follow Durkheim and then the documented history of science, we find that forms of specialization develop within many societies over the premodern and early modern periods as a consequence of an impetus for new technology, attempts to improve the quality of life, or the development of novel strategies for executing tasks (Burke, 2000; Valleriani, 2017; Moodie, 2019). The defence of a homeland or the attempt to acquire new property through conflict provided further impetus, and through forms of trade and exchange, the innovations of different social groups intermingled. Specialization resulted in new categorizations of knowledge and new processes by which that knowledge was recorded and circulated (Valleriani, 2017). Not all this knowledge was explicit, and in the early modern period, systematic organization of the knowledge was sporadic and came in various forms. For example, architectural technical knowledge was recorded in notebooks which included drawings and models that were overlaid with iterations of construction designs in ways which would have been comprehensible only to the initiated specialist (Merrill, 2017). Moodie (2019) highlights how knowledge gained through the practices of brewing and gunnery was increasingly recorded and recontextualized into partially codified forms that could be circulated among practitioners. However, there are also examples of more formally organized knowledge from the classical period being selected and transformed to address problematics posed by technological advance. For example, Valleriani (2014: 127) shows how 'sixteenth century hydraulic and pneumatic engineers appropriated ancient science and technology', in this case, Hero of Alexandria's text 'Pneumatics', to improve the practical efficacy of their technologies. This was undertaken through enlargements and commentaries on Hero's original text, resulting not only in further technical knowledge, but also in the 'elaboration of the theoretical principles of pneumatics' (Valleriani, 2014: 172). Thus, specialized knowledge developed in a myriad of ways and formats to meet technical objectives and develop greater understanding.

Young and Muller (2014: 8) identify 'two principal kinds of specialised knowledge' which have integrated ever further from the Enlightenment onwards, at least in the industrialized world. They suggest that there is: (1) 'knowledge specialised to develop conceptually', which aims to 'extend the generality and reach of the conceptual edifice'; and (2) 'knowledge specialised to a contextual purpose', which seeks to 'arrive at a more elegant or efficient solution to a technical problem' (Young and Muller, 2014: 8–9). Young and Muller (2014: 9) state that these two forms of specialized knowledge 'joined common cause in the seventeenth century', created the conditions for the scientific revolution, and eventually fuelled the forms of industrialization in the contemporary world. There is, therefore, an 'irreversible twist in the braid of contemporary specialised knowledges' which means that 'much contemporary theoretical knowledge has roots in technical solutions reached in advance of basic science' (Young and Muller, 2014: 9). In recent times, it could be argued that specialized knowledge has been oriented ever further towards the needs of capital, and has resulted in the expansion of potentially exploitative industries with origins in the most heavily industrialized parts of the world. The mode 2 knowledge of Gibbons et al. (1994), which is produced 'in the context of production', is a form of specialized 'to a contextual purpose' knowledge which is produced specifically for industrial needs. In summary, what we may think about as specialized knowledge in twenty-first-century Europe is the contemporary manifestation of the symbolic in societies that are now highly differentiated and specialized.

However, specialized knowledge that seeks greater abstraction, understanding or 'technical' solutions to physical or social issues should not be perceived as primarily a contemporary European manifestation. There have been multiple forms of specialization in historical societal contexts, as Collins (2000) demonstrates through intricate analysis of the development of metaphysical systems in China and the richness of Indian philosophical creativity. Furthermore, many forms of specialized knowledge are considered subversive and remain on the margins of societies facing active suppression or apathetic ignorance, while challenging accepted practices and understandings. Rudolph et al. (2018, 26) highlight the marginalization of 'the histories and literatures of women and of the poor and working classes', and of 'non-heteronormative social analyses', while also notable is the growing citizen science movement, which struggles for recognition in academic scientific disciplines, despite its potential (Kosmala et al., 2016).

But *non-systematized* specialized knowledge did not disappear with technological progress, even though the advent of printing and, more recently, the information technology revolution have radically increased the potential for systematization. Arguably, all new knowledge that is addressed to a problematic arising within a specialized community while taking account of existing specialized knowledge, is specialized. Novel technical innovations or new research inquiries that have been developed to address a problematic may be considered specialized knowledge, even before they have been fully admitted into some form of corpus of knowledge relating to a discipline or work practice. They may be either 'specialised to a contextual purpose' or aiming to 'extend generality' (Young and Muller, 2014), which in itself can be considered a different form of purpose, albeit internally controlled by a specialized community.

Furthermore, specialized knowledge is not *immediately* available to all; hence, educational institutions or some form of pedagogic relations are arguably necessary in order to develop an understanding of specialized knowledge. In times before recorded history, those who were not part of social group A would not have fully understood the meaning of symbol A for social group A, unless they spent significant

periods of time with social group A, and participated in their practices and customs (probably with some pedagogical assistance). On the other hand, visitors might have been able to immediately understand some of the more mundane activities in which social group A participated (although even these might have been invested with symbolic meaning in certain circumstances, for example, the preparation of food, washing or hunting), and in some cases pick them up through imitation. However, via pedagogic relations, newcomers can be inducted into a higher level of understanding of group A's specialized knowledge (or the recognition and realization rules of the group's practice (Bernstein, 2000)). The same rule applies to specialized knowledge in highly differentiated contemporary societies – those with sufficient initiation into specialized knowledge are able to read the meaning of acts and judgements that have significance for society.

There is a further important point to make here. While it may take considerable time to develop understanding of any specialized knowledge, and to be able to infer the significance of any proposition in terms of its relation to other propositions (and, thus, more fully to 'know' the knowledge), this does not suggest that we are not acquainted with, or make use of, other forms of specialized knowledge in our daily lives. White's (2019) example of Harpic, 'the most powerful cleaner', is a case of an industrial product that has been developed through the use and refinement of specialized chemical knowledge for a specific purpose – to produce a cleaner that can safely and efficiently remove bacteria and limescale. However, not all its users understand the chemical processes that led to its production, and the reasons why it works. We are surrounded by the products of specialized knowledge in the contemporary industrialized world, but as individuals we are only likely to have adequate command of a small range of such specialized knowledge. Hence, the manufacturers are instructed to provide the general public with instructions for the use of Harpic, as, without guidance, most of us lack the detailed chemical knowledge to judge where and how to use the product safely. An individual who has engaged at a high level with such specialized knowledge would, however, be better placed to make an informed judgement.

## Systematization

Not all specialized knowledge is systematized. However, what could systematization potentially mean? There are at least two answers to this:

1. The systematic arrangement of webs of propositions, held together by inferential relations which make each proposition meaningful in the context of other propositions (Derry, 2008; Winch, 2010). Such a systematic arrangement of knowledge does not necessarily mean that the knowledge is 'static' or inert. Indeed, new propositions or research findings can be added to the existing webs to supplement understanding. In some cases, new insights may transform the existing web of inferential relations, reconfiguring them into a new arrangement. It may also be that it is important to exercise caution when considering the making of inferences – the process of inferring the relations between propositions may need to be sufficiently open-ended in order to advance new interpretations of existing knowledge (Muller, 2016), and consequently stimulate innovation.
2. However, the systematization of knowledge can also mean the specific process of formalizing and circulating the knowledge, which very often means making it more explicit through some form of documentation. This codification of knowledge in explicit form multiplies the potential usages of the knowledge. For example, a systematized body of medical knowledge can be used as the

basis for the formation of medical practitioners, and can be more efficiently and accurately revised. Young and Muller (2014: 9) use the term 'to denote the different components of specialized knowledge that go to make up a curriculum'. In the early modern period, the formalization and codification of knowledge was often through publications that were circulated among interested parties. In the case of architects in Italy in the fifteenth and sixteenth centuries, notebooks containing annotated diagrams and design recipes were shared with collaborators and across generations. While the requirements of each building may have been different, the notebooks provided an indispensable reservoir of accumulated knowledge and a record of innovation (Merrill, 2017). With ongoing technological development, it has been possible to codify and endlessly (re)categorize and organize data in ways that would have been previously unimaginable. However, this systematization process does not *necessarily* result in greater specialization, although it may usefully serve to reinforce it, and to improve the levels of understanding of the specialized practice (disciplinary, professional or otherwise).

What these developments in systematicity may lead to are processes for the evaluation of the suitability of new knowledge for inclusion in the existing body of systematic specialized knowledge, and this may entail agreements on explicit or implicit procedures for such evaluation, which can be applied to the new knowledge claims (Winch, 2010). The development of such procedures or criteria for the evaluation of knowledge is arguably best maintained over time by forms of normatively organized practice that husband the evaluative criteria on which judgements are made (Addis and Winch, 2019). Those who acquire a degree of procedural 'know-how' are equipped to apply procedures judiciously – to make reasonable judgements on whether a new claim to knowledge can be admitted into the existing knowledge base. This, one could argue, is the basis for the 'discipline of the disciplines' (Bridges, 2006), with the differing character of evaluative procedure reflecting the specific structures and practices of each discipline or field of knowledge.

The evaluative process may take the form of a continual iterative evaluation, and therefore develop into what Young and Muller (2013: 236) term 'systematic revisability'. However, this systematicity and the processes of revision are fallible. In any disciplinary structure, procedures and criteria may be more or less judiciously applied at any point in time and in any context. Thus, systematic revisability may be contentious – what counts as 'revision' or 'systematic' in the context of any 'specialized community' must be open to scrutiny. An important aspect of the process of 'systematic revisability' is the process by which any knowledge is considered 'redundant', and the efficacy with which redundant knowledge is discarded. In the physical sciences, if we follow Bernstein's (1999) suggestion of progress via the integration of propositions, it may be easier to identify and discard redundant knowledge. However, the social sciences, due to their multiple and possibly incommensurable 'specialised languages' (Bernstein, 1999), which each provide a different lens on an issue, do not remove knowledge at the same rate.

It is claimed here, therefore, that systematization is a process that often follows from specialization. Systematization has accelerated specialization, and made the sharing and evaluating of specialized knowledge considerably more efficient and potentially more equitable. New knowledge claims can be evaluated more rapidly and to a greater degree against existing claims. However, even if knowledge is specialized and systematically organized, this does not necessarily entail that it is being

systematically *revised*, or that the process of systematic revision is always executed *reasonably* and *accurately*, taking full account of the existing knowledge base. It is possible that forms of specialized, systematically organized knowledge become moribund, perhaps because their use value has declined. For example, the organized technical knowledge used to produce the steam engines or large rigid airships of the past has limited contemporary use. It is also possible that processes of systematic revision are enacted partially, to the exclusion of certain claims or interpretations that are considered inadmissible by dominant parties within a specialized community. All specialized communities are subject to imbalances of power and control that can suppress radical new ideas. Merton's (1968) exposition of the 'Matthew effect' in the sociology of science demonstrated how specialized scientific communities offer further rewards and status to those already enjoying privilege, with the consequence that alternative perspectives outside of established networks can struggle to be acknowledged.

It could be argued that systematization coupled with just and fair systematic revision enhances specialization and that the consequence of these processes is a *more definitively specialized knowledge*. In other words, the result of these processes is a knowledge that is more acutely specialized to its purpose, either a higher 'generality' or an even more 'elegant or efficient solution to a technical problem' (Young and Muller, 2014: 9). If such an argument is followed, then specialization can best be seen as an ongoing process that is served by certain forms of systematization. Notwithstanding this, it is important to note the potential for systematization to accentuate partiality and to magnify the exclusion of valid alternative perspectives or interpretations of a problematic. Knowledge that has been systematized and is readily available to interested parties in an explicit and easily transferable form (via publication or other media) has a considerable advantage over those forms of knowledge that remain unsystematized.

It is important also to question what is meant by 'system' when we consider something to be systematic. Reflection on the nature of systems has led some to distinguish between closed, and open or recursive systems in 'semiotic systems' (Biesta, 2010: 496) such as education. Whereas a closed system operates 'deterministically', open or recursive systems operate 'probabilistically' and iterate as a 'result of a combination of external factors and internal dynamics' (Biesta, 2010: 496). A closed socio-epistemic system suggests insularity and a refusal to accommodate novelty, or to include new contributors to processes of revision. However, a more open or *iterative* system suggests that processes are prepared to adapt to change: to listen to novel, radical claims that could transform understanding, and to include contributors who will challenge existing perspectives (Hordern, 2019b). There is a risk in such arrangements of co-option or tokenism, but these are not inevitable.

## What is distinctive about powerful knowledge?

Young and Muller (2013: 233) argue that there are 'three distinctions essential to an understanding of what we have referred to as "powerful knowledge"', and that these distinctions are 'cumulative' in that 'each depends on the one(s) prior to it'. These are:

- The distinction between "knowledge of the powerful" and "powerful knowledge"
- The distinction between non-specialized knowledge and specialized knowledge
- The distinction between specialized powerful knowledge and specialized less powerful knowledge. (Young and Muller, 2013: 233)

The first distinction is not substantively relevant for the matter under discussion here (although it could be brought to bear in a more elaborate discussion of the workings of specialized communities), but the second and third distinctions are relevant. As noted above, the argument about specialization is a Durkheimian argument about the development of bodies of knowledge and expertise that are necessary elements of a differentiated society. Whereas certain forms of symbolic knowledge would be appropriate in an undifferentiated society where there are few specialized roles, in a complex, interdependent contemporary society, a greater range of specialized knowledge is required. Arguably, the remnants of the (purely) symbolic in the contemporary world are neglected or have often proved out of step with changing societal identities and commitments.

The second distinction refers to the identification of some knowledge as specialized (either 'to a purpose' or to 'extend generality' (Young and Muller, 2014: 8–9)), and some knowledge as not (currently) transcending an everyday local usage: in other words, its meaning is exhausted in the context of its use without wider significance (that which Bernstein (1999) terms 'horizontal discourse').

With the third distinction, Young and Muller (2013) open up the possibility for some differentiation between what is understood by 'specialized' and 'powerful'. They suggest that some specialized knowledge could be considered more powerful than other forms of specialized knowledge, but that specialization is the precondition for powerful knowledge. There are, therefore, certain characteristics that can generally be attributed to specialized knowledge in its contemporary form (that is, systematic revisability, emergent, real, material and social (Young and Muller, 2013: 236–8)), and that could ascribe it with 'power'. It could be argued that some of these characteristics are subject to evaluation, in that they may be variably demonstrated in any given context, whereas other characteristics reflect Young and Muller's (2013) ontology and epistemology.

Young and Muller's (2013) Durkheimian realism leads them to suggest that specialized knowledge (and, by implication, powerful knowledge) is real, material and social, and that these characteristics are not open to qualification or evaluation in any context. If we follow the path of Durkheim (2001) and Bernstein (1999), all (systematic) specialized knowledge must be real, material and social. According to Young and Muller (2013: 238), specialized knowledge 'is about something other than itself about which it says something in a robustly reliable way', and for this to be true, there must be 'something' (real) about which we can potentially say something meaningful. This position is likely to be shared by various proponents of realism. Furthermore, the claim that knowledge is material and social because it 'is produced in particular socio-epistemic formations' according to the 'internal rules of solidarity, hierarchy, and truth norms' represented by the differing 'internal material cultures' (Young and Muller, 2013: 238) of specialized or disciplinary communities, is a position that is developed from a historically and genealogically informed sociology of knowledge similarly expressed in the work of Williams (2002), Burke (2000) and Collins (2000).

However, it could be argued that for less systematized specialized knowledge (which we might also suggest is less fully specialized than more systematically organized specialized knowledge) the 'socio-epistemic formations' may only be partially developed and the 'internal rules of solidarity' only partially agreed. And here there is the potential for some form of evaluation of the extent to which the community has acquired the criterial basis on which new knowledge claims can be fairly assessed.



Furthermore, in terms of both 'emergence' and 'systematic revisability', it is possible to suggest that specialization can be further qualified and evaluated. It could be that where there are greater levels of emergence and systematic revisability, specialized knowledge becomes particularly powerful, in Young and Muller's (2013) terms. According to Young and Muller (2013, 237), for knowledge to be fully emergent, it must be 'independent of' its 'originary contexts and their agents', even though these contexts may 'leave their mark on the knowledge'. In the social sciences, Young and Muller (2013: 237) note, there is also a specific meaning of emergence which relates to the Durkheimian idea that certain social phenomena 'have a "social" reality that we can have knowledge of that is not reducible to the actions of individuals'. However, it could also be argued that there is something more to say here about emergence. Independence from specific context is one way to characterize emergence, but perhaps equally important is to state that emergence denotes the capacity for specialized knowledge to have widespread resonance for multiple people or across multiple contexts, by providing pertinent explanations and insights that enable the rethinking of experience or the reconfiguration of problems. For some knowledge, for example in the physical sciences, this resonance and explanatory purchase may seem infinite, until better explanations for physical phenomena are developed. Geocentrism held a grip on European thought in the early modern period until Copernicus's and Galileo's findings stimulated a shift towards a heliocentric model. In the social sciences or humanities, it is much less likely that knowledge will achieve 'infinite' resonance. However, it could be suggested that when philosophical, historical or sociological knowledge has explanatory purchase across a greater range of contexts for a greater range of people, then it has more 'power' or resonance. The extent of the 'range' can be evaluated, and is likely to be variable, depending on the knowledge. A carefully curated local history of a community has considerable value as a specialized body of knowledge for that community, and will have *even greater* value or power for a society if it richly demonstrates some aspects of social change or significant events that have widespread resonance and import.

Systematic revisability, as noted in the section above, can be practised in a range of ways. The argument presented above suggests that the processes and criteria by which judgements are made about knowledge claims should be open to adaptation. There must be a preparedness for iteration of the evaluative processes in a sufficiently open system: if the 'discursive gap' in the system is closed, then there is no potential for knowledge to become richer, more refined or more 'powerful' (Moore and Muller, 2002). In other words, the existing structure of knowledge must be sufficiently contestable to be open to restructuring in the light of new findings and insights. The 'grammar', or the means by which new insights are identified and translated back into the structure of knowledge, must function (Bernstein, 2000). The extent of 'openness' or conservative closure to new insight can also be evaluated, as can the functionality of the grammar, and therefore the extent to which knowledge is being adequately revised to take account of new information and insightful work can also be evaluated as it may be variably demonstrated. Furthermore, following Durkheim (2001), a strong argument can be made that the current state of knowledge must *collectively represent* a community. While the knowledge of the history of a village community is sufficiently specialized if it represents and has resonance for the past and present inhabitants of that village, the more emergent powerful knowledge that claims to have resonance throughout society needs to work harder in order to collectively represent all past and present members of society adequately.

## Diagrammatic representation of the argument

Table 1 represents the argument in outline form. Powerful knowledge can be seen as a subset of systematized specialized knowledge, which itself is a subset of specialized knowledge. Furthermore, specialized knowledge includes non-systematized specialized knowledge, which includes new knowledge claims or innovations awaiting systematization and systematic revision, and other types of non-systematized or tacit knowledge which it may be currently impossible to systematize.

**Table 1: Specialized and systematic knowledge**

Knowledge type		Characteristics
(1) Specialized knowledge		'knowledge specialised to develop conceptually' and 'knowledge specialised to a contextual purpose' (Young and Muller, 2014: 8). Some of this knowledge remains marginalized in contemporary societies.
(2) Systematic specialized knowledge	(3) Non-systematized specialized knowledge	(2) is knowledge that has been systematized within an organized knowledge base (for example, for a curriculum – Young and Muller, 2014: 9).  (3) is knowledge which remains currently unsystematized and is not part of the existing processes of systematic revision (for example, new technical innovations or professional heuristics developed in the light of existing systematic specialized knowledge).
(4) Continuously systematically revised systematic specialized knowledge	(5) Systematic specialized knowledge which is not subject to ongoing systematic revision	(4) is 'powerful' knowledge that is subject to continuous systematic revision in 'socio-epistemic formations' (for example, disciplinary communities, including the professions) (Young and Muller, 2013). The systematic revision may or may not be representative of the collective.  (5) is knowledge that is systematically organized and specialized, but not currently subject to sufficient systematic revision. It is potentially powerful.

## Conclusions

Specialization, systematization and the ascription of knowledge with power in Young and Muller's (2013) terms are related processes, but they do not necessarily follow from each other – they are related but distinct. Not all specialized knowledge is necessarily as powerful as other specialized knowledge. Some specialized knowledge that may be thought of as powerful may (through the actions of its specialized community) be considerably less powerful than is currently thought, and this may often be because the processes of systematic revision are not sufficiently open to innovation and alternative perspectives that can offer rigorous challenge.

Furthermore, it is not the existence of a socio-epistemic formation (or specialized community) which is at stake, but rather the manner in which those involved in this formation exercise their capacity for systematic revision of the knowledge itself. Further work is needed to establish the dynamics by which specialized communities maintain 'openness' in their processes of systematic revision of existing knowledge and continuously expose some of the unjustifiable exclusions of the past (Rudolph et al., 2018). This does not entail discarding the idea of specialization or the socio-epistemic, but broadening its scope so that 'collective representations' are authentically collective and thoroughly representative, particularly when knowledge is held up as having particular import or 'power' in society.

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## Notes on the contributor

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