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Knowledge Organization Needs Epistemological Openness

A Reply to Peter Jaenecke

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This paper is put up to enter into a discussion about the theses of Peter Jaenecke in Knowl.Org. 94-1. Jaenecke's differentiation of knowledge as "core knowledge", "peripheral knowledge", and "pseudoknowledge" is rejected, since his conception of knowledge is limited to a particular epistemology and knowledge domain. The author argues in favor of an epistemologically open conception of knowledge organization considering knowledge organization as a user-supporting but not as a user and producer controlling task. (Author)

1. Introduction

In KO 94-1 Peter Jaenecke's article "To what end knowledge organization" is announced by the editor to be "a forceful stroke on a kettledrum". Indeed, Jaenecke's article is a forceful stroke, but I am afraid that this stroke could lead knowledge organization in an unfavorable direction.

First of all I agree with some of the main lines of Jaenecke's basic analysis

- that there is a problem of access to adequate knowledge for desired actions,
- that knowledge organization lacks a clear-cut definition,
- that it is difficult to identify the fields belonging to knowledge organization,
- that knowledge organization should reflect on its objectives,
- that there is a bias on methodology.

I sympathize with his approach at the beginning of his article to define basic concepts as "message", "content" and "knowledge", and I can accept - with some minor caveats - these definitions with the exception of his most important one: the definition of knowledge. I consider this definition too strict and therefore not useful as a basis for defining the objectives of knowledge organization.

Jaenecke demands that knowledge be defined on the basis of four conditions: Statements containing knowledge must be

"1) general statements on a great number of things. They must also be 2) ageless, hence not lose their validity after a certain time. They must 3) permit rational decisions of general interest and not merely of interest to a special circle of persons, and they must 4) be exact so that, in principle, every human being may obtain from them the same information." (11)

Statements meeting these conditions, in Jaenecke's terms, are "core knowledge", e.g. the periodic table of elements or the theory of electrodynamics. In contrast to "core knowledge" the so-called "peripheral knowledge" violates the conditions 2) - 4). It consists of general statements in scientific discussions, theses, research reports etc. and it will become either obselete or it will be transformed into "core knowledge". The third kind of knowledge is called "pseudoknowledge". It violates as "peripheral knowledge" the conditions 2) - 4) but on top of that it is "neither true nor wholly false, as they link together ideas which, while having a true core, do not belong together". According to Jaenecke it is vague and mediated in an "obscure way of expression". It is not surprising that Jaenecke demands "pseudoknowledge to be "screened out". (11)

In this article I argue against Janecke's differentiation of knowledge into "core, peripheral and pseudoknowledge". I doubt that the identification and screening out of all pseudoknowledge is possible or desirable. In order to present my ideas I will use two analogies, one introduced by the famous astrophysicist Sir Arthur Eddington and the other one by the sociologist Michael Thompson.

2. The Network of Knowledge - or Man's Limited Capacity to Find Objective Knowledge

In his "Philosophy of Physical Science" (5) Eddington compares the work of a natural scientist to the work of an ichthyologist. He describes the ichthyologist as a person who wants to explore life in the ocean. He sets off for the fishing grounds and uses a net for fishing. Examining his catch he states:

1. No creature in the ocean is smaller than 2 inches.
2. All creatures have gills.

Tentatively, he assumes that this result could be repeated as often as he fishes with his net. On the one hand, we could say that the procedure of the ichtyologist leads to objective knowledge about creatures in the ocean, since he can confirm his statements by repeating his fishing several times, always leading to the same results. On the other hand, we could say his statement is absurd. Of course, there

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are creatures smaller than two inches and without gills. The net the ichthyologist uses is simply not appropriate for his purpose. If the holes in the net would be smaller or wider the results would differ. But what does "appropriate" mean? The ichthyologist could answer that everything not being caught by the net does not belong to the realm of knowledge about creatures in the ocean, since he has defined that only what could be caught by his net belongs to the realm of knowledge about creatures in the ocean.

For Eddington the work of this ichthyologist resembles the work of a natural scientist. Each fish is a knowledge unit. The catch is a system of knowledge, the net equals our senses and thinking abilities, and throwing out the fishing net could be regarded as a scientific observation. We can regard the knowledge units as concepts in Dahlberg's terms (1).

The answer of the ichthyologist seems to be sophistic only at first sight. It is a ubiquitous formula we find in the empirical research of the natural sciences as well as of social sciences: The researcher defines the parameters and dimensions which will be the object of the methods and instruments he has chosen for his observations (3,4). It is an obligation of the researcher

- to inform his audience what kind of net he uses,
- what kind of fish he expects to catch and (if possible),
- what kind of fish cannot conceivably to be caught by one's net (e.g. no fish smaller than two inches).

Obeying these obligations makes the knowledge criticizeable which one assumes to have created by drawing conclusions from one's observations. In Popperian terms this could be regarded as a condition for verifiable and falsifiable knowledge (15).

From this point of view there is no such thing as objective knowledge, since the creation of knowledge by man depends on the limited capacities of his senses, on the limited capacities of the instruments by which he tries to improve his senses (e.g. microscopes), and on his particularly limited thinking abilities. Another limitation (not mentioned by Eddington) preventing the creation of objective knowledge is due to our choice of parameters and procedures for observations. This choice is neither accidental nor objective but depends on the problem we need to solve or would like to solve. There are elements in the problem situation that lead the researcher to using a net with holes not larger than two inches. We could ask for elements of the ichthyologist's problem situation by such questions as: Does the researcher want to make his research comparable to other research that uses nets with holes of two inches? Does the manufacturer of the net lack the ability to produce nets with holes smaller than two inches? Does the ichthyologist want to write a handbook for fishermen to help them classifying a catch with fish of a particular size which can be sold at the market?, etc. In other words: When we create knowledge by solving a problem the created knowledge depends on the particular interests we pursue when we enter the problem situation, and the created knowledge depends on necessary limitations outside the researcher, like access to resources or unavoidable constraints.

Historians and theorists of the history of science like Thomas S. Kuhn (12) have provided many examples confirming that the limited capacities of human beings and the elements of a problem situation influence our creation of knowledge. One of the most instructive examples is the phlogiston theory which tried to systematize the phenomena we call nowadays oxidation. This theory claimed that all bodies contained phlogiston, a matter which made bodies inflammable. The phlogiston was thought to leave the bodies when the bodies are set on fire. Between 1670 and 1770 this theory was generally accepted and constituted the main theory on this topic. It was assumed, in Jaenecke's terms, to be "core knowledge". Nowadays we *assume* we know that there is no such thing as a phlogiston and that oxidation is - grossly speaking - the combination of an element with oxygen.

Kuhn mentions a couple of reasons for this change of thought. On the one hand it is of particular importance to him that scales developed more and more to a standard instrument in chemistry by the end of the 18th century. The use of this instrument (a different or more sophisticated net) necessarily revealed that the bodies gain weight when seton fire. This speaks against escaping phlogistons, since a body should loose weight when something escapes. Moreover the phlogiston theory turned out to be more and more unable to account for phenomena in pneumatic chemistry (the "fish caught" by pneumatic chemistry were not expected to be caught on the base of the phlogiston theory).

Our limited capacities lead us not only to abandon theories (which represent knowledge) like the phlogiston theory but also to limit the range of phenomena for which a theory is thought to be true. The most famous example is Newtonian mechanics, a body of knowledge which certainly has to be supposed to be "core knowledge" in Jaenecke's terms.

According to Heisenberg Newtonian mechanics is a "closed theory" (8,9). This is a theory consisting of defined and precisely formulated concepts, arranged in a consistent axiomatic system, with the relations between the elements being determined by deterministic or probabilistic laws. "Consistency" usually refers to a mathematical formalism (8,9). Heisenberg claims - and all physicists will agree with him - that this theory will be valid today and in 2 million years in any even the remotest galaxy (9). But, and this is not a small restriction, the famous German physicist says as well that in the microcosm of the atoms Newtonian mechanics is included *only* as a *borderline case* of quantum mechanics. In the microcosm the way "electrons behave cannot be understood by the conceptual instruments of Newtonian mechanics" (9). In this case the knowledge represented in Newtonian mechanics has not been abandoned, but the domain for which the knowledge was thought to be valid has become considerably smaller.

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This means that Newtonian mechanics is still valid as an idealization for *a part of reality*, but this part of reality is restricted now (8,9).

Apart from the limitations of our capacities we have to accept that the capacities of human beings differ among individuals and among cultures - not only in terms of limitations but also in terms of conceptualization. Quite often we assume that the western type of rationality and creating knowledge is the only "real" way of thinking. This neglects the research in cross cultural psychology. This research reveals that people of different cultures perceive the same objects differently, have different systems of categorization and preferences for categorization, and draw different conclusions although they are confronted with the same phenomena or situations (cf. 14,16,18)

Even inside our western rationality some scientists think that there exist particular "cultures" of disciplines. In a tradition starting with Droysen and Dilthey, to Snow, to Schwab, and to Liebau/Huber (cf. 2, 13, 17, 19) it is claimed that the conceptions of rationality, methodology and communication in the various disciplines are so different that these disciplinary cultures do not understand each other. A member of one culture is not able to judge whether something accepted as knowledge in the context of one discipline is really valid. This lack and sometimes unwillingness of understanding quite often leads to the accusation that those working in other disciplinary cultures do not produce knowledge at all, since that what is called knowledge does not meet the standards of one's own culture - like standards of formalization, categorization or coding.

These thoughts based on the ichthylogistanalogy can be summarized in a short sentence:

Knowledge cannot be separated from individual or cultural subjectivity.

3. From Knowledge to Rubbish to Knowledge - Knowledge Creation as a Process of Value Decrease and Increase

At the end of his book on "The Philosophy of Physical Science" Eddington mentions that knowledge is only the surface of the problem of rationality but the deeper problem is the problem of value. The question is: What is the process like by which some statements gain the status of being particularly valuable knowledge? I think the answer to this question

- cannot be restricted to Man's limited mental and technical capacities, although these limitations are of particular importance,
- and should not be a normative answer referring to the standards of a particular disciplinary culture as the only valid standards.

Many historians and theorists of science in the tradition of Fleck (6) and Kuhn (12) emphasize the paradigmatic character of science. The attribution of value to knowledge and complex knowledge systems as theories is thought to depend on the problem solving power of and the acceptance by a scientific community (disciplinary culture). I will not repeat these ideas which I assume most of the readers are familiar with. I will refer to another author who has attacked this problem very intelligently from another perspective extending the ideas of Fleck or Kuhn and pointing to an important underlying mechanism of paradigm constitution. It is the sociologist Michael Thompson and his "Rubbish Theory" (20).

Thompson's central idea can be exemplified by a simple everyday example: When you buy a car it is of transient value. Usually after fifteen to twenty years a car in Germany is not usable any more and you want to get rid of it. The car has become rubbish. But it is possible that when you keep your car for a couple of years and when you take care of it you will have a very valuable oldtimer. The value of the oldtimer will not decrease but more likely it will increase in the course of time. According to Thompson no object in a society can be durable from the beginning. First of all it is a transient object with a decreasing value. After having gone through the state of rubbish it can become a durable object.

Thompson argues that this development is typical for the attribution of value to objects. People consider objects:

- as transient, i.e. things have a particular value but this value decreases in the course of time;
- as rubbish, this is the end of decrease, things then seem absolutely worthless to us, nobody would buy it or desire it;
- as durable, i.e. things have a value which does not decrease but does only increase, they do not become rubbish any more.

This idea transferred to the realm of knowledge seems to resemble Jaenecke's differentiation: Knowledge valued as transient could be regarded as peripheral knowledge, knowledge valued as rubbish could be regarded as pseudoknowledge and knowledge valued as durable as core knowledge. This resemblance exists only at first sight. The important difference is that according to Thompson there is a particular dynamics: rubbish has the potential to become durable knowledge, whereas according to Jaenecke "pseudoknowledge" has to be screened out.

This potential of rubbish is no property inherent to an object like a physical quality. This potential is due to a social process. This means: It is not the quality of the object which elevates rubbish to the status of durability but the interest loaden attribution of value by the people. I will only sketch this process very briefly by leaving out many of Thompson's subtleties, leaving out in particularly his references to catastrophe theory.

Thompson basically argues along the lines of transaction theory. This theory claims that people in a society interact always by the transfer of objects. An interaction without transfer seems not to be conceivable (at least you transfer "words") and so the concept of "transaction" has

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been established. This engagement in the transfer of objects is thought to be value loaden, i.e. the objects we transfer are always of a particular value. The overall idea is that people initially have a "ragbag" of disparate values. Engaging in transactions with other inidviduals they find out that their "rag bags" are differently constituted. Therefore, in their transactions there will be a mismatch between the expected results and the perceived results, because their values are not accepted. Since this mismatch can prevent an individual from achieving his or her objectives, individuals try to rearrange their values in order to be more successful the next time. This process of interdependent rearrangement leads to a more systematized "rag bag".

Knowledge can be regarded as such a transactional object. Those working in a scientific community know this very well. When you write an article inside a community (in Kuhn's terms: inside one particular "paradigm") by using the accepted methods and instruments and meeting the demanded standards, your article is likely to be supposed to be valuable. The rejection of an article quite often is due to a difference between the values of your research and those accepted by the editors of the scientific journal. But in another journal highlighting other values of research the article can be accepted.

According to these ideas the attribution that some knowledge is rubbish and some other durable and that there is a development from "rubbish" to "durable" is a matter of increasing and decreasing transactional success. This means, it is not only the problem solving power of knowledge which makes it valuable but also the instrumentalization of knowledge for personal transactional success. The attribution of value to knowledge has to be seen as an interplay between the problem solving power and this instrumentalization.

Summarizing the ideas based on Thompsons "Rubbish Theory" we can say:

The attribution of value to knowledge is a social process in the course of time. This process allows that knowledge regarded as rubbish may develop to the status of durable knowledge.

4. Knowledge Organization and Epistemologies

Jaenecke's ideas as well as, hopefully, the ideas presented here in this article both display some inner plausibilty. What is the reason that they are so different? The answer is obvious: We argue along the lines of different disciplinary cultures and we have in mind different domains of knowledge when we talk about a general concept of knowledge. If we broaden our horizon and leave the borders of disciplines we could say that our answers to the problem of knowledge are based on different assumptions concerning the ability of cognition and the desired outcomes of cognition - in philosophical terms one would say the presented ideas are based on different epistemologies.

Jaenecke does not say much about his epistemological concept but from his definiton of knowledge one can infer that his epistemology is based on a realist's point of view (cf. 10). In realists' epistemologies it is believed that entities, properties and relations exist in the world independent of our sensual experiences and independent of any conceivable structure of the observer. This means observation is supposed to be independent of the limitations or preferences of an individual or a disciplinary culture. Holding this belief leads to statements like:

- Knowledge derives out of conclusions drawn from observation.
- Gaining knowledge is an act of discovery.
- The results of observation and theorizing following observations are ageless laws.
- Knowledge can be of limited duration and can change in the course of time. But this change is supposed to be due to limitations of the problem solving situation, i.e. not all parameters, dimensions, elements, etc. were considered, but had they been considered, no change would occur.
- Only scientific knowledge is knowledge, since only (natural) science provides us with adequate methods.

These are only a few typical statements in the realist's framework as defined above. Some of them are compatible with each other, some of them are not compatible and mark different positions in this framework.

In the idealist's framework, properties, entities and relations do not exist independent of our mind or our ability to reason. So observation is thought to be dependent on our mind. We cannot observe things as they are (Dinge an sich) but as they are processed by our senses and our mind. The varieties of modern constructivists' epistemologies are usually forms of idealism. They refer to Kant but avoid the word "idealism", which is not popular nowadays. In Thompson's terms one could say: Using the term "idealism" endangers one's transactional success. Holding this belief leads to statements like:

- Knowledge is a notion relative to time, space, domain of knowledge, interest, etc.
- Science is not the only domain creating knowledge.
- Knowledgecan be limited to individuals or small groups of individuals.
- Knowledge is a process of interaction between individual and environment.
- Knowledge is a construction and not a discovery.

Variations of these epistemologies and other epistemologies not mentioned here (e.g. phenomenology) are possible.

Acting according these different epistemologies has led and will lead to individual success and success of communities as science communities. None of these epistemologies is better or worse in general. Possibly an epistemology is better or worse in respect to particular problem situations.

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5. Conclusion

From these considerations concerning the process of knowledge creation and the epistemological status of created knowledge a couple of arguments against Jaenecke's conception of knowledge arise:

- The attribution of the predicate "knowledge" to a statement does not depend on the statement's pertaining to a great number of things. "Knowledge" is something which is identifiable, intelligible, verifiable and falsifiable. Why should it necessarily refer to a great number of things?
- Knowledge is not ageless - not even the knowledge we find in handbooks which - according to Jaenecke - are the most likely candidates for containing ageless "core knowledge". Our pursuit of knowledge depends on our limited capacities and our needs and interests in problem-situations. So even statements and theories which seemed to be of eternal validity have been complemented, changed or abandoned in the course of the development of new mental or technical tools.
- Although there is a strong feeling that a lot of "pseudoknowledge" exists we have to be aware that our evaluation could depend on our "belonging" to a different culture or disciplinary culture.
- Pseudo knowledge has the potential to develop to durable knowledge and should not be screened out.
- Jaenecke's conception is shaped by a realist's epistemology. Different epistemological concepts do exist and there is no reason to denounce them as improper.

The term "knowledge organization" taken literally means making knowledge an "organum" (Greek = instrument, aid) for particular purposes. The users who want to take advantage of knowledge organization come from different cultures and disciplinary cultures, believe in different epistemologies, have at their disposal different capabilities and instruments, and they are interested in achieving very different goals. The same holds for the producers of knowledge. Although this leads to a confusing situation, particularly in a time where the number of publications explodes, the task of knowledge organization should not be a normative one demanding producers and users to adhere to tight epistemological standards. This would mean that the organizer who is supposed to support knowledge retrieval for particular purposes would judge which purposes, questions, methods etc. are acceptable for a user or producer of knowledge. This would be a load far beyond the competence of knowledge organizers. The task of the knowledge organizer is not to control the user and producer but to provide control for the user and producer.

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