Defining Knowledge: an Epistemological Foundation for Knowledge Management

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Abstract

Knowledge Management is a field of increasing popularity, within both the academic arena and the business community. However, although there is an abundance of advice on how to develop and manipulate knowledge-based systems (particularly through the medium of web sites), there is still confusion within the Knowledge Management community of what actually constitutes knowledge (this often manifests itself through poor university and business "home pages" on the Internet). This paper attempts to clarify the meaning of knowledge and thus provide strong conceptual foundations for the discipline of Knowledge Management. In doing so, criteria for knowledge will be established, together with an elicitation of different types of knowledge.

1. Introduction

The World Wide Web plays an important role in facilitating new avenues for competitive advantage in the business community (Laudon and Laudon [1]). As a first step to gaining competitive advantage, companies are creating Web Sites to enable customers to view business service catalogues (Berthon et al. [2]; Runge et al. [3]).

Web usage, however, has not been problem-free. Fears over security of online transactions and the vulnerability of confidential information have been expressed by many researchers (Kyas [4]; Skinner [5]; Biggam [6]; Gollman [7]; Biggam and Hogarth [8]).

Increasingly, researchers are also questioning the quality of Web Sites (Bennet et al. [9]; Jeong and Lambert [10]). The main criticisms concentrate on the quality of the information provided and the relevance to customer requirements.

Web sites can be viewed from two main perspectives: 1) the technical creation and maintenance of the web site (software used, multimedia tools, programming techniques, etc.); and 2) the knowledge that the web site reflects about an organisation (e.g. services it offers, history of successful projects, staff profiles, etc.). The technical ability required to create a web site is relatively undemanding. However, researchers are now questioning the ease by which web sites can be created and the danger that the knowledge that appears on the web site may be lacking proper management.

The field of Knowledge Management, although relatively new, is having an impact on business processes (Probst et al. [11]). This field emphasises the need to understand how knowledge is used in order to be better placed to utilise knowledge for competitive advantage (Hamel and Prahalad [12]; Lester [13]; O'Dell and Grayson [14]).

Universities are also keen to exploit the Internet. The contents of a university web site contain knowledge on teaching programmes, research activities, consultancies, etc. Below is an example of a university web site:
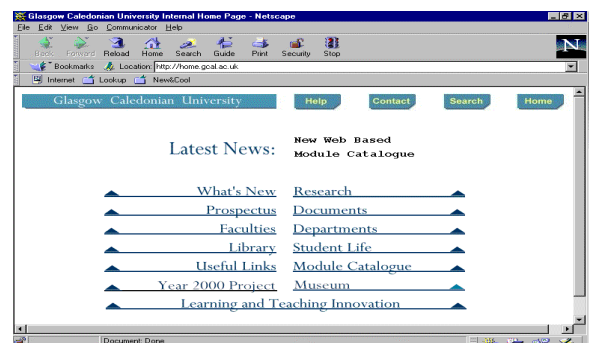

Figure 1. University Web Site

It is important that universities, and businesses, understand their web site contents, and the processes to produce and maintain these contents, from a Knowledge Management perspective. For instance, does the knowledge on Glasgow Caledonian University's web site accurately reflect activities in the university? How was this knowledge obtained? How is it utilised? Is the knowledge used to best advantage? Indeed, what is the purpose of Glasgow Caledonian University's web site? These are all issues pertinent to Knowledge Management.

However, a more fundamental issue is of concern to the author. For the academic discipline of Knowledge Management to progress it needs to be built on strong conceptual foundations. Unfortunately, within the Knowledge Management community, there is still much confusion over what actually constitutes knowledge (Alavi and Leidner [15]). Andreu and Seiber [16] echo this view when they write that not "everybody understands the same under the name KM". Sharifi and Button [17] emphasise this disparity of opinion: "there is a kind of confusion about what knowledge is or is not". The purpose of this paper is to try and address this issue and therefore contribute to the development of Knowledge Management.

2. What Constitutes Knowledge?

What is knowledge? Does knowledge differ from opinion or belief? Are there different types of knowledge? How do we decide what constitutes knowledge? As a starting point in an attempt to understand the concept of knowledge, a variety of definitions and schools of thought will be examined.

The Concise Oxford Dictionary [18] defines knowledge as:

"*1. a) awareness or familiarity gained by experience (of a person, fact, or thing) b) a person's range of information. 2. a) a theoretical or practical understanding of a subject, language, etc. b) the sum of what is known. 3. true, justified belief; certain understanding, as opposed to opinion.*"

This definition can be more properly described as a collection of definitions. Do they make sense? Are they compatible? How do they contribute to our understanding of Knowledge?

3. The Empiricist View

The first definition in the above list states that knowledge is an "awareness or familiarity gained by experience (of a person, fact, or thing)". This definition follows in the tradition of the school of philosophers referred to as empiricists. They believe that knowledge can only be acquired through experience (Hume [19];

Gibson [20]; Yolton [21]). The main contributors to this view have included the philosophers Locke, Berkely, Bacon and Hobbes (Russell [22]). As Locke [23] the recognised founder of British empiricism, born in 1632, put it:

"Let us suppose that the mind to be, as we say, white paper, void of all characters, without any ideas; how comes it to be furnished? When comes it by that vast store, which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer in one word, from experience: in that all our knowledge is founded, and from that it ultimately derives itself" (Book II, chap. I, sec 2, p33).

If knowledge can be gained only through experience then this would mean that we could only claim to know that a successful general called Julius Caesar ruled Rome and was assassinated more than two thousand years ago if and only if we experienced Caesar's rule and assassination. Indeed, much of what we view as knowledge of our world, past and present, would need to be discounted as knowledge.

Within a University context, if the empiricist view of knowledge was adopted, then students could only claim to have acquired knowledge if and only if the subjects they studied contained practical elements. If a lecturer taught students theoretical aspects of Information Systems Development, for example, and the students had no experience of developing information systems, then according to the empiricist school of thought, the students had no right to state that they were knowledgeable in the area of Information Systems Development. Perhaps, though, in a subconscious way, employers and universities do lend partial support to the empiricist argument when they hold student placement schemes in high regard. Such experience is often held up as a valuable experience, something that enhances the student's education, thus perhaps reflecting a tendency to value knowledge acquired through experience greater than theoretical knowledge.

Another problem with the empiricist definition of knowledge ("awareness or familiarity gained by experience") is that it makes no distinction between truth and falsehood. Suppose that a student has a small group of friends, and that these friends have engaged in plagiarism throughout their university education, and, suppose further, that these collection of experiences lead him to believe that plagiarism is acceptable behaviour for a student; then according to the definition that knowledge is "awareness or familiarity gained by experience" the student could claim to *know* this to be the case. Yet plagiarism is not acceptable behaviour, so the student cannot claim to know: he can only claim to have a belief. Truth ought to be a prerequisite of knowledge, in order to distinguish it from false belief (definition 3. supports this

view: "true, justified belief; certain understanding, as opposed to opinion").

Lastly, the empiricist approach to what constitutes knowledge has difficulty explaining knowledge derived by rational thought (as opposed to knowledge derived by experience).

This would mean that any conclusions that we arrived at about our environment through the use of reasonable and logical thought processes would not count as knowledge. The absurd effect of this would be that only that which our senses had experienced would count as knowledge. Which means that our knowledge of the world would be extremely limited, if not negligible. However, as Descartes [24] pointed out, our senses sometimes deceive us (e.g. hallucinations during illness, mirages, mistaken identities, optical illusions, etc.), therefore experienced knowledge is often unreliable and should not have a greater claim to knowledge than that gained from rational thought.

What, then, can we conclude about the view of knowledge expressed in the Concise Oxford Dictionary, that knowledge is "awareness or familiarity gained by experience"? Yes, knowledge can be gained through experience, but this is not the only way one can acquire knowledge. It can also be achieved through rational thought. Importantly, for something to be accepted as knowledge it must be true (this helps distinguish between fact and belief). This latter point could aid in one fundamental aspect of the development of the University web site, in that those responsible for their University web site must be sure, prior to displaying information, that what is presented is accurate and not merely based on beliefs.

4. Knowledge as a Person's Range of Information

The definition of knowledge as a "person's range of information" is contradictory to the previous definition of knowledge ("awareness or familiarity gained by experience"). Whereas the latter definition confines knowledge to personal experience, the former accepts non-experiential knowledge (i.e. rational thought). However, it is the latter definition that is limited and debilitating (as discussed earlier), and it is the former definition, although somewhat vague, that has the advantage of not excluding rational thought as a means of acquiring knowledge.

Once again, though, there exists the problem of a definition of knowledge not distinguishing between truth and falsehood. For example, a member of the public may hold information about a particular university, but the view may be biased and based on gossip rather than on fact, yet because this belief is clearly a part of this

"person's range of information", then it would, according to the above criteria, count as knowledge.

Knowledge as a "person's range of information" presents knowledge acquisition as an active process. Information is data that has been interpreted (either by the perceiver or someone else) in a way that is understandable to the perceiver (Sajama and Kamppinen [25]). This means that knowledge cannot simply be given to someone, as one would give a present, but that the receiver, in order to become knowledgeable, must become involved in the knowledge acquisition process. This view is supported by definition 2a ("a theoretical or practical *understanding* …"). This has clear implications for universities and web site development: universities, if they wish to impart knowledge to the web site visitor, ought to design their web site in such a way as to leave the visitor with an *understanding* of the university's services, culture, etc. (i.e. provide information).

5. Definition of Knowledge

In essence, the above discussion produces the following criteria in establishing what counts as knowledge:

- It must be true
- The perceiver must believe this to be the case

Suppose that a business student with no mathematical background where to memorise Euclid's Elements (Dedron [26]) and that the student believes these mathematical statements to be correct. According to the above two criteria the student would be knowledgeable in Euclid's Elements. This is patently absurd: the student, through rote-learning, has merely memorised the Elements. He is in no position to judge their validity or otherwise. This tells us that another criteria needs to be added to the above two criteria in order for something to count as knowledge:

- It must be true
- The perceiver must believe this to be the case
- The perceiver must be in a position to know this to be the case (Gettier [27])

Someone could claim to "know this to be the case" either by personal understanding (e.g. he has a degree in mathematics) or through the word of an acclaimed expert in the field. This third criteria also implies that for knowledge to occur, the perceiver has gone through an active process towards acceptance of a fact (this protects against the claim that those who merely repeat "facts" through rote-learning are acquiring knowledge: what they are acquiring are words, remembered like a mantra, not knowledge).

However, is there knowledge that does not meet the above three criteria? The above conditions refer to "factual knowledge", e.g. that man has walked on the

moon. But what about knowledge gained through experience, e.g. "practical knowledge"? An example of this latter type of knowledge is knowledge on how to complete a research paper. Or knowledge of how to repair a flat tyre. The three criteria for establishing knowledge is still applicable: for instance, in the case of the research paper, what the tutor says about completing a research paper must be true (although there may be different correct ways, thus allowing for more than one "truth"), the student must believe this to be the case, and she must be in a position to believe this (e.g. trusts the tutor, has followed the advice before, understands the process, etc.).

Knowledge gained through experience, particularly practical knowledge, ought to count as knowledge, although it also ought to be recognised that it is a different type of knowledge from factual knowledge.

What about knowledge of people, places and things? This is sometimes referred to as "knowledge by aquaintance?" ('A Dictionary of Philosophy' [28]). If a University has an excellent reputation in research should this count as knowledge? Yes, provided the three criteria established earlier still hold. That is, what is being claimed is true, it is believed to be the case, and the person making the claim is in a position to support the claim.

6. A Knowledge Management Perspective

What is the definition of knowledge given by academics and practitioners of the discipline entitled Knowledge Management? The following quotations from papers included in the University of Warwick's conference proceedings on Knowledge Management (2000) provide an excellent bird's eye view of how knowledge is perceived within the Knowledge Management community:

- "Traditionally researchers have distinguished between *tacit* and *explicit knowledge*" (Wensley [29])
- "Thus the authors argue that a complex picture of 'everyday reality' of *organisational knowledge* needs to be developed" (Shepherd et al. [30])
- "… this paper will critique the current pre-occupation of the KM literature with the duality of *explicit and tacit knowledge* … we argue that *organisational knowledge* must not be viewed as a static commodity that can be easily transferred, but as dynamic process …" (Bohm [31])
- "**External knowledge** [and] *internal knowledge*" (Andreu and Seiber [16])
- " … we take a *social constructivist approach* rather than seeing *knowledge as something static* and easily discovered …" (Bergquist [32])

- "It is suggested that the *dynamic*, and emergent character of the concept of knowing more accurately represents how *understanding in organisations* is based in processes of ongoing practice than *static conceptions of knowledge*" (Hislop et al. [33])
- "A common way of emphasising the human nature of much knowledge is through the notion of *tacit knowledge*" (Whitley [34])
- "Our instinctive skills, often, favour the *fixed and the static*, …" (Sharifi and Button [17])
- "There are some who question how far it is possible to convert *tacit into explicit knowledge*" (Marshall and Sapsed [35])
- "Much of the firm's strategically relevant knowledge, we argue, will reside in the *tacit form* …" (Tovstiga [36])
- "We also suppose that *knowledge systems are dynamic* and organic, …" (Spender [37])
- "… *organisational knowledge* is much talked about but little understood" (Tsoukas [38])

Clearly, within the Knowledge Management community, there are different views of what is meant by Knowledge. Nevertheless, how can we categorise the different views of knowledge represented by the Knowledge Management community and how do these views fit in with earlier discussions in this paper viz-a-vis knowledge as factual, practical, of people, etc. and based on certain criteria?

The matrix below illustrates the "knowledge opposites" that are perceived by academics and practitioners:

	Tacit	Personal	Dynamic	Internal
Explicit	V			
Organisational		V		
Static			V	
External				V

Figure2. Knowledge Dichotomy Matrix

In what way is tacit knowledge different from explicit knowledge? Tacit knowledge refers to knowledge that is understood or implied without being stated (derived from Latin *tacitus*, meaning "silent"). An example of such knowledge would be the unwritten procedure for providing students with a successful lecture (like riding a bike, there may be certain guidelines, but for the most part they are undeclared). Explicit knowledge is knowledge that is stated, e.g. procedures for student appeals. This paper is an attempt to make explicit our tacit understanding of what we mean by knowledge!

Describing knowledge as either tacit or explicit does not provide an understanding of what constitutes

knowledge: it merely illustrates that knowledge can either be expressed or it can remain undeclared. That is not to say that the tacit/explicit dichotomy is unhelpful in exploiting knowledge: on the contrary, recognising that much of what occurs in an organisation remains tacit is an important stage in the desire to exploit knowledge for competitive advantage.

How does personal knowledge differ from organisational knowledge? The goal of many businesses is to make explicit the skills and knowledge that remain personal to employees. Organisational knowledge is seen as collective knowledge that helps distinguish one organisation from another. Personal knowledge will involve a combination of tacit and explicit knowledge; therefore, organisational knowledge will similarly consist of a collection of tacit and explicit knowledge. However, what counts as personal *knowledge* or organisational *knowledge* (as opposed to opinion)?

Dynamic knowledge emphasises that knowledge often changes and is influenced by cultural factors, i.e. it rarely remains fixed. Once again, although useful in that one can appreciate that knowledge is a "shifting sand", the "dynamic v static" dichotomy offers no clarification on criteria for knowledge itself.

"Internal v external" knowledge offers the obvious distinction that an organisation's knowledge can come from inside the firm, or from outside the firm. In fact, this distinction is too simplistic because no organisation operates in a vacuum, and therefore knowledge comes from *within* and from *outwith*.

How do the above knowledge dichotomies fit in with the expressed view that there are different types of knowledge, specifically that
1. there is "factual" knowledge;
2. there is "practical" knowledge; and
3. there is knowledge of people, places and things?

None of the above knowledge dichotomies contradict the aforementioned types of knowledge. For instance: tacit knowledge can be factual, practical and of people etc. Similarly, with the other knowledge categories (explicit, personal, organisational, dynamic, static, internal and external).

Are we not simply replacing one type of knowledge with another type (e.g. tacit with factual, etc.)? No. The benefit is that incidences of knowledge from *all* the different knowledge dichotomies can be more helpfully categorised within one of the three types (factual, practical or of people, etc.). For instance, incidences of explicit knowledge (e.g personnel procedures) can be placed in the appropriate knowledge type (e.g. factual interview procedures). This can be of benefit in later attempts to exploit that knowledge. Without this new "umbrella category", the different knowledge dichotomies remain separate and apparently unrelated.

The knowledge dichotomies expressed by the Knowledge Management community can now be expressed and linked to other types of knowledge (factual, practical, etc.), as represented by the enhanced matrix below ("Knowledge Types"):

Epistemological Divisions →	Factual Knowledge	Practical Knowledge	Knowledge of People, Places & Things
KM Dichotomies ↓			
Tacit v	$X(1,1)$	$X(1,2)$	$X(1,3)$
Static	$X(2,1)$	$X(2,2)$	$X(2,3)$
Personal v	$X(3,1)$	$X(3,2)$	$X(3,3)$
Organisational	$X(4,1)$	$X(4,2)$	$X(4,3)$
…	…	…	…
…	$X(r-1,1)$	$X(r-1,2)$	$X(r-1,3)$
…	$X(r,1)$	$X(r,2)$	$X(r,3)$

Figure 3. Knowledge Types

Further, the criteria developed earlier to distinguish knowledge from opinion or false belief ("it must be true"; "the perceiver must be in a position ...", etc.) can also be applied to the above matrix elements to determine what constitutes actual knowledge. As the criteria could be used to determine what constituted factual knowledge, practical knowledge etc., then it follows that if the knowledge dichotomies can be expressed in terms of factual knowledge, practical knowledge, etc. (as illustrated in the above enhanced matrix) then the knowledge dichotomies themselves can also be assessed to determine if they represent knowledge.

For example, suppose that a lecturer has a way of teaching students that he thinks is successful. Does he have knowledge? What type of knowledge is it, i.e. how does it fit in to the "Knowledge Types" matrix? First of all, if his understanding is unstated, then it is tacit. Secondly, it is only knowledge if each of the following hold:
- It must be true (does his teaching approach work?)
- The perceiver must believe this to be the case (if he does not believe in his teaching approach and the results it has, then he cannot claim to have knowledge)
- The perceiver must be in a position to know this to be the case (is he an experienced lecturer, well qualified, etc.?)

Is the lecturer's knowledge factual, practical, or of people, things, etc.? His knowledge would be classed primarily as practical because it relates to a skill, but there are aspects of his lecturing skills that may be classed within the other knowledge types (e.g. knowledge *of*

students and how they behave under certain stimuli). This demonstrates that the knowledge classifications provided by philosophers ought not to be viewed as mutually exclusive, since knowledge need not be confined to one knowledge type but can in fact be members of different knowledge classes (i.e. factual knowledge *and* practical knowledge *and* of people, etc.).

7. Conclusion

Researchers and practitioners within the Knowledge Management community are keen to exploit knowledge for competitive advantage. However, it is widely accepted within this community that they have failed to agree on a definition of what constitutes knowledge. Rather, their efforts have been directed towards describing different knowledge dichotomies ("tacit v explicit", etc.) and ways in which to manipulate knowledge. This paper has categorised these dichotomies under other knowledge types: factual knowledge; practical knowledge; and knowledge of people, places and things. Further, a definition of knowledge has been derived to facilitate future development work on Knowledge Management.

In summary, there are three broad *types* of knowledge:
1. there is "factual" knowledge;
2. there is "practical" knowledge; and
3. there is knowledge of people, places and things

Each of these knowledge types can be derived through experience or as a result of rational thought, or, more commonly, from a combination of both.

However, in order to differentiate knowledge from blind belief or mere opinion, for something to count as knowledge the following criteria must hold:

Criteria 1 → It must be true

Criteria 2 → The perceiver must believe this to be the case

Criteria 3 → The perceiver must be in a position to know this to be the case

Figure 4. Criteria for Knowledge

The next stage in the author's research is to use the above definition, criteria and types of knowledge to revisit the building blocks of Knowledge Management, from knowledge acquisition, development, through to retention and review. The purpose of this research will be to interpret Web Site development (a key area for the modern organisation) in terms of a Knowledge Management paradigm, built on solid conceptual foundations, with a view to better understand and exploit the Internet for competitive advantage.

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