

A basic model of knowledge (Cavelights & Tools Unlimited) which simplifies mutual understanding and liberates creativity

Rolf Lövgren

Dept. of Innovation, Design and Product development (IDP)
Mälardalen University
Eskilstuna, Sweden.
Email: rolf.lovgren@mdh.se

Abstract

A simple model of knowledge based on the conception of communication via signal systems is presented. Knowledge, based on mutual understanding between at least two human beings, is interpreted and made active by the awareness and consciousness of human beings. The evaluation and judgement of this knowledge as useful or true or useless or false is to be decided by groups of people within the appropriate world of knowledge. It is argued that this fundamental definition of knowledge has profound impact on all types of communication processes between people and gives a simple practical guide for the individual to reach human understanding – and knowledge.

Keywords: communication, learning, knowledge, creativity, education, research

1. Introduction

Sometimes in the beginning there was light so that man could see the world in all its greatness. But for the early man the world was incomprehensible in all its grandeur. Rather soon ... after thousands of years, ~ 400 BC, we know that Plato concluded that what we could see gave us only a fractional knowledge of the world. His vivid picture of our situation is easy to remember – we are sitting in a cave and can only see shadows of light on the walls – the light from the “real” world (in his view the knowledge in the perfect world of ideas). Thus, we seem to be confined to a room (of knowledge) essentially in darkness – in a “cave”! So from the time of Plato other thinkers, philosophers and researchers have tried to generate light in the cave and build tools to reach the “real” world outside the cave. Names like Aristotle, Decartes, Locke, Comte, Russel, Popper, Kant, Husserl, Mearleau-Ponty, Schutz, Foucault, Peirce, Dewey, Lave, Ryle, Schön, Johannessen & Nordenstam, Polanyi, Gadamer, Ricoeur, Habermas and Engeström to mention a few, have all made their imprints in the theory or philosophy of knowledge. Their views on knowledge assembled and judiciously discussed by Bernt Gustavsson (Gustavsson, 2000) are used as a case study of the validity and usefulness of our proposed model of knowledge. See Lövgren (Lövgren, 2006) for details.

But WHAT is knowledge? WHERE can it be found? HOW can it be captured? These are three relevant basic questions and natural simple answers to them give us a truly basic model of knowledge, which we playfully could call ‘Cavelights & Tools Unlimited’. But its simplicity is ostensible. Its implications – which we will outline in this paper – give us a strong explicable power and will free our thoughts and creativity of what useful tools of knowledge are and where to find sources of knowledge.

2. The proposed model of knowledge – Cavelights & Tools Unlimited

It is plausible that phenomena in our world are governed by logical choices, procedures or processes aiming at the most appropriate (in a Darwinist sense or otherwise), the simplest, the shortest or the least energy demanding strategy to solve problems. Certainly we are keen on jumping to conclusions, although we then may lose understanding of possible alternatives and/or reflections on why we made that particular choice. E.g. studying historic persons that have dwelled upon the problem of knowledge and truth, we may focus on their conclusions and not on their basic postulates, prerequisites or axioms or the frame of reference in which their conclusions and arguments may be seen as belonging to a domain of logical reasoning. We may understand some part of the conclusions or arguments. But are we satisfied with the proposed solutions to the problem? If not; we have to show a better logical strategy using the “given” frame of reference or we have to discuss the frame of reference in the first place. When an appropriate frame of reference is chosen, we can look for a logical path to find solutions to the problem, which we can understand and believe in – at least for now.

Einstein’s focus on the frame of reference for space and time and Newton’s postulate of absolute time gave seeds to a new theory, the theory of relativity, and an enhanced understanding of our conceivable world. Looking at historical theories of knowledge and truth may make you feel dizzy. Different researchers enlighten different perspectives. And you can by changing frame of references, of course, see different aspects of a phenomenon. But is there a more fundamental frame of reference which can enlighten and unite the historical theories of knowledge? We believe there is such a frame of reference. It comes from natural answers to the three basic questions of knowledge, which we will try to explain in this short paper.

2.1 What is knowledge?

We will answer this basic question in a series of connected propositions in order to make the logical path evident. These propositions will also define fundamental concepts (“words”) used in this paper.

1. *Knowledge* presupposes a *language*.
2. *Languages* are communicated between *individual human beings* (persons) with the help of signal systems.
3. *Knowledge* presupposes *communication*.
4. *Knowledge* presupposes a *signal system*.
5. *The human being* (HB) consists of head and body (or soul and body, or mind and body).
6. *Head and body* are both senders and receivers of signals to and from the surroundings.
7. *The head* can only master a small amount of information or thoughts in the consciousness. External signals and internal signals (from the head and body) influence and can change the contents in the consciousness.
8. A *symbol* (notion, concept) consists of a *symbol code* and a *symbol description*.
9. A *symbol code* is created in a signal system and corresponds to the designation or identification of the symbol or in a verbal language the “name” of the concept articulated as sound waves and/or as artefacts (as these written symbol codes) mediated through electromagnetic waves.
10. A *symbol description* is created in a signal system and is a *string of symbols* which gives meaning to a symbol code or
11. A *symbol description* corresponds to the definition of the concept.
12. A *string of symbols* is a permutation or an ordered set of symbol codes recognizable and interpretable by a human being.

13. A *symbol code* without a interpretable symbol description is meaningless or
14. A *concept* without a definition is meaningless.
15. A *language* consists of *concepts (defined symbols)*, *rules* (of the language) and *propositions (interpretable strings of symbols)*.
16. *Rules* are fundamental strings of symbols in a language. (Rules give e.g. properties of permitted strings of symbols in a language, the syntax of a language).
17. *Propositions* are permitted strings of symbols in a language.
18. A *domain of a language*¹ (the room of definitions of a language) is a set of all permitted concepts (defined symbols) and rules in the language.
19. A *codomain of a language* (the room of influence of a language) is a set of all permitted (possible) propositions in the language.
20. A *language* is permutations of strings of symbols or more precise
21. A *language* is symbol codes with symbol descriptions and permutations of strings of symbol codes.
22. *Knowledge* is by definition found in *rooms of knowledge*. Two or more rooms of knowledge can be said to define a (specific) *world of knowledge*.
23. A *room of knowledge* is the union of the domain and codomain of a language.
24. *Knowledge* is (this is our fundamental definition of knowledge) “interpretable strings of symbols” (belonging to a language communicable by human beings) which are communicated with mutual (reciprocal) understanding between at least two human beings or (replacing the cited “interpretable strings of symbols” with “everything”)
25. *Knowledge* is “everything” that can be communicated with mutual understanding between at least two human beings².

This sounds like a “terrible” definition of knowledge, but we have not defined ‘knowledge’ as ‘true knowledge’, which, of course, depends on the frame of reference. We also understand that *potential knowledge* can be found in individual persons, but it can only be made useful if it can be communicated to other human beings (with mutual understanding).

2.2 Where is knowledge found?

Knowledge is by definition found in worlds of knowledge. We can define two types of worlds of knowledge; *abstract worlds of knowledge* (AWK) e.g. mathematics, logic, theoretical philosophy, chess and *concrete worlds of knowledge* (CWK) e.g. physics, chemistry, biology, psychology, aesthetics, practical philosophy respectively.

An *abstract world of knowledge* (AWK) is characterised by e.g. that; it has an absolute existence; it is self-contextual and is therefore (in that sense) time independent – eternal.

A *concrete world of knowledge* (CWK) is characterised by e.g. that; it has a relative existence; it is always contextual – in space and time – and is therefore time dependent.

The decisive difference in the character of knowledge in an AWK and a CWK is that the knowledge in a CWK must correspond to occurrences, phenomena or courses of events in the reality – the concrete world.

Because the knowledge in a CWK always is contextual and time dependent we can describe knowledge in the CWK as *current interpretations – currently-true knowledge* – of occurrences, phenomena or courses of events in the reality – the concrete world.

The foundation for knowledge is communication; that a signal system exists between a HB and the surroundings or between subject and object, where of course, an object for a HB can be another HB, another subject.

Everything – all worlds – we can communicate with is a potential source for knowledge. To build knowledge we need a language to partly code and partly interpret the signals. To build a language we need communication – a signal system between HBs.

The domain and codomain of a language with its concepts, rules and propositions or symbol codes and strings of symbols and their coupling to a current AWK or CWK will be the source (frame of reference) to judge whether the knowledge is true, currently-true or hypothetical. Not true or not currently-true knowledge is false in the current world of knowledge used as a frame of reference.

2.3 How is knowledge captured?

It depends on where we search and what we are looking for. Sources for knowledge are found in all the worlds we can communicate with. Primarily *in nature itself*, of course, (where we are self-esteeming members) and in particular in traces and processes created by human beings; *in all kinds of artefacts, in living persons, in all kinds of man-made processes*.

Let us here list our definitions of essential concepts coupled to our proposed model of knowledge.

A process – is a course of events where exchange or communication of data, information or knowledge occurs with the help of signal systems. Normally there are several signal systems in action simultaneously and the communication varies with time. A process is always contextual in space and time.

Data – means in this context all signals³ that can be communicated to a human being.

Information – is data interpreted (made conscious) by a human being.

Knowledge – is information which has got the status of knowledge.

A process model (PM) – describes assumed/stated/observed (relevant) process components being part of a process. PMs can be on different levels of detail and abstraction. A PM is a static “map in space”.

A process component – is the “smallest” part in a process model.

A process procedure (PP) – describes assumed/stated/observed (relevant) courses of events in a process. PPs can be on different levels of detail and abstraction. A PP is a “map in space and time”. PPs can be static (“a process (time) plan”) or dynamic (“a process simulation”). A PP presupposes a PM.

Tools – are all types of aids to support (or facilitate) a process. All processes presuppose signal systems for exchange of data, information or knowledge. A tool introduces a supporting signal system.

Tool properties – characterize what the tool can do in a process; in what way and how the tool can influence the process; specify the properties which may be useful in the process under study.

Tool competence – characterize how well the user can use the tool properties in a process.

Tools of knowledge – are the tools that are used to extract and establish knowledge.

Sources of truth – are the sources where “true” knowledge can be (or are supposed to be) found.

Capturing knowledge is a process (as defined above). How can we catch knowledge? We can catch it; by working on (relevant) sources of knowledge; by using catching tools to communicate by means of signal systems with the sources of knowledge.

Which tools are at our disposal? Our primary toolbox is in our head and body. We have well-known built-in tools; signal systems to see (read, communicate and ability to interpret, understand); to hear (listen, talk, communicate, interpret, understand); to write (make notes, communicate, interpret, understand); to feel; to taste to smell; i.e. using our five senses, our head and the mobility of our body to work on the sources of knowledge we have access to.

Today we have an abundance of external tools to work on the sources of knowledge in nature itself, in artefacts, in living persons and in man-made processes. Making observations, doing experiments (with an abundance of (technical) tools), personal meetings (interviews, attending courses, seminars, ad-hoc meetings, coffee-breaks etc.), Internet, e-mail, databases, libraries, computer programmes of various kinds, procedures for efficient learning, mind maps, pencils and papers etc.

Our model of knowledge (playfully called “Cavelights & Tools Unlimited”) opens our minds to alternative ways of catching knowledge. By reflecting on the metaphor of fishing, we also become aware of the natural idea that different sources of knowledge may demand different types of catching tools and catching procedures. Making that an active knowledge may make the difference between success and failure in catching (new) knowledge.

2.4 Knowledge demands communication and creates a language in a room of knowledge

We have concluded that knowledge demands communication and depends on the creation of defined concepts (symbol codes with defining symbol descriptions) and rules (strings of symbols) to be able to express understandable propositions (strings of symbols). Concepts and rules give the prerequisites to express permitted (comprehensible) propositions in the room of knowledge. The room of knowledge defines a language (of knowledge)⁴. Fundamental elements in the signal systems, which are the foundation for communication, we call *data*. Data are signals which we can identify and interpret as strings of symbols. When we interpret the data we get *information*, i.e. data interpreted in a language understandable by human beings. The way we verify this information determines its “status of knowledge” – true, currently-true or hypothetical knowledge. Scientifically only true or currently-true knowledge can be classified as knowledge, but false knowledge (i.e. conscious lies), unconfirmed information (i.e. rumours), (personal) opinions or not provable statements (i.e. religious beliefs) play an influential part in our everyday life for most human beings – not to say all humans!

3. Discussion

Our proposed definition of knowledge is so simple and is based on such fundamental concepts that it seems self-evidently relevant and applicable and useful in discussions and in the search for knowledge. This chapter will focus on three relevant questions we have to discuss and give reasonable answers to:

a) *Why is this definition of knowledge useful?* b) *What are the drawbacks?* c) *Is the work of ingenious philosophers, researchers and thinkers in the history of mankind of no relevance or importance?*

a) *Why is this definition of knowledge useful?* First of all the definition is easy to understand. Every reader of this paper will agree that their knowledge is based on mutual understanding of “strings of symbols” together with at least one human being e.g. their experiences of direct knowledge creation together with their parents in their childhood, their teachers and classmates at school, their workmates and friends as adults or indirect knowledge creation through mutual understanding of information documented in books, papers, newsletters etc. by appreciated or respected human beings known as “true” knowledge communicators. Secondly knowledge, as defined here, is grounded in the individual person. It is you as a unique human being that has to establish your mutual understanding of information with at least another human being to be able to talk about knowledge. Otherwise you are just an information (which can be lies, rumours, opinions, not provable beliefs or nonsense) transmitter. This is a profound virtue of our definition of knowledge. You have to seriously judge your consciousness for logic and plausibility in the information you are facing. Are you really satisfied? Do you really have mutual understanding? Do you still have reasonable doubts? Then you have to search further, wider and/or deeper for knowledge. This is a useful guide in searching for knowledge whether in your everyday practical life making lot of decisions based on information/knowledge or in your pursuit for scientific knowledge. This is a truly useful property of our proposed definition of knowledge.

b) *What are the drawbacks?* The definition of knowledge given here is just a classification of a basic property of knowledge. This is a drawback as well as a good feature. A drawback is that it does not give you a simple “knowledge filter” easily applied to any information you are facing. It passes on qualitative work on your part. You have to use Your experiences and Your prior knowledge to work on the information You are judging. Finding mutual understanding may also impose revising your prior knowledge. What you as a human being previously has held for true knowledge may be false knowledge or just misconceptions. A good feature is that the history of knowledge in most of our worlds of knowledge (preferably, of course, in the concrete worlds of knowledge, as defined above) has taught us that what is true or currently-true knowledge has often been changed or more elaborated or otherwise revised over time. This should also be a characteristic feature of the historic development of knowledge in You and I as individual human beings, as all our worlds of knowledge are communicated by and reside in individual human beings! This is a fundamental proposition. Those who signal mutual understanding with this proposition will probably also show mutual understanding with the essential arguments in this paper.

c) *Is the work of ingenious philosophers, researchers and thinkers in the history of mankind of no relevance or importance?* To first make it absolutely clear. Earlier work on knowledge is, of course, both relevant and important. This work is inspired by and, in that sense, based on earlier work. We will try to explain the importance and try to picture the characteristics of previous theories of knowledge. This simplified overview is mainly based on a case study of a

second hand information source, judged as reliable, namely the book “*Philosophy of knowledge. Three forms of knowledge in a historical perspective.*” by Gustavsson (Gustavsson, 2000) earlier referred to. Details are to be found in Lövgren (Lövgren, 2006).

Gustavsson examines historic theories of knowledge from the the viewpoint of three forms of knowledge according to Aristotle; *episteme* (theoretical-scientific knowledge), *techne* (practical-productive knowledge) and *fronesis* (practical wisdom) respectively.

Looking at *episteme* focusing on our three relevant questions: What is knowledge? Where is it found? and How is it captured?, we may construct this scheme of evolution (Table 1):

WHAT?	WHERE?	HOW?	REFERENCE
Justified true belief (Rationalism)	World of ideas	Head (Good reasons and logical arguments)	Plato
Rationalism (Cogito ergo sum)	Head (reason)	Head (reason)	Descartes
Empirism	Experiences	Head + tools	Locke
Positivism	Positive experiences	Head + tools	Comte
Logical empirism	Observations, experiments	Head + tools	Russel
Critical rationalism	Tradition of knowledge, fantasy & intuition	Head + tools	Popper
Phenomenalism	Human consciousness and world of life	Head & body + tools	Kant, Husserl, Merleau-Ponty, Schutz, Foucault

Table 1: Schematic picture of the evolution of *episteme* (theoretical-scientific knowledge)

Looking at *techne* focusing on our three relevant questions: What is knowledge? Where is it found? and How is it captured?, we may construct this scheme of evolution (Table 2):

WHAT?	WHERE?	HOW?	REFERENCE
Poiésis –purpose and aim outside the action	Practice in handicraft, art and politics (rhetoric)	Head & body + tools	Aristotle
Pragmatism (learning by doing)	Practical actions and observations in a world of life of traditions, social and cultural contexts	Head & body + tools	Peirce, Dewey, Lave, Ryle, Schön, Johannessen & Nordenstam

Table 2: Schematic picture of the evolution of *techne* (practical-productive knowledge)

Looking at *fronesis* focusing on our three relevant questions: What is knowledge? Where is it found? And How is it captured?, we may construct this scheme of evolution (Table 3):

WHAT?	WHERE?	HOW?	REFERENCE
Praxis – purpose and aim as a central part of the action	Practice in ethical actions and politics	Head	Aristotle
Hermeneutics – methods for interpretation and understanding	Practical actions and observations in a world of life of traditions, social and cultural contexts	Head & body + tools	Polanyi, Gadamer, Ricoeur, Habermas, Engeström

Table 3: Schematic picture of the evolution of *fronesis* (practical wisdom)

It is interesting to see that for *techne* (practical-productive knowledge), which is essential for the survival of mankind, from collecting and hunting for food to agricultural and industrial craftsmanship; it is natural that head & body together with appropriate tools are tools used for capturing knowledge, whereas the early philosophical arguments for *episteme* (theoretical-scientific knowledge), and *fronesis* (practical wisdom), the whole human being both head & body are excluded as a tool for knowledge in favour for the head and theoretical reasoning.

“Necessity is the mother of invention” as a proverb tells us, and obviously the early philosophical reflections on where knowledge is to be found and how knowledge is captured were less inventive than the practical search for knowledge driven by necessities on how to survive and make a good living.

We also conclude that the ideas on where to find knowledge and how to catch it, the amount of tools for knowledge, are expanding over time. We eventually start to search for knowledge in all worlds we can communicate with and use our head & body together with external tools to catch new knowledge. Thus, the history of the theories of knowledge shows us examples of a variety of worlds of knowledge and gives examples on how to catch the knowledge and elaborates on appropriate tools of knowledge in those worlds. Our proposed model of knowledge is consistent with and is underlying all kinds of knowledge enterprises to be found in the work of the reference persons in the tables 1-3 above. To use the words of the clear-sighted philosopher Immanuel Kant (Kant, 2007, 1787, 1781, p. xxiii):

“That all our knowledge begins with experience there can be no doubt. For how is it possible that the faculty of cognition should be awakened into exercise otherwise than by means of objects which affect our senses, and partly of themselves produce representations, partly rouse our powers of understanding into activity, to compare to connect, or to separate these, and so to convert the raw material of our sensuous impressions into knowledge of objects, which we call experience? In respect of time, therefore, no knowledge of ours is antecedent to experience, but begins with it.”

Isn't that a more poetic formulation of the signal processes which make us aware of data, which we as individuals (through “the faculty of cognition”) can interpret as information and

in collaboration with at least another human being can establish, through mutual understanding, as knowledge or as a “justified true belief”, according to Plato?

Thus, our proposed model of knowledge is just a basic abstraction and classification of the processes of extracting and establishing knowledge, specific examples of which are supplied by the evolution of various kinds of knowledge in the history of the philosophy of knowledge.

3.1 Learnings from the history of knowledge

To summarize: The case study in Lövgren (Lövgren, 2006) based on Gustavsson (Gustavsson, 2000) looked at the historical development of knowledge from the Aristotelian classification of knowledge in episteme (theoretical-scientific knowledge), techne (practical-productive knowledge) and fronesis (practical wisdom) respectively. We described the historical development by asking the three questions: WHAT is knowledge? WHERE is knowledge? (Where are the sources of truth?) HOW is knowledge captured? (What are the tools of knowledge?).

The result of the historical assessment of e.g. episteme showed both a broadening (an increasing multitude) of tools of knowledge – from head, to head + tools, to head & body + tools – and an increasing multitude of sources of truth – from the world of ideas (thoughts), to the world of experiences, to (specific) observations and experiments, to a world of life with (specific) social and cultural contexts or (specific) discourses. We have become more sophisticated to identify “new” sources of truth – we have enlarged the domain of knowledge – and thus become more conscious of the complexity of the phenomena of life. The luxury in the domain of natural sciences to be able to verify or falsify theories and hypotheses by (in principle) controllable and repeatable experiments with material objects have in the human sciences been replaced by interpretable phenomena or courses of events with living organisms, which in principle are impossible to repeat. Control has been replaced by interpretations of validity and repeatability has been replaced by interpretations of reliability.

The focus on practical knowledge have made us aware of that the whole human being – head & body – is both a source of knowledge and a source of truth – both a receiver and interpreter and a sender of signals. Our basic model of knowledge makes us aware of that all signals we can identify in principle can be “building materials” for knowledge. Thus, all the theories examined in the case study are de facto subsets of our basic model of knowledge. A consequence of our model of knowledge is to promote all possible types of tools of knowledge to catch knowledge and all possible sources of truth to find (new) knowledge. Our model therefore gives us motives and reasons to look at all situations of knowledge as a challenge to our creativity. What is the best way to catch the knowledge we are looking for? Can we find knowledge in “places” we previously have ignored? Can we look at the problem situation from another point of view? etc.

Our model gives us theoretical support for doing the unexpected. We are allowed to be creative!

3.2 Some consequences of our proposed model of knowledge

Here we will only give some examples of consequences of our model of knowledge. More detailed discussions of the model and its implications on research, education and pedagogy are found in Lövgren (Lövgren, 2006).

The key concepts in our model of knowledge are *communication*, *signal systems*, *language* (*symbol codes*, *symbol descriptions*, *strings of symbol codes*) and *mutual understanding* (in a language comprehensible to human beings). A general consequence of our model is therefore that knowledge is exchanged between humans if they share a language by which they can establish a mutual understanding. The core concept in signal systems are *data* – here defined as every property of our world that can establish a contact with a human being, e.g. electromagnetic, electrical, chemical or mechanical signals, matter, materials or energy in various forms. Data in our world are truly the “seeds of knowledge” – a natural consequence of our model. In this sense, all our activities, efforts or businesses are concerned with knowledge, mutual understanding, in all the various forms data (the seeds of knowledge) can take. We are surviving through the knowledge of food, travelling through the knowledge of transportation vehicles, making businesses through the knowledge of being able to build or exchange products of knowledge, which other persons can (mutually) understand and appreciate to be willing to “pay for them” – willing to make an exchange of “equal” values of knowledge!

Reflections on this fundamental property of knowledge give natural implications for all types of human enterprises; *research* (new knowledge can be found “anywhere”, e.g. in data not paid attention to); *education and pedagogy* (is knowledge explored and captured where it is found?); *businesses* (what knowledge – in various forms (theoretical-scientific, practical-productive, practical wisdom) as mutual needs, as e.g. informative facts, procedures, products, activities – can we create, build or deliver that other persons are willing first to approach and then hopefully to buy?).

The aim of advertising in the market place is to catch and deliver “mutual understanding” - “knowledge” (the truth and value of that information ... imparted knowledge, is questionable as every “buyer” know from their own disappointing personal experiences!) to potential customers in the market place!

Today many businesses are clustered in the creation and transportation of knowledge through the global highway of information made possible by the Internet. “Chaos at Google” an article on pp 34-42 in *Fortune*, vol 154, no 6 October 2, 2006 is a current example of activities in a (just now successful) company to generate information products which can generate mutual understanding – knowledge – and eventually income to the company.

4. Summary and conclusions

It is a relatively simple statement to say that our conscious knowledge of the surrounding world is formed by the frames of reference through which we communicate with and interpret the world – by the worlds of knowledge we are able to get in contact with. The history of science shows how traditions, social and cultural contexts or discourses form different worlds of knowledge. The way we recognize, interpret and “understand” phenomena in our world of life is a consequence of the symbol codes, symbol descriptions and strings of symbols we use to interpret the signals from the world of life we can register with the help of our five senses (head & body) and external supporting tools. In other words: *We interpret the phenomena in the world of life we can recognize with the help of the rooms of knowledge we have access to.* The development of our universe of knowledge is often a result of interplay between abstract and concrete worlds of knowledge. This is natural as all our “models of the reality” – process models and process procedures according to our terminology – mean different grades of simplifications and (abstract) idealizations of a complex reality.

To summarize our basic model of knowledge we argue that:

- 1) Knowledge demands communication and is created in a room of knowledge, which defines a unique language. Two or more rooms of knowledge constitute worlds of knowledge.
- 2) The concepts, rules and propositions of a language are (like this abstract text) symbol codes, symbol descriptions and strings of symbols based on conscious interpretations of signals by human beings. Phenomena in the reality (which we can reflect upon) enter our consciousness via signals which we can register and interpret. The process of interpretation is contextual in space and time. *This insight gives us playroom for our creativity.*
- 3) Knowledge is "everything" we can communicate with mutual understanding between at least two human beings. *This insight makes us observant and conscious of that "knowledge" of a certain phenomenon (or what "everything" may represent) can differ from person to person! This insight should also make us humble in discussions with other persons and may help us solve conflicts whether they are interpersonal on a local or a global scale! Only scientific knowledge – critically scrutinized by the scientific community – can claim objectivity.*
- 4) Sources of truth – sources of knowledge – are found in nature, in artefacts, in living persons or in processes. *This insight gives us a multitude of potential sources of truth.*
- 5) Rooms of knowledge can be classified as abstract or concrete. *This insight gives us guidance in discussions of knowledge and for choice of methods for catching knowledge.*
- 6) Concrete rooms of knowledge aim in some way to depict, describe, explain and "understand" phenomena in the reality – what we can register with our senses with or without external tools. Examples of concrete worlds of knowledge are physics, chemistry, biology, sociology, psychology. (Every subject has as is well-known several rooms of knowledge!). Knowledge in concrete rooms of knowledge can only be created if we can establish "meetings" – which demands communication – with the concrete reality. *This insight gives us guidance for research, education and pedagogy.*
- 7) Knowledge in concrete rooms of knowledge is relative, contextual in space and time and is at best currently-true.
- 8) Abstract rooms of knowledge are self-contextual and their criteria for truth are independent of phenomena in the reality.
- 9) Knowledge in abstract rooms of knowledge is independent of time. Examples of abstract worlds of knowledge are mathematics and logic. (Every subject has as is well-known several rooms of knowledge!). Chess is an example of an abstract room of knowledge.
- 10) Our rooms of knowledge filter our interpretation of the reality – the phenomena we can register with our senses with or without tools. Our rooms of knowledge limit what we can "see" and what we can do. Which problems we can see and which solutions we can see. Which possibilities we can use and which difficulties we can avoid. *This insight gives us playroom for our creativity.*

We emphasize that our basic model of knowledge, due to its all-embracing definitions, gives an overview which let us sort and classify all possible types of views of knowledge from the history of knowledge, which our concise case study exemplifies (details are to be found in Lövgren (Lövgren, 2006)). We are given the possibility to understand knowledge from a very

fundamental point of view. Communication – signal systems – senders – receivers – interpretation – symbol codes – symbol descriptions – strings of symbols – data – information – mutual understanding – knowledge – rooms of knowledge – languages – concepts, rules and propositions – criteria of truth – true knowledge – currently-true knowledge – hypothetical knowledge – false knowledge.

Thus, we argue that (albeit within this short paper format) we have shown that our proposed basic model of knowledge simplifies mutual understanding and liberates creativity in our search for knowledge in the world that surrounds us – “whether we shut our eyes and put our fingers in our ears or not”.

We could playfully argue that we have generated light in the cave (of Plato) and liberated our creativity to the challenge of building tools (of knowledge) with unlimited reach – Cavelights & Tools Unlimited!

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Footnotes

1) Following a mathematical notation: “Given a function $f: X \rightarrow Y$, the set X of input values is called the **domain** of f , and Y , the set of **possible** output values, is called the **codomain**” (from Wikipedia.org).

2) Assuming the essential properties of human beings are generally spread there is a possibility of spreading ‘the knowledge’ to in principal all human beings – in due time.

3) Mechanical, electro-magnetic, chemical etc.

4) In this language, of course, “the string of symbols” may not be “words” but rather “actions” as in part of what is commonly called ‘tacit knowledge’.

5) English translation of the title is made by R. Lövgren

6) English translation of the title is made by R. Lövgren