

Appendices

Appendix 1: Results at a glance

Table A1.1 Examination results

	1997	1998	1999	2000	2001		97-99	00-01
All Students								
n	35	33	37	53	51		105	104
Average	41.5	51.3	44.1	52.5	49.4		45.5	51.0
Rd Students								
n	22	21	21	25	19		64	44
Average	40.5	49.6	37.9	47.6	32.9		42.6	41.3
Ra Students								
n	13	12	16	28	32		41	60
Average	43.2	54.4	52.3	56.9	59.1		50.0	58.1
All Students								
≥ 90	0	1	1	2	2		2	4
80 - 89	0	1	0	3	6		1	9
70 - 79	0	2	1	8	3		3	11
60 - 69	3	7	4	9	9		14	18
50 - 59	8	7	10	8	3		25	11
40 - 49	10	7	9	9	10		26	19
< 40	14	8	12	14	18		34	32
Rd Students								
≥ 90	0	0	0	1	0		0	1
80 - 89	0	1	0	0	0		1	0
70 - 79	0	1	0	4	0		1	4
60 - 69	1	5	1	2	1		7	3
50 - 59	5	3	6	5	1		14	6
40 - 49	7	6	6	4	4		19	8
< 40	9	5	8	9	13		22	22
Ra Students								
≥ 90	0	1	1	1	2		2	3
80 - 89	0	0	0	3	6		0	9
70 - 79	0	1	1	4	3		2	7
60 - 69	2	2	3	7	8		7	15
50 - 59	3	4	4	3	2		11	5
40 - 49	3	1	3	5	6		7	11
< 40	5	3	4	5	5		12	10

	97-99	00-01
% Pass	42.9	51.0
% Fail	57.1	49.0
% Pass	35.9	31.8
% Fail	64.1	68.2
% Pass	53.7	65.0
% Fail	46.3	35.0

Table A1.2 Assignment results

	L1	L2	L3	L4	L5	L6	Av
n(97-99)	107	106	106	106	105	104	
97-99	78.3	63.2	81.9	71.2	69.3	73.9	73.0
n(00-01)	103	102	104	102	98	92	
00-01	76.3	72.0	72.4	64.1	55.2	59.4	66.6
Rd students							
n(97-99)	66	67	66	67	67	65	
97-99	75.8	63.2	82.5	70.6	66.2	73.3	71.9
n(00-01)	43	42	42	43	44	42	
00-01	73.6	73.5	78.9	62.4	53.4	59.9	67.0
Ra students							
n(97-99)	41	39	40	39	38	39	
97-99	82.4	63.3	80.9	72.4	74.9	75.0	74.8
n(00-01)	60	60	62	59	54	50	
00-01	78.2	70.9	68.0	65.4	56.7	59.0	66.4

Table A1.3 Church project

	Paper based		Web based	
	n	%	n	%
All students	92	71.5	104	62.7
Rd students	63	76.0	44	60.5
Ra students	29	61.7	60	64.4

Other Course Information

23. Did you look at the "Additional Assignments"?

Yes No

24. Did you try any of the "Additional Assignments"?

Yes No

25. Did you read the "Course Objectives"?

Yes No

26. Did you read the "Useful Information"?

Yes No

Solutions

27. Have you compared your answers with the solution pages?

Yes No What solution pages?

28. Which solution pages have you looked at?

0 1 2 3 4 5 6

29. Which solution pages, of those you looked at, gave insufficient information?

1 2 3 4 5 6 All were adequate

30. Have you queried your LOGO marks with the lecturer or the tutors?

Yes No

31. Why did you not collect your tests?

But I did... I wasn't interested... I didn't know I could... I was too embarrassed...

General LOGO

32. Do you feel that you coped with the LOGO course without lectures?

Yes No

33. Would you have liked to have had some lectures?

Yes No

34. Do you think you could have completed the assignments without the physical presence of the lecturer and the tutors (ie away from the campus)?

Yes No

35. Was there sufficient information, for you to complete the assignments, in the LOGO web pages?

Yes No

36. Were the lecturer and the tutors helpful during the practical periods?

Yes No

37. Were the lecturer and the tutors attentive to your problems during the practical periods?

Yes No

38. Have you discussed LOGO work with the lecturer outside the practical period?

Yes No

39. If you answered YES to the previous question:

39a. How often?

1 1 to 5 more than 5

39b. Did the lecturer answer your question(s) satisfactorily?

Yes No Sometimes

39c. What was the lecturer's attitude towards your query?

Unhelpful Helpful

40. Did the lecturer show an interest in your work?

Yes No

41. Do you think the lecturer understands his subject?

Yes No

42. Rate your maths capabilities **before** this course.

Not too good... OK... Good... Very good...

43. Have you learnt anything from the LOGO course?

Yes No

44. In your own words, qualify your answer to the previous question (use the back of this sheet if necessary).

Appendix 3: Email monograph: Information and Knowledge by AM de Lange

(This document has not been modified in any way, other than to remove the hard carriage returns in the paragraphs, inserted by the email software.)

From: AM de Lange <amdelange@gold.up.ac.za>
To: <alan@gold.up.ac.za>
Subject: Information and Knowledge
Date: Monday, August 21, 2000 20:00

This contribution is complex. Hit the ESC key to flee from this complexity if necessary.

I think that this complexity is unavoidable as a result of the Law of Requisite Complexity. The more I delved into the topic, the more I came under the impression how the presentation of "information" evolved through the centuries to such a level of complexity that it now appears to be like "knowledge". To distinguish between the two have become almost like trying to distinguish between an authentic note of currency and an almost perfect counterfeit copy of it. Nevertheless, it is of paramount importance to distinguish between the two, even if it entails that we have to delve deep into complexity.

We are being flooded with composite nouns like "knowledge management", "knowledge transfer", "knowledge engineering", "learning organisation", "learning community", "information technology" and "information society". The less we know what each of "knowledge", "learning" and "information" means, the more we will become confused by the meaning of these composite nouns. This confusion is caused by writers who use these words indiscriminately, unaware of their present and past meanings.

The fact that we have to deal with these nouns in a COMPOSITE manner, whether bewildering or meaningful, points that we are now in a profound bifurcating period which concerns our very intelligence and even spirituality. Should we desire these composite nouns (or even new words to rename them) to represent constructive emergences rather than destructive immergences, we will have to make sure among other things what their constituent nouns mean (see the essentiality sureness).

Why? In the evolution of every realm like the geosphere, biosphere or the logosphere, species of a new order generate from species of an older (which will afterwards function as the genera) in a linked manner. It is like twigs developing from a branch or branches developing from a trunk. Twigs have to be linked to a branch and branches have to be linked to a trunk to come into existence and to remain alive. Twigs and branches cannot live unlinked in the void because then their "identity" will become syncategorematic. Likewise an evolutionary species cannot be created in the void without losing the "categoricity" of its "identity". Its emergence has to happen within an "evolutionary tree" to suite sureness.

In this contribution we will consider the evolution of the logosphere. This evolution of words is better known in linguistics as etymology. We will focus on the evolution of two words, namely "knowledge" and "information". We will link their present meanings to past meanings so as to become aware what future meanings we may give to them. This will help us to avoid confusion as a result of destructive immergences in meanings.

The Anglo-Saxon substrate of Modern English comes from Old English. The etymology of the word "knowledge" relates to the Old English word "cnawlec". The "-lec" is a suffix meaning "having resemblance to". The equivalent of "-lec" in Modern English is "-like". In my own mother tongue Afrikaans the equivalent of "-lec" is "-lik" while in German it is "-lich".

The root "cnaw" comes from the verb "cnawan" which means "pretty, well and lofty thinking". In Afrikaans a remnant of this meaning is still to be found in the word "knap" (German "klug"). Hence the syntactical evolution of "knowledge" in Afrikaans from "cnawlec" would have been to the word "ken(ou)lik". But "kenlik" itself means in English "obvious" (German "sichtlich"). The actual semantical equivalent of "knowledge" in Afrikaans is "kennis" (German "Kenntnis"). We also have in Afrikaans the adverb "nou(geset)" (German "genau"). The word "genau" is a pretty reflection on the phonology of "cnaw". The word "nougeset" means "within knowledge".

Should the English people have derived the word corresponding to "knowledge" from Greek rather than Old English, it would have corresponded syntactically somewhat to " 'eunoia' " ("eu"=good, "noeo"=think). Compare this with our recent LO-dialogue on " 'orthonoia' ", "metanoia" and "paranoia". But should they have derived it from Latin, it would have corresponded syntactically to " 'bonagnition' " where "bonus"=good and "nosco"=know. This reminds us of the close relationship between "knowledge" and "cognition" where "co-"=together. It means that knowledge has very much to do with cognition. How?

In the "(c)no-" of "noeo" and "nosco" as well as in the "cna-" of "cnawlec" we are reminded of the ancient Indo-Germanic root "cno"=bulge. The English word "knob" still retains this ancient meaning for which we today will use the word "emerge". Thus the word "knowledge" has its etymological roots firmly in the sense of "that which is bulging or emerging". In other words, the evolution of the root word for knowledge in Mesopotamia (Sumer) began with the awareness to emergent phenomena INCLUDING this very awareness itself as an emergent phenomenon.

It is for this reason that we have to distinguish in learning between its two asymptotes: emergent learning and digestive learning. The emergent learning correspond to cladogenesis in biological evolution while the digestive learning correspond to anagenesis. The emergent learning requires a high rate of "entropy production" so as to move towards the edge of chaos. The digestive learning requires a low rate of "entropy production" so as become close to equilibrium. Cognition is an outcome of emergent learning. Digestive learning, unlike emergent learning, relies very much on external sources of information

The word "information" is related etymologically to the Latin prefix "in"=in and the noun "forma"=form. The suffix "-tio" in Latin transformes the noun of any material thing into a corresponding abstract concept. Hence it is as if the word "information" is saying literally "in abstract form". Perhaps this is why the word is so easily misused for knowledge because the "in abstract form" of information cannot exist without some or other "physical representation" of it in a dazzling diversity. Knowledge is abstract too, but it requires physically the "functioning brain". This "functioning brain" cannot ever act as the "physical representation" for "information", despite the dazzling diversity otherwise.

In my mother tongue Afrikaans the semantical equivalent of "information" is "inligting" where the "in"=in, "lig"=light and "-ing"=ing. It is as if "inligting" says "to bring into light so as to be able to look at it". However, should we focus on the "abstract" aspect of information as the suffix "-tion" ought to tell us, one semantical equivalent of "abstract" in Afrikaans is "uittreksel" where "uit"=out, "trek"=pull and "-sel"= -xxx. This suffix "-sel" is a peculiar construct in Afrikaans by which a verb is transformed into a noun which will refer to the OUTCOME of that verb. It functions like the suffix "-ment" in English with respect to verbs from Latin origin like "achieve-ment" and "state-ment".

The Afrikaans word "inligting" would correspond syntactically to the English word "enlightenment". This perhaps suggests another reason why "information" has been inflated. The increased availability of "information" since some three centuries ago sustained a period of major digestive learning of which the outcome was called the "enlightenment".

Many outcomes of knowledge or facets of it may be described by words ending with the suffix "-tion". The following list contains only lesser complex synonyms of knowledge like apprehension, cognition, comprehension, erudition, information, intuition, perception and recognition. Because they are simpler synonyms it means that each tells about some facet of knowledge. Therefore it also means that not one of them, not even information, can be semantically equivalent to knowledge. In other words, using the word information when meaning knowledge or vice versa is a grave immergence in meaning.

Let me now attempt to give a short description of knowledge. In this description knowledge will be referred in the manner of an irreversible, spontaneous, self-organising system.

Knowledge comprises the whole of all acts and outcomes of conscious thinking. Knowledge places no restriction on its sources, whether internal or external. It employs them by way of authentic learning so as to complexify continually. Knowledge functions within the human independent of technology. It is a processing structure (whole becoming-being). It is rich in diversity and aware of its limitations. It is open to new inputs and eager to connect effectively with them so as to increase in sureness. As an irreversible, spontaneous, self-organising system it is a subsystem of human spirituality.

Allow me also to attempt a short description of information.

Information is a collection of abstract forms represented (carried, coded) by any artifact outside the human mind. Information is produced by knowledge so as perhaps to assist some mind in its future complexification. Information itself has no implicit knowledge, but can be recognised by a knowledgeable person as information. Information is unaware of itself, its aggregate nature, its limitations and poverty, its closure by the very artifacts signalling it and its inability to self-organise irreversibly and spontaneously. It can be manipulated (engineered) outside the mind with technology (another artifact of knowledge), but without feasible artificial intelligence the outcome will not gain in any knowledge, not even implicitly. Even present information management by way of information engineering will not add any knowledge to the outcome, since it happens outside the mind and lacks substantial artificial intelligence despite all attempts so far.

We can compare the two descriptions above. But let us rather make comparisons with respect to definite issues.

Perhaps the most profound difference is that knowledge resides "inside-the-person" whereas information is "outside-the-person". Knowledge is closely linked to personality whereas information is by way of speaking "faceless". A person can be profoundly knowledgeable without ever having written any book. Yet people study the information in books so as to evolve in knowledge. People with much or little knowledge, except for a basic literacy, can write books. The information in such a book will be telling of the knowledge with which the person had written the book. But this information "in the book" can never be equated with the knowledge "in the author".

The advent of computers removed an important restriction on information "in the book". Book based information is static (being). Computer based information can also be represented dynamically (becoming). Despite this active representation of information "in the computer", it is still not knowledge. It lacks the irreversible, spontaneous, self-organising nature of knowledge. The lack of this very nature when even copying human learning into computerised models of artificial learning, artificial intelligence or even artificial life still makes it not knowledge.

Knowledge has many layers in it so that we can speak of its top layer as "sapient knowledge" (wisdom) and a couple of layers down as "tacit knowledge" (intuition). Although information can also have many layers created on purpose in it, it has neither wisdom nor intuition in them. Thus the thinking mind needs its own intuition and wisdom to deal knowingly with information as one of its sources. In contrast wisdom and intuition can be expressed as information, but lose their very nature by this expression. Hence the "information on wisdom" appears to be folly for some people while the wise recognise their own wisdom with it. Likewise the "information on intuition" appears to be ignorance for some people while the experienced recognise their own intuition with it.

Knowledge evolves (complexifies) spontaneously. Engineering attempts to force the growth of knowledge non-spontaneously result in its degradation (simplification). No matter how massive any collection of information has become, every increment in it was the result of reduction of knowledge. This reductionistic property of information disqualifies any part of it as well the sum of it from representing knowledge. But knowledge self overcomes this reduction by a continual migration through emergences from sensory inputs to experience, then to intuition, followed by formalisations and finally by wisdom. Even further emergences from wisdom to higher orders of spirituality are possible. However, information does not sustain higher order such as faith or caring love. It is rather infamous for making faith and love banal.

Knowledge has an ordinate cyber loop in it so as to manage its evolution in a changing world. The upwards action begins in the physical world with sensory inputs while the downward action begins in the spiritual world with caring love. Information has no (and perhaps will never have) an implicit means to guide its own evolution. Consequently it depends on knowledge to make its growth feasible and valuable. It means that information management depends fully on knowledge. Information management is often confused with knowledge management, even though the latter only happen within the mind itself spontaneously. Knowledge management can also be described as double loop learning, i.e. learning to learn. The counterpart for information management, namely informing to inform or "double loop informing" is actually meaningless. Forcing knowledge management by external means such as information management, sometimes called knowledge engineering, is detrimental to the evolution of knowledge

The mind can store information by memory, but information cannot ever store knowledge. Not even informative books on knowledge as their topic can store knowledge. Such books will have information on knowledge, but they do not have any knowledge self since then they would have evolved on their own as a result of such knowledge. Electronic Based Information Technology (EBIT) are replacing more and more books because in certain aspects EBIT is superior to paper based information technology. One such an aspect is the economy and feasibility of storing information by devices called electronic "memory" devices. Despite their name as "memory" devices EBIT is not any knowledge. Nowadays EBIT allows dramatic simulations of the dynamics of the

mind, yet despite all this dynamics in the information presented by EBIT, this sometimes glorified information is still not knowledge.

Knowledge is like an organism. The faculties of knowledge are like the organs of an organism. Each faculty of knowledge has like an organ a morphology (structures) and a physiology (processes). Although information itself can also be presented with structures and processes, it is still not more than a mere simulation of knowledge. Any simulation of knowledge, impressive as it can be, cannot transcend itself as information so as to match the actual knowledge itself. Thus information remains a puppet of which the strings are pulled by knowledge. Information, like the puppet, is often a mere caricature and sometimes a grotesque monstrosity of the knowledge which it supposedly images.

The aggregation of information upon information may become far more than that which one person can ever cover knowingly. Thus we are tempted to equate information with knowledge or even consider it as superior to knowledge. However, we should bear in mind that knowledge itself also has a collective ("mitsein") dimension when learning individuals transcend together into a learning organisation. This seldom explored "collective knowledge" of a learning organisation is more than a match against all perceivable aggregates of information.

Perhaps the composite noun "information source" causes the most confusion because it has become fashionable to use it. Like all fashion it changes continually in its meaning. The etymology of the English word source goes back to the Latin "surgo"=rise. Hence this word has strong connotations with the concept "emergence". Information has always a "physical model" which "carries" it. Only humans can become aware of the "information" carried by the "physical model" by way of a mental emergence. Other living species, plant or animal, seem to have no awareness to the "information" carried by the "physical model". Perhaps this "physical model" representing the "information" ought to be the only thing which may be called the "information source".

Reality in all its realms serve as the "source of knowledge". Hence the "knowledge source" is physical and spiritual, i.e. the "world-inside-the-person" as well as the "world-outside-the-person". On the other hand, all "information sources" are cultural artifacts. They have been created by humans to codify with protocols some facets of knowledge. They can be perceived only by knowledgeable humans and not, for example, other kinds of animals. It is not possible to codify all knowledge into information because of the "measurement problem" -- the advanced reduction of patterns of the wave packet when explicating some of them as information. Thus "information sources", despite their sometimes massive and enticing nature, are inferior to the knowledgeable mind which has produced them as measures of itself.

The way in which I think of "information" is that it is a source of data. To perceive bits of "data" in "information" itself also requires a mental emergence, the so called "analytical faculty of mind". Many people seem to speak of "source of information" when they actually deal in their minds with a "source of data", something which I consider as "information" itself. Knowledge on the other hand, is not a source of data, but a producer of sources of data in any required form. Knowledge can produce and digest data, but information can neither produce data nor digest them.

By now my own personal contemplations on what information and knowledge mean for me, may have become as confusing as the many composite names involving "information" or "knowledge" in them. Thus I should rather end

these musings on "information" and "knowledge". But I cannot end by stressing once again that knowledge lives within me with mental "cno"s essential to it whereas information is documented outside me, devoid of any "cno"s (emergences), except telling about them.

Knowledge is like the country side and information like a map depicting the country side. Let us not confuse the map with the real thing which it represents.

With care and best wishes

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