

Comments on "About a framework for information and information processing of learning systems" by M. Rauterberg

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1 CONCEPTS

The author remarks that the term "*information*" is over-used and expresses the view that there is a need for a concept covering novelty, *activity* and *learning*. This is not unlike the widely accepted view that, while information is expressed as and conveyed by messages, signs, a selection of data and so on, the deeper significance is that it forms (often intentionally) a basis for "*decision making*". The author points out the essence of the decision making process:

stimuli : external (sensory) / internal (mental), part of *context*
 leading to : *perception / attention / action planning*

Instead of the ill-definable concept "information", the *mental model complexity* is used and contrasted with the *external complexity*. The author refers to their difference as "*incongruity*".

Unfortunately, a notational problem to the reader is caused by the excessive use of abbreviations, a small selection of which may be contrasted with their more common usage:

CC	Complexity of Context	["carbon copy" ?]
BC	Bodily Complexity	[not "BC" as opposed to "AD"]
EC	Environmental Complexity	["European Commission" ?]

Some debate is in order regarding "perception" (as schematized in Figures 2 and 3). Perceivable (including "potentially" perceivable) stimuli are distinguished and classified by the author:

KS	"Known" Stimuli (and structures)
NS	"New" Stimuli (and structures)
US	"Unknown" ... and therefore "not perceivable" Stimuli

This begs the question which information/complexity associations should be made. Because Figure 2 represents a specific mechanism, a further question would be to what extent it can be regarded sufficiently comprehensive. These points are not addressed in the paper as such.

2 SYSTEMS

The overall objective of the author is to find an interpretation of information that is compatible with activity and learning. To this end a number of systems are considered. Figure 2, for instance, which juxtaposes "context" and "system", implies that the latter must be identified with the learner. On the other hand, in section 5, "system" and "mental model" are contrasted with "context". And in section 6, considering "user" and "technical system", the statement is made that the ... "user must build up mental representation".

It would seem - according to the author - that both (our descriptions of) users and other selected parts of the world must be termed "systems", which are capable of "learning" (i.e. of reducing incongruity). This stance leads to two problems and two debating points:

system : does the author view a "system" as observer dependent, and - if so, does that apply to "living" systems, as well?

incongruity : defined as "the difference internal/external complexities" and illustrated by software complexity, how would this apply to other systems, e.g. organizational or merely living systems?

- If "task activity" is expressible in states and transitions, can this also be applied to "business analysis" ?
- If there is an important difference between the complexities of the mental models of "beginners" and "experts", might this also be used to write better user guides?

3 INFORMATION, INCONGRUITY AND COMPLEXITY

The author only illustrates incongruity/complexity concepts in connection with the use (and possibly design) of software systems, e.g. Human Computer Interfaces. Apparently, incongruity is related mostly to *understanding* of such "technical" systems. Information applies to decision making and action in a world with all sorts of material, living and "abstract" systems:

- *material* : factories, etc.
- *living* : animals, plants ... people, organizations
- *abstract* : service industries, computer programs ...

It is doubtful whether "real world" activity lends itself readily (or at least, generally) to Petri Net type description and McCabe type metrics, although this may be too pessimistic a view. Anyway, further interesting debating points might be:

- What merit might there be in analyzing the "business system" not in terms of *information*, but in terms of arranging for useful *stimuli*, i.e. by seeking *incongruity optimization*? This, of course, concerns the (technical) design product, not the (human) design process.
- To what extent do we need to educate information users regarding the views expressed in this paper? This point concerns understanding of users vis-a-vis their information.

SUMMARY

All in all, a very attractive paper, which is close to main problem area addressed by FRISCO (understanding what information is and how to use it). It also demonstrates the need to involve other disciplines than computer science and management science.

Interesting debating points concern the definitions in the area of information systems and the potential consequences the author's approach might have for the information system design process and design product.