

CASE STUDY 1.

FROM DAAI to ACA

Transforming HMI into ACA (Applied Cultural Anthropology)

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Gerd Doeben-Henisch [GDH](gerd@doeben-henisch.de)

July 28, 2020

Abstract

The collection of papers in the *Case Studies Section* deals with the possible applications of the general concept of a GCA *Generative Cultural Anthropology* to all kinds of cultural processes. The GCA paradigm has been derived from the formalized DAAI *Distributed Actor-Actor Interaction* theory, which in turn is a development based on the common HMI *Human Machine Interaction* paradigm reformulated within the *Systems Engineering* paradigm. The GCA is a very general and strong theory paradigm, but, saying this, it is for most people difficult to understand, because it is highly interdisciplinary, and it needs some formal technical skills, which are not too common. During the work in the last three months it became clear, that the original HMI and DAAI approach can also be understood as the case of something which one could call ACA *Applied Cultural Anthropology* as part of an GCA. The concept of ACA ist more or less directly understandable for most people.

1 Terminology and Scope

The field of *anthropology* is very broad, and even the sub-term *cultural anthropology*¹ shows a complicated history with a terminological context, which is only broadly described. The intention of this text here and of the overall project is not to reproduce this whole field of (cultural) anthropology as a whole but to think from the opposite: given is an elaborated concept of integrated engineering as a formal theory with an empirical embedding and an interface to

*Copyright 2020 by eJournal uffmm.org, ISSN 2567-6458, Publication date: July 28, 2020

¹See for a good first overview the text in Wikipedia https://en.wikipedia.org/wiki/Cultural_anthropology.

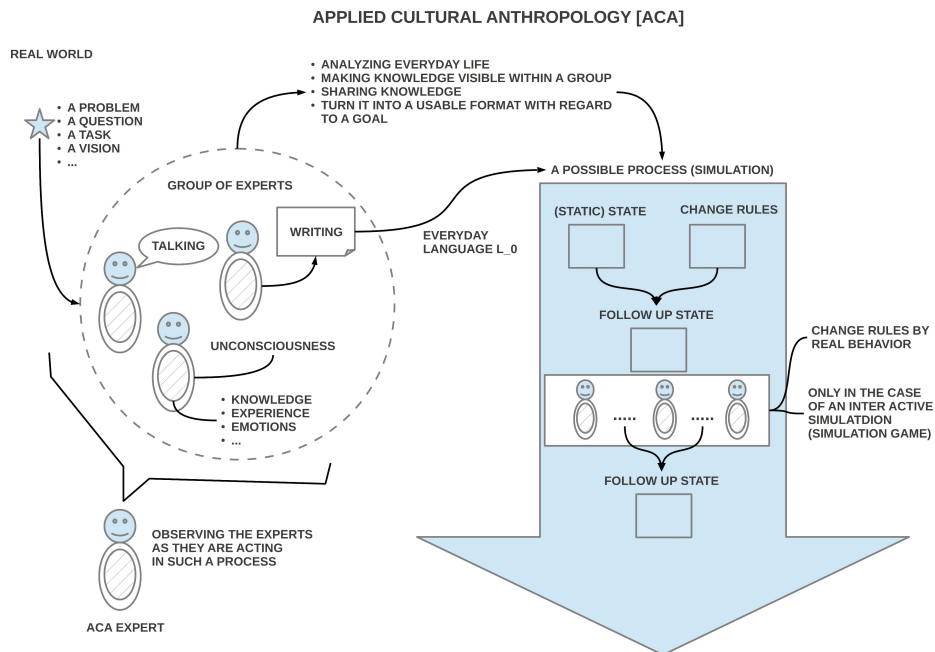


Figure 1: Outline of the ACA (Applied Cultural Anthropology)

advanced computing, and it has to be explored how far one can extend these technical terms into the field of *human culture*. The term *culture* is here associated with all those behavior and behavior induced artifacts which can only be found with human populations and not with other live forms. Thus human languages, technology, cities, agricultural etc. are all elements of culture in the before defined sense.

2 ACA - Basic Idea

Figure 1 shows the basic idea of an *applied cultural anthropology ACA* without many details.

Working Group: The main idea assumes that there exists a *working group of experts*, which have at least one *everyday language* as there main language which can be used for communication. This symbolic communication is *embedded in an everyday situation* which can be perceived – in principle – by all members of the group.

Triggering Event: There exists some *question or problem or task or some vision* or something like this which functions as a *trigger* for the group to examine their – *mostly unconscious* – knowledge and experience to share this with each other.

State, Change, Inference: The final description should include at least one *static situation (state)* as typical starting point and a *set of change rules* which describe, how a given situation can be changed. Finally one needs a kind of an *inference concept* which describes how one can apply a set of change rules to a given state and how one can *get all possible follow-up states from this*.²

(Passive/Interactive) Simulation: If a description of at least one start state exists together with change rules and a defined inference concept, then one can infer a series of follow-up states representing a process. Such a process can be called a (*passive*) *simulation* demonstrating, what can happen, if things would be as assumed in the given texts. Compared to the real world such a simulation can only be as good as the *assumptions* are. But principally, a *passive simulation* is generally different to the real world because the *real world* is as such a *dynamic process* which *changes itself continuously*. One important factor for these changes are *all kinds of actors*, not the least human actors. Thus it would be a great improvement for a simulation if one could include *real actors as part of the process*. This can be done after each inference, when a new follow-up state has been generated. Instead of only rely on the fixed change rules in the change-rule text one can *ask real persons which take some role in the scenario* how they would act now. This would turn the *passive* simulation into an *interactive* simulation. The case of an interactive simulation can further be divided into two sub-cases: (i) the set of possible actions offered is *fixed* or (ii) the actor can *propose a new action* which is not yet part of the set of defined rules. In the last sub-case one has a truly *innovative/ creative* process which can shed some new light into the possibilities of possible futures.

Simulation Game: Interactive simulations are commonly known as *simulation games*.

²Because such an inference can become soon very demanding for the human brain it is helpful, to have an *interface* from the everyday language text to a *formalized text* which can be processed by a computer. In the enlarged version of our approach this is part of the concept. See e.g. the text <https://www.uffmm.org/wp-content/uploads/2020/07/requirements-no1-25july2020-v1-pub.pdf>

Empirical Meaning: The texts (state, change rules, inference) generated by the experts can be understood as an *empirical theory*, if it is possible to establish *decidable interpretations* of the expressions used to the assumed part of the real world. The main criterion for such an empirical interpretation is always the *built-in meaning function* in every participating expert. It is part of the everyday language game that the participants of the game are able to decide whether an expression of the language can be *verified* by the actual situation *or not*. In case of *abstract terms* it must be possible to generate a *connection* between the abstract term in question and finally a decidable expression. If such an *inferred verification* is not possible, then the term is *undefined*. In the case of different kinds of actors with 'hypothesized' 'rich' inner states, where it is usually not possible to look *into* the system, one can establish a *hypothetical model* which *explains* the *observable behavior* 'sufficiently well'.

Applied: The usual understanding of an anthropological and as well of a cultural anthropological theory is primarily a *descriptive* one, explaining *what is*, and not more. From a philosophy of science point of view this can raise many deep methodological questions and indeed, one can find lots of discussions around these topics. The anthropological writings are furthermore primarily addressing the anthropological community and not the people which has been observed and described. Besides many methodological issues this can induce the question in which sense such a science is helpful for the society? Here this question will not be answered. Instead it will be explained, in which sense an *Applied Cultural Anthropology* does surround most of the methodological problems of the *Description Paradigm* and in which sense the *Applied style* can be of great help for the real living people. In the ACA paradigm the ACA expert does not make any description by its own but he *invites* members of some part of the real world, to share *their experience* in the light of some *trigger taken from their interests*, to talk about this with their *own language* and then to compare the resulting texts to the world in the *light of their own experience*. And, if the *experts-by-their-own* are using the format of a *simulation game* then they can intensify the encounter with the modeled world while they are urged to *act by themselves* in this game, having their *own experiences*. The generated texts are representing a real theory with an empirical interpretation, which is decidable. This improves the understanding of the *natural experts* by *learning* together.

Autopoietic Theories: The concept of *autopoieses* is originally known from evolutionary biology to point to some special properties of biological living systems.³ But, by analogy, one can transfer this structure to other application

³The term has been introduced in 1972 by the Chilean biologists Humberto Maturana and Francisco Varela to define the self-maintaining chemistry of living cells. See Maturana & Varela (1980) [MV80].

domains, e.g. to the self-driven processes described above: the *natural experts* act by their own dynamics, causing some new dynamic, which in turn is feeding back to the native experts. Thus a theory which is arising within such a process is not some isolated moment of reality but part of an ongoing process which creates theories and these again change the process to generate new theories. Therefore the theories as moments of a process are part of an autopoietic process.

References

[MV80] Humberto Maturana and Francisco Varela. *The Organization of the Living*. Reidel Publ.Company, Dordrecht (NL), 1980.