HERBERT ALEXANDER SIMON: A CENTRAL EPISTEMOLOGICAL REFERENCE POINT FOR A COMPLEX DIDACTICS OF LANGUAGES-CULTURES (DLC)

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Introduction

Herbert Alexander Simon was awarded the Nobel Prize in Economic Sciences in 1978, and the Turing Medal (known as the "Nobel of Computing") in 1975 for his research into Artificial Intelligence and Cognitive Science.

In my previous publications, I have often cited this author because of the great epistemological interest of many of his ideas for the conception of **complex didactics of language-cultures** (DLC; on this notion of "complex didactics", cf. 023, 046, 2003b)[1] . This is why I consider him to be one of my three main reference authors for the epistemology of the discipline, along with the French philosopher of complexity, Edgard Morin, and the American pragmatist philosopher Richard Rorty (cf. 048).

In this short synthetic article, I propose to summarize H.A.'s seven ideas, all of which can be found in his 1969 book *The Sciences of the Artificial* (available online; see reference in final bibliography). The order in which these ideas are presented here is not significant.

1. Artificiality to manage complexity

- For H.A. Simon, "the issues of artificiality and complexity are inextricably intertwined". It is artificiality, in fact, that enables complexity to be satisfactorily managed. In DLC, the great advantage of formal teaching (in classroom) over informal "language immersion" learning, all other things being equal (i.e. the level of input intensity and learner

[1] References to my publications are direct links in the pdf version of this article.

motivation) is precisely that it is artificial: it is this very fact that enables it to offer progressive learning, aided, guided by the teacher and supported by intensive targeted exercises. I have just published (May 2024) an article entitled "Praise for the artificial in school didactics of languages-cultures" (2024e-en).

2. The relationship between artificiality and engineering: the notions of "device" and "project"

For H.A. Simon, the engineer is essentially a designer of artificial devices: the "sciences of the artificial" he analyzes in his 1969 book are the sciences of engineering. In fact, he devotes an entire chapter to the "engineer paradigm" (chap. 3). This is one of the main functions attributed to teachers by specialists in educational science, who speak of "pedagogical engineering". One of the factors of complexity is sensitivity to the environment (cf. again 046): the notion of "device" is precisely one of the key notions in the field of "environment" in DLC (cf. 030).

Engineers always work with projects, which can be seen as devices that create their own environments in such a way that they can be mastered. In pedagogy in general, and DLC in particular, the device is an artificial environment that facilitates learning, and the project is a macro-device of this type, which has the particularity of being built to a certain extent by the learners themselves (depending on their degree of autonomy), with conceivable consequences for learner motivation and adaptation of the device to their needs.

3. Adopting the adequacy paradigm and abandoning the optimization paradigm

In the history of methodologies, the new methodology was supposed to replace all the previous ones and impose itself everywhere, because it was considered "optimal", *i.e.* better in absolute terms, particularly on the pretext that it was based on theories (linguistic and/or cognitive). In his 1969 book, H.A. Simon writes the following about the "true economic actor":

> *Faced with the complexity of the real world, business turns to procedures that find sufficient answers to questions whose best answers are unknown. Because optimization in the real world, with or without optimization in the real world, with or without a computer, is impossible,* ***the true economic actor is in fact a "satisficer",*** *a person who accepts "good enough" alternatives, not because less is better than more, but because he has no choice.* (1969, pp. 28-28, emphasis added)

The didactic field being as complex as the economic one, the following reflections by H.A. Simon (which I quote in Document 048) seem to me to be directly transposable to the "real didactic actor".

This adequacy paradigm explains and justifies two major developments in DLC since the end of the XXth century:

> a) from an empirical point of view, **eclecticism**: we take from the various existing methodologies what can best be adapted to our own environment (cf. my *Essay on eclecticism*, 1994e);
>
> b) from an epistemological point of view, **the transition from theories to models** (cf. 015; 016 for cognitive models, 018 for grammatical models; 2022f for DLC modelling).

4. Shifting the focus from product to process

This is another consequence of our awareness of complexity. In any complex environment, productions are very different from one another, since the factors involved are multiple, heterogeneous, variable, unstable, involving the subjectivity of subjects, etc. (cf. "The components of complexity", 046). It is therefore more interesting to be able to **describe the**

unique process that has generated and will continue to generate different productions, than to needlessly accumulate descriptions of a large number of existing productions. On this idea, see below the excerpt from H.A. Simon 1969, available in French on the Internet, entitled "*La description de la complexité. Les descriptions des états et les descriptions des processus*" (« Describing complexity. State and process descriptions » : see final bibliography).

I put this idea into practice in my essay 2024a, proposing a "3M" model (Matrix-Model-Methodology), which represents the mechanism of change, elaboration and adaptation of methodologies at work in DLC, and on which I make the following hypothesis:

> *[This mechanism] has worked and works in the same way in other countries and in other didactic traditions, even if the methodologies generated are different", and that it "also works at all levels of actors in DLC, from didacticians developing a new methodology to teachers adapting it in real time in the classroom, via educational managers, inspectors, trainers and publishers, each intervening with their own objectives, needs, constraints and conceptions.* (Introduction, p. 2-3)

The multiplication of presentations of different methodologies –and in colloquia sometimes it's even the methodology that the speaker has personally developed in the course of his or her teaching career– is of no interest from the point of view of disciplinary reflection, except as a simple illustration of a certain didactic issues.

The priority given to process over product has many applications in DLC. In the action-oriented/project pedagogy perspective, it means,

> –at the start of the project, greater emphasis is placed on designing the project (i.e. the process needed to achieve the desired objective) than on pre-programming the sequence;
>
> –and, at the end of the work, to give greater importance to personal and collective self-assessment of the process (by the learners), than to hetero-assessment (by the teacher) of the learner's final productions.

5. Ontogenesis recapitulates phylogenesis

H.A. Simon (1969) presents this idea, with its application to the design of learning progression, as follows:

> *In the course of its development, the individual organism passes through stages that resemble some of its ancestral forms. The fact that the human embryo develops gills and then modifies them for other purposes is a familiar feature belonging to generalization. [...] Generalization [...] is just as easily applied, for example, to the transmission of knowledge in the educational process. In most subjects, especially in the rapidly progressing sciences, the passage from elementary to advanced courses is to a large extent a passage through the conceptual history of the science itself.* (p. 213, 215)

I've taken this same idea from H.A. Simon and applied it to DLC, for example, in a 2018 article:

> *[In my earlier work, I postulated] that for most teachers, professional maturation reproduced the evolution of the discipline: methodological perspective (with the central question of "how?"), then didactical perspective (with the central question of "what?"), finally didactological perspective (with the central question of "why?"). Based on this premise, I have proposed* ***a model of formative progression in DLC ,*** *linking the three constituent perspectives through which DLC has passed in order to take better account*

> *of the complexity of its object: the methodological, didactic and didactological perspectives* (2018b, p. 2).[2]

Note that this idea can also be linked to the priority given to describing processes rather than states (see point 4 *above*).

6. Criticism of applicationism

I think it's worth quoting this long passage by H.A. Simon 1969 in full, because I believe that the criticisms and proposals he makes there apply exactly to the training of learners in DLC:

> *Engineers are not the only professional designers. Anyone who imagines a few arrangements to change an existing situation into a preferred one is a designer. The intellectual activity by which material artifacts are produced is not fundamentally different from that by which we prescribe a remedy to a sick person, or imagine a new sales plan for a company, or even a social policy for a state. Design, conceived in this way, lies at the heart of all professional training. It makes the difference between science and the professions. Engineering schools, as well as schools of architecture, law, management, medicine and teacher training colleges, are all primarily concerned by the design process.*
>
> *By an ironic paradox, at a time when the decisive role of design in all professional activity is asserting itself, it should be noted that the XX² century has almost completely eliminated the sciences of the artificial from the curriculum of schools training professionals. Engineering schools have become schools of physics and mathematics; management schools have become schools of finite mathematics. The use of qualifiers such as "applied" conceals the fact, but doesn't change it! It simply means that in vocational schools, the subjects taught are selected from the fields of mathematics and the natural sciences, taking into account what is considered to be of particular interest in this or that professional activity. But it does not mean that design is taught as such, as distinct from analysis. [...]*
>
> *Such a universal phenomenon must have a general explanation. It's quite obvious. As vocational schools, including independent engineering schools, become based on a general university culture, they aspire to academic respectability. [...] The vocational schools of yesteryear did not know how to teach design in the workplace at the intellectual level required in higher education. New-style vocational schools have all but abandoned their responsibility for teaching genuine vocational specialties. Today, we need to imagine a vocational school that simultaneously achieves two objectives: teaching at a high intellectual level, covering both natural and artificial sciences.* (2004, pp. 113-115)

The same phenomenon occurred in the history of DLC with the applicationist drifts of the era of triumphant applied linguistics and applied psychology. I've already had occasion to point out that the importance of practical training in the first master's degree in French as a foreign language (FLE), in the early 1980s, was rapidly reduced in university courses (up to the current Master's degree in FLE) in favor of "theoretical" courses, more prestigious and considered more in line with academic requirements.

[2] On the three perspectives that make up DLC, cf. 1994a, 1999a. On their application to the design of progression in the training of DLC learners, cf. 2010a. I don't see why it would be easier to dispense with the history of DLC in university training than with the history of linguistic and cognitive theories in the corresponding disciplines.

7. The project approach (by way of conclusion)

For H.A. Simon, the sciences of the artificial are the sciences of the engineer, who designs artificial devices that enable to act on reality: a bridge, for example, enables us to cross a river by means other than fording or swimming. Civil engineers –to continue with the same example– constantly work on a project basis, because each of these devices has to adapt to its environment, which is always specific, taking into account both the goals of the clients and the constraints of the ground. The pedagogical model of the project, which is that of the Social Action-Oriented Approach ("Perspective actionnelle" in the French version of the *Common European Framework of Reference*, cf. on christianpuren.com the corresponding bibliography), is justified from an educational point of view by its suitability for the pursuit of educational goals (autonomy, responsibility, solidarity, and more broadly all the values known as "citizenship"). From an epistemological point of view, it is justified as the preferred approach to dealing with complexity.

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