Andy Clark and Kim Sterelny: The Extended Mind and the Cognitive Niche

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Abstract

In this article, I complete the block devoted to the philosophical foundations of the CCFP model. If virtue epistemology (Article 11) explained why the qualities of the knower matter, and the theory of dispositions (Article 12) explained what they consist of and how they are formed, then this article answers the question: what kind of environment makes this formation possible. I turn to two interrelated concepts: Andy Clark's extended mind and Kim Sterelny's cognitive niche. Clark shows that cognition is not a purely internal process - it is distributed among brain, body, and environment. Sterelny shows that humans evolved as natural-born apprentices who master cognitive skills through apprenticeship in niches created by culture. Together these concepts provide an answer to the question that remained open in the previous articles: why the infrastructure and culture of a school are not an additional option but a constituting condition for the formation of the CCFP. I show that a school is a cognitive niche and that its quality determines which dispositions can be formed within it. The industrial school is a poor niche that supports memorization and obedience. The school of thinking is a rich niche that supports inquiry, dialogue, and reflection. It is in this sense that pedagogy becomes the design of cognitive niches.

Keywords: extended mind, cognitive niche, niche construction, apprenticeship, distributed cognition, scaffolding, Andy Clark, Kim Sterelny, communicative-cognitive framework of personality, school infrastructure.

Where Thought Is Located

In the previous articles of this block, I have built an argument that can be formulated as follows. Virtue epistemology asserts: knowledge is the product of the qualities of the knower. The theory of dispositions refines this: these qualities consist of sensitivity, inclination, and ability, and they are formed through enculturation - through immersion in a culture of thinking [10]. But here one question remains that I have so far deferred: where exactly does this immersion take place? What is the environment in which dispositions are formed?

The question may seem strange. "Where?" - in school, of course, in the classroom, in the family. But the philosophical tradition I turn to in this article shows that this answer is too simple. Cognition does not merely occur in an environment - it is distributed in the environment. The environment is not a background for cognition; it is part of it. And if we want to understand how cognitive dispositions are formed, we must understand how the niche in which they are formed is structured.

Recall what a carpenter's workshop looks like. The tools are not hung up for beauty: every chisel, every plane lies in its place because the master's hand is accustomed to this order. The master thinks not only with the head; they think with the hands that reach for the needed tool before they have time to realize what exactly they need. The workshop is not the "background" of their work. It is an extension of their thinking. If you rearrange the tools, not only the convenience will change but the very course of thought. The cognitive niche is arranged in approximately the same way: it does not "surround" cognition, it forms it.

It is precisely this question that the two concepts I examine in this article answer: Andy Clark's extended mind and Kim Sterelny's cognitive niche. Both challenge the traditional idea that cognition is a process that occurs "in the head." Both show that cognition is distributed among brain, body, and environment. And both have a direct bearing on my model: if cognition is distributed, then the infrastructure of a school is not an additional option but a constituting condition for the formation of the CCFP.

The Notebook and Memory

Andy Clark (b. 1957) is a British philosopher and cognitive scientist and one of the most influential theorists of contemporary philosophy of mind. His principal work, *Supersizing the Mind: Embodiment, Action, and Cognitive Extension* (2008), became a manifesto of what he calls the extended mind [2]. Clark's main thesis can be formulated as follows: cognition is not limited to the brain. It is distributed among brain, body, and environment. When we use a notebook to remember a shopping list, we do not merely "use a tool" - we extend our memory into the notebook. The notebook becomes part of our cognitive system, not merely its external accessory.

To illustrate this thesis, Clark, together with David Chalmers, in the famous 1998 article "The Extended Mind," proposes a thought experiment [1]. Imagine two people: Inga and Otto. Inga suffers from Alzheimer's disease and carries a notebook in which she writes down all important information. Otto is a healthy person who remembers information "in his head." When Inga needs to recall where the museum is, she opens the notebook and reads the entry. When Otto needs to recall the same thing, he "simply knows." Clark and Chalmers ask: is there a fundamental difference between these two cases? Both use information to achieve a goal. Both demonstrate behavior that we call knowledge. The only difference is where the information is stored - in the head or in the notebook. But if this difference does not affect behavior, why should we think that it affects the status of cognition?

Here it is easy to object: a notebook is not memory, it is a crutch. But Clark and Chalmers insist on the principle of parity: if an external process performs the same function as an internal one, and if we consider the internal process cognitive, then we must consider the external one cognitive as well. They formulate it thus: if, when confronted with a task, a part of the world functions as a process which, were it inside the head, we would without hesitation accept as part of the cognitive process, then that part of the world really is part of the cognitive process [1]. This is a strong claim, and it generates much debate. But for my model, what matters is not so much the philosophical resolution of the dispute as the practical consequence: if external structures can be part of cognition, then their quality matters.

Clark introduces the concept of scaffolding - external structures that support and amplify cognitive processes. Language, writing, diagrams, tables, tools, interfaces - all of this is scaffolding. They do not merely "help" one think; they form the way we think. A child who learns to write does not merely master the skill of writing - they master a new way of thinking that becomes possible thanks to writing. An adult who uses diagrams does not merely illustrate their thoughts - they think through diagrams.

For my model this means the following. The infrastructure of a school is not décor but scaffolding. Studios, workshops, and sports facilities are not additional rooms. They are external structures that make certain cognitive processes possible. A child who works in a workshop is not merely engaged in labor - they think through the material, through the tools, through the process of creation. A child who plays chess is not merely entertaining themselves - they think through the pieces, through the board, through the rules. Infrastructure is part of the cognitive system, not its environment.

The Niche We Build Ourselves

Kim Sterelny (b. 1950) is an Australian philosopher working at the intersection of the philosophy of biology and cognitive science. His principal work in this field, *The Evolved Apprentice: How Evolution Made Humans Unique* (2012), offers an evolutionary explanation of how humans became natural-born apprentices [4]. Sterelny's main thesis can be formulated as follows: humans evolved not as solitary thinkers but as apprentices who master cognitive skills through participation in cultural practices. We are not born with ready-made cognitive abilities; we are born with a readiness to master them through apprenticeship in a cognitive niche created by culture.

Sterelny borrows the concept of the cognitive niche from evolutionary biology. In biology, a niche is the set of conditions that an organism creates for itself and that, in turn, shape its evolution. Beavers build dams that change rivers, which change the living conditions of beavers, which change the direction of selection. This is niche construction: an organism does not merely adapt to its environment; it creates the environment to which it adapts. Here it is appropriate to recall the old metaphor: a human is an animal that builds itself a house and then discovers

that the house builds them. The house forms habits, habits form character, character forms the next person who will build the next house.

Sterelny applies this idea to humans. Humans create cognitive niches - external structures that amplify and shape their cognition. Language, writing, mathematical notation, scientific instruments, social institutions - all of these are cognitive niches. And these niches do not merely "help" one think; they form the way we think. A child who grows up in a culture with writing develops cognitive abilities that a child growing up in a culture without writing does not have. Not because they are smarter, but because their niche provides them with scaffolding that makes certain cognitive processes possible [5].

The distinction between Clark's extended mind and Sterelny's cognitive niche is the distinction between synchronic and diachronic analysis. Clark analyzes how external structures here and now are part of the cognitive process. Sterelny analyzes how external structures historically shape cognitive abilities. Clark answers the question "where is cognition located?"; Sterelny answers the question "how did cognition develop?" Both answers are important for my model: Clark explains why infrastructure matters now; Sterelny explains why it matters for development.

Sterelny introduces the concept of the evolved apprentice. Humans evolved so as to learn through observation, imitation, and participation in adult activities. A child in a traditional society does not "learn" hunting in school; they participate in the hunt, observe adults, imitate their actions, and gradually master the skill. This is apprenticeship - not formal instruction but immersion in practice. And this is important for my model: a school must be not a place for the transmission of knowledge but a niche of apprenticeship. A student must not study thinking from a textbook but participate in the practice of thinking - observe how adults think, imitate them, and gradually master the skill.

The Rich and the Poor Niche

Now it is possible to formulate the main thesis of this article. A school is a cognitive niche. And the quality of this niche determines which cognitive dispositions can be formed within it.

The industrial school is a poor cognitive niche. It provides scaffolding for memorization, obedience, following instructions, and external evaluation. It does not provide scaffolding for inquiry, dialogue, reflection, or creativity. A student in such a school learns to reproduce, not to think. They master the skills needed for an examination, but not the skills needed to solve the hard problem. It is like a greenhouse in which identical seedlings are grown according to a strict scheme: the plants survive but do not become what they could have become.

The school of thinking is a rich cognitive niche. It provides scaffolding for inquiry, dialogue, reflection, and creativity. A student in such a school learns to think, not to reproduce. They master the dispositions needed to solve the hard problem. This is no longer a greenhouse but a forest: in it, different plants find different conditions, different ways of growing, different forms of life.

The distinction between these two types of schools is the distinction between two types of cognitive niches. And this distinction has a material dimension. A rich niche requires infrastructure: studios, workshops, sports facilities, and rooms for intellectual games. Without this infrastructure the niche remains poor, because the student has no scaffolding for certain cognitive processes. They cannot think through the material if they do not have the material. They cannot think through play if they do not have the play.

The distinction between the poor and the rich niche is not merely a distinction in the quantity of resources. It is a distinction in the type of scaffolding. The poor niche provides scaffolding for reproductive thinking: memorization, reproduction, following an algorithm. The rich niche provides scaffolding for productive thinking: inquiry, creation, reflection. This distinction corresponds to the distinction between the conveyor-belt school and the school of thinking that I introduced in the first article of the series. But now this distinction receives a philosophical justification: it is not merely a pedagogical metaphor but a distinction between two types of cognitive niches.

The infrastructure that I spoke of in the article on mental mechanisms is the material part of the cognitive niche [9]. But a niche is not only infrastructure. It is also culture: the norms, values, and practices that determine what counts as good thinking. A teacher who models thinking creates a niche. Students who discuss their thinking processes create

a niche. Feedback that is directed at the quality of thinking, not merely at the correctness of the answer, creates a niche. All of these are elements of the cognitive niche that make the formation of dispositions possible.

The Niche as a Condition of Possibility

Why is the concept of the cognitive niche a necessary element of my model? First of all, because it explains why infrastructure is a constituting condition. If cognition is distributed among brain, body, and environment, then the environment is part of the cognitive process. Without an appropriate environment, the cognitive process cannot be complete. This does not mean that without infrastructure a person cannot think. It means that without infrastructure a person cannot think in a certain way - the way that is required for solving the hard problem.

Furthermore, it explains why a school must be a culture of thinking rather than a place for the transmission of knowledge. If dispositions are formed through enculturation, then a school must be a culture, not an institution. It must provide not only content but also an environment in which thinking is valued, modeled, and supported. This is precisely what Sterelny calls a niche of apprenticeship.

It also explains why individualization through unique abilities works. If the niche provides diverse scaffolding, then each student can find their own entry point - the scaffolding that corresponds to their strengths. One child thinks through music, another through technology, a third through literature. The niche must be rich enough to provide scaffolding for different types of thinking.

And finally, it explains why pedagogy is the design of niches. If cognition is formed in a niche, then the task of pedagogy is not to transmit knowledge but to design the niche. This means: to create infrastructure, form culture, model thinking, organize interaction, and provide feedback. Pedagogy becomes the design of an environment, not the transmission of content. Here I must confess that the word “design” slightly embarrasses me. There is something in it of a technical project, of a blueprint, of the confidence that everything can be foreseen. Perhaps it would be more accurate to say “cultivation.” A teacher does not design a niche the way an engineer designs a bridge. They rather grow it the way a gardener grows a garden: they create conditions but cannot guarantee that every seed will sprout. And in this, perhaps, there is its own honesty.

The connection between the three articles (the eleventh, twelfth, and thirteenth) can be formulated as follows. Virtue epistemology says: knowledge is the product of the qualities of the knower. The theory of dispositions says: qualities consist of sensitivity, inclination, and ability, and are formed through enculturation. The concept of the cognitive niche says: enculturation occurs in a niche, and the quality of the niche determines which qualities can be formed. The three articles form a single chain: the agent, their qualities, their environment. And it is precisely this chain that underlies my CCFP model.

Limits and Objections

The concepts of the extended mind and the cognitive niche are not free from criticism. I want to identify three objections in order to show that I see the limits of their approach.

First: the coupling-constitution fallacy. Critics, especially Fred Adams and Ken Aizawa, argue that Clark confuses coupling with constitution [7]. The fact that we use a notebook does not mean that the notebook is part of our cognitive system. We use glasses, but glasses are not part of our vision. We use a calculator, but the calculator is not part of our thinking.

Second: the risk of environmental determinism. If cognition is formed by a niche, does this not mean that a person is determined by their environment? Do we not lose agency - the capacity of a person to go beyond their niche and create a new one?

Third: the difficulty of empirical verification. If cognition is distributed, how is it to be measured? Laboratory experiments record processes in the head, not in the niche. Observation under real conditions is a more adequate method, but it requires time and resources.

These objections are important because they show that the concepts of Clark and Sterelny are not a dogma but a research program. In my model these limits are taken into account. I do not assert that all cognition is distributed. I assert that certain cognitive processes - those required for solving the hard problem - require distribution in a niche. I do not assert that a person is determined by their environment. I assert that the environment forms possibilities that a person may use or not use. Agency is preserved: a person can create new niches, not merely adapt to existing ones.

What Remains Behind the Scenes

Virtue epistemology told us that knowledge is the product of the qualities of the knower. The theory of dispositions told us what these qualities consist of and how they are formed. The concept of the cognitive niche tells us where this formation takes place. And this "where" is of decisive importance.

For my model this means the following. The CCFP is not merely a set of dispositions; it is a set of dispositions formed in a cognitive niche. The MMs are concrete dispositions that can be formed only in a rich niche. Pedagogy is the design of niches, not the transmission of knowledge. It is in this sense that I say that pedagogy is a strategy for the evolution of the cognitive potential of the species. It forms not merely intelligent people but people capable of thinking, because it creates the niche in which thinking becomes possible.

But here a question remains that will become central for the next article: how exactly should this niche be arranged? What makes a niche rich? Which elements of infrastructure, culture, and practice are necessary for the formation of the CCFP? This is the subject of Article 14, devoted to Thomas Kuhn and the structure of scientific revolutions. Kuhn will show that a paradigm shift is not merely a new idea but a change in the niche in which scientists work. And this will give us the key to understanding how a school of thinking should be arranged. For now, one thing is clear: thought does not live in the head like a bird in a cage. It lives in the workshop, in the library, in the classroom, in conversation. And if we want it to live, we must build a house for it.

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