

The Germ Cell and the Unit of Analysis

Two concepts which play key roles in CHAT are the ‘unit of analysis’ and the ‘germ cell’. The ‘unit of analysis’ was introduced by Vygotsky in the first chapter of “Thinking and Speech,” and ‘germ-cell’ was introduced into the Activity Theory tradition by Vasily Davydov and further developed by Yjro Engeström. Both are claimed to represent the embryonic form of a complex process, but they are evidently not the same.

In short, we could say that these terms indicate two different aspects of one and the same concept, and this can be demonstrated by consideration of how CHAT writers have appropriated the idea from Marx.

The key words of Marx which we should cite are from the first Preface to *Capital*, where Marx is talking about the problem of value in political economy:

The human mind has for more than 2,000 years sought in vain to get to the bottom of it all, whilst on the other hand, to the successful analysis of much more composite and complex forms, there has been at least an approximation. Why? Because the body, as an organic whole, is more easy of study than are the cells of that body. In the analysis of economic forms, moreover, neither microscopes nor chemical reagents are of use. The force of abstraction must replace both. But in bourgeois society, the commodity-form of the product of labour — or value-form of the commodity — is the economic cell-form.” (1867)

Earlier, in the *Grundrisse*, Marx had explained the history of any science as being made up of two phases as follows:

“It seems to be correct to begin with the real and the concrete, with the real precondition, thus to begin, in economics, with e.g. the population, ... However, on closer examination this proves false. The population is an abstraction if I leave out, for example, the classes of which it is composed... Thus, if I were to begin with the population, this would be a chaotic conception of the whole, and I would then, by means of further determination, move analytically towards ever more simple concepts, from the imagined concrete towards ever thinner abstractions until I had arrived at the simplest determinations.

“From there the journey would have to be retraced until I had finally arrived at the population again, but this time not as the chaotic conception of a whole, but as a rich totality of many determinations and relations. ...

“The concrete is concrete because it is the concentration of many determinations, hence unity of the diverse. It appears in the process of thinking, therefore, as a process of concentration, as a result, not as a point of departure, even though it is the point of departure in reality and hence also the point of departure for observation and conception. Along the first path the full conception was evaporated to yield an abstract determination; along the second, the abstract determinations lead towards a reproduction of the concrete by way of thought.” (1857)

CHAT writers often refer to this latter process of reconstructing the whole on the basis of an adequate abstraction of the essential process as “rising to the concrete.”

Marx provides us a perfectly good example of these concepts, but we should acknowledge its origins. In his study of *Volkgeist*, the spirit of a people, Johann Gottfried Herder (1774) proposed the *Schwerpunkt*, by which he meant that particular activity or historical experience which gave a people their distinctive character (today we would call this the ‘leading activity’). Herder’s friend Johann Wolfgang von Goethe (1795), further developed the idea in his study of the morphology of plants, defining the *Urphänomen* as the simplest form of an organic process from which all the essential features of the whole organism could be generated. Goethe died before microscopes had sufficient power to observe the microstructure of living organisms, but it is widely recognised that what Goethe had imagined was the *cell*, the building block of all biological organisms. It was essential to Goethe’s conception that the *Urphänomen* was not a suprasensible law or a principle governing a process from outside, so to speak, but a real, if simple, entity given to sense perception.

Hegel appropriated Goethe’s idea, making it more precise and universal in its scope. In his *Logic*, Hegel (1816) set out a general method for all the sciences. The key concept of the *Logic* is the abstract concept. The structure of the *Logic* is just as outlined by Marx in the above quote from the *Grundrisse*. The first book of the *Logic*, Being, is about immediate perception, with events just coming one after another; the second book, Essence, is about the successive theories which give us abstract concepts by means of which we can grasp immediate perception; the third book, Concept, retraces the journey, beginning with the abstract concept which grasps the essential features of the process as a whole, and the concretisation of this concept, leading up to the Absolute Idea, in which the all the different aspects of reality are ‘concentrated’ in a concrete concept.

But let us leave this early genesis for another day, and let us take Marx’s idea of the ‘germ-cell’ of bourgeois society which he took to be the *commodity*. The commodity is both the germ-cell from which bourgeois society develops, *and* the unit of which bourgeois society is composed. All the essential features of bourgeois society may be grasped from the understanding of the commodity relation.

Let us recall how Vygotsky (1934) defined the ‘unit of analysis’ in his study of the verbal thinking (i.e., the intellect). He advocated a

“form of analysis [which] relies on the partitioning of the complex whole into *units*. In contrast to the term “element,” the term “unit” designates a product of analysis that possesses *all the basic characteristics of the whole*. The unit is a vital and irreducible part of the whole.”

Note that implicit in the idea of ‘unit’ is that the whole is made up of many of the *same* kind of unit, whereas implicit in the idea of ‘elements’ is that there are *several* elements required to reproduce all the qualities of the whole. Directly alluding to Marx and Goethe’s biological metaphor Vygotsky continues:

“The word is comparable to the living cell in that it is a unit of sound and meaning that contains - in simple form – all the basic characteristics of the integral phenomenon of verbal thinking.”

Vygotsky cleverly introduces the term “unit of analysis”:

“Is word meaning speech or is it thought? It is both at one and the same time; it is a *unit of verbal thinking*. It is obvious, then, that our method must be that of semantic analysis. Our method must rely on the analysis

of the meaningful aspect of speech; it must be a *method for studying verbal meaning*. We can reasonably anticipate that this method will produce answers to our questions concerning the relationship between thinking and speech because this relationship is already contained in the unit of analysis.”

“Unit of analysis” already had its own meaning and history when Vygotsky adopted it and *Wikipedia* gives us the meaning of this term as it is understood by mainstream analytical social science:

“The unit of analysis is the major entity that is being analysed in a study. It is the ‘what’ or ‘who’ that is being studied. In social science research, typical units of analysis include individuals (most common), groups, social organizations and social artefacts.”

This definition is perfectly adequate; it is exactly what Vygotsky meant. What distinguishes Hegel, Marx, Vygotsky and the activity theorists from the mainstream sociologists is the trouble we take to identify the *right unit*, the unit which, as Vygotsky says, we can reasonably anticipate that produce answers to our questions because the relationship in question is *already contained* in the unit of analysis.

Marx’s view of bourgeois society was that it was essentially a market place, and that by taking the unit of analysis as an exchange of commodities, he had chosen a unit which already contained what he thought was essential to bourgeois society. Thus the complex whole which Marx set out to understand was to be taken as just thousands and thousands of commodity exchanges. Likewise, the intellect which Vygotsky set out to study could be taken to be just thousands and thousands of word meanings.

So the relation between a unit of analysis and the whole is that we take the whole to be nothing more than thousands and thousands of those units. Obviously, the whole is not the same as the unit. An ocean is a very different thing from an H₂O molecule.

Bourgeois society with its banks and stock exchanges and multinational corporations is a very different thing from a single exchange of products between two producers. But the point is that these features of the larger process arise from the nature of the unit and can be discovered within it, or to use Hegel’s expression, can be *unfolded* from it.

So the passage from Marx’s *Grundrisse* means this: the first phase of the development of a science is complete when we arrive at the unit of analysis, the singular entity which exhibits the essential relations of the whole process. The second phase is when we have to write our *Capital* or our *Thinking and Speech*, that is, we have to ‘reconstruct’ the whole, now not as a chaotic conception, but as a systematic whole, a whole which exhibits the essential features with which we are familiar in the unit from which we began. We are familiar with it, and indeed we can viscerally understand it because the unit of analysis is a singular, finite relation, actually an *action* when we are dealing with the specifically human sciences. As Goethe demanded, it is not some *law* (like the law of gravity) which is hidden from perception and governs the process from outside, but something we can get to know at first hand, whether experimentally or in day-to-day life.

At this point we have to pay attention to a problem which we have skated over. On this basis Marx’s *Capital* and Vygotsky’s *Thinking and Speech* appear to be overly simplistic and frankly mistaken. Who’s ever seen an exchange of commodities in our times? What we see are purchases and sales. Even then it is often hard nowadays to pin down the precise act of sale when we consider complex contractual arrangements and

financial activity. It seems that Marx should have taken the unit to be an act of purchase and sale, involving money, not an act of exchanging commodities. Likewise, the intellect is not really just a matter of word meanings, it is far more complex and intangible than that!

This is where we come to the germ cell.

In section 3 of Chapter 1 of *Capital*, Marx gives us a schematic history of the evolution of commodity exchange from primitive times when people exchanged goods at the boundaries of their territory with passing merchants or foreigners, and in a form which mirrors the second of the three books of Hegel's *Logic*, shows how commodity exchange develops by its own logic into purchase and sale by means of coin; real history can take over from there. So the essential relation is that of commodity exchange, but in the process of becoming *ubiquitous* commodity exchange has developed into purchase and sale; but still, it should be noted, the production of products for sale as commodities, and the sale of labour-power on the labour market, retain the character of commodity production; purchase and sale is still *essentially* exchange of commodities. But by taking the unit as commodity exchange rather than purchase or sale for money, Marx took out of the equation the mysterious power of money, whose real nature cannot be grasped viscerally and immediately, but seems to act – like the law of gravity – unseen, and governing economic life from without. It can only be understood, in fact, in the light of commodity exchange.

So when Marx said that the commodity was the “cell-form” of bourgeois society, there were two steps to this process of finding his starting point. Firstly he had to see that bourgeois society (*bürgerliche Gesellschaft* – understood in Marx's time as that which was beyond the family but outside of the political state; historically, that which grew up in the gap which had developed as the state separated from the family) was essentially, nothing but a market place, but also, that money was essentially a commodity, the *universal* commodity in fact. Capital is not just money, and bourgeois society is not just a market place, but the commodity relation contained all the essential relations from which an understanding of capital could be built. But this did not mean that Marx thought he could explain *everything* about the modern world on the basis of the commodity relation. The state and family life were not market places; they had their own distinct history and essential nature. The way capital interacts with the political state and family life is a process of development which is quite distinct from the kind of development exhibited by the development of commodity exchange into money and the development of money into capital. This form of development, which includes the interaction of *different* processes, is treated by Hegel in the third book of his *Logic* – the development of an abstract concept or relation into a concrete whole, the development of the village society into capitalism, with its ‘own’ form of the family and its ‘own’ kind of state. But that is another story.

So when Activity Theorists identify a relation or action or concept or artefact as the “germ cell” of a complex process, they mean that the relation is the simplest possible relation which will over time develop into the more complex process. It *may* be the first, historically, but not necessarily. The germ may not appear in pure form until later on, perhaps after a series of trials-and-errors. It is the simplest because it contains without any further addition the essential relation which will stimulate further development and stimulate interaction with other processes. Scientific discoveries are generally ‘germ cells’, but you never know right away that a given discovery is the germ cell –

sometimes a new theory or discovery turns out to be a mistake; sometimes it turns out that there were aspects of the first idea which were extraneous and mistaken even though the idea was essentially right. The process of ‘purifying’ a concept or relation, ridding it of misconceptions and extraneous additions is described in the second book of Hegel’s *Logic*, Essence, and the outcome is the Abstract Concept. The Abstract Concept then forms a new starting point of development of a concrete whole, ‘reconstructing’ the original problem in conceptual form. Innovations in technology begin as “germ cells,” but once a new piece of technology has overcome its teething problems and goes into production and use in the community, it enters into a new cycle of development. That is the stage described in the third book, the “rising to the concrete.”

So in summary, to understand a complex process we have to break it down into units, and find the simplest possible form of that unit. The “complex process” may simply be some problem which has arisen in social practice, and the process of finding the germ is getting to the bottom of the problem in a *practical* way by devising a solution. This solution must then be tested out, and once verified, it has to be concretised, taking into account all the *other* things going on, which were necessarily discarded in identifying the essential problem at hand, but which now have to be addressed. This is the “rising to the concrete.”

Note that in the above two quite different processes of development have been considered. The development of the germ-cell *into* a concrete whole by its interaction both with *many others* of the same kind, and with *other* processes, is quite distinct and different in character from the process by means of which the germ-cell emerges *out of* the complex whole.

Invariably the unit of analysis or “germ cell” is also a *unity* of disparate substances, like the point at which two lines intersect. Arising as it does as the solution to some kind of problem, the unit is a unique “correlation” between two different processes. A unit is also a unity, in that it is complete and whole in itself.

So for example, a commodity is a unit of use-value, in that it is both useful for the buyer, *and* has some quantum of “replacement value.” But it is the *act* of exchange that makes it both “complete and whole in itself” as well as singular.

Likewise word meaning is both sound and meaning, that is, it acts as a meaningful sign for the listener, and it is a material process – sound waves, united in the *act* of speech.

In both these instances the two disparate processes (use and labour in one case, and meaning and sound in the other) are inherently continuous, but in the *act* of exchanging something with someone or saying something to someone, a *singular* action produces a singular commodity or a singular word meaning, and has a beginning a middle and an end.

It is this *internal* unity (like the bonds uniting the elements of Hydrogen and Oxygen in the H₂O molecule) to which Vygotsky (1934) is referring when he says:

“Therefore, it may be appropriate to view word meaning not only as a *unity of thinking and speech* but as a *unity of generalization and social interaction, a unity of thinking and communication.*”

As can be seen, the primary unity – sound and meaning – provides the basis for other unities, because of the unique place of meaningful speech in human life.

One final reflection. Is this not some kind of reductionism? No. Until a whole complex process can be understood in terms of a single concept we are left with nothing more

than a description of the process in terms of its most prominent and consistent features. That is not understanding at all. To say that the singular exchange of commodities is the germ cell or unit of analysis of bourgeois society is not to “reduce” bourgeois society to a market place, but to take the market place and its unit, the commodity exchange, as the *starting point* for the scientific study of bourgeois society.

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