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Tool or Medium?

The Meaning of Information and Telecommunication Technology to Human Practice.  
A Quest for Systemic Understanding of Activity Theory.  
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1.

After a time of purely enthusiastic reactions in Germany there is now a growing interest in discussing the importance of computing technologies. The most frequently asked questions, particularly concerning my special subject, are for instance: What do computers mean to learning and teaching activity in all kinds of educational settings (like public schools, child rearing and nursery schools, university instruction, adult education and further education, vocational training and professional instruction and so on), to medical welfare and public health, to all facets of social work, guidance and counselling respectively? Or in a more general diction: What do computers matter to different fields of societal practice? Is it simply a new technology like many others, which at best can slightly change our life and activity? Or does it perhaps represent a fundamentally outstanding technical revolution which changes our living and working completely, that is revolutionize our societal practice as a whole? In short: computers – change or revolution?

An other point is how to act with computer technology: Shall we ignore it, make use of it, support it? Shall we observe it most critically or shall we resist or struggle against it? Can activity theory help us to find perspectives of orientation? Does Leont'ev deal with those problems at all? What does he say in particular?

2.

I will describe a theoretical point of view which may serve to answer some of these questions. But I shall not deal with the presentation or with existing interpretations of Leont'ev's relevant books, contributions, conferences, courses papers and so on. Most of his publications relevant to the subject are not yet translated, and all of the existing appropriate papers found in the family archives are up to now not available. And equally I will not discuss existing approaches from the point of view of our problem – like e. g. the publications of Engestroem, Miettinen, Virkkunen and their institute of Helsinki university, Kaptelinin from Umeå, Bødker/Bertelsen from Århus or Fichtner of Siegen university. To discuss their approaches, their methods and results would need much more theoretical and methodological work and would be quite an other lecture.

I shall rather focus on one single question which however defines the central and decisive theoretical problem: Which concept is adequate to characterize the importance of computer technology – "tool" or "medium"? To catch the qualitative difference between these two notions and to understand their specific content concerning their importance answering our question, I have first to explain what is "tool" and what is "medium". Only then I will be able to show the different approaches behind those concepts and to expose the underlying theoretical problem in its vital substance.

3. Computer technology, taken as a tool, is just a new technology like many others, say e.g. motorcars or airplanes. Cars and planes of course change our activity when

we make use of them, but they change it not, if we don't. They make a difference in societal practice institutionalising new systems like airports or highways, travel agencies or gasoline stations and their technical and organisational relations and consequences etc., but we can always find alternatives to using them. They do change fundamentally all kinds of transport, but they do not change our newspapers, our schools, our social work services, our public health system, our sciences, our religion, our world views. They are neither frameworks to any other existing technology nor historical paradigms of a whole epoch, like Gurjewitch (1978) or Judin (1984) put it. In other words, they are not without alternatives, not unavoidable, not irreversible, not general and not universal.

But can we really say so in characterising computer technology? It is becoming more and more obvious that computer technology is in fact without any alternative, unavoidable, irreversible, general and even universal. It changes not only one specific concrete activity but revolutionizes the societal activity structure as a whole and the complete relations of activity and consciousness (that is the economic, social and psychic status of any tool available). There is no revolution with broader or more fundamental consequences than the invention of book printing or computer technology. There is no medium with a broader range of impact. In our days it touches even the last tribe in the Brazilian jungle. It really integrates every existing communication technology without any exception. And it even seems to mark an already ongoing process of new drafts of our societal existence as a whole emerging. Its revolutionary importance is therefore not comparable to any other existing technology. No political revolution is comparable with computer based globalization. This urges us to reflect on digital information and telecommunication technologies as catalysts of a new social system emerging. At least this is the unanimous appraisal from McLuhan up to modern media theorists.

So if we insist in characterizing computer technology as a "tool", we must be aware that it is a tool of its own with quite a different quality. We have to consider that these two qualitatively different meanings of the same term "tool" emerge from their different "logical status", as Bateson puts it. Like the term "menu", which can mark a fixed-price meal on the one hand and a bill of fare on the other hand, the term "tool" is suitable to mix up its logical status and to forget its theoretical derivation. In our common understanding of activity theory the term "tool" marks an apparatus, an instrument or a technical equipment, that is a real thing. Therefore, to indicate a paradigm for constructing semantic systems, world views or social utopias we need a qualitatively different and unmistakable concept. That means the concept of "medium".

Communication by media is the modus operandi of social systems. Media are basic conditions and prerequisites of any communication. And media are both: material substratum and meaning, actuality and potentiality at the same time. They store not only specific technologies but the specific form of societal activity. More than only common media are general and determine societal activities even in their future development. In the words of Derrick de Kerckhove, Marshall McLuhans best known disciple, media are "Weltanschauungsapparate", that is "apparatuses" of world views, philosophies of life, horizons of societal meaning, semantic systems.

4.

It should be clear now, that the central problem emerges from the difference between "tool" and "medium". These two concepts have not only different methodological implications and diverging practical consequences but belong to separate theoretical

approaches. "Tool" is a main concept of activity theory in our common understanding and "medium" is the central concept of media theory. The decisive theoretical question, which is exceedingly practical as well, therefore is whether these theories are compatible or not.

If not, that is, if activity theory is in fact fixed on "tool" in the above described sense as its only adequate concept, we will hardly be able to appreciate any more general – not to speak of revolutionary – importance of computer technology. Any methodological implication of that concept restricts our assessment of consequences at best to modifying changes within the given boundaries of existing societal reality. Activity theory would be unable to describe, understand or assess the actually ongoing fundamental societal changes, in other words it would only fit to fix and stabilise or consolidate given social relations. Activity theory would decay to a conservative theory, unfit and unqualified for modelling the actual computer based developments and coupling with other theories.

If yes, that is, in case we insist in making use of "medium" in the above described sense as a genuine concept of activity theory, the benefits would be obvious. But then we would have to prove, that we are allowed to do so.

My hypothesis, as you may assume already, runs as follows: If we understand activity theory by means of system theory, we will overcome the above argued bias. And what is more, I am sure systemic thinking can be shown to be an inherent quality of Leont'ev's theory itself. In his well known book "Development of the psyche" he demonstrates his systemic thinking convincingly. And in answering a corresponding question within the discussion of one of his public conferences he confirms this understanding explicitly – stressing of course the fact that his systemic thinking has to be distinguished ideologically from any kind of bourgeois system theory. There are two reasons, however, finding it impossible to do a precise comparative analysis of activity theory and modern system theory or to methodologically discuss the systemic quality of Leont'ev's theory here in detail: There is not enough time left in respect to the temporal frame of my lecture on the one hand, and what is more there is a lack of competence regarding my personal knowledge concerning the system theory of e.g. Niklas Luhmann or Humberto Maturana, not to speak of the state of the art of modern system theoretical thinking in general. For the special purposes of this discussion, however, we can confine ourselves to two main arguments, which, as I hope, are sufficient in order to verify my hypothesis.

5.

My first argument starts with activity theory looking at system theory's solutions of our problem and it runs as follows: "Tools" could be seen as "media" (and vice versa) – even in activity theory. As you certainly know, Leont'ev in his struggle against behaviorism lays particular emphasis on the fact that the relation between subject and object is basically different. It has three instead of two segments: Subjects relate to objects with the help of other objects, which serve as a means or mediators. In other words, any activity is mediated. Consequently thinking as psychic activity is mediated as well using signs or symbols as mediators. In this case Leont'ev following Vygotskij speaks of "psychological means" or "psychological tools", because to human consciousness any "picture" of reality is not a physical copy but a creation which requires a means. And like Vygotskij Leont'ev emphasizes the importance of psychological tools or means for human subjects by showing that only the use of psychological tools or means as mediators can untie subjects from a direct dependent reaction to nature and make their selfregulation possible. Leont'ev therefore continues

Vygotskijs idea, that "psychological tools" as mediators of psychic activity are the basic precondition of human freedom. Or in terms of system theory: "psychological tools" are the decisive medium to the selfregulation of psychic systems. But Leont'ev puts the concept of "psychological tools" in quotation marks in order to make clear that he is speaking by analogy. And more: when discussing the basically mediated character of activity he avoids using the concept "tool" but speaks of "object" or even prefers using the German philosophical notion "Gegenstand" in order to prevent any mixing up with pure material things. So dealing with the mediating quality of "objects" his understanding of mediators is very close to the meaning of "medium" in media theory. However, when dealing with human consciousness in particular he exchanges the notion of "activity" for that of "work" and consequently speaks of "tools" and "psychological tools". In other words, he comes to a narrowing usage of notions. He addresses the material substratum of medium instead of its meaning as medium.

So we may draw a tentative conclusion by putting some questions: Is Leont'ev's reference to Marx and his concept of work maybe provoking the usage of "tool" instead of "medium"? May be Leont'ev got into ideological pressure trying to adjust his theory to the logical constraints of Historical Materialism? Does perhaps this narrowing usage only exclude Leont'ev's theory against possibilities which, of course, would not include media theory, but would have made his theory connectible or at least compatible with media theory? Is therefore our problem nothing but historical or a question of terminology? It is worth while studying Leont'ev's works carefully to answering these questions. However, there is a decisive limitation within the methodological range of "tool as mediator" to be considered if we compare it with "medium". Tools, to Leont'ev, store operations, they do not store actions or activities. That is because they are unable to store neither aims or motives nor sense or meaning. Leont'ev defines tools as crystallised societal meaning but emphasises the fact that archaeological tools are artifacts that do not reveal their original societal meaning – precisely because their crystallising quality is restricted on the level of operations. Therefore Leont'ev's understanding of tools as mediators knows two levels only: material techniques and mental technologies, both bare operations. So dealing with the computer he can only understand it as a material technique or a mental technology, because activity theory – as we know it and commonly understand it – has in itself (!) no logic place to discuss the social meaning of tools in particular, just because tools as mediators do not suite to mediate societal meaning. And what is more, the logic system of his theory is not in need of a third level of mediators related to societal meaning, because sense or meaning cannot and need not be mediated.

Objective societal meaning may be seen as kind of environment to human subjects but not as a medium of communication. It emerges by activity and becomes objective through the crucial test of societal activity but not through communication. Speaking of societal meaning as objective is to say it cannot be discussed but appropriated only. So it does not need any communication beyond activity itself and therefore no medium of communication in particular. It is indeed crystallised in cultural artifacts but it lives in the form of personal sense only. And personal sense cannot be instructed just because it is personal. Personal sense comes into being by appropriating the existing societal meaning through using tools as its crystallised forms, but not by communication. This appropriation takes place within the process of societal intercourse, but intercourse means the totality of societal activities as a whole and not communication as a special form of activity. Of course this appropriation process in school settings is organized by special forms of "mediation". But to Leont'ev learning

and teaching are forms of activity not of communication. They require special tools or mediators but not a medium. In sum this limitation seems to be a grave barrier to understand the difference between mediating tools and media just as a problem of terminology. And there is still an other fact to be considered.

This approach is consistent in itself because of one basic assumption, which is the objective realism of its epistemology that includes the identity of sense and meaning as a fundamental precondition to normally functioning relations between subject and object. To Leont'ev, not only "Gegenstände" or sciences but the whole semantic system (or world view) of Historical Materialism are objective. In the words of Lenin knowledge indeed becomes more and more objective, because it is always unfinished, imperfect and uncompleted. But it is never contingent, that is accidental and unpredictable. And because of its objectivity there is no contingency of meaning. Even differences between sense and meaning can only be reflected in terms of contradictions between interests of social classes. The mediation of those contradictions consequently takes place only in class wars and societal revolutions as historical events but not in every day life communication. And class wars are seen as struggles of social units, that do not require any other medium, and they are not seen as communicative units that can only be realised with the help of special media. The fate of the Soviet Union may serve as an example to illustrate what happens when a social system insists on contradictions instead of contingencies. Because of its refusing to communicate with its more and more complex environment (the growing capitalistic world) and its weakness to destroy capitalism on the other hand it had no possibility to reduce the increasing complexity of its environment – and "died". Following Luhmann this is the necessary consequence of Historical and Dialectical Materialism's priority in the "identity of identity and difference and not in the difference of identity and difference". So to my point of view this objective realism is the main limitation or even a barrier between activity theory and media theory. To objective realism truth is all, to media theory "communication is all" (Norbert Boltz 1997). Therefore objective realism does not match with the understanding computers as "worldview apparatuses", that is as a medium for continuously merging different competing semantic systems.

Leont'ev himself indicates the critical point where he departs from his otherwise systemic understanding of the development of the psyche. In particular when reflecting the role of language he stresses: "Words, indicating a thing in the course of the work process, (...) generalize it as objectively societal, that is as a societal object. Language therefore is not only a means of social intercourse but a means, a form of human consciousness and thinking which is not yet separated from material production. Language becomes the carrier [bearer/sustainer] of conscious generalisation of reality." (1971, 176) But "individuals don't have their own language, they cannot produce their own meanings. To become aware of the phenomena of reality they therefore require all completed meanings available – like knowledge, arguments, approaches – which they appropriate from outside and which they acquire within societal intercourse." (1979, 149) As you see he obviously comes back to the concept of psychological tools as mediators of the appropriation process. And staring at tools and their material substratum he loses sight of their importance as media, and material production gets much more important than communication. Together with this tool-notion he overtook its theoretical connotation and failed to come into distance required to assess the real importance of the concept of medium.

Leont'ev's actual decisive point of departure however seems to be another one. Leont'ev's constriction from "activity" to "work" corresponds his narrow

understanding of psychological tools as mediators. "Work (with tools) makes man" is equivalent to "psychic activity with psychological tools makes consciousness". So tools stand at the origin of both social and psychic systems – in phylogenesis as well as in ontogenesis. Arguing this way Leont'ev comes close to Luhmann who speaks of a "co-evolution" of social and psychic systems. But while changing social systems follow their own inherent laws (the basic methodology of which could be found in Historical Materialism), there is from Leont'ev's point of view no comparable characteristic lawfulness nor any autonomy at all in changing psychic systems as Luhmann sees it. Concerning consciousness Leont'ev rather follows the theoretical guidelines of Historical Materialism without any restriction or even mental reservation, defining that "societal being determines societal consciousness". We know Leont'ev's psychological version: "material activity is hurrying on ahead while the structure of consciousness lags behind". This seen as a law concerning the development of the psyche excludes any possibility to recognize media as fundamental prerequisites of autonomous changes in the structure of consciousness. Those always follow the succession of societal formations. So speaking of a genuine theory of media formations is unthinkable to both Leont'ev and Vygotskij. To Leont'ev in particular cultural historical research on human consciousness has basically to deal with investigating concrete sociohistorical activity, that is work. From the point of view of dialectic and historical materialism one may regard Leont'ev's scientific evidence for activity and consciousness being a contradictory unity as a great feat, what it fairly is focussing "the identity of identity and difference". But regarding "the difference of identity and difference" we cannot but note the failure and the losses. Leont'ev's initially systemic understanding of autonomous psychic systems and his beginning systemic understanding of medium which – according to Marshall McLuhan – is the message itself.

May be these theoretical restrictions are owed to the social historical situation of Leont'ev's and to the theoretical possibilities or limitations of Historical Materialism in its specific understanding of man and society at that time. It would be a very important and interesting program of historical research to show this. However that may be, at the end of my first argument there seems to be a preliminary conclusion: The concept of tool is an important interface between activity theory and media theory. Using tools as mediators activity theory could possibly be able to reflect and discuss as well communication media as precondition and enabling of emerging social meanings and their societal range and consequences. But there are serious theoretical challenges to activity theory on the other hand: It would have first to resign of objective realism or in other words, it would have to accept the fundamental contingency of sense and meaning. But that would mean putting into perspective Historical Materialism as a methodology to psychology like already did Vygotskij himself in his "The crisis of psychology in its historical meaning" where he pleaded for a specific "psychological materialism".

It is quite understandable to me therefore that there seem to be serious theoretical difficulties to activity theorists in general but also to those dealing with information and telecommunication technology in particular, because they have – following Lompscher – "too little answers or perhaps not even the adequate questions and means to answer." And Lompscher therefore is also right, supposing information technology to be "the challenge, which perhaps leads to the fourth developmental stage of activity theory".

My second argument relates to an other critical point of contact between activity theory and system theory but looking this time from the other side, that is from Luhmann at Leont'ev. This argument runs as follows: "Sense", a central concept to system theory and to activity theory as well, is the ultimate reference to every kind of autopoietic system and it is therefore the most general medium at all, because there is no other medium beyond "sense".

Luhmann as sociologist makes use of this concept with regard to psychic systems and social systems only, while natural scientists, like Maturana, Varela, Tembrock or Roth and others, speaking of surviving as highest criterion of any organismic system could use the term "sense" or "biological sense" (Jantzen) as well. What unites them is the argument, that any autopoietic system is forced on behalf of its surviving to reduce the complexity of its environment. "Sense" in whatever respective understanding is the most general regulation principle of this reduction. Leont'ev distinguishes between "personal sense" as topmost criterion of psychic systems and "objective societal meaning" as uppermost criterion of social systems, due to the fact – as we saw already – that contingency (or "modality", in Leont'ev's terms) differs personal sense from societal meaning and makes appropriation necessary. To Luhmann however contingency is a fundamental quality of any autopoietic system, on psychic and social systems in particular. This contingency as a matter of principle releases him from distinguishing "sense" but forces him to show how this contingency, which is even doubled between two systems, can get overcome. His solution – as I explained already – is communication as basic horizon of understanding and misunderstanding. And even more than language is "sense" the irreversible medium to make communication possible. Therefore psychic and social systems (like educational systems, social work, public health, trade unions, political parties, nongovernmental organisations, churches or religious bodies, and even art and science, activity theory respectively) can neither operate for themselves nor interpenetrate each other – that is, they cannot survive as autopoietic systems within their specific environment – without "sense" as their uppermost communication medium. And because "sense" is always contingent as well, communication is a everlasting necessity. Psychic and social systems are forced to create, actualize and communicate their "sense", if they need on behalf of their surviving to interpenetrate into or to link with other systems. Therefore the mastery of communication media on every possible level is a question of surviving to any psychic and social system.

So what do system theory and activity theory have in common? They clearly agree in their conviction of "sense" as the universal and fundamental reference to every autopoietic system. And their equally obvious difference applies to the theoretical functioning of "sense" as a medium.

Leont'ev is restricted to tools as mediators of activity. Sense or meaning are products and prerequisites of activity but not its medium. In terms of computer language you can say, "tools" are not upward compatible to Leont'ev. Applying tools on meaning marks their unsurmountable limit. We saw already why. Meaning is objective, amodal, and therefore needs not communicating or mediating but appropriating. It emerges in material activity but not in communication, which at best is required to make objective meaning commonly known. Normally – quoting Marx – "theory touches the masses"! There is no need of communication because there is no fundamental (!) contingency separating personal sense and social meaning. Appearing contradictory class interests are objective and require what Hegel called "Aufhebung" by revolutionising the whole social system towards a new identity, which normally resulted in destroying the dominating class as a social system and not in communicative

actions between the classes.

To Luhmann social and psychic systems are forced to communicate their fundamental differences and inevitable contingencies in order to stay alive. To get rid of irritating differences with its environment by destroying environment is no real option to a social or psychic system because this finally destroys the system itself, for there is no system without environment and without difference to it. Media are irreversible and irresistible catalysts of communication. They make communication possible by reducing complexity. That highly complex medium internet is so to see the system's reaction upon the increasing complexity of its environment. Computer technologies are enabling conditions or potentialities for not only modifying but creating quite new social or psychic systems in order to reduce environment's complexity. The concrete range of their potentiality depends of course from their technical or technological quality. Comparing with other media computer technology is simply universal: It integrates every existing medium – except "sense" itself – and changes their importance. It is the first medium, which set going a scientific and public discussion about the structure and functioning of media in history and in society. It extends our communication unavoidably and irreversibly into a world wide dimension. Every social and psychic system is now supposed to be aware of "sense" as a concrete horizon of communicating mankind as a system of its own. On the other hand communication media of social systems can be transferred to psychic systems as well. So we can make use of writing in order to store personal information out of any social communication. Or we can use language speaking to ourselves in order to get clear our individual thinking. In these cases the originally communication media change their status and become technical or technological tools. In other words, to system theory and to media theory as well the concept "medium" as opposed to "tool" is fully downward compatible, what is its most decisive benefit, as I see it, because it can show that

- material techniques (or "tools") indicate the tool character of media,
- technologies (or "psychological tools") indicate the cognitive character of media, while
- sense/meaning indicate the communicative character of media.

Tools and media are not different things but different functions, different modes of reflecting on them. It keeps a question of deciding ourselves which function is our most interesting problem. We reflect on computers as a material technique, when we are interested in e.g. the form of keyboards as man-machine-interfaces; we reflect on computer technology as a psychological tool when we want to control its importance to psychic processes as conceiving, thinking, speaking, learning or other activities of psychic systems; and we reflect on it as a medium of communication, when we want to explore in details its importance to social systems like education, social work, public health, postal services, leisure industry, transport, police and penitentiary systems and so on. You may add here whatever social system you want.

Marx' concept of work, Leont'ev's notion of activity and Luhmanns notion of communication are of course not identical but they are functionally equivalent. Leont'ev moves off quite a lot from dogmatic materialism historicising it and beginning with its further development. His theory makes contacts and connections with other theories possible and allows modernizing activity theory. His historicization of consciousness e.g. actually made the concept of learning culture useful. These possibilities we should not underestimate staring at legitimate arguments and critics only.

7.

So coming to my conclusions I like to emphasise some main results:

1. "Sense" can be seen as the central interface between activity theory and media theory, if we reflect them on the basis of system theory.

2. Referring to "sense" it is possible to import the concept of "medium" into activity theory. And what is more we can understand by means of system theory that activity as a social system itself is supposed to realise this interpenetration of both theories on behalf of its surviving. But I know that this is not so much a result but a program.

3. The final answer to our question – is computer technology tool or medium? – runs: it is tool and medium. It is simply a question of approaching a thing reflecting it as tool or as medium. But we have to be aware of the fact, that this change of view is a methodological potentiality of activity theory only when reading it from the point of view of system theory.

4. As a medium of communication computers are "machines" to give rise at the same time to social meaning of social subsystems and of human mankind as a whole. They make possible the emergence of alternative semantic systems, new world views or social utopias and they change our imagination of what could be realised.

5. The new medium can possibly be considered a new potentiality of brand-new activities, so to say a new "Zone of proximal development" of a new societal networking at the higher and more general level of mankind as a whole.

6. Thus it makes possible new global dimensions of conscious societal communication, and urge us to discuss the political consequences. They can produce completely new social systems.

7. Computer technology is a so called "dominating medium" because of its function of integrating every existing communication medium. In this process of being integrated these do not disappear then but change their social importance. That is true regarding language or printing or traditional media of communication like press, film, radio and TV.

8. Analysing computer technology, it is therefore necessary to begin from above, that is from reflecting its universal importance to human mankind first, coming then to examining its meaning to social subsystems and after all to investigating its meaning to individual psychic systems.

9. Doing this we should always consider – its universal and irreversible quality and further more – its double potentiality of changing old and creating new systems emerging differentiation, specialisation, division of work and integration of originally separated activities within existing social systems or as emerging new systems, – its neutrality as medium: Computers are neither good nor bad themselves. The first stone in the hand of a human being did not make him bad or made him kill his neighbour. And language or books did not make him bad, because he now was able to lie and to insult his neighbour.

10. To believe in media causality is sort of denying human responsibility. Media are not causes, they are catalysts, nothing else. That is true of violence and suppression as well. Not media bring the evil into being, but humans do. Media are horizons of communication about whether we want violence or not. They do make new forms of suppression possible but not necessary. They have just one unique purpose: guarantee the surviving of autopoietic systems on a more complex level.

11. Computer technology brings into being extensive processes of societal standardisation or socialisation like e. g. processes of:

– technical adjustments of computers and their applications to social requirements (Negroponte 1997),

- economical globalisation and their consequences to national state concepts (Beck 1998),
  - reconstructing systems of political steering and controlling (Sloterdijk 1993),
  - forming and improving new psychic abilities and attitudes (Hörisch 1997).
- And so on.

Explaining, exploring and discussing all these results in details with regard to concrete systems of activity is of course as necessary a scientific investigation program. It is impossible to realise it within just one lecture. So let me finish with this simple message: Computer technology seems to be the most outstanding and decisive challenge to all kinds and sections of individual or social activity. And it is therefore and in the same time the most important challenge to activity theory itself. We therefore should work together to not only show the multivoicedness of activity theory (what remains a permanent important task), but to prove its connecting and integrating potentiality especially against new approaches concerning this challenge, because computer technology seems to be the touchstone of activity theory's survival quality.

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See also D. Hung, Design principles for web-based learning: Implications from Vygotskian thought. In: Educational technology, 41 (2001), 3, pp 33-41; D. Hung/A.

Wong, Activity theory as a framework for project work in learning environments. In: Educational technology, 41 (2001), 2, pp 33-37; P. Pang/D. Hung, Activity theory as a framework for analysing CBT and e-learning environments. In: Educational technology, 41 (2001), 4, pp 36-42.

But see e.g. G. Rückriem, Das Problem der Erziehungswissenschaft mit den Medien. Vortrag anlässlich des 30. Jahrestags des Funkkollegs Erziehungswissenschaft in Marburg/L. <http://www.ich-sciences.de> To Lompscher "the internet is more than just a technical novelty, it represents the base of new societal activities, it is to be analysed as an activity itself with specific contents and structures (not only as a means of well known activities)." Joachim Lompscher, Lernkultur Kompetenzentwicklung. Aus kulturhistorischer Sicht. Lernen Erwachsener im Arbeitsprozess. Berlin: Lehmanns Media – LOB.de, 2004, pp 417.

That seems to be the point of view of Yrjö Engeström who, asked for the importance of New Media, answered: "The internet is a useful instrument, that's all. [ ... ] It is useful the same way like books or other means. [ ... ] I can't see any revolutionary impact in it." Lompscher, Lernkultur, 2004, p 292. Translated by the author, G.R.

I gratefully thank Johannes Werner Erdmann for his friendly help to improve my understanding system theory. What did even more consequently Vygotskij, who seems to make use of this term in order to keep connection to Historical Materialism. See: Lev Vygotskij, Ausgewählte Schriften, hrg. von J. Lompscher, Vol. I, Berlin:

Lehmanns Media-LOB.DE, 2003, S. 309. For the actual methodological and philosophical discussion of tool and medium in their difference and their relation see Roessler/M nker/Sandbothe (Hrg.), Medienphilosophie, Frankfurt/M. 2003; see also the review of this book: D. Mersch in: Dialektik. Zeitschrift f r Kulturphilosophie, 2003, H. 1, S. 169-173. N. Luhmann, Soziale Systeme. Grundri einer allgemeinen Theorie. Frankfurt/M.: Suhrkamp: 1987, S. 607. Translated into English by the author, G.R.

Norbert Bolz, Die Sinngesellschaft, Econ: D sseldorf 1997. Of course the term of communication to media theory as well as to system theory is not restricted to understanding or interaction in a narrow sense. It rather comes very close to Marx and Leont'ev's term of societal intercourse. Translated into English by the author, G.R.

Vygotskijs understanding of psychological tools as "inner technique" (quoting Clapar de) or as "modus operandi" (quoting Thurnwald) we can call historically general but not concret historical, because he points out that regarding their function as mediational means they are all the same and equal. There is no further difference beyond that. (See L. S. Vygotskij, 2004, vol. I, p. 309ff, pp. 312 ff; vol II, p. 517.) In the same way the famous Middle Asia research was not meant to investigate the concrete differences in consciousness of primitive tribes dependent on their culturalhistorical media but to explain those differences according to their real work. L.S. Vygotskij, Die Krise der Psychologie in ihrer historischen Bedeutung, in: J. Lompscher (Hrsg.), Lev Vygotskij. Ausgew hlte Schriften. Bd. I, Berlin: Lehmanns – Media.LOB.de, 2004, p. 257. Translated by the author, G.R.

Joachim Lompscher, Lernkultur Kompetenzentwicklung. Aus kulturhistorischer Sicht. Lernen Erwachsener im Arbeitsproze. Berlin: Lehmanns Media – LOB.de, 2004, pp 417 ff. "So fiel bei den Interviews mit f hrenden Repr sentanten der T tigkeitstheorie auf, da die Frage nach Computer und neuen Medien durchweg weniger fundiert beantwortet wurde als andere Fragen. In der Regel wurde nur thematisiert, da die Informations- und Kommunikationstechnologien neue, zus tzliche Mittel f r die T tigkeit, neuartige Wissensspeicher etc. zur Verf gung stellen, und eher vor Illusionen und  bertriebenen Hoffnungen hinsichtlich der Wirkungen der neuen Medien gewarnt. Da damit aber – wie in der entsprechenden Literatur seit langem, ausf hrlich und aus unterschiedlichen Perspektiven diskutiert wird [ ... ] prinzipiell neue Herausforderungen und Chancen in allen Sph ren des gesellschaftlichen Lebens [ ... ] entstehen, die Computer-Alphabetisierung eine gegen ber der Buchkultur geradezu revolution r ver nderte Kultur hervorbringen und damit die T tigkeit und Lebensweise der Menschen grundlegend ver ndern [ ... ] spielt bisher in der kulturhistorisch orientierten Literatur und Diskussion, wie mir scheint, noch eine untergeordnete Rolle. [Dazu] muss sich wahrscheinlich die kulturhistorische T tigkeitstheorie begrifflich und methodologisch selbst weiterentwickeln." Lompscher, Lernkultur, pp 417-418. The whole book of Lompschers, which represents the most actual state of the art of activity theoretical research, reveals this tool oriented methodology of the various approaches.