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Abstract: This contribution provides an answer to the question of what informational needs might be, how they develop in the digital age, and why the concept of (informational) needs adds to a critique of (digital) capitalism. Based on a critical activity theory approach, it is argued that there is a subjective need to participate in societal organisation and this need has informational qualities. The development of these qualities is phylogenetically traced and its recent transformation in the digital era is described. The contribution ends with an outlook how the concept of informational needs can be applied to criticising the problems of (digital) capitalism.

Keywords: needs, Marx, critical psychology, activity theory, digital capitalism, informatisation, digitalisation

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1. Introduction

In this contribution, I will seek to give an answer to the question what informational needs are and how they develop in the digital age. Thereby, I find the reference to activity theory (see e.g. Engeström, Mietinen, and Punamäki 1999), concretely Marxist activity theory in the German tradition of critical psychology particularly helpful. This tradition mainly builds on the works of Soviet psychologists A.J. Leontyev (1978) and is linked to the works of Klaus Holzkamp (1983; 2013) and Ute Osterkamp-Holzkamp (1990) at the Free University in Berlin (see Tolman and Maiers 1991; Tolman 2013; Schraube 2009). Later this approach was introduced to communication studies and media sociology by authors, such as Renatus Schenkel (1988), Wulf D. Hund (1988; Hund and Kirchhoff-Hund 1982), and Horst Holzer (1975; 1987). These works form a rich but almost completely forgotten historical-materialist tradition of critical engaging with media and communication in society (see Sevignani 2016; Holzer and Fuchs 2017). My interest here, and it is a long-term interest as well, is it to re-actualise this thinking.

Here are some general key features of this theoretical angle: The concept of activity provides an integrative social theoretical view on subjective and objective aspects of how the social works. For instance, needs, situated in the subjects cannot be appropriately understood without looking at the active relation to the natural and social environment. Critical psychology links anthropological informed social theory, to a



theory of (present) society, and derives from it critical diagnoses of the time, e.g. dysfunctional or pathological currents in the development of society. Critical Psychology argues that there is a ‘natural potency to sociality’ (Holzkamp) in the human evolution, that has originated phylogenetically because it provided a selection advantage. However, it also assumes that evolutionary logic has been superseded with sociality and historical, man-made development dominates now evolution. This leads for Critical Psychology to the necessity to engage with social theory and to theorise the mediation of individual with the societal level, of class consciousness and capitalist structure of society and so on.

Critical Psychology provides us with an interesting approach to situate communication in society and can be understood as an attempt to illuminate the communication blind spot of Western Marxism, which sets work/labour as the central category to understand society. Historical-materialist theories of society, if they are interested in communication, traditionally situates it within societies’ superstructures. Communication is then, first, relevant and interesting for historical materialist (only) because it is communication about labour and its capitalist development. Second, communication might be also of interest as an aspect of the labour and production process. Then communication is situated closer to the societal base and is relevant because it regulates the work process. This position can be termed communication in work. Third, and this point can be made in the Critical Psychology perspective, communication is relevant and interesting because it lies at the heart of societal production. This position can be termed communication as work and gains relevance in the digital age.

2. What Is a Need and Why Is It an Important Concept in Critical Theory?

However, before applying this kind of thinking to my topic, some definitory remarks about the terms ‘need’ and ‘information’ are necessary. A first definition drawn from common sense is that needs consists in a feeling of lacking something, which accompanies a motivation that something must be done against it. Need is an intersectional term that urges us to theoretically engage with several basic relations and to differentiate it from closely related concepts. Such social theoretical basic relations are, first, the subject-nature-relation. Concepts that focus on the subject’s natural characteristics are e.g. ‘drive’, ‘instinct’, but also basic needs. Second, inner-subjects-relations, mainly between consciousness (e.g. ‘aim’, ‘goal’ ‘whish’) and unconsciousness (e.g. ‘drive’) aspects. Here, I am, third, mainly interested in the relation between the individual and society. Social and societal aspects of ‘needing something’ are frequently referred to as ‘social needs’ or ‘interests’. In general, I assume that ‘need’ is a crucial notion of a subject centred and humanistic theory (Heller 1976), needs of society do not exist or should be termed differently, e.g. functional affordances.

Needs provide a sound basis for a critique of (capitalist) society. There are distinct ways to confront social relations critically. One option is to link to general shared norms such as equality (equal access to media e.g.) and freedom (e.g. of expression) and critical theory then demonstrates that (capitalist) societies cannot or only insuffi-



ciently realise these norms (immanent normative critique). A second option is to understand that the current trajectories of (capitalist) development are unsustainable or will undermine the bases upon which capitalism builds and this gives rise to systemic crises (immanent functional critique). A third option, which I think is finally involved also in the other two options, is that (capitalist) society constantly harms human essence. Such essence is not simply given or postulated but is a dynamic version of essence that is capable to develop and to flourish (weak external critique).

It is the third version of critique that strongly relates to the notion of 'human needs', which involves some basic needs that must be satisfied to speak about human life and social needs that must be satisfied to speak about a decent, good, or flourishing human life. By setting flourishing human needs as a reference point for critical theory, (capitalist) exploitation/inequality as well as unfreedom/alienation can be criticized. The latter problem (alienation) also refers to the problem of 'ideology', which in the context of need theory means that people do and want things that cannot be in their true interest (false needs, manipulation). Capitalist societies link need satisfaction to monetary capacities and this systematically negates the needs of the poor. This claim applies for basic needs (e.g. in the global periphery) as well as social needs that must be satisfied to live a proper life and to flourish (e.g. in capitalist centres of the world) under given conditions. Capitalist societies should be criticised because of non-satisfied needs but also for subsuming need development to profits and for cutting off potentials of human flourishing. Since capitalism is developing, critical social science faces the task to reformulate such foundational critique under actual circumstances of informatisation, big data, and social media.

This perspective does not propose a taxonomy of potentially effective needs as do some influential approaches, e.g. Maslow (1987), Doyal and Gough (1991), or Nussbaum (2011; Gough 2014). Human needs are always developing, so it is, in principle, impossible to give a definitive description of all needs and motives, which humans can develop.

3. Need Development Between Appropriation and Objectification

Activity theory most basically assumes that subjects and objects are mediated through processes of internalisation or appropriation and externalisation or objectification and that human history is a history of ever-increasing mediation between subjects and objects. Activity theory thereby follows Marx's concept of man as 'Gegenständliches Gattungswesen' (concrete species being). Michael Quante (2013, 76ff) reconstructs three crucial aspects of this essence of human being. Humans are social, concrete and productive beings. This means, first, becoming an individual self-determination is only possible in social relations; second, self-determination is only possible through alienating and appropriating activity. Subjective aspects of the individual (e.g. living labour power) are transformed in objects (e.g. a labour product) by appropriation of the external (first) nature (e.g. labour object and means of labour). Thereby both, the objective and the subjective objects are transformed. Man-made



objects (second nature) then flow into the labour process again. Through labouring on (first and second) nature, not only nature develops but also the labouring subject and his or her needs. Third, the concept of concrete species being primarily orients us to the material processes of the production of life and the means of life as a starting point for social theory.

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Critical psychology adds to the Marxian notion of concrete species being and the labour process, by giving a detailed theory of how nature transforming activities effect subjectivity and assumes that the internalization of mediated external processes results in mediated processes internal to the subject. Externally mediated functions become internally mediated (see figure 1).

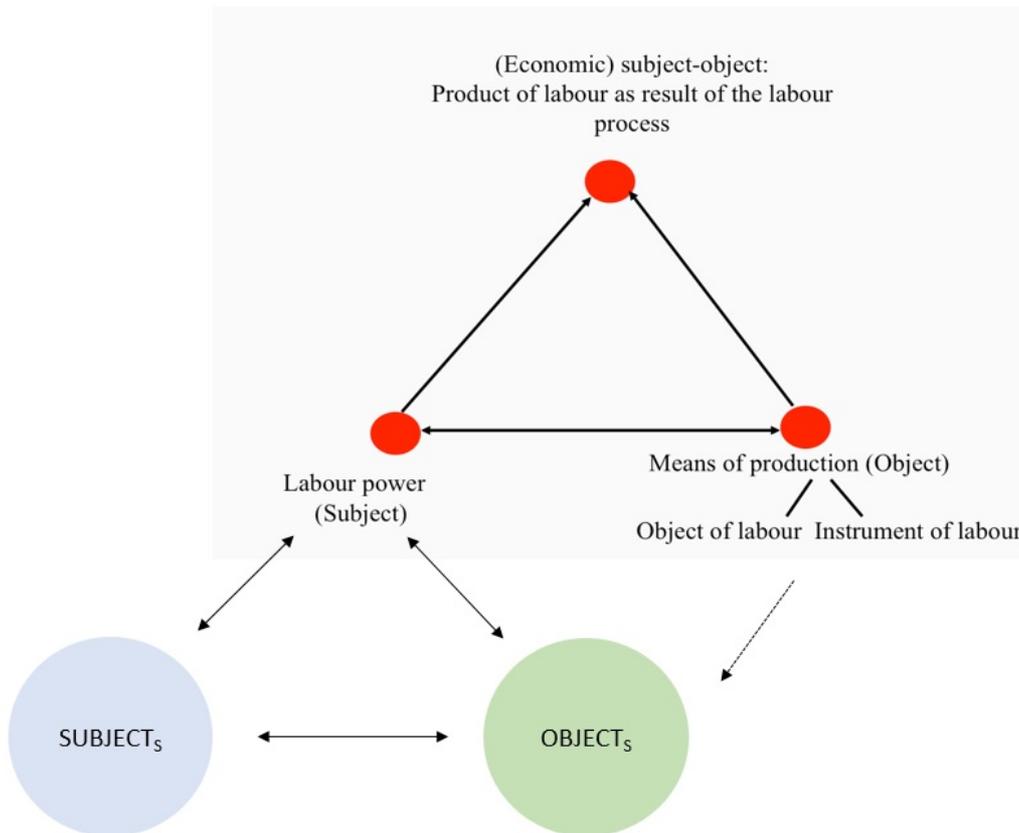


Figure 1: The process of internationalisation and objectification of the concrete species being:

Needs are situated within the subject, although they also have objective connotations (mediated by activity). Marx saw the historicity and the class dependency of needs, but for him needs originate from the consumption process:

“consumption creates the need for new production, and therefore provides the conceptual, intrinsically actuating reason for production, which is the pre-condition for production” (MEW 13, 624f.)

Critical Psychology contributes additional insights here by asking:

“how could humans ever get to the point that they produce the conditions of their survival socially, if there is only a need to consume socially produced goods but no need to create them?” (own translation, Osterkamp 1990, 18).

Marx did not investigate the subjective motives of social production but Critical Psychology does by giving a highly differentiated and elaborated account of the human evolution (Holzkamp 1983). It phylogenetically traces the development of ‘the psychic’ from pre-human stages to the tipping point where the concrete species being first appears, and then further to its full realisation in society. Thus, what Marx philosophically assumes, is scientifically substantiated by Critical Psychology with the help of anthropological insights and references to the natural sciences.

4. The Development of the System of Needs from Organisms to Concrete Species Beings: The Perspective of Critical Psychology

We can first speak of a psyche, in a very basic sense, if the relation between an organism and its environment is internally mediated by a) orientation, b) emotion, and c) learning (see figure 2). The psyche develops evolutionary as a mediation between activity and given objective circumstances because it provided organism with better chances in the survival of the fittest.

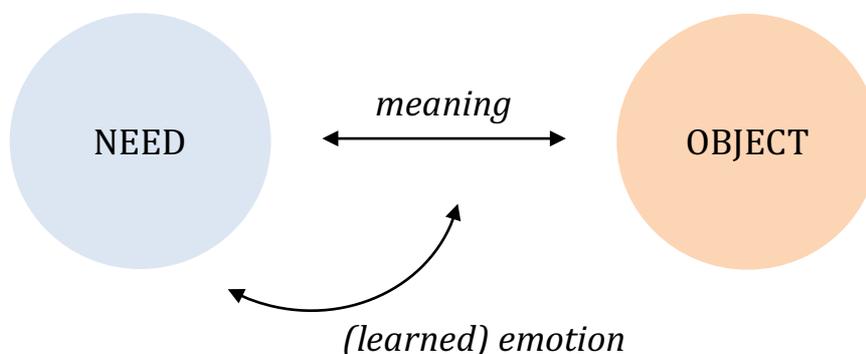


Figure 2: A basic model of the psyche.



The first psychic or internal mediation is orientation: With the development to orientation, organisms' activities are no longer restricted to simple execution but a second kind of activity – orientation – emerges. Execution is an activity that serves the conservation of the self and the species. Orientation is an activity that guides towards an execution or mediates execution. The environment becomes meaning for the organism according to these two forms of activity (e.g. an object prevents an organism from drinking (executive activity), then circumventing this object is an orientational activity). A doubling of the system of needs takes place simultaneously: From now on there are needs that refer to the execution of an activity (e.g. thirst) but also needs that motivate orientational activity that is necessary to satisfy executive needs (e.g. scanning the environment according to potential barriers).

The second mediation is emotion: With the rise of the psychic, meanings and emotions mediate the relation between needs and their satisfaction and form a first system of motivation. The pre-human organism has certain needs and there are possibilities to satisfy them in the environment. The organism has the basal cognitive ability to recognise these possibilities, which is the same as saying the environment becomes meaning for the organism. Needs point to the disposition for an activity and meanings point to the relevance of an activity. Emotions evaluate meanings according to the organism's needs. Meaning is then actualised and an activity follows or not. An object has meaning for an organism if, and only if, there is a need for it, and it is evaluated. Emotions allow problem solving if meaning and need fall apart; they allow orientation and unification in ever complex environments.

The third internal mediation is learning or the ability to develop: An organism's ability to learn meanings of the environment instead of following fixed meanings and fixed emotional evaluations, which are determined by genes, is a huge advantage for survival in changing environments. Learning extends the range of what can gain meaning to the organism. Organisms are then able to learn relations of meanings, that is e.g. five orientational steps/meanings are necessary to satisfy hunger. In these chains of meanings, it becomes necessary that the organism learns to anticipate emotionally the final satisfaction to be motivated to go through the chain of steps in the first place. The new psychic quality of learning also means that meanings are no longer clear from the outright, they must be learned now. This simultaneously means that there is now a coercion to learn to survive. Accordingly, a specific need develops in this uncertain situation that motivates learning activity – the need to control the environment.

At this stage of human evolution, the stage of higher animals and coordinated groups, tools are used to ensure the satisfaction of needs. Additionally, other animals that are identified as similar can be used as a kind of “social tool” for need satisfaction. For instance, driving only makes sense if the catch is distributed later and drivers also get a share of it. The single activity only becomes meaningful only in a inter-individual (chain of) activity. Individual satisfaction is only possible if there is a form of social control exists. The participant in this social coordination must learn that someone is rather a hunter than a driver. In this stage, the individual survival depends on successful coordination. The control needs now not only refer to an undif-



ferentiated environment but to the group too. If coordination fails, need satisfaction cannot be guaranteed. A specific need for it comes to life, that is the need of controlling the social.

After the psyche and its specific aspects have evolved and higher animals grouped together, a decisive qualitative step towards humanity or what Marx calls 'species being' has been made. However, two further steps must be taken to its full realisation. The first precondition for this, is an important means-end-reversal. So far, means (objects but also social tools) have meaning only within a certain activity that aims to need satisfaction. After this certain activity, the meaning of means is de-actualised, the tools disappear. Now tools are produced as a precaution. Their meaning is contained also when it is not used, tools have now a stable and socially generalized meaning. The environment is now enriched by generalized ends and affordances. A trans-individual storage of the processes necessary for the survival is created that can be appropriated by the descendants.

The social control need loses its reference to actuality. (Primary) needs are no longer satisfied if actual shortage and threat is prevented by social control. Control needs now are directed towards provision in relatively stable social cooperation. A need for individual participation in cooperative-provisional production of life conditions and opportunities of need satisfaction develops. Holzkamp describes this crucial step as follows:

“The general principle characterizing this development is the growth in the active appropriation of nature by means of altering, interventional objectification of generalized life-sustaining aims. The objectification thus characterized is the new societal quality of the previously described 'externalization' of orientational activities through the preparation and use of aids to action [= tool use] [...]. The process of appropriation-objectification is the earliest shaping of 'labour' as the creation of use-values in human life; it is the creation of that which makes [human] life possible.” (Holzkamp 1983, 176 cit. in Tolman 2003, 91)

The second precondition, is the rise of language. Critical Psychology puts forward a production based theory of the origin of language. Tools, such as a stone axe, can be used for a variety of purposes. They could, for example, cut trees, kill animals, or dig soil. The objects to which an axe was applied could be soft or hard. Some objects were easy to cut, some required substantial time and effort, and some were so hard that it was impossible even to leave a dent on them. Despite these differences, all the objects could be compared against the axe, which was an invariant component of all encounters. Therefore, the axe could be considered an embodied standard of softness/hardness. Using the axe for practical purposes to do something with an object in the environment had the side effect of placing the object on a 'scale' of softness/hardness. This scale emerged as a generalization of the individual experience of using the tool. Since people followed shared, culturally developed procedures of cre-



ating and using tools, the tools could serve as an embodiment of abstract concepts based on the generalization of both individual and collective experience. In short, the cooperative tool making process leads to so called practical concepts to which symbols can be attributed. The activity to fix a roof necessitates a concept of liquid tightness. Symbols can now represent these practical concepts but allow to detach them from the immediate point of origin this leads to the creation of symbolic worlds.

From now on, people make their own history, evolution is no longer the dominant driver of development. The integration of a substantial number of social cooperations leads to a final new quality - the rise of society. This new quality is characterised by the 'transcending of the immediate' (Unmittelbarkeitsdurchbrechung). This means that the nexus between the production of the means to survival and their individual use/consumption is broken, the relation now exists only on the level of society or on average.

An individual's specific socio-economic position and personal condition mediates between the individuals and society. Societal conditions reach meaning for individuals now only mediated by their specific condition of life and position in social structure. It follows that social meanings become potentialities for the individual. Activity and agency are now differentiated, relation of possibility. This includes the possibility not to act. Agency as is the exercise of control by the individual over the conditions relevant to the satisfaction of his or her needs through participation in societal production. The corresponding needs to this situation are so called productive needs. This is the decisive concept that follows from the complex derivations up to this point.

Productive needs do not have a homeostatic-cyclical quality. They do not move from tension to relief to renewed tension because they have no fixed objects as a goal; rather they cause a general disposition for activity. They refer to the social form within which sensual-vital need satisfaction takes place. To speak about productive needs does not mean that there is now a need to be a productive worker; rather it means the individual integration and participation in social relations that enables the production, distribution, and consumption of goods.

At the societal level, sensual-vital needs - that are basic needs and socially determined needs - can only be satisfied if productive needs - that is the participation in societal mediated provision - are satisfied at the same time. It is precisely this integration of sensual-vital needs into productive needs that marks the specific human face of need satisfaction. For instance, it is a crucial difference if bread is eaten in the condition of acute shortage or if it is consumed with the knowledge in mind that there will be bread also in the coming days. If this guarantee exists, that is productive needs are satisfied than the satisfaction of sensual-vital needs is joyful instead of driven by acute demand. The sociality of needs does not only consist in the fact that needs are socially determined but also in an important change of their quality. This means that on the one hand human needs are not satisfied by giving refugees food if refugees suffer from a lack of socially mediated control over their life conditions. On the other hand, it this means that even satisfying basic needs by lobster, champagne, and palaces is inhuman if these satisfactions are not secured by societal provision.



5. The Development of Informational Needs

Information stems from the Latin word ‘in formare’, which means ‘to impress’, ‘to bring something into shape’, ‘to design’ but also ‘to instruct’, ‘to brief’, ‘to let somebody know about something’. In the first meaning, a nexus between information and making (the world, social relations) and thus the reference to activity theory is clearly visible.

I refer to a theory of information that links the phenomenon to self-regulating systems (Hofkirchner and Fleissner 1996; Fuchs and Hofkirchner 2002; Hofkirchner 2002). Information comes into existence if a system (re-)organizes:

“Every system acts and reacts in a network of systems, elements and networks, and is exposed to influences mediated by matter and/or energy relations. If the effects on the system are fully derivable from, and fully reducible to, the causes outside the system, no informational aspects can be separated from matter/energy cause-effect relations. However, as soon as the effects become dependent on the system as well (because the system itself contributes to them), as soon as the influences play the role of mere triggers for effects being self-organized by the system, as soon as degrees of freedom intervene and the reaction of the system is unequal to the action it undergoes, the system produces information [...]. Information is created if there is a surplus of effects exceeding causes in a system” (Fleissner and Hofkirchner 1996, 248).

Information is the specific ability of a system to reproduce or map external affects through internal change and thereby reacting to the external world. The origin of information thus relates to the evolution of the psyche (already on a pre-human level) since it presupposes the instances of recognizing meaning and evaluation according to given demands/needs¹.

Human labour processes have two strictly intertwined aspects (Fuchs and Sevignani 2013): On the one hand, they have an energetic-material aspect. That is that labour transforms matter and energy. On the other hand, they are cognitive, knowledge based processes. This means that an image of the object to be worked on and the final appearance of the labour product exist in the worker’s brain during the work process (see Engels 1895-6; Leontyev 1978, Sayers 2007). Marx argues that

“what distinguishes the worst architect from the best of bees is that the architect builds the cell in his mind before he constructs it in wax. At the end of every labour process, a result emerges which had already

¹ This diverts from Hofkirchner’s approach (Fleissner and Hofkirchner 1996; Fuchs and Hofkirchner 2002, 277), who assumes that information processes are also a quality of non-living matter that adapts to its environment thermodynamically.



been conceived by the worker at the beginning, hence already existed ideally” (Marx 1967/1976, 284).

The process of informatization can be understood as the objectification of mental activity, knowledge, or the psyche (Boes and Kämpf 2012, 320ff.). Objectifying activity undergoes a structural duplication on the informational level. What was only in the mind now becomes information. Informatization as a process is the precondition for mental activity being able to exist as an own form of human work that is relatively independent from manual work and then can be subjected to rationalization. Mental processes become independent from their authors and flow into technology, e.g. the construction of machines and the organization of work.

The objectification of mental activity allows then others to gain access to them. and without information humans would not understand each other, knowledge could not be shared. This refers to the second meaning of information as something that informs somebody. Thereby information (objectified knowledge) is not identical to the initial thoughts but an incomplete reflection of it. Similar the appropriation of information is structured by it but not completely determined (Pfeiffer 2004, 71). It must be deciphered in the context of the receiver’s knowledge. Informatization is a twofold activity of objectification/externalization and appropriation/internalization. Information reduces knowledge by making it sharable, but to understand information demands again knowledge to (re-)contextualize it. Knowledge is the non-objectified form of information.

Critical Psychology’s analysis of need development can be specified from a communication and media sociology perspective. I assume that informational needs are integral to orientational activity and occur first with its differentiation from executive activity. While need develop from simple orientational demand to control demands on the pre-human stage to social control needs in the field of transgression between animals and humans to species being’s productive needs, so do informational needs (Schenkel 1988; see figure 3). With the development of productive forces and increasing transgression from first to second nature, subjects face an increasing complexity. This complexity of the environment means for the subjects an increasing challenge to be able to appropriate or internalize it (Pfeiffer 2004, 140-143, 158f.). Consequently, this results in the constant necessity to learn and triggers motivational development. Which concrete informational aspects has the development of human needs?



Human development (Phylogenesis)	Qualitative steps	Object relations	Subject relations	Informational aspects of need development	Sociality	
Pre-human	Tool using Learning (anticipation) 'social' tool using driver-hunter-example	Meaning		Needs/Demands		
		Orientational meanings	Executive meanings	Executive needs/demands	Orientational needs/demands	"informational needs"
		Learned orientational meanings	Preferred meanings	Learned needs/demands	Control needs/demands	"communicational needs" (language)
Field of transgression from animals to humans	Tool making species being Means-end-reversal axe-example	Meanings of means		Participatory needs in cooperative participation (social control)	"medial needs" (representation in symbols, script)	
Human	"Transgression of the immediate" Relations of potentiality	Societal structures of meanings (ideologies)	Socially determined primary meanings	Sensual-vital needs Productive needs	"mass medial needs" (individual/society)	Inter-individual cooperation ("Gemeinschaft") Trans-individual system of cooperation = Society ("Gesellschaft")

Figure 3: The phylogenetical development of informational needs.

First, with orientation and emotion as psychic instances that mediate the organism-world-relations, an informational need rises and the organism now needs to process information to survive. This can be termed cognition. Second, bi-directional communication is the informational aspect of the social. Together with the need to control the social environment, a need for communication evolves. Third, the need for individual participation in cooperative-provisional production of life conditions accompanies a need of language and later script mediated communication. These development link to a tripleC-model of information that includes cognition, communication, and cooperation (Fuchs and Hofkirchner 2002; Fuchs et al. 2010): “in order to cooperate you need to communicate and in order to communicate you need to cognize” (Fuchs et al. 2010, 43).

However, the perspective of Critical Psychology stresses differences in forms of human cooperation (community vs. society): Thus, there is a fourth step of development in informational needs: (Mediated) communicative needs transform into individual participation in the process of societal self-understanding. This communicative need is externalized in separate institutions - the mass media. Mass media create a mass communicational need that is the foundation for human development into societies. The informational aspect of productive needs is the development of mass medial needs. With the ‘transgression of the immediate’, the nexus between individual communication and communication as a process of self-understanding of society becomes problematic or loses its immediateness. The appropriation of socially mediated meanings is mediated by one’s socio-economic position and personal life condition. The individual’s relation of possibility to the whole society also effects his or her communicative relations. If, what, and how an individual communicates is no longer pre-given. The individual ability to communicate must be developed but at the same time can be developed because through internalization there is now a foundation in



the individual need structure. Similar to the changed quality of sensual-vital need satisfaction in the light of productive need satisfaction, the quality of individual communication now depends on its integration in mass media discourses: "If one level serves the function of a necessary condition for the next higher level, then the lower level might be influenced, shaped, adjusted according to this function by the higher level" (Fuchs et al 2010, 52).

6. Informational Needs in the Digital Era

The preceding thoughts are unfortunately very unspecific to the latest development of capitalism to its informational stage. As a next step, it is necessary to build on the previous but considering that digital media mark once again a change in the process of internalisation, objectification, and need structure. To draw a picture of this change, it is first necessary to elaborate on what the transgression to an informational stage contains on the level of the development of productive forces.

Rudi Schmiede (1996; 2006) links the process of informatization, that is the objectification of the psyche and the formalization or reduction of knowledge that is bound to this process (see above), directly to the reproduction of class society and capitalism (see also Schiller 1994): Capitalism, as all class societies, is founded on a division of manual and brain work (Marx 1867/1976, 643). In principle, capital conceptualises or commissions work processes and workers execute work processes. Capital strives to control and shape the labour processes (directly or indirectly) according to its logic, which is maximising profits by systematically rationalising informational structural duplications of work processes. Information is systematically collected and processed, organisationally and personally separated, and integrated into complex information systems. Information systems as formal models of the reality of production, distribution and consumption processes are built. Right from the beginning of capitalism informatisation is thus prolonged by a new type of work that is not immediately concerned with the production of goods but with its informational management. This perspective enables us to understand that the development of the computer and modern ICTs is driven by capitalism and as such it has its roots in the introduction of accounting and is preceded by the Taylorist organisation of production (Baukowitz et al. 2000). This perspective is valuable but totalising. Formalisation and informatisation are necessary qualities of the development of the productive forces and (post-capitalist) societies that are based on a high degree of the division of labour are not imaginable or desirable without informatisation (Pfeiffer 2004, 130; 183f.). Informatisation is a general dimension of the development of productive forces and not only of capitalism (see last section).

Digitalisation means a further development of the system of productive forces and a decisive phase of the process of informatisation, where the computer eventually operates as the guiding technology. Computers are an outcome of cognitive, communicative, and collaborative productive activity and operate as tool that mediates human access to first and second nature. This development of the productive forces comes



along with key qualities – further formalisation, universality and plasticity, reflexivity, and integration:

- **Further formalisation:** We already know about the reduction of knowledge to information through objectification. The computer and digitalisation demand that information transform again into data. Data are documented distinctions that have per se no meaning. In the process of digitalisation information is reduced to a binary logic of 0 and 1, electronic impulse or no impulse. Information consist of data that is distinct from other data due to a certain relevance or meaning it attributed to. Information is thus a ‘difference, which makes a difference’ (Bateson). For instance, distinctions get a first meaning if they are graduated on a scale, such as temperature. In this process, the meaning of temperature differences gets attached to them. Or, and this makes it clear that the transformation of information is relational, temperature data/information (e.g. 37,9 °C) become information, if they reach certain relevance, such as the meaning that 37,9 °C body temperature is ‘elevated temperature’. The transformation of information into knowledge is then to contextualise elevated temperature e.g. as a symptom of a certain disease. Data and information always must be appropriated and re-contextualised by humans. Human-computer-interactions deal with the transformation of information into data and vice versa.
- **Plasticity and universality:** A universal machine, such as the computer that operates with the binary logic, needs an informational input “from the real world and must give back its output to the real world to fulfil its purpose within the context of the system as a whole, within the redoubled world of working on and processing symbols it is free of these limits and open to any step of work” (Schmiede 2006, 337). For instance, a printer needs informational inputs and must produce informational outputs, in the form of a combination of letters that have meaning. However, the printer is not restricted to certain symbolic combination but is able to print any number of symbolic combinations.
- **Reflexivity:** The universality and plasticity of computers, that is the “autonomization of the machine system” (Schmiede 2006, 339) enable that “facts and contexts are understood to be informational processes right from the beginning and are formulated and modelled appropriately; they are the starting point of processes of reorganization and technologization” (2006, 337). For instance, computer programs simulate the operation of a tool before it is build, the simulation shows that the tool will not be functional, and as an outcome the informational image of the tool is modified accordingly before it is built.
- **Integration:** ICTs allow for enormous compression of time and space, that is they enable to bridge temporal and spatial distances by spending relatively less investments. This, together with the previous qualities, allows that formerly distinct information systems (e.g. production, distribution, and consumption related information) can be integrated.



These developments in the system of productive forces result in the Internet as a new medium or as a new social space (Boes and Kämpf 2012). The tool (the computer as universal machine) becomes a medium (the Internet), like it happened with (body) language, script, and mass media before. Georg Rückriem (2015) points to a helpful difference between medium and tools. Tools refer to a “two-plus-one-relation” that bridges subjects and objects via a tool. A medium, such as (body) language, script, mass media, in contrast, is a “three-in-four-relation”, that is the space or horizon within which tool mediated subject-object-relation can take place. Media have epistemological quality, that is they open potential world-relations (Boes and Kämpf 2012, 325):

“In such a relation, the computer represents information about the world, and the user reads, observes, navigates, or reformats this information, and may also add information about the world herself, or instruct the computer to produce or transform information. A consequence of the frequent use that is made of computers as a hermeneutic device is that increasingly, our knowledge of the world is mediated by computers. Importantly, this mediation is not a passive process of rendering pictures or texts. Computer systems also engage in interpretation, calculation, reasoning, planning, and decision making, and thus play a very active role in the formation of our knowledge of the world and our plans for acting on it” (Brey 2008, 198).

The computer is a tool, the Internet is a medium. When tools become media, the psychic organisation is changing. This process entails the social organisation of new media institutions (as a response to newly created informational needs). We are now in this phase of transgression that we cannot fully grasp because we lack a standpoint of distance. It is crucial to remind that potentials of the Internet are not fully realized, also due to antagonisms and contradictions in capitalism (Fuchs et al 2010). One way to approach this change is to picture the new quality of digital mediation, also in contrast to previous regimes of mediation (Giesecke 2002; Logan 2002).

The decisive quality of the Internet as a medium is, first, that within this medium non-codified information, such as text, music, and video, as well as codified information, such as software code can be processed and this, for the first time in history, allows to connect the general human use of information to complex information systems via a universal medium (Boes and Kämpf 2012, 325). Brew argues in this context that symbolical user interfaces for systems of codified information “make no good use of our sensorimotor abilities, and instead rely on our capacities for abstract thought. However, because people's sensorimotor abilities are usually better developed than their capacity for abstract thought, it pays to treat data and programs as manipulable, visible objects, when possible. As a result, the tendency in software development has been to devise programs in which data strings, (sub)programs and procedures are translated into visual icons and actions like clicking, ‘dragging’, and scrolling” (Brey 2008, 196). Second, the Internet integrates, at least in principle, “Web 1.0 as a tool for cognition, Web 2.0 as a medium for human communication,



and Web 3.0 as networked digital technology that supports human cooperation" (Fuchs et al 2010, 43). Third, the Internet allows the integration of inter-individual communication, cooperation and societal mass communication. The Internet is a medium of spatial, temporal, and informational convergence.

Giesecke (2002, 279) argues that the pre-digital cultural era neglects qualities, such as the revaluation of non-linguistic and non-visual senses, associative, affective, and circular information processing, social self-reflection instead of individual self-experience, interaction instead of mono-directional information flows, that are now fostered by ICTs. He speaks in this context about 'the vanishing of the central point of view'. The "the central perspective solves the problem of communication about our visible environment without interaction. Hence, a third party is enabled to make the same experiences as unknown beholders have done somewhere along the way" (Giesecke 1998, 9). As such, the central perspective enabled the enormous development of productive forces and technology. However, the central perspective has simultaneously reduced multimediality, which is "is one of the inborn attributes of the human being" (Giesecke 1998, 13). The Internet revives multimediality and denotes the vanishing of the central point of view: "Our culture will recognize that it needs a variety of media as much as the conversation of the variety of natural biogenous species. By considering the past it will learn that all technical development has resulted in a disruption and singular use of senses and all multimedial installations reached only a percentage of possible integration and sensuality" (Giesecke 1998, 15).

This kind of convergence responds to societal mega-trends, such as globalisation and reflexivity that structure our productive needs to participate in the societal organisation and to gain agency. Reflexivity, gaining and testing new knowledge through simulation, building networks, and compressing spatial and temporal distances rebecomes necessary in the face of global threats, uncertainties, and interdependencies. The informational integration of cognition, communication, and cooperation thereby potentially allows for better transformation between concrete knowledge and abstract information or data. Thus, for a better balancing the tension between formalisation and experience because every boost of informatisation brings about new subjective necessities of appropriation into concrete practical contexts. The internet, in principle, serves productive informational needs as it connects information with contextual experience and knowledge. 'Digital needs' as the latest development of the informational qualities of participating in societal organisation (productive needs) then, to sum up, are best described as needs for informational convergence. While the quality of individual communication became dependent on its integration in mass media discourses with the rise of society and productive needs, the digital needs demands that abstract information and information distributed by mass media must re-integrated into concrete inter-personal forms of communication and cooperation.



7. Outlook: Need-Based Critique in (Digital) Capitalism

In this concluding section, I pose some thoughts about what this perspective on informational needs may add to a critique of capitalist conditions. This, of course, would demand a detailed critique of the political economy needs that I cannot provide here. Thus, my ‘outlook’ contends itself with general ideas that need to be substantiated. As I proposed in the introduction, capitalist societies should be criticised because of non-satisfied needs but also for subsuming need development to profits and for cutting off potentials of human flourishing. From the previous discussion, I think we can gain three critical arguments:

- First, having productive and informational needs is a feature of being a human and society should ensure their satisfaction.
- Second, it is a problem if productive and informational needs are restricted and people fall back to immediate forms of need satisfaction. Restriction of these needs means that without them the satisfaction of all other needs becomes less secure and loses its full satisfactory quality.
- Third, informational needs themselves are not fully satisfied if, society only allows to satisfy them on a less-developed level that does not coincides with the current historic level of the development of the productive forces.

In capitalist societies individuals face two main problems – exploitation and alienation. The social mechanism of exploitation creates and reproduces unequal life-chances and antagonistic interests among classes. The efforts and the capabilities of the workers are turned against them as capital, which confronts them as something alien. Exploitation fuels the profit principle that exercises itself against the will of all people in competition. Living in a capitalist society means that the means of satisfaction of productive and informational needs are antagonistically distributed; it, however also means that there are limits for everyone to satisfy these needs.

Individuals always must act after the transgression of the immediate. He or she can satisfy her needs under given circumstances or he or she can satisfy productive needs additionally and extend the opportunities of need satisfaction in general. In whatever condition the individual may be, there is this space of opportunity available because there is no total determination. Within this situation, it is subjectively understandable that individuals waive or limit productive need satisfaction and concentrate on already existing options to satisfy their needs. In capitalism, people restrict extending their life quality by participation in creating the condition within they must act because the risks entangled with this kind of agency are too high. This means for them there is an existential insecurity about actually achieving a higher level of agency and the threat to lose the current opportunities of need satisfaction. He or she can satisfy her needs under given circumstances or he or she can satisfy productive needs additionally and extend the opportunities of need satisfaction in general.

Critical Psychologists term this twofold range of options ‘restrictive’ or ‘generalised agency’ (Holzkamp 2013, 23f.). The former is sustaining agency by accepting dominant conditions and making a deal with partial interest, for instance capital. Restrictive



tive agency externalizes the costs of sustaining the own agency to others that loose agency. For instance, trade unions make a deal about job securization by the expense of precarious. Restricted agency although subjectively functional is however not sustainable in the long run. This is because need satisfaction is still dependent on the will of others and therefore principally combined with the fear of a situation within which it is not granted by the powerful. As restrictive agency is still agency, this critical perspective orients us away from users as dumps or deluded towards to their participation in ideologies and domination because there are subjective reasons to choose restricted agency.

Many informational problems then could be re-interpreted in the proposed theoretical framework. I think it is worth to think about information, communication, and media in the framework of restrictive or generalized agency. Critical arguments can be gained in the face of horizon of generalised informational agency when people create their own or appropriate means of communication to cooperatively change societal meaning structures and generalise the conditions within which they live:

- First, from the perspective of informational needs as a form of productive needs, it becomes clear that the victimization of users in the context of privacy threats through commercial service providers is problematic. By victimization of users, I mean the assumption that people freely chose to use commercial social media. Consequently, they must simply accept, for instance, privacy threats that are specific to advertising based business models driven by economic user surveillance (see Sevignani 2016). And that they are responsible for their privacy self-management. There is, however, a need of using digital media that founds a subjective force to use social media that are currently accompanied with several disadvantages mainly caused by their commercial quality. So, I think we can assume that the exclusion from social media equals a threat to humanity.
- Second, the problem of filter-bubbles and the reproduction of one-sided information processes could be interpreted as falling behind possible informational productive needs. Driven by interests of the advertising industry to precisely categorise, identify, and approach users, people de-couple from discourses that aim at societal self-understanding but reproduce specific class positions. This is because mass media communication on the level of society determines the possible range of contents that can become kept in a bubble in the first instance. Without the participation in societal communication and the opportunity to have a say in which meanings structures or ideologies are created the informative value of filtered news is insecure. We then can ask to which extent social media communication enables societal communication and when it falls back to forms of communication that do not meet people's societal nature. On the other hand, capital can make use of productive and communicative needs. This is sometimes discussed as the transformation of needs to desires in a consumerist culture. Desires have qualities similar to productive needs. They do not vanish with consumption. Desiring, for instance, an iPhone promises to satisfy not only specific functional



needs but its commodity aesthetics also promises to satisfy productive needs of being accepted, connected, in control etc. One cannot get enough of these qualities. Thus, it motivates us to buy the newest version of this device. However, this is a form of restrictive agency because the iPhone is still a luxury good, and not everybody can have one or it would lose its appeal if everybody has one and the commodity cannot hold true what it promises.

- Third, the problem of de-politication of information processes and the Internet's underdevelopment in terms of Web 3.0 applications (Fuchs et al. 2010) then could be interpreted as restrictive agency. The Internet potentially fosters because the necessary re-appropriation of information in concrete contexts and subjective knowledge but exactly these technological potentials (Web 3.0) are currently less developed. One reason for this might be that such applications can challenge hierarchical information processes in a society that is structurally based on social inequality.

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