

# Metacontradictions:

## A Social Psychology of Contradictory Motives in Distributed Activities.

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### Abstract

In this paper, the impact of distance and distribution on actions is tackled from an activity-theoretical perspective. I apply the psychological principles of consciousness and contradictions to analyse a remotely-distributed work-integrated learning project. The results and analysis reveal *metacontradictions* between “central” and “neighbour” activities, in Engeström’s (1987) parlance. While Engeström argues that internal contradictions are primary and that they further generate external (secondary, tertiary and quaternary) contradictions with ‘neighbour’ activities, our analysis, however, reveals a different pattern: that contradictions between central and culturally more advanced central activities are rather primary and subsequently shape internal contradictions that are secondary. Based on these arguments, I discuss the implications of metacontradictions in analysing individuals’ actions in a distributed activity.

**Keywords:** Metacontradictions, Consciousness, Distribution, Activity.

## 1 Introduction

The distribution of human activities in contemporary times is a reality that cannot be disregarded in our need for a proper understanding of human activities. This reality has emerged as a result of a combination of the expansion of erstwhile localised activities and technological advancements aimed for the achievement of greater efficiency in work and learning activities. It is well known that remote distribution is essentially and profoundly different from localisation or centralisation; however, the social psychological intricacies of distribution are often simply taken for granted as mere quantitative additions to localised activities and subsumed narrowly under localisation-based conceptualisations. We must not ignore the more important qualitative dimension of the problem. Distribution engenders several qualitative challenges of coordination, communication and cooperation of human actors and their actions (Olson & Olson, 2000). Also inherent in distribution are the various degrees of mobility of humans, artefacts and information between and within locations in which actions are performed. As integral parts of an activity, the meanings of these actions and the personal senses made of them by actors become critical issues of consideration in the organisation of distributed activities. Leont’ev (1981) refers to this mental conflict between meaning and personal sense as “contradictions of consciousness.” Since contradictions are inevitable attributes of activity (Engeström, 1987), an exposition of the origins of these contradictions and the new forms they assume in distributed activities are critical necessities for understanding the nature of actions in distribution.

Contradictions are directly related to consciousness; and the problem of consciousness lies at the heart of the social psychological interpretations of actions. Evidence of this can be seen in the efforts of researchers like Vygotsky (1979), Leont'ev (1978; 1981), Piaget (1952), (Il'enkov, 1977) and James (1904) whose explications on the relationship between consciousness and actions have been influential in developmental psychology. Consciousness is the prism through which we can clearly discern and understand contradictions and actions. In his proposition of the theory of "Expansive Learning", Engeström (1987) submits that inner contradictions are primary and that they further generate external (secondary, tertiary and quaternary) contradictions with "neighbour" activities. However, since consciousness and contradictions are closely related at every stage of the internalisation and externalisation efforts of individuals in an activity, I argue, in harmony with Vygotsky (1962) and Leont'ev (1978; 1981) and against Engeström (1987), that the origins of contradictions are directly related to the origins of consciousness – external and not internal.

Engeström's explications of contradictions between a "central" and its "neighbour activities" shows the rich interrelationships which shape the consciousness of the individual actor. In his attempts, he placed human activities within the context of other interrelated activities, and further argued that the problems in human activities must be sought within the contradictions between these interrelated activities. However, while his expositions put activities into context, their inadequacy lie in his lack of differentiation between localised and distributed activities. His attempts also fail to tackle the power and political forces which lie beneath and influence the nature of contradictions which characterise distributed activities. Such omissions undermine any meaningful efforts to study the contradictions inherent in contemporary remotely distributed activities, especially given current technological advancements that have immensely reduced, but not eliminated, distance and time barriers in communication, collaboration and coordination. In this respect, it is imperative to transcend existing conceptualisations of contradictions in localised activities to tease out the nature of contradictions in distributed activities.

Thus the aim of this paper is two-fold: first, an attempt to re-conceptualise the origins of contradictions based on an activity-theoretical discussion of the social psychology of the origins of consciousness; and second, an application of this re-conceptualised schema to examine the nature of contradictions in a distributed work-integrated learning activity. My analysis lead to the submission of the concept of *metacontradictions* as a fundamental attribute necessary for understanding the origins and implications of contradictions in distributed activities.

The next section presents a review of the Activity theoretical foundations of my arguments. Following this, I present the findings of an empirical study of a distributed work-integrated learning activity, leading to the analysis of the origins of consciousness. Next, the significance of distance and distribution in an activity are discusses to unearth the concept of metacontradictions. This paper concludes with explanations of the implications of metacontradictions in terms of distributed actions.

## **2 Activity, Consciousness and Contradictory Motives**

### *2.1 The Theory of Activity*

The philosophical assumptions of the Activity Theory (hereafter AT) are founded on the following ontology: every human activity is conducted by a *subject* who pursues an *object* with a motive to transform the *object* into a product or *outcome*; the relationship between the subject and object is always mediated by some physical and psychological *tools*. In a collective activity, during which an individual collaborates with others to perform an activity, an activity is intrinsically complicated by the *community* of collaborators, the tacit and

explicit *rules* which regulate their actions, and the implicit and explicit *division of labour* which manifest (see Figure 1).

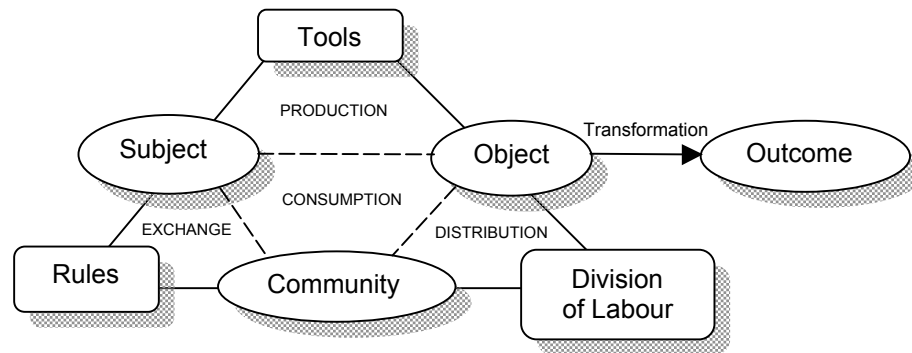


Figure 1: The Activity System [Source: Adopted from Engeström (1987)].

Essentially, the activity system suggests that the transformative relationship between the subject and object elements is mediated in varying forms and degrees by the other elements – tools, rules, community and division of labour.

An activity is driven by a *motive* that “answers a definite need of the subject, is directed toward an object of this need, is extinguished as a result of its satisfaction, and is produced again, perhaps in altogether changed conditions” (Leont’ev, 1978, p.62). This motive results from stimulation in the consciousness of the subject by biologically- and environmentally-satisfying external objects. The object may be “either real or ideal, either present in perception or exclusively in the imagination or in thought” (*loc. cit.*). The general macrostructure of an activity encompasses both mental and physical components that are constituted by a series of conscious and goal-directed *actions*. These actions are also constituted by subconscious *operations* (see Figure 2).

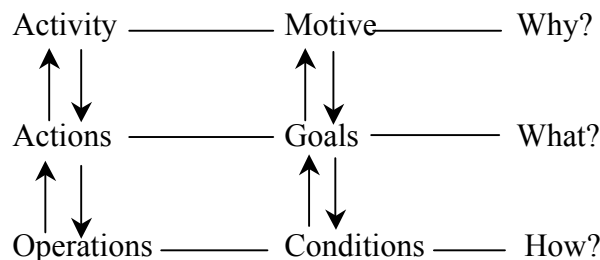


Figure 2: General Macrostructure of an Activity [Source: Leont’ev (1981)].

The motive that drives an activity answers the question *why*, and the intentional characteristic of goal-directed actions is a response to *what* must be achieved. Goals are necessarily intermediate and partial outcomes that are achieved by separate actors in a collective activity. However, they are achieved in specific *conditions* that represent a problem of *how* or through what means. The “how” problem is consistent with the range of executable *operations*. An operation is a methodical aspect of an action “which is determined not by the goal in itself but by the objective conditions of its achievement.” (Leont’ev, 1978, p.65).

Depending on the “personal sense” made of one’s goal-oriented actions, those goals may be serving the motives of different activities, and the different motives may have contradictory personal senses to the subject.

“It follows from it that the aim of one and the same act can be cognised differently, depending on what motive precisely it arises in connection with (...). Depending on what activity the action forms a part of, it will have one psychological character or another.” (Leont'ev, 1981, p.404-405)

The activity-actions-operations levels are interrelated in the sense that any one of them is transformable into the next:

"Activity may lose the motive that elicited it, whereupon it is converted into an action realizing perhaps an entirely different relation to the world, a different activity; conversely, an action may turn into an independent stimulating force and may become a separate activity; finally, an action may be transformed into a means of achieving a goal, into an operation capable of realizing various actions." (Leont'ev, 1978, p.67).

For example, conscious actions may develop into subconscious operations through a continuous learning and skill development process. However, given that an operation is shaped by the goal that is given in certain conditions requiring a certain mode of action, operations may also degenerate into actions when the subject encounters adverse conditions in an activity.

## 2.2 *Consciousness and Contradictions*

A central feature of an activity is its productive character – its orientation to transform an object into a static product. According to Leont'ev, an activity is terminal, that is, it is “extinguished” at some point where the product absorbing the activity is realised. This phenomenon is a reflection of Marx’s interpretation of human labour: “a transition of static activity into a static product.” (Marx 1909). Given that the product of an activity does not yet exist at the beginning or during the performance of the activity, the transformation proceeds only by virtue of an idealisation of the product of activity – the creation of a mental representation of the material properties of the outcome by the subject. These mental representations are conscious creations of conscious reflection.

“... the mental image of the product as a goal must exist for the subject in such a way that he can *act* with this image — modify it according to the conditions at hand. Such images are conscious images, conscious notions or, in other words, the phenomena of consciousness.” (Leont'ev, 1978).

The notion of consciousness which postulates an extraction of mental representations from external reality challenges the idea that mental images are original and genetic images of individuals that are projected into the world (*Ibid.*). Vygotsky’s theory of child learning, espoused in agreement with Leont'ev and in challenging Piaget (1970), postulated that the child’s first thoughts revolve around images and speech that are derived or extracted from its external environment, and not the other way round. Il’enkov (1977), also used his knowledge of the *ideal* to corroborate this actuality: “...both will and consciousness are determined by this ideal form, and the thing that it expresses, ‘represents’ is a definite social relationship between people...”. Consciousness in activity, therefore, implies internal conscious reflection of external activity as the origin of thinking and not external activity emanating from internal thought processes. Of course from the beginning, the subject is conscious of the objects of his surrounding environment, but this is what Leont'ev calls *image-consciousness*, which is related to direct visual perception. However, consciousness is not a matter of the subject’s formation of mental images of static or passive objects; rather, consciousness implies continuous imaging of an activity: the subject’s imaging of his or her interaction with and transformation of the object. Here, activity also becomes an object of consciousness; and consciousness becomes *activity-consciousness*.

It is through consciousness that an activity is sustained, by availing to the subject an idealised image of the material product of activity. This idealisation of activity through

imaging and language presents an opportunity for the subject to perform mental transformations of the object to an extent far greater than what would be possible in external activity. Through activity-consciousness, “man becomes aware of the actions of other men and, through them, of his own actions. They are now communicable by gestures or oral speech. This is the precondition for the generation of internal actions and operations that take place in the mind, on the ‘plane of consciousness’” (Leont'ev, 1978).

Meaning has a dual existence on the individual plane of consciousness – personal subjective sense and objective meaning. Personal senses are not independent phenomena; they are meanings formed from objective meanings. Objective meanings are culturally- and historically-evolved ideals that are assimilated from early stages of ontogenesis. The knowledge of objective meanings is drawn from Vygotsky’s theory of child learning: the child’s assimilation of “‘ready-made’, historically evolved meanings [that] takes place in the child’s activity during its intercourse with the people around it” (Vygotsky, 1978). Objective meanings derive from the development of language, and obey the socio-historical laws and inner logic of their development. Language is “the product and means of communication of people taking part in production. [It] carries in its meanings (concepts) a certain objective content, but content completely liberated from its materiality.” (*Ibid.*). It is the combination of activity-consciousness and the use of language that underpin the learning and development of the human subject. They are the original basis of cognition of the individual as he or she engages in social interaction and conscious actions. They “express the movement of science and its means of cognition, and also the ideological notions of society – religious, philosophical and political” (*Ibid.*).

However, the personal demands of individuals as they engage in conscious actions embodied in activities lead to the individualisation and subjectivisation, but not the destruction, of objective meanings. Regardless of whether the individual is conscious or unconscious of the motive of an activity, there is a conscious personal evaluation of the immediate objective circumstances, leading to the personal sense-making. Thus personal senses become refractions of objective meanings by means of the individual’s unique characteristics such as needs, emotions, previous and current experience, temperament and personal principles.

Personal senses vary from objective social meanings by degree. The greater the degree of refraction, the more confrontational or ‘controversial’ the individual becomes; and if the individual persists in the objectivisation of his or her personal senses through external activity, the process can result in alienation and/or an innovative outcome. Learning and innovation are thus factors of the forms of personal senses that subjects make of the objective meanings during the performance of conscious actions.

Personal sense-making out of the objective social meanings underlying the motive of an activity makes the principle of consciousness very resourceful in analysing contradictory motives and their origins. It is an analytical tool which augments an understanding and interpretation of the impact of external mediating elements in an activity.

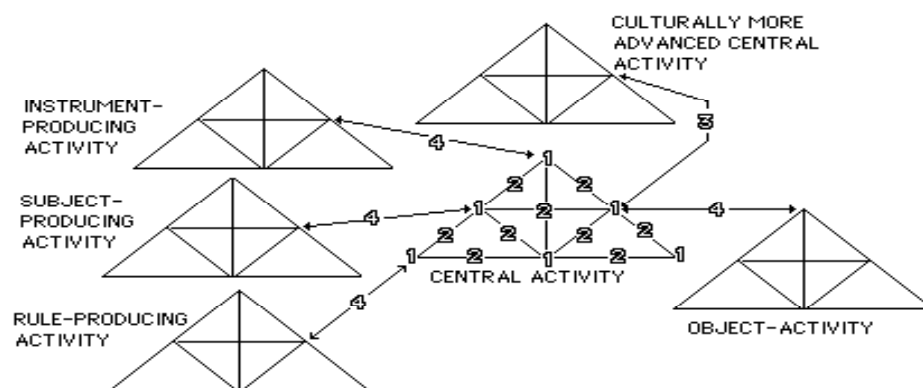
The personal sense and objective meaning of goal-oriented conscious actions may generate contradictions because, in a capitalist society for example, the personal sense of goals is oriented towards personal or “leading” motives (Leont'ev, 1981); and they often oppose the objective meanings of the goal that orients towards the motives of employers, or capital owners for that matter.

The fundamental contradiction in activity can be traced to the analysis of the “division of labour in society” by Marx in *Capital* (1909). Marx’s ideas are richly conveyed in the origins of division of labour in human activities that were aimed at the production of products; and subsequently, the intrinsic objectification of products into commodities. On the one hand, there was an original natural division of labour as a result of familial, tribal or communal

bonds shaped by differences in physiological features such as age and sex: this represented the first stage of subjugation of the individual by social forces. On the other hand, there was a subsequent division of labour resulting from differences between communities, tribes or families in terms of environment, means of production, subsistence, modes of living, and products. At the crossing point of two communities, “it is the spontaneously developed differences which...calls forth the mutual exchange of products, and the consequent gradual conversion of those products into commodities” (Ibid.). Interdependencies between societies are thus reified in the commoditisation of products and exchange; moreover, products assume an objectified social character.

The essence of Marx’s analysis lies in the exposition of the contradiction inherent in the nature of the product of activity – product as product versus product as commodity. As a product, it possesses a primary use value – valuable in its utility to the producer. As a commodity, it acquires a social exchange value in addition to its primary use value; these values co-exist as a contradiction in the consciousness of the producer (subject) respectively as the personal sense and objective meaning. “In the one case, it is the making dependent what was before independent; in the other case, the making independent what was before dependent” (Marx, 1909, p.344-345). To Engeström, “the essential contradiction is the mutual exclusion and simultaneous mutual dependency of use value and exchange value in each commodity” (1987).

This analogy of the contradictory nature of outcomes of activity is an illumination of the sociality of ‘individual’ activities. There is always some form of contradiction within each of the elements of an activity system that reflects an inner conflict between product-as-utility (use value) and product-as-value (exchange value) of the subject’s perception. The contradiction at the product- or outcome-end naturally results in inner contradictions within each of the elements of the activity system. For example, a school pupil can be caught in-between perceiving himself or herself as a grades achiever and as a learner. His contradictory perceptions will also apply to the instruments, rules, community and division of labour that mediate his or her studies. It is important to note, however, that this inner contradiction is derived from and shaped by external phenomena such as exchange and interaction with other communities.



- Level 1: Primary inner contradiction (double nature) *within* each constituent component of the central activity.
- Level 2: Secondary contradictions *between* the constituents of the central activity.
- Level 3: Tertiary contradiction *between* the object/motive of the dominant form of the central activity and the object/motive of a culturally more advanced form of the central activity.
- Level 4: Quaternary contradictions *between* the central activity *and* its neighbour activities.

**Figure 3: Four levels of contradictions within the human activity system**

[Source: Engeström (1987)].

“The 'neighbour activities' include *first* of all the activities where the immediately appearing objects and outcomes of the central activity are embedded (let's call them object-activities). *Secondly*, they include the activities that produce the key instruments for the central activity (instrument-producing activities), the most general representatives being science and art. *Thirdly*, they include activities like education and schooling of the subjects of the central activity (subject-producing activities). *Fourthly*, they include activities like administration and legislation (rule-producing activities). Naturally the 'neighbour activities' also include central activities which are in some other way, for a longer or shorter period, connected or related to the given central activity, potentially hybridizing each other through their exchanges” (Engeström 1987).

The coexistence of contradictions within elements of the activity system on the plane consciousness (first and second levels) is an elaboration of Leont'ev's conceptualisation of objective social meanings and their subsequent subjectivisation into personal senses by a subject. The most outstanding contribution made by Engeström's levels of contradictions is found in his conceptualisation of the relationship between an activity and “neighbour” activities – phenomena which are not much discussed in the works of Leont'ev.

### **3 Work-Integrated Learning as a Distributed Activity**

To examine the origins and implications of contradictions, I studied a distributed work-integrated learning activity which was conducted as part of the employment reforms of the National Health Service (NHS) of United Kingdom. A more detailed account of this empirical study has been documented elsewhere (Wiredu, 2005), and thus only an epigrammatic version of this account is presented to reveal the necessary data required for understanding our problem.

The key driver of this learning activity was the European Union Working Time directive (EUWTD) which required the weekly working hours of UK junior doctors to be reduced from 72 as of January 2003 to a maximum of 58 by August 2004. In fact, the legislation stipulated that by August 2005, their maximum number of weekly hours must not exceed 48. As of January 2003 until August 2004, the legislation was not being enforced; however, it has been in full force since August 2004. Thus, the EUWTD placed pressure on arrangements for medical cover within UK hospitals. Since the production of junior doctors in UK was suffering at the time, and even the training of many more of them was expected to take more than a few years to complete, pressure was mounting on the NHS to fill the impending vacancies with a new category of health professionals. A looming crisis in the NHS had to be dealt with immediately.

As a measure to tackle this looming crisis, the Changing Workforce Programme at the Department of Health (DoH) instituted a training project to tackle the mandatory reduction in the workload of junior doctors. This project – Peri-operative Specialist Practitioner (PSP) project – was aimed at introducing a new medical professional role to expand hospital surgical teams. It was also aimed at providing patients with comprehensive integrated care before and after an operation. The PSPs would take over some of the activities that were erstwhile performed by junior doctors. The essence of integrated care was to afford every surgical patient a stable relationship or affiliation with a single PSP throughout their stay in hospital, rather than a fragmented series of contacts with different healthcare workers. The new role was also aimed specifically at peri-operative management for elective and emergency surgical care which comprises of a range of diagnostic procedural skills. The new

practitioners would assume many of the diagnostic and procedural responsibilities carried out by junior doctors.

It was expected that the training project would rely on operational flexibility to provide a constructive response to the EUWTD. The project took an activity-oriented approach that was driven by clinical needs and underpinned by accountable assessment of competence. These included per-operative clinical assessment, routine post-operative monitoring and care, identification and management of post-operative complications, and determination of fitness for discharge from hospital.

Each PSP worked and learned in the surgical team of his or her hospital. These surgical teams comprised of a consultant head, junior doctors and nurses of various levels in the hierarchy of the medical profession. In their learning, each PSP was supposed to integrate into their surgical team and develop their pre- and post-operative care skills. According to prior agreements with the project team, the consultants – the leaders of the surgical teams – were supposed to facilitate the integration of the PSPs into their teams and ensure that they achieved optimum learning experiences.

The project was a full-time learning activity that lasted for one year from April 2003 to April 2004. and the trainees were drawn from existing medical staff who served in various capacities in hospitals under the NHS scheme. It was work-integrated because they trained in the same hospitals in which they used to work in different locations across UK, and their learning and skills acquisition were undertaken within the work practice of their hospitals. The activity was also distributed because it consisted of two components: intensive one-week training modules conducted at Imperial College London that alternated with longer periods (mostly six weeks) of supervised clinical practice within the surgical team at each trainee's hospital.

This arrangement allowed the classroom-based skills learnt during training sessions in London to be consolidated, tested and extended in the hospital. These skills included pre-operative assessment and investigation; understanding normal and abnormal states of sutrival patients; identification and treatment of common and important complications; and, carrying out clinical procedures including taking patient histories, ordering tests, taking blood and putting up intravenous infusions. The distribution also engendered both remote and local human mobility: remote mobility ["traveling" (Kristoffersen & Ljungberg, 2000)] of each trainee between his or her hospital and the London training centre, and local mobility ["wandering" (*ibid.*)] of each trainee with the hospital as a participant in the surgical team's routines.

In order for the project team to monitor, control and "scaffold" (Salomom & Perkins, 1998) the distant actions of the trainees, each of them was given a Personal Digital Assistant (PDA) equipped with software which would allow the trainees to log their actions instantly, and write reflections-on-action (Schön, 1983) at the end of each day.

The results of this pilot project would be fed into the institution of subsequent mass-scale training schemes.

### 3.1 *Findings: Problematic Learning Conditions*

The accounts of the PSPs pointed to considerable interpersonal problems in their hospitals which were directly confrontational as far as their actions were concerned. They reported of serious encounters of resistance and non-acceptance by their surgical team members. This was not too surprising given the volatility and novelty of the new role; it was also not too surprising given the natural uneasiness on the part of the surgical team members as they comprehended PSPs who would end up higher in the ranks above most of them.



These resistances manifested in the PSPs over-acting or under-acting in the performance of their clinical actions in their hospitals. Some of them reported, on the one hand, that they could perceive overt and covert tactics of rejection and resistance on the part of surgical team members which stifled their participation in patients care. On the other hand, in instances where their participation was not stifled, they were overloaded with tasks by their team members. For example three of them complained bitterly that in much of the time spent with their teams, their roles were reduced to running errands which constituted total aberrations as far as their learning objectives and actions were concerned.

More importantly, the nature of work-integrated learning which this project exemplified entails elements of pragmatism which coerce learning participants to concentrate more on the work. In healthcare, the pragmatic demands of patient care overrides and overwhelms any other concerns, and therefore it was not surprising to hear them reporting that the clinical demands of patient care did not make possible the contemporaneous utility of the PDAs.

All these forms of conditional problems were attributable to the immediate control exerted on the actions of the PSPs by their team members. While the project leader instituted some measures to exercise remote control over their actions through mobile technology, these measures were significantly supplanted by the immediate control of the surgical team. For example, the distant project leader's aim laid in the skill development of the PSPs which contrasted with the surgical teams' leaders' aim of efficient and effective healthcare delivery for their patients. Since mobile computing was instituted as part of the project leader's controlling measures, and since the surgical teams were less concerned with mobile computing and even largely opposed to it, it was always going to be difficult for the PSPs to compute on-the-move during their clinical duties. The balance of control between the surgical and project teams, therefore, played a dominant role in shaping the clinical actions of the PSPs in their training.

#### **4 On the Origins of Contradictions**

The PSP training project was a collective activity in which the PSP was the learning subject who was motivated primarily by the transformation of external and intangible pre- and post-surgical care skills – the object – into internal knowledge. The activity was mediated, on the one hand, by psychological tools in the form of the surgical cultural-historical ideals – the jargons, concepts, mannerisms, etiquette and procedures that identify the surgical role; and, on the other hand, by physical tools such as portable computers, paper-based learning portfolios, surgical instruments and simulation technologies. As a collective human activity, it was undertaken within a community of other PSPs, medical professionals and the entire network of stakeholder hospitals and institutions. The relationship between the PSP and this community was mediated by the implicit and explicit learning rules that governed their actions and operations. These rules produced the specific mobile and remotely-distributed conditions within which the goals of learning actions would be achieved. Finally, the relationship between the community and the learning object was mediated by the distribution of the learning tasks – division of labour – among the stakeholders. These relationships defined the activity system (Figure 4).

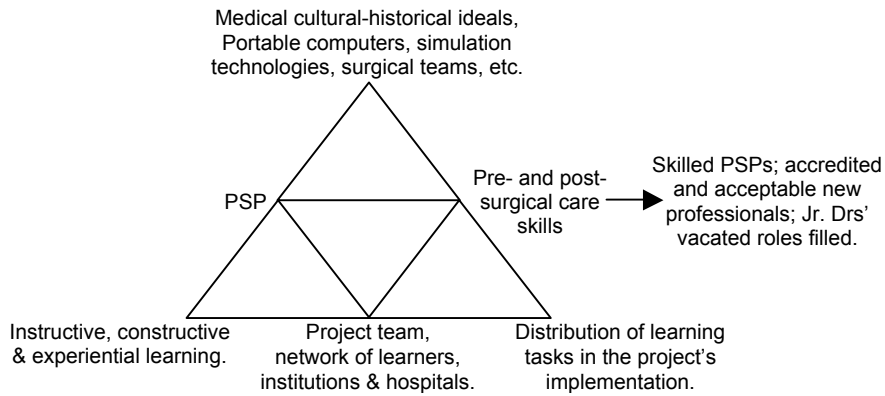


Figure 4: The Central Activity System of a PSP.

The system represents, in Engeström's (1987) phraseology, the *central* activity of the PSPs which represents the unit of our analysis. It is central because it is the perspective from which we can properly understand the relationship between contradictory motives and their manifestations in actions. The outcome of this central activity was the transformation of the PSP into accredited and acceptable new medical professionals capable of delivering effective pre- and post-surgical care, and to assume most of the junior doctors' vacated roles. It is important to observe, however, that the motive behind this transformation was not necessarily engendered by the PSPs; rather, it introduced by the project team who, in this instance, were the representatives of the cultural underpinning of the medical profession and its looming crisis. The PSPs adopted this motive because it was "only understandable" (Leont'ev 1982) from their individual perspectives.

While the project team, as subjects of a "culturally more *advanced* central activity"<sup>1</sup> (advanced activity hereafter), were motivated by the PSPs' skills development, the PSPs, in responding to their personal and professional needs, adopted this "only understandable" motive to share the outcome. This adoption ensured that the central activity of the PSP was intertwined with the advanced activity of the project team. In this picture, the outcome appears to satisfy the motives driving the two activities. Indeed, it was not merely the outcome and motives of the advanced activity which were shared or adopted by the PSP; its tools, rules, community, division of labour, and associated actions were all shared with the central activity.

However, their subjects and objects were not shared or identical, and this was not trivial. In truth, these activities were significantly dissimilar in the sense that while the central activity had the PSP as its subject and the intangible and external peri-operative skills as its object, the advanced activity had the project team as its subject with the PSPs themselves as its objects. And because one activity is distinguished from another by its object which gives it a "determined direction" (Leont'ev, 1978), these different objects gave the two activities different directions and orientations.

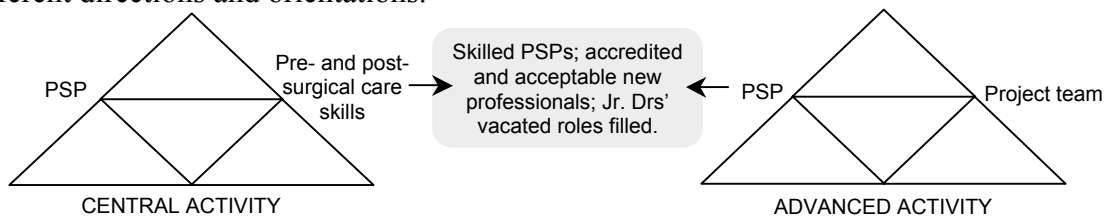


Figure 5: Interaction between the central activity and culturally more advanced central activity depicting the shared outcome.

The actions of the advanced activity, conceptualised in anticipation of the conditions within they would be executed by the PSPs, entailed objective meanings derived from cultural-historical origins that reflected the culturally more advanced motive. However, the empiric and pragmatic conditions in which they performed the designed learning actions were overwhelming and largely unexpected. For example, the resistances and uncooperative attitudes of other medical professionals in their surgical teams; the perception of the PSPs as threats to their roles; the territorial disputes; the mobile nature of their learning; and the life-and-death actuality of dealing with real surgical patients as an integral aspect of the learning process, were all intrinsic daily challenges which conditioned their actions and stimulated their personal evaluations of those actions. The instinctive reaction is always the subjectivisation or personalisation of the pre-conceptualised objective goals of those actions. For example, they were coerced to demonstrate their usefulness to appease the sceptics, cynics and resisting agents in their surgical teams. To wit, these conditions within which the PSPs performed their learning actions guided a metamorphosing of the goals of the actions of the central activity to contradict those of the advanced activity. In short, the practicalities and realities of the learning conditions that confronted the PSPs caused a reshaping of the goals of their actions.

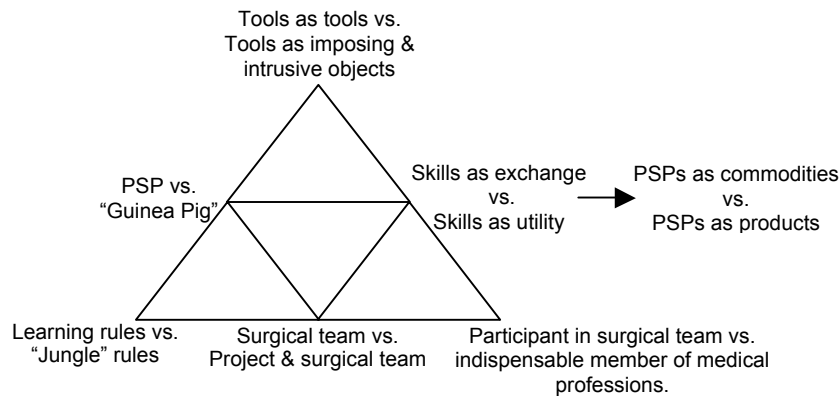
Therefore, at a superficial level of analysis, the outcome shared by both sets of subjects seems to be mutually supportive. However, beyond skills acquisition, the PSPs' subjective sense-making and the objective meanings championed by the project team spawned two supplementary but contradictory motives: respectively, the PSPs' demonstration of their personal utility to their surgical teams and hospitals; and national accreditation and countrywide acceptability of the new professional role by, most notably, other medical professionals. The former, analogous with the central activity, mirrors the skilled PSPs as products of use-value, while the latter, which relates to the advanced activity, reflects the skilled PSPs as commodities of exchange-value in the wider society. Note that this "double nature" (Engeström, 1987) was a result of a dialectic of perceptions embedded in the consciousness of the PSPs between their individualistic motive of subject-production in the central activity on the one hand, and subordination to the advanced activity's collective motive of object-production on the other hand. The personal sense made of the objective conditions, and hence actions, contradicted the objective meaning of the goals of the advanced activity. Therefore, the origins of sense-making by the PSPs were rooted in this first and external contradiction: the conflict between the PSPs' central and the project team's advanced motives.

To understand the origins of contradictions in an activity, it is important to emphasise the fact that the trajectory of any individual's ontogenesis is replete with his or her multiple activities and associated motives in varying degrees of contradictions and relationships. What becomes the "leading motive" (Leont'ev, 1981) for an individual at any time is dependent on several conditions which cause his or her multiple motives to drift. Leont'ev's explanations of contradictions rendered the concept a fundamental trait of consciousness:

"... a closer examination of the general picture of man's life in a capitalist society brings out not only its dual character but also its inner contradictoriness. (...) [they] are usually called contradictions of consciousness and sometimes, more expressively, torments of consciousness." (*Ibid.*, p.258).

The surgical teams' activity represented the object-activity within which the peri-operative skills – the object of the central activity – were embedded. Information technology, software engineering and computer science, which gave birth to the PDA and its applications, constitute the instrument producing activities. The subject-producing activities include the previous medical training, which had shaped the PSPs into nurses and operating department

practitioners, and therefore ensured their eligibility to enrol in the project. The EUWTD, the administrative arrangements of the project, hospital regulations, and accreditation requirements were the rule-producing activities that influenced the training of the PSPs. To a large extent, the central activity of the PSPs constantly interacted with representations and reifications of these “neighbour activities.” In concurrence with the advanced activity, they constitute the external environment of the central activity, and are represented in various forms – tangible and intangible – in the objective conditions which shape actions.



**Figure 6: Inner contradictions within the elements of the central activity.**

These inner contradictions are results of the internalisation efforts of the PSPs through continuous sense-making of the goals of their actions. Internalisation is a conscious mental reflection of the objective world in which subjective representations of the objective world are formed in the internal “plane of consciousness” (Leont’ev, 1978). What was internalised by the PSPs at the institution of the project was an image of the shared outcome – PSP as commodity. However, that was mere “image-consciousness” (*ibid.*) corresponding to fantasy and hapless flight of imagination. Later, their proper “activity-consciousness” (*ibid.*), which derived from the actual learning experience, and which generated the motive of the central activity, resulted in the internalisation of a contradictory personal outcome – PSP as product. This internalisation process was grounded on an inter-psychological antecedent of external contradictions between the central and the advanced activities.

Intra-psychologically, activity-consciousness resulted in the search for an identity: necessarily about how the PSPs perceived themselves against how others saw them. Indeed, the aims of the project were clearly explained to the PSPs at the beginning; but the mere fact, for example, that full accreditation of the role was not promised at the beginning nor at the final evaluation was sufficient for the PSPs to see themselves as “Guinea Pigs” of the pilot project rather than new surgical professionals. Therefore as subjects of the central activity, they made sense of their actions based on an inner identity contradiction between PSPs and Guinea Pigs.

They also made sense of the peri-operative skills as an object of utility or object of exchange; this sense-making mode was also a result of external contradictions between the PSP’s central activity and the surgical team’s object-activity. For example, each PSP represented a tool of their surgical team’s object-activity which motive was a transformation of patients through surgery. Based on the product-commodity contradiction, the PSP’s sense of the object-activity was founded in contradiction between, first, a parochial discernment of the peri-operative skills as objects of utility whose transformation would lead to the skilled

PSP as a product; and, second, a holistic perception of those skills as exchange objects whose transformation would result in the skilled PSP as a commodity.

The actions and operations, which constituted the actual learning experience, were performed with the support of the physical and psychological tools. However, the utilisation of these tools was subject to the impact of external rule-producing and instrument-producing activities. The relevant outcome of the rule-producing activities manifested in the instructive, constructive and experiential pedagogical principles; these further underpinned the development of the custom applications of the PDA. The learning rules dictated the remote mobility and distribution of the PSPs and their learning – distance and distributed learning – leading to the critical need for remote monitoring. The direct outcome was the deployment of the PDAs, and to this end, they were expected to be supportive tools whose performance would constitute actions of the central activity, at least. However, their actual learning experiences were rather dominated by informal (“Jungle”) rules and norms of their surgical teams – of the object-activity – which challenged the pre-designed learning rules from the very beginning. For example, the jungle rules dictated the local mobility and actions of the PSPs that did not allow the desired contemporaneous use of the PDAs. Thus, against the background of the contradictions with the advanced activity, the PSPs perceived the PDAs as imposing and intruding objects that were at odds with the supportive tools notion promulgated by the project team. The results of the case showed that, had it not been abandoned, it would have generated another activity altogether.

In addition, the learning community of stakeholder hospitals and institutions, which corresponds with the advanced activity, and which represented the embodiment within which the PSPs would identify themselves as professional participants, could not manifest. Rather, their surgical teams represented their narrow community within which their actions found their meaning and were directed. The division of labour was also affected: there was a contradiction between the planned PSP as an indispensable medical professional and the resultant PSP as a mere participant in his or her surgical team.

In the formulation of his four levels of contradictions, Engeström built upon Leont’ev’s idea of “inner contradictoriness” (Leont’ev, 1981) and concluded that “internal contradictions find their outward expressions in external ones” (Engeström 1987). To Engeström, both internal and external contradictions are fundamental in human activities; and they are even more pronounced in sanctioned activities such as work and learning. Inspired by Bateson’s (1972) concept of “double bind”, he coined the phrase “double nature” to refer to the inner-contradiction that manifests in contradictions of each element of the central activity. He called this the primary contradiction which implies that it is the original form of contradiction that leads to other forms; that is, the secondary, tertiary and quaternary contradictions that follow.

However, the analysis of the case reveals a different picture; that the contradictions between the motives of the central (or leading) and neighbour activities, and hence between the PSPs and their authorities – instructors, bosses, organisations, and society – are rather primary. Primary contradictions lead to the “double nature”, inner-contradictions that signify the intra-psychological or consciousness facet of an activity. This distinction or clarification is important because it directly relates to the age-old psychological problem of the origin of consciousness that dominated arguments between Vygotsky and Piaget in the 1930s. The activity-based understanding of the origin of consciousness, based on Vygotsky’s and Leont’ev’s expositions, suggest that

“consciousness owes its origin to the identification in the course of labour of actions whose cognitive results are abstracted from the living whole of human activity and idealised in the form of linguistic meanings. As they are communicated, they become part of the consciousness of individuals.” (Leont’ev, 1978).

“Interiorisation” is the term that Leont’ev used to describe the process of consciousness generation in an individual. Upon this, it is important to note that contradictions implicitly concern the persistent struggle between individuals and society<sup>2</sup>: its origins are found in the conflict between the motives of learner’s/worker’s central activity and those of the instructor’s/authority’s advanced activity. This inter-contradiction further and necessarily generates the intra-contradictions – inner contradictions – within the individual’s central activity or cognitive frame. By implication, the individual is eventually defined by a double identity in production. In learning, he or she is a subject of his or her central activity and an object of the advanced activity of the instructor; in work, he or she is a subject of his or her central activity and a tool of the object activity.

Based on these deliberations, I argue, therefore, that it is the external contradictions between the motives of the central and advanced activity that engender the contradictions in the outcome of the central activity; and it is the outcome contradictions that effected “inner contradictions” in all the other elements of the central activity system. Stated differently, the original or primary contradictions are external, and the subsequent inner contradictions are secondary and necessarily conditioned by the external contradictions.

We must also note, with interest, that the intrinsic conditions of distance, distribution and mobility in the project shaped the nature of contradictory motives that prevailed. In order to tease out the dynamics of these parameters in relation to contradictory motives and their degrees of influence, it is important to discuss the general significance of distance and distribution in human activities.

## **5 The Significance of Distance and Distribution in Activity**

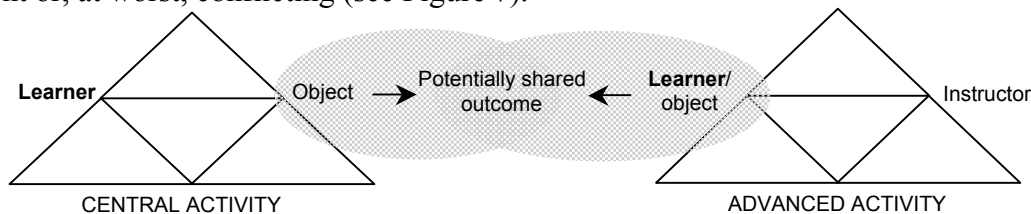
As I have argued, inner-contradictions are direct resultants of the personal sense-making of external objective meanings in the consciousness of the individual subject. These objective meanings are associated with the goals of actions, but it is the conditions within which these actions are performed that engender personal sense-making or subjectivisation of objective meanings on the plane of consciousness. In effect, it is the conditions surrounding an activity and their dynamics which engender both inner and subsequent external contradictions. These conditions are defined by their “social variables” (Bijker, 2001); in this regard, contradictions owe their existence to a high magnitude of social determinism (cf. Leont’ev, 1981). Since the remote distribution of an activity is inherently an essential condition, its significance can be found on its impact on contradictions, among other principles and parameters, within activities – work and learning activities in particular. Furthermore, since the social variables characteristic of localised activities are significantly different from those of distributed activities, we must expect the nature of contradictions generated in distributed activities to differ.

Our first obligation, therefore, is to explore the differences in contradictory characteristics between localised and distributed activities. It calls for a spelling out of the critical differences between the motives and contradictions which shape the actions of a localised activity and those which shape the actions of a distributed activity. Localised activities are performed in a contained or defined area where distance between individual subjects is insignificant, and where the instructor or authority is co-present within the area. Examples can be found in traditional classroom and office settings. Conversely, in distributed activities, the subjects are distributed in diverse and remote locations and, in most instances, the distribution is defined in relation to one particular location where the subjects converge or report to account to an authority (see a typical example in Wiberg and Ljungberg 2001).

### 5.1 *Contradictions of a Localised Activity*

Both localised work and learning are characterised by the proximity of individual subjects in production in a localised area, but their uniqueness lie in the relationship between the central, advanced and object activities. In the sense of this relationship, there are considerable differences between work and learning, which reflects in the kind of contradictions dominant in these activities.

In learning activity, the dominant motive is subject production – the cognitive transformation of the learners. It is characterised mainly by a contradiction between the central motives of the learners and the advanced motives of the instructors. These motives may be entirely different and even conflicting: for example, in the classroom, the learner whose motive of school-going is to meet with friends to play will always be in conflict with the instructor whose culturally more advanced motive is the cognitive transformation of the learner. To be fair, this form of contradiction is a feature of the early stages of human ontogenesis, when the child’s mind is predominated by play. In later stages, when adulthood is reached, studying replaces playing and learners tend to understand the culturally advanced motive as acceptable (Engeström 1987) or “only understandable” (Leont’ev 1982). The work-integrated learning case exemplifies this understanding that resulted in the adoption of the motives of the advanced activity by the PSPs. It must be said, however, that in the typical learning setting, the essential inner-contradiction directly reflects the identity of the learner: the learner identifies him- or herself as the subject of learning while the instructor identifies him- or her as a part of the objects to be transformed. This follows from the fact that while both parties potentially share the same outcome, their objects and motives may be entirely different or, at worst, conflicting (see Figure 7).



**Figure 7: Learning Activity depicting the differences in motives and the dual identity of the learner.**

The potentially shared outcome contains the “double nature” (Engeström 1987) contradiction of the value of the outcome. For example, is the outcome – the skilled individual – conceived to be an instrument of success demanded by the object activity or an instrument of learning content mastery? An instrument of content mastery signifies a product of primary use-value, while an instrument of success signifies a commodity of exchange-value in addition to the primary use-value. This double nature of the outcome or product of learning activity constitutes the consciously reflected image which must “exist for the subject in such a way that he can act with this image – modify it according to the conditions at hand” (Leont’ev, 1978). In other words, the image of the outcome, including its double nature, determines the will, consciousness and the personal-sense made of the transformative learning actions.

In this form of localised learning, there are two possible scenarios: On the one hand, both the learner and instructor are immersed in the object activity within which the learning object is embedded, as typified in workplace learning or on-the-job learning. On the other hand, the object activity may be removed from the localised setting leaving the learner to learn with either a mental image of the real object or its representation (see Il'enkov, 1974). The latter scenario is exemplified in learning through experiments and simulations. In the instance where all three activities feature co-presently in the learning activity, the object and advanced

activities are almost merged into one: the instructor remains the subject, and the learner and the learning object are his objects. The only difference here is that the erstwhile learning image or object representation becomes the real object. The significance of this merger of object and advanced activities is in the fact that the learner remains under the tutelage of the same instructor, and this is important as far as the control of learning actions is concerned.

In localised work, the relationship is rather dominated by a contradiction between the motives of the central activities of workers and the advanced activities of the authorities of the work organisation. Unlike learning activities in which the cognitive transformation of learners reigns as paramount, work activities are oriented towards object production. For example, the instructor in a learning activity is motivated by transforming his or her objects, the learners, into skilled products. His work, however, obtains its objective basis in the wider context of his or her institution or on the principles of the discipline that his or her instructions are founded. The economics of human labour (e.g. Marx, 1909) suggest that human labour is fundamentally a subsidiary aspect of the entire societal production; it is aimed at exchange, distribution and consumption in society. Societal production is objective because outcomes of activities are ultimately aimed at exchange, distribution and consumption necessarily by society and not by the producers. In collective work, for instance, the owners of the work capital are motivated by societal production that fulfils their capital accumulation needs, and also represents an advanced motive compared with the central motives of the workers. In short, human labour and activities are always subordinated to the motives of advanced activities.

The actions of a worker, although subordinated to others' advanced motives, are also ultimately aimed at satisfying his or her immediate needs; this is where the motives of his or her central activity are directed; and this constitutes the fundamental contradiction of motives in work. Leont'ev illustrated this fact with Marx's quotation:

“What [the worker] produces for himself is not the silk that he weaves, not the gold that he draws from the mine, not the palace that he builds. What he produces for himself is *wages*, and silk, gold, palace resolve for themselves for him into a definite quantity of the means of subsistence ...” (Marx, 1977 quoted in Leont'ev 1981, p.253)

This division portrays the fundamental contradiction in work – contradiction between the individual worker's central motive and the advanced motive of the authorities of the organisation which employs him or her. Again, the most extreme form of this contradiction reflects in the identity of the worker – a subject of his central activity and a tool of the imposing advanced activity. In a typical work setting, since the worker is directly involved in the object activity, his central and the object activity systems possess the same elements, although the motives of object transformation may also be contradictory (see Figure 8).

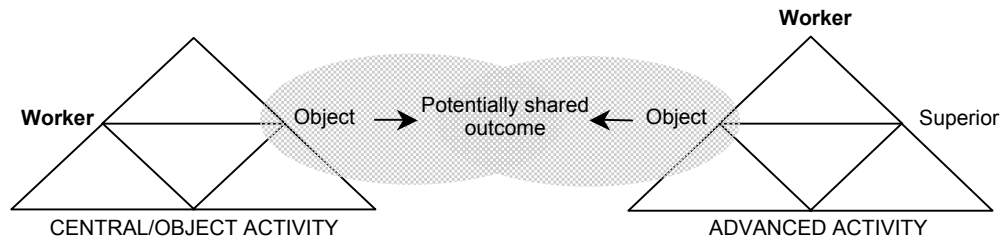


Figure 8: Work Activity depicting the differences in motives and the dual identity of the worker.

The significance of these clarifications lies in the fact that localised activities are always characterised by “double nature” contradictions. The actor's – learner or worker – central motive potentially conflicts with or is subordinated by an advanced motive. Therefore, the localisation of activities is necessarily characterised by the actor's disposition between



individual motives and the immediate organisational motives represented by the advanced motive. This translates into a direct unmediated relationship between primary (external contradictions) and inner contradictions (see Figure 9a). This unmediated relationship directly bears on the “double” sense-making of actions of workers or learners in localised activities.

## 5.2 *Metacontradictions of a Distributed Activity*

Compared with localised activities, a distributed activity is one which is performed in at least two remotely separated locations, and in which the worker/learner typically acts in one location away from authorities or instructors in the other. The distance between the worker/learner and the instructor introduce new problems of remote control, coordination and cooperation into the activity; but at the same time, distributed activities hold promise for efficiency gains especially when modern technologies are deployed to overcome distance and time barriers. Distance learning and remote work are new commonplace expressions used to describe contemporary distribution of human activities. A distributed activity necessarily increases the level of human mobility, as actors usually oscillate in-between two locations at least, and within one location as actions demand. The work-integrated learning case is an epitome of this form of distribution.

In a purposeful distributed activity – learning or work – the actor may perform two sets of localised actions, and this departs significantly from unitary localised activities in the sense that one authority or instructor can be co-present in only one localised area at any one time. In this respect, the actions that may count towards the same activity may be performed under different authorities and instructors from one location to another, as we beheld in the distant actions of the PSPs. Consequently, the individual may receive instructions from different authorities whose motives are contradictory. In short, the remote distribution of actions may complicate the contradictions associated with localised activities because of the likelihood of additional external contradictions between the motives of authorities in different locations.

Both learning and work activities exhibit similar characteristics when distribution becomes a factor in terms of the location of subjects and objects. For example, in distance learning, the subject, learning with either the real object or its representation is accountable to the instructor at some point but the immediacy of his or her environment may induce other contradictions into his or her activity. How, for instance, does he or she reconcile the learning activity with other immediate activities in the absence of the distant instructor? Distributed work is also confronted with a similar problem: the transformation of the work object usually occurs in a one location under an immediate authority whose motives may contradict those of the distant authority. Furthermore, work and learning are similar on the grounds that in nearly all instances, individuals' actions in a distant location represent their separation from their authorities/instructors who hold the advanced motives of the distributed activity.

The first necessary upshot is that the distribution of activities induces further contradictions from other immediate dominant activities into the frame of the individual's actions. In understanding what happens when an individual contributes his or her actions to the advanced motive from a distant location, it is important to realise that the central activity of the actor may not necessarily involve the transformation of a tangible object; on the contrary, its image. For example, in contemporary distance learning, it is possible for one to conceive a learner who performs his or her central activity with computer-aided simulations and other representations of the learning object. In such an instance, the object activity is as removed from the central activity as it is with classroom-based learners. Therefore, although in most instances, the sense behind the distribution of an activity is to immediately avail the object activity to workers or learners at a distance, it is not always the case.

The motives of the central activity are likely to contradict with the motives of any immediate incidental activity. One considerable certainty is that since the central motive is derived from the personal sense-making of the subject, it is an intrinsic part of him or her. Thus, the advanced and object activities may remain localised and static in distributed activities, but the central activity, and hence motive, is always mobile and dynamic in response to the conditions encountered by the subject in time and space.

It must be said, however, that these scenarios above do not hold as much challenge for understanding the problems of a distributed activity as the one in which the distant learner is immersed in the object activity for practical learning or work purposes. Much of the following deliberations will therefore centre on the scenario of a distributed activity in which the distant actor is immersed in the object-activity. Here, the similarity of contradictions within the subjective and objective motives of work and learning may persist and shape the actions, but the key difference remains: that is, learners begin at the periphery of the object activity compared with workers in the core. But the difference is not as crucial as one other similarity; that is, in both distributed work and learning, efficiency dictates that the individual mainly participates in the object activity away from their distant authorities who champion the advanced motive of the distributed activity.

A third form of distributed activity appears in a hybridisation of the two extremes: work-integrated learning, experiential learning (Kolb, 1984), and learning-at-work are some of its popular epithets. While these appellations depict the hybridisation, they do not sufficiently enlighten us on the impact of the distance factor. This hybrid is exemplified by the empirical case – learning within the object activity. The perfect instance of work-integrated learning occurs when the performances of all three activities – central, advanced and object – coincide in one location. The unity of these activities does not suggest contradiction-free actions; rather, production is subjected to a triple-nature contradiction of identity of the learner or worker. He or she identifies him- or herself as the subject of his or her central activity; he or she is identified as an object of the advanced activity by its subjects; and he or she may be identified as a tool of the object activity also by its subjects. The tool perception is key because its total reverse is full acceptance and integration into the object activity as a subject.

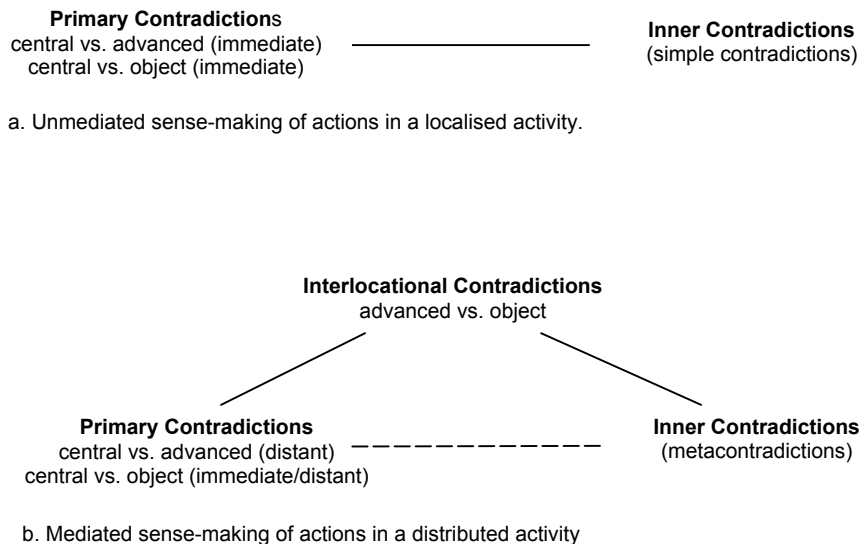
Distance and distribution rips apart the unity of these activities leading to a geographical separation of advanced and central activities; by implication, remote separation of learner/worker and instructor/authority. In learning, the ultimate motive is for the learner to be integrated into the object activity, leading to educational strategies which place premium on the practical aspects of learning. In addition, contemporary technological advancements have greatly reduced distance and time barriers by enhancing communication, collaboration and coordination among distributed workers and among learners and instructors. These are some of the key drivers of contemporary distribution of sanctioned human activities. And within the context of earlier arguments made in this paper, it is the nature of contradictions associated with distribution of an activity which determine the kind and range of possible actions performed by individuals in any location.

The range of possible actions is a direct result of the magnitude of control wielded by immediate authorities – if there happens to be any – in the location where an individual finds him- or herself performing remote actions of a distributed activity. In the absence of an immediate authority, the individual assumes that role; which implies that his or her central activity is likely to equate his or her object activity. For this reason, it is interesting to examine the contradictions generated by the immediate dominant motives associated with each location of a distributed activity.

The problem of contradictions in distributed activities is more complicated compared with localised activities. The individual actor is confronted with the challenges of his or her immediate environment, and at the same time with the distant advanced activities of

authorities or instructors to which he or she must align their actions. Essentially, the contradiction between the motives of an individual’s central activity and the imposing advanced activity remains primary, even though they may be geographically separated. However, another primary contradiction is established in the individual’s localised environment between his or her central activity and the immediate object-activity or other incidental activities. In other words, at a distance, and in the likely absence of the authority, there may be a contradiction between the worker’s central activity and other immediate neighbour activities; the latter form of contradiction is characteristic of any localised activity. In addition to these, and more crucially, there may be another contradiction established between the motives of the authorities who control the localised object-activity and the distant advanced activity (see Figure 9b).

It is important to note again that these two primary forms of contradictions ultimately translate into inner-contradictions in the consciousness of the learner or worker, but their interconnection is mediated by the nature of the interlocational contradictions between the motives of the advanced and object activities. Although these contradictions are external from the point of view of the individual, they bear directly and continuously reshape the primary contradictions confronting the individual; that is, they mediate the central/advanced primary contradictions and the consequent inner contradictions. This continuous reshaping is a result of the power relations between the agents of the object and advanced activities, which translate into the types and range of actions the individual subject will or is allowed to perform in a distant location. If we come to think of the fact that the contradictions between the object and advanced activity reshape the primary contradictions of the individual, then it can be argued that the newly formed inner contradictions would be *metacontradictions* – contradictions of contradictions between the motives of the object and advanced activities. Therefore, in distributed activities, what would abound in individuals’ consciousness are metacontradictions between the contradictions associated with the central and advanced motives on the one hand, and those associated with the central and object motives on the other hand, one set mutually affecting the other.



**Figure 9: Structures of contradictions depicting mediation by interlocational contradictions in distributed activities.**

The corollary is the impact on the identity, or perceived identity, of the individual in production within the immediate object activity. The individual’s participation in the object activity provides him or her with a tool- or subject-identity depending on his or her degree of

“social participation” (Wenger, 1998) in the practice of the community of members of the object activity. For a learner, at the outset, he or she is usually a peripheral participant whose ultimate motive is the attainment of an exchange-value identity. However, peripheral participation is usually associated with undertones of non-acceptance, conformity, subjugation and being perceived as a tool by core community members. Successful participation signifies the construction of an exchange-value identity which necessitates a progression from peripheral to core membership, from use-value to exchange-value identity, from a tool of the object activity to its subject. In work, progression from peripheral to core membership is a movement from being perceived as an object to being perceived as a subject of production. Now these progressions are not givens, nor are they smooth. They potentially entail irritable problems of power, politics, control, resistance with which the learner or worker has to grapple in the process (cf. Star, 1991). To wit, the individual’s participatory actions are likely to be dictated, determined and controlled by subjects of the object activity – the core participants of the community.

The modes of belonging to a community, according to Wenger (1998), manifest in members’ engagement in the negotiation of meanings, imagination of broader perspectives, and alignment of their energies, “activities, and interpretation of events with structures, forces and purposes beyond their community of practice” (*Ibid.*). Given the reality that both learners and workers remain accountable to their instructors and authorities, their participation in and hence alignment with the immediate object-activity demands occurs concurrently with their alignment with the requirements of the distant advanced activity. In other words, individuals are bound to satisfy requirements of objective and advanced motives at the same time. This scenario creates another “double bind”, but a double bind of secondary nature; that is, a double bind of double binds, which mirrors the metacontradictory nature of a distributed activity.

To conclude, it is necessary to note that one essential and distinguishing feature of a distributed activity is its immediate impact on individuals’ actions. The primary contradictions of a localised activity directly affect the psyche of an individual subject leading to his or her personal sense-making and subjectivisation of objective circumstances. In contrast, the primary contradictions of a distributed activity indirectly affect the psyche of the individual; they are mediated by interlocational contradictions between object and advanced motives. These mediating interlocational contradictions are functions of power, control and other political motives of authorities concerned as well as of parameters such as distribution, distance and mobility.

## **6 Concluding Remarks**

The individual’s experience of multiple identities as a result of the distribution of an activity is interesting in the sense that it provides us with fundamental insights that ensure a proper understanding of his or her actions in a distributed activity. Together, the components of mediated sense-making peculiar to distributed activities are useful for analysing and managing the actions of workers or learners in a distributed activity. If subjects’ sense of actions manifest in how they perform their actions, then the concept of metacontradictions contains significant epistemological elements that can be deployed to understand individual actions leading to the institution of necessary controlling measures.

In a distributed activity, the modes of actions necessarily correspond with the given conditions that directly derive from the peculiarities of those locations in the distribution that are hosting those actions. Against this backdrop, actions in any location may degenerate into separate activities or may be serving the motives of other activities which are incidental to the central activity. In this scenario, the actions may be serving the contradictory motives of two

or more activities; and the motives driving “neighbour” activities may contradict those driving the central activity. For instance, although a central activity being conducted in one location and a culturally more advanced central activity in another location may be sharing the same outcome, contradictions may persist between them. It is these essential challenges and how they can be confronted that make the exposition of the origins of contradictions and the subsequent rendition of the concept of metcontradictions relevant.

To conclude, this paper contributes by unearthing the nature of contradictions, its origins and implications in a distributed activity. Effectively, the relevance of the exposition of metacontradictions lays, not in its essence, but in its origins and implications for the planning, understanding and management of distributed actions. These implications are likely to harbour a complex array of power interrelations within which explications of the magnitude of immediate or remote control of individuals’ actions can be examined. These explications are however beyond the scope and objectives of this paper, and are fertile areas of subsequent research.

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<sup>1</sup> According to Engeström, the more advanced motive is induced by representatives of culture by some means (e.g. rewards), and assumes an encompassing role to subordinate or conflict with the central activity.

<sup>2</sup> In this context, I use 'society' to refer to entities such as instructors, bosses, authorities, managers who champion the motives of advanced activities within which individual subjects' actions are subordinated.