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## **THE ROLE OF ACTIVITY IN DEVELOPMENT AND EDUCATION**

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Compared with other species, the characteristic that distinguishes humans is the ability and proclivity to engage in tool-mediated joint activity with other humans. It is this characteristic that accounts for the development of human cultures over the course of history, as they invented artefacts of various kinds in order to adapt to and exploit the ecological niches in which they found themselves. It also accounts for the diversity of individual persons' development, which depend on the particular activities in which they participate. As Vygotsky (1978, 1981) was one of the first to point out, the 'higher' mental functions that make us human are not biologically given but are developmentally constructed through the appropriation of historically developed tools and practices that are made manifest to the child and 'scaffolded' in the meaningful actions and utterances of the coparticipants in joint activity.

Before continuing, readers might find it interesting to reflect on their own developmental trajectories to who they are today. I suspect that they may find themselves agreeing that *Who we become depends on the company we keep and what we do together.*

### **A Brief History of the Development of Joint Activity**

Leont'ev provides a succinct account of Vygotsky's insight in the following summary:

The initial ideas that led Vygotsky to investigate the genesis of internal mental activity from external activity are fundamentally different from the theoretical approaches of other modern authors. These ideas came from the analysis of the features unique to human productive labor activity, which is mediated by tools. This activity is initially social in nature, that is, it is developed under the conditions of cooperation and social interaction among people. Vygotsky

identified two main, interconnected features [of this activity] that are necessarily fundamental for psychology: its tool-like ('instrumental') structure, and its inclusion in a system of interrelations with other people. It is these features that define the nature of human psychological processes. The tool mediates activity and thus connects humans not only with the world of objects but also with other people. Because of this, human's activity *assimilates the experience of humankind*. This means that humans' mental processes (their 'higher psychological functions') acquire a structure necessarily tied to the sociohistorically formed means and methods transmitted to them by others in the process of cooperative labor and social interaction. But it is impossible to transmit the means and methods needed to carry out a process in any way other than a social form – in the form of an action or external speech. In other words, higher psychological processes unique to humans can be acquired only through interaction with others, that is, through interpsychological processes that only later will begin to be carried out independently by the individual (Leont'ev, 1981, pp. 55-56, emphases in the original).

As well as emphasizing the *social and cooperative* nature of human activity, this quotation is important with respect to the arguments that I want to develop in this paper as it highlights the central role of *semiotic mediation* in development: Knowledge is created, as well as appropriated, in the discourse among people who are working together in a specific situation in order to create or improve an artefact or to solve a problem of importance to the group. However, Leont'ev also alludes to another of Vygotsky's key insights, namely that, in order to understand current activity, it is necessary to investigate the history of that activity. It is to this that I next turn.

In analyzing the history of human development, at least four different time-scales need to be considered. The longest is the history of the cultural evolution of the species (the phylogenetic level); next is the historical development of particular cultures. The third level (ontogenetic) traces the developmental trajectory of individual humans over the course of the lifespan. Finally, the microgenetic level is concerned with the development of an instance of a particular activity.

In practice, it is the latter that has been explored in most detail for, using contemporary technology, it is relatively easy to observe and record the sequence of actions through which an activity is enacted and the specific operations in which the participants engage, making use of the relevant artefacts that are

available in the situation. (Leont'ev, 1981). These artefacts may be either material (knives, pencils, automobiles) or symbolic (utterances, maps, theories) – though, as Cole (1996) has pointed out, to function as mediators of joint activity, all artefacts must have some form of material embodiment as well as a symbolic meaning, that is to say, they must be ready to hand and also have a cultural significance relevant to the situation.

However, the form in which a particular instance of activity is realized depends, not only on the artefacts that are to hand in the situation, but also on the participants' past experiences with the practices in which the artefacts are used to mediate achievement of the action goals that contribute to the joint activity. Thus, the microgenesis of a particular instance of activity is necessarily dependent upon the ontogenetic development of the participants, that is to say, upon the opportunities their life trajectories have afforded them to appropriate the relevant cultural knowledge through participation in instances of similar actions and operations.

But, on the time-scale of ontogenetic development, each individual's trajectory of development is itself strongly influenced by the culture in which he or she is growing up and on the historical development of that culture. As Rogoff (2003) illustrates in considerable detail, cultures vary considerably, both over time and across ecological niches, in what mediating artefacts and practices are available and in the relative value accorded to each. Moreover, within each culture at any particular historical moment, participants in activities both incorporate the ways of previous generations and adapt them to the exigencies of current conditions.

Stepping up one further level, the historical development of a particular cultures is itself shaped by development on the even larger timescale of the cultural and biological evolution of the species. This is the most difficult timescale to describe in detail for lack of the necessary evidence. But certain broad distinctions between human communities can be made in terms of their modes of subsistence and of the mediating means available for joint activity (Diamond, 1998; Donald, 1991). As recent research has shown, our earliest ancestors, some 5 million years ago, lived in small bands of hunter gatherers, often on the edge of lakes and oceans. Initially, their tools were found in the surroundings, but over several million years they invented ways of making more sophisticated artefacts, such as knives, arrowheads, baskets and clothing, from flints, bones, skins and vegetable materials. Then, as some groups migrated

to particularly fertile parts of the world, they adopted a more settled, agrarian way of life, growing crops and breeding animals. The resulting ability to produce more food than immediately required led, in turn, to the emergence of trade and to a diversity of specialist occupations, such as potters and tailors who exchanged their products for food and other necessities. This stage also saw the development of much larger population groupings with hierarchical class structures that included priests, tax collectors and other religious and political functionaries.

While migration had been a common feature of human existence from the earliest times, the development of large settled populations and of weapons made of bronze and iron led to the expansion of certain cultural groups through territorial conquest and colonization by sea and by land. As a result, during the last few thousand years, the latest phase of phylogenetic development has been characterized by the rise and fall of imperial cultures, which have imposed their technologies, laws and administrative procedures, as well as their religions, arts, knowledge and values, on widely diverse subjugated populations. Most recently, the further development of the inventions that led to the first industrial revolution has simply served to increase the scale and intensity of these imperialist trends. At the same time, these inventions, as well as those of the current industrial revolution, have also led to a great increase in humans' understanding of their social and material environment, both through scientific and social research and through the dissemination of information about other times and places resulting from travel and the use of print and electronic technologies.

In presenting this very condensed account of phylogenetic development, I have emphasized the material tools that have mediated the progressively more complex and diverse activities in which humans have engaged over the course of the species' history. However, bearing in mind that what has been the driving force of human development is joint activity, an equally – if not more – important determinant of this history is the development of the modes of representation through which humans have communicated and developed their understanding of the world. Table 1 presents the developmental sequence proposed by Donald (1991), based on archeological, neuroanatomical, historical and other types of evidence. The table also includes the stages in the historical development of ways of knowing that were proposed by Wartofsky (1979).

**Table 1 Modes Of Knowing: Phylogenetic And Cultural Development**

Time Years B.P.	Mode of Knowing	Participants	Donald (1991)	Wartofsky (1979)
2 million years	Instrumental	Individual in action	Episodic	Primary artifacts: material tools
1 -- 1.5 million years	Procedural	Between individuals while engaged in action	Mimetic	Secondary artifacts: tools and practices; mimetic interaction
50,000 years	Substantive	Among members of a cultural group, reflecting o action and as a basis for plan further action	(Linguistic)	Secondary artifacts: representations of tools and practices; spoken interaction
50,000 years	Aesthetic	Among members of a cultural group, making sen the human predicament	Mythic	Tertiary artifacts: artistic represent- ations in myth, narrative, graphic, and musical modes
2,500 years	Theoretical	Among members of a specia community seeking to explai natural and human world	Theoretic	Tertiary artifacts: decontextualized representations, such as taxonomies, theories, models etc.
?	Meta	Among members of a cultur: group, also individuals, seek understand and control their mental activity		Tertiary artifacts: representations of mental and semiotic processes

From Wells (1999)

The first stage in this sequence corresponds to the phase in which proto-humans began to diverge from other primate species. In this phase, as in the behavior of contemporary higher primates, practical action was the predominant form of communication as – not necessarily deliberately – participants signaled their intentions in a shared situation, and these intentions were interpreted and responded to by their co-participants in the activity. In the second, mimetic phase, which must have developed gradually over many millennia, communication became somewhat differentiated from the activity to which it referred as humans deliberately used gestures, mime, facial expression and various types of phonation to comment on as well as to coordinate action and the objects to which it was directed. Later still, with the gradual modification of the vocal tract and of the primate brain, there emerged the ability to communicate through speech and hence the ability to refer not only to particular objects and actions but also to generalized classes, and to express observed and intended relationships between objects, actions and events, thus allowing participants to plan for and reflect on the outcomes of joint activity. Finally, the invention of writing, which ushered in the final phase in Donald's proposed sequence, occurred extremely recently in the long trajectory of phylogenetic development. Yet, as with those that preceded, it enormously increased the human repertoire of means for making and communicating meaning. Essentially, what it added was an "external memory". By creating a (relatively) permanent representation of linguistic meaning, it made possible the compilation and distillation of reported information from many sources, including the writer's own verbalized thoughts. It also allowed the writer and those who read his or her written text, to review, critique and revise the meanings expressed and to make the results available to people in later times and other places for further constructive debate and improvement.

However, action, gesture, speech and writing are not simply progressively more powerful modes of communication. They are also progressively more powerful mediators of thinking. This is most obvious with respect to the linguistic modes of communication. But, even before the emergence of speech, action and – to an even greater extent – mimesis enabled humans to think together and thereby to create a shared interpretation of their joint activities. In fact it has been argued that the emergence of language was not simply the result of brain and vocal tract development, but rather was part of a more general pattern of adaptation that, building upon the cognitive achievements of mimetic knowing, strove to integrate the unconnected bits of information in a more comprehensive and coherent account of

being-in-the-world (Deacon, 1997). Nevertheless, it is also true that the availability of language greatly enhanced both communication and thinking together for, as Halliday observed,

the grammar of every natural language is (among other things) a theory of human experience; it is through our acts of meaning that we transform experience into the coherent - though far from consistent - patchwork that we learn to project as 'reality'. (1993, p. 46)

In sum, what Donald and other scholars argue is that contemporary mental abilities are the outcome of the development over time of a series of progressively more powerful and flexible modes of representation – or, in Vygotskian terms, of semiotic mediators of higher mental functions - that have made possible the rational, theoretically oriented modes of knowing that underpin the achievements of modern science and its technological applications. In the philosopher Wartofsky's words:

... our own perceptual and cognitive understanding of the world is in large part shaped and changed by the representational artifacts we ourselves create. We are, in effect, the products of our own activity, in this way; we transform our own perceptual and cognitive modes, our ways of seeing and of understanding, by means of the representations we make (1979, p. xxiii)

There is, however, one further important aspect of Donald's (1991) thesis that is crucial for the argument that I wish to develop. Although the semiotic systems of mimesis, speech, and writing each powered a new mode of cognitive activity, they did not replace those that preceded, but were additive in their effects. The result is that contemporary humans have a variety of modes of knowing at their disposal as they engage in joint activity. Furthermore, most such activities call for more than one mode of knowing and require the complementary and interdependent use of more than one mode of representation.

### **Joint Activity as the Site of Ontogenetic Learning and Development**

Two important implications follow from the multi-level historical conception of development just outlined. First, on any occasion, the type of activity that is undertaken, and the specific manner in which it is enacted, are necessarily dependent on the particular cultural-historical antecedents of the

participants, both human and artefactual, that come together in its realization. In particular, the manner in which the situation is interpreted - in terms of what action goals are appropriate and how they can be achieved - depends on the motives, values and knowledgeable skills of the human participants and on the affordances of the technologies available in the situation. And second, every instance of an activity provides an occasion for a triple transformation: of the situation in which the activity is carried out, of the artefacts and practices that mediate its enactment and, most importantly, of the knowledge and skills of the human participants. Taken together, these propositions clarify the way in which cultural and individual development are both interdependent and rooted in particular, situated occasions of joint activity. As Rogoff (1993) argues:

People of each generation, as they engage in sociocultural endeavors with other people, make use of and extend cultural tools and practices inherited from previous generations. As people develop through their shared use of cultural tools and practices, they simultaneously contribute to the transformation of cultural tools, practices and institutions (p. 52).

Potentially, therefore, *every* occasion of joint activity provides an opportunity for development on the part of *all* participants. This is a point to which I shall return. But first, I want to consider more carefully the concept of development itself.

Clearly, built into the concept of development is the implication of change and, typically, of change in the direction of increasing complexity and effectiveness. In other words, development is typically taken to imply improvement or progress toward some ideal end state or capability. However, in the light of the previous discussion, such a progression, while it may be meaningful to (some of the) participants in any particular situation, cannot be understood in any absolute sense, but must be seen as relative to the unfolding historical trajectory of the species, of a particular culture, and of the immediate community - its values, its dominant activities and the knowledgeable skills that form its resources. Furthermore, just as these have changed in the past, they will continue to change in the future in response to the changing demands of the larger environment. So, while ontogenetic development does indeed involve increasing complexity and effectiveness of individuals' participation in the activity systems in which they are involved in their daily lives, the overall trajectory of development is emergent and its endpoint can never be specified in advance, even in terms of an ideal to be attained.

Nevertheless, this does not mean that there are not strong regularities in the sequence of ontogenetic development, particularly in the early years. Indeed, as Nelson (1996) has suggested, during the preschool years children follow a trajectory very similar to the sequence of phylogenetic development proposed by Donald (1991) (see Table 1 above), as they appropriate the semiotic tools of representation afforded by action, mimesis, speech, and writing. Of course, this is not a simple recapitulation; children growing up in a contemporary literate culture, for example, are surrounded from birth by artifacts and practices that result from and embody all the available modes of knowing (Cole, 1996). Appropriating existing cultural tools is thus very different from inventing them *de novo*, as Scribner (1985) points out. Nevertheless, given the combination of biological and cultural inheritance, it is not surprising that in most, if not all, cultures children follow the same sequence as did the species as a whole over the course of history.

In the first weeks of life, infants act on their immediate surroundings, both animate and inanimate, and begin to develop what Piaget (1970) called sensori-motor intelligence. However, although this most basic form of activity may appear to be instinctual, it is nevertheless also inherently social. First, all infants are born into an environment that is cultural in the sense of having been shaped by countless preceding generations; and second, the infant's actions are treated as being intentional and are responded to as such. So, from the beginning, the infant is caught up in social interaction (Newsom, 1978). In the second phase, which typically begins in the first few months, the infant also begins to engage in mimetic communication, through gaze, facial expression and rudimentary gesture (Bruner, 1990). Couched in terms of primary and secondary intersubjectivity, this phase has been described in considerable detail by Trevarthen (1978, 1979). Primary intersubjectivity develops as the infant and parent engage in mutual gaze, thereby communicating that they are attending to and responding to each other. In secondary intersubjectivity, third parties are brought into joint attention, as the parent through gaze directs the infant's attention to an object of potential interest or follows the child's direction of gaze and signals that he or she is also attending to the same object.

It is on this basis of joint action and attention that, towards the end of the first year, the child begins to exploit his or her growing command of vocalization, often accompanied by gesture, to begin to communicate through speech. From research, predominantly involving children in "Western" societies,

it has been established that, at first, the child's utterances are idiosyncratic, drawing only partially – if at all – on the speech of those around him or her; nevertheless, parents and other family members have little difficulty in interpreting them in context and, once again, they respond in a manner that is contingent on their interpretation, thereby establishing spoken communication as a joint interactive activity. By the end of the second year, however, children appear to abandon this idiosyncratic “protolanguage” form of communication and begin to construct a linguistic meaning potential that is systematically related to the language that is addressed to them in the oft-repeated activities of family life (Bruner, 1990; Halliday, 1975; Wells, 1986). Significantly, within particular language communities, the sequence in which children master the basic meanings and the lexicogrammatical forms in which they are realized tends to be very similar from child to child (Slobin, ; Wells, 1985).

The developmental sequence just described – action, mimesis, speech – is common to children in all cultures and in all cases takes place in and through joint activity and interaction with other family and community members. However, although the sequence is universal, the manner and pace at which it proceeds vary very considerably across cultures. These differences depend upon many culturally-determined factors, such as adult expectations about their children's development, the position in which the infant is typically held or carried, facing the caregiver or turned outwards to face in the same direction as the caregiver, the makeup and size of the interactional groups in which communication typically occurs, and whether these events are part of family and community life more generally or are deliberately arranged and structured for the presumed benefit of the child (Rogoff, 2003). In the later stages of language development, the range and extent of the meaning potential that children construct begins to vary even more widely, depending on the activities in which they engage, the linguistic registers that are used in those activities, and the stances typically adopted by interlocutors toward the use of language in their interactions with children (Hasan, 2002; Heath, 1983).

So far, the ontogenetic developmental sequence I have described is fundamentally similar across cultures and follows the phylogenetic sequence in which humans have progressively added new semiotic mediational means to their communicative repertoires. In an important sense, therefore, the final mode of representation in Donald's scheme, that of writing, is an optional extra, since many cultures have survived and prospered without a written mode of representing meaning. Moreover, even in cultures that have a writing system, the extent and scope of literacy that individuals attain varies very

considerably, depending on the activity systems in which they participate, the value that is placed on written texts by those communities, the purposes to which they are put, and the genres that are used for those purposes. However, since literacy and its uses are so strongly associated with schooling, I shall leave further discussion of this mode of semiotic mediation to a later part of this paper.

Before concluding this section, however, I want to explore further the concept of semiotic mediation. In one of the better known passages in Vygotsky's writings, where he argued for the social and cultural origin of higher mental functions, he wrote that every function occurs on two planes, first in activity and interaction *between* people and then *within* the individual learner (Vygotsky, 1981). What bridges between these two planes, as is clear from his other writings, is semiotic mediation. To recall Leont'ev's formulation of this argument:

... it is impossible to transmit the means and methods needed to carry out a process in any way other than a social form – in the form of an action or external speech. In other words, higher psychological processes unique to humans can be acquired only through interaction with others, that is, through interpsychological processes that only later will begin to be carried out independently by the individual (1981, pp. 55-56).

In other words, when people engage in joint activity, their actions, gestures and speech not only mediate the coordination of participation, but they also make overt the mental activities involved and so render them available for appropriation by novice participants.<sup>1</sup> Halliday is very clear about this. Although the following quotation refers only to language, the term 'language' could justifiably be replaced by 'semiotic mediation'.

In the development of the child as a social being, language has the central role. Language is the main channel through which the patterns of living are transmitted to him, through which he learns to act as a member of 'society' - in and through the various social groups, the family, the neighbourhood, and so on - and to adopt its 'culture', its modes of thought and action, its beliefs and its values (1978, p. 9).

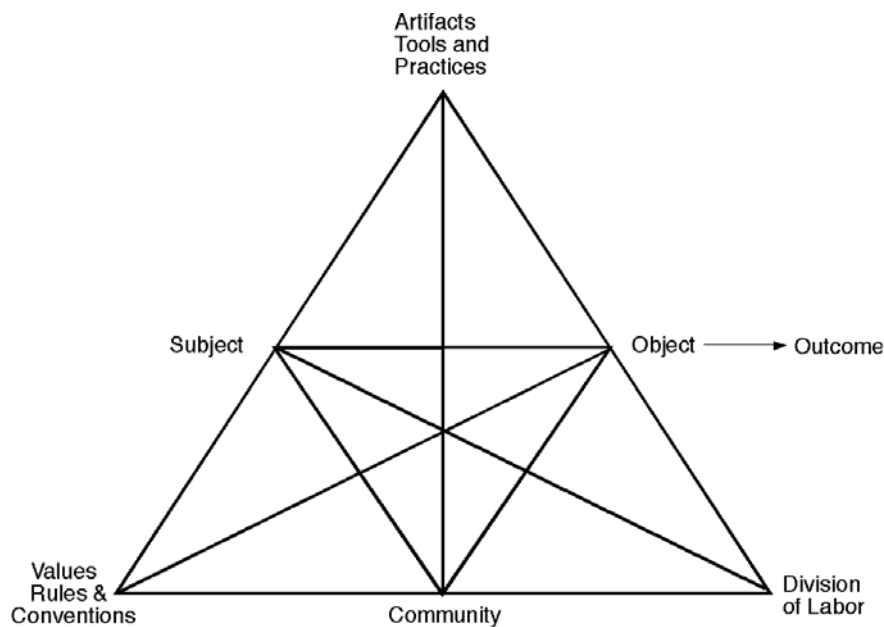
However, as the child grows older, language does become the predominant mode of semiotic mediation and, as he wrote in a later paper, “Language is the essential condition of knowing, the process by which experience *becomes* knowledge (Halliday, 1993, p.94 , original emphasis).

### Assistance for Learning in Joint Activities

So far, in the discussion of the role of joint activity in human development, I have concentrated on the tools, and particularly the semiotic modes of representation, that mediate the achievement of the outcome of activity. In this section, on the other hand, I turn to the role of other people in this process, both family members and the larger community.

Until now, I have referred to coparticipants in an activity in general terms; but clearly there are further distinctions to be made. Particularly helpful in this respect is Engeström’s model of an activity system, which is shown in figure 1.

Figure 1. The Triangle of Activity



Engeström, 1987.

What this model shows is that, when we look at an ongoing activity from the point of view of an individual participant (the Subject), that individual is involved in a nexus of other relationships that link him or her to other ‘participants’: the Tools and artifacts to mediate action on the Object, but also the Community of others engaged in the activity, together with the Division of Labor within that community, and also the Rules and Conventions that govern the manner in which the activity is carried out (Engeström, 1999). What this latter category of ‘participant’ underscores is the historical dimension of an activity system, since these rules and conventions – as well as the tools and artifacts – bring into the present the distilled practices of previous generations who have engaged in the activity as these are interpreted and utilized by the current community.

To illustrate the relevance of this model to the development of the young child, we might compare two versions of a similar activity, reported by Wertsch et al (1984). In their study, Brazilian children carried out a puzzle task on two occasions, first with the mother and secondly with a primary teacher. What the researchers found was that, in general, the mothers and teachers engaged in the activity in systematically different ways. Whereas the mothers tended to direct the children’s behavior, or even carry out parts of the task themselves, in order to complete it in an efficient manner – just as they would have done if engaged in a household task - the teachers tended to encourage the child’s autonomous performance and only provided hints and suggestions when they judged them to be necessary to advance the children’s understanding. Interpreting these results, the researchers suggested that the two groups of adults belonged to two different communities (or activity systems) that had different rules and conventions about engaging in this joint activity. And this, in turn, led to the different divisions of labor that they observed. Similarly, Rogoff (2003) cites many examples of substantial differences between cultures in almost all aspects of child rearing with respect to their ways of engaging children in the activities that they consider important.

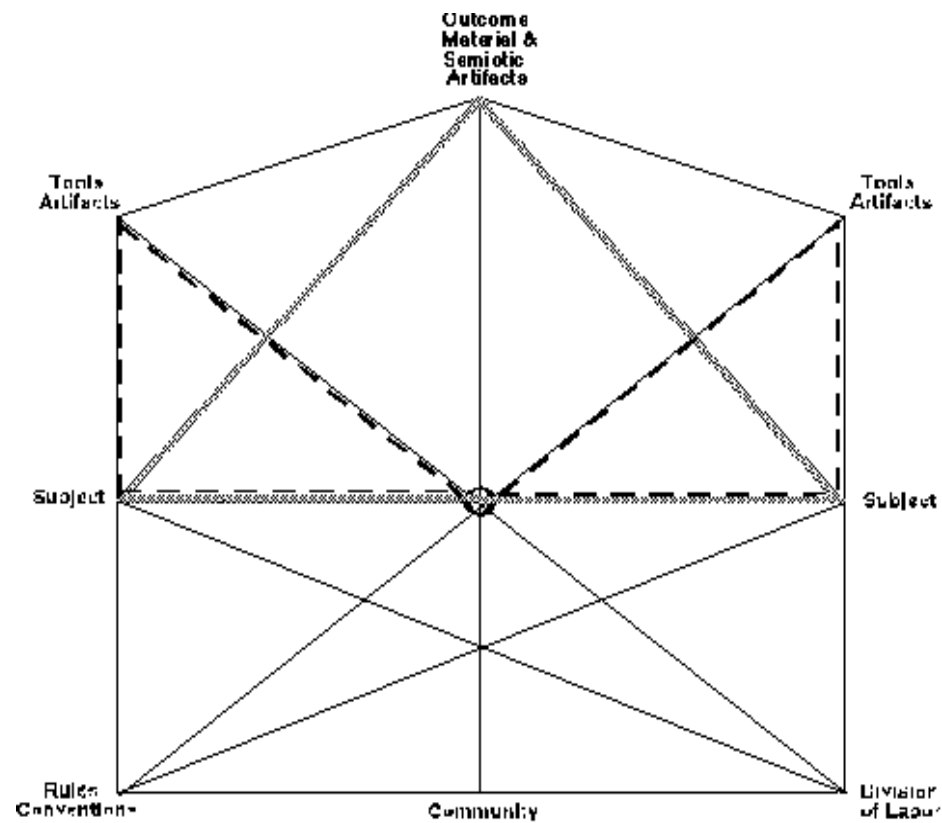
What is clear is that, “behind” the particular adult – or older siblings, in some cultures – who are directly engaged with the child, there is a wider community of family members, neighbors and others who have an interest in the upbringing of children and who share beliefs about appropriate ways to involve them in the activities of daily life. So, whether in Spain, Japan or the Peruvian Highlands, although the actual practices vary across cultures, in each, those responsible for children’s well-being and development act

as agents of a wider community whose beliefs and practices are rooted in a long tradition concerning how activities should be carried out. But equally, in all cultures, practices also change in response to changes in the world beyond the particular community. In many Western homes, for example, computer games or television programs have recently taken the place of the bedtime story, while in many indigenous communities, crafts that until recently only supplied local needs are now exploited commercially for the tourist trade, changing the rhythms of daily life and the relationships among family members and the activities in which children are involved. As suggested earlier, therefore, in order to understand the activities in which children participate today, we need to look not only at the immediate situation but also at the wider community and the changes taking place on all these time-scales.

### **Microgenesis and the Zone of Proximal Development**

It is, nevertheless, always the immediate, microgenetic situation that is the site of ontogenetic development - the action and interaction between the learner and those with whom he or she is engaged in the activity in progress. When we adopt this microgenetic perspective, however, we need to modify the representation of an activity system presented in figure 1. In that representation, the focus was on the goal-oriented nature of action. Here we need to focus on the interaction *among* the participants - their attempt to attain intersubjectivity with respect to the common object, and the complementarity of the knowledgeable skills they bring to the coconstruction of the intended outcome (see figure 2). What figure 2 emphasizes is the fact that, although the tools and artefacts that are available to mediate the jointly undertaken action are the same for each participant, each brings a somewhat different familiarity with their use as a result of their different life trajectories and it is this variability in their expertise that makes it possible for each to provide assistance to the others in at least some aspects of the joint action. Viewed in this light, it is clear why Vygotsky emphasized the role of joint activity in development, and wrote of its potential to enable learners “to go beyond themselves” with the assistance of more expert others.

Figure 2. Dialogue in Joint Activity



From Wells (2002b)

The metaphor Vygotsky used to characterize the potential for learning that this sort of activity creates was the “zone of proximal development”.. As he wrote, when another participant in the activity provides instruction that is appropriately pitched beyond what the learner can manage to do on his or her own, it “wakens a whole series of functions that are in a stage of maturation lying in the zone of proximal development” (1987, p. 212). Vygotsky conceptualized development as the formation of new functional systems (“neoformations”) and of changes in the relationships among systems, which he considered to occur as a succession of “crises of development” that are particularly facilitated by engagement in the relevant “leading activity” at each stage, for example, play in childhood and learning to read and write in the early school years. However, it would be a mistake to focus only on the periods of revolutionary

change since, as he equally emphasized, at any time there are also other more gradual processes of growth.

Processes that are central lines of development at one age become peripheral lines of development at the following age and conversely, peripheral lines of development of one age are brought to the forefront and become central lines since their meaning and relative significance in the total structure of development changes... (Vol 5, p. 197).<sup>2</sup>

In developing his important concept of the zone of proximal development, Vygotsky tended to characterize the assistance given by others as “instruction” and to see its value in “the child’s potential to raise himself to a higher intellectual level of development through collaboration, to move from what he has to what he does not have through imitation” (1987, p.210). However, many recent scholars who have built on his work have taken a broader view of the developmental significance of collaboration in joint activities and have characterized the assistance that is provided within this relationship in terms such as “apprenticeship” (Lave & Wenger, 1991; Rogoff, 1990), “guided participation” (Rogoff, 1994, 2003), and “scaffolding” (Wood et al., 1976). Nevertheless, while these different metaphors highlight different features of the relationship, what they all have in common is the inclusion of the learner in an activity in which there is provision of the assistance necessary to help the learner to complete an activity in which he or she is interested and to do so in such a way that he or she makes progress toward being able to participate more fully and autonomously in the future (Maybin, J. et al, 1992).

In many joint activities such as, for example, traditional forms of craft apprenticeship, assistance is only provided when needed and the “master” does so with no deliberate didactic intention beyond that of involving the novice in the completion of the particular task in hand (Lave, 1996). Similarly, in socialization into activities around the home, no explicit instruction is necessary, for novices can learn a great deal by simply watching and listening (cf. Rogoff, 2003) This is what Lave and Wenger (1991) mean when they insist that learning is not an independent activity but an intrinsic aspect of “legitimate peripheral participation” in a community’s activities. From their perspective, therefore, formal education, in which learning is the sole purpose of the activity, is something of an anomaly, particularly when the only form of assistance provided is the expert teacher’s direct instruction and subsequent evaluation of the extent of the students’ learning.

In many recent discussions it has also been recognized that it is not only a “teacher” who can provide assistance in the zpd. On the one hand, in a complex activity, many participants are more expert than others in some aspects, and therefore on some occasions are able to help those who are less expert (Rogoff, 1994); and, on the other hand, those who provide assistance do not have to be physically present: texts and other artifacts can equally well help a participant “to go beyond him/herself”, as is often the case in intellectual work, such as research and writing (Wells, 1999). Furthermore, as Engeström (1999) and others – building on other aspects of Vygotsky’s theoretical writings – have noted, the material and symbolic tools that have been developed by previous participants in the activity can also provide the same sort of assistance. However, perhaps the most important point to emphasize is that there are many situations in which no-one is an expert; yet, as each brings his or her own past experience to the solution of a common problem, the group together is able to achieve more than any single member could have done alone. Clearly, it is such collaboration that has made possible the inventions that have led to the major advances of great civilizations over the course of cultural history.

### **Development in the Pre-School Years**

As noted above, the responsibility for caring for children in early childhood varies very considerably from one society to another. Nevertheless, in all societies, children are involved in joint activities with others in which they receive assistance with respect to their participation, however that may be locally achieved. For the most part, as already mentioned, these are activities that are regularly repeated in the taken-for-granted routines of daily life. The expectation is that the child will learn to fit in and is simply helped to do so. Often referred to as “enculturation”, this form of apprenticeship ensures the continuity of the culture’s way of life from one generation to the next and, as Donald (1991) argued, it probably occurred even before the emergence of speech.

However, in all activities, there are occasions when problems arise that call for some level of deliberate decision-making. In these situations, spoken interaction makes possible a degree of reflection and forward planning in which the relations of cause and effect, intention, action and outcome, are made explicit and open to question and discussion. The talk that occurs on these occasions thus plays a particularly important role in helping children to attend to and understand the world around them in terms of the culture’s ways of “making sense” of it. However, these occasions can also open up

possibilities for change, both in the form of the activity and in the participants' understanding of it. How caregivers habitually take up these opportunities is particularly important, for it plays an important part in shaping the intellectual dispositions with which children enter school (Carr, 2002; Hasan, 2002; Pontecorvo & Sterponi, 2002).

In this section, I include some representative examples of kinds of talk that arise from joint activities in the home. These examples are drawn from observations made in settings in England (Wells, 1986) and Australia (Hasan, 2002) in which the young children observed spent most of their time at home with one parent, sometimes with one or more siblings; some of the time they entertained themselves with occasional adult involvement, but they also frequently watched and "helped" the parent with household tasks of various kinds.

In the first example James (aged 3 1/2 years) has been playing alone in the garden and, as he reenters the house, his mother tries to get him to take off his muddy shoes. However, at that moment he sees a bird outside, which interests him more than changing his shoes.

#### Example 1

Mother: There we are . there, one slipper on  
 James: I can see a bird  
 Mother: A what, love?  
 James: See a bird  
 Mother: (whispering) Is there? Outside?  
 James: (pointing and whispering) Yes . see  
 (both continue to speak very softly)  
 Mother: Is he eating anything?  
 James: No  
 Mother: Where? Oh yes, he's getting- do you know what he's doing?  
 James: No  
 Mother: He's going to the- the paper sack to try to pick out some pieces-  
 Oh, he's got some food there . and I expect he'll pick out some  
 pieces of thread from the sack to go and make his nest under the roof,  
 James .. Wait a minute and I'll-

[James now wants to go out to see more closely but at that moment the bird flies away.]

James: That bird's gone

In the second example, Elizabeth (aged 4 years), who is helping with the house cleaning, watches with interest as her mother shovels wood ash from the fireplace into a bucket:

Example 2

Elizabeth: What are you doing that for?

Mother: I'm gathering it up and putting it outside so that Daddy can put it on the garden

Elizabeth: Why does he have to put it on the garden?

Mother: To make the compost right

Elizabeth: Does that make the grass grow?

Mother: Yes

Elizabeth: Why does it?

Mother: You know how I tell you that you need to eat different things, like eggs and cabbage and rice pudding to make you grow into a big girl

Elizabeth: Yes

Mother: Well, plants need different foods too . and ash is one of the things that's good for them

The third example involves James again, now eighteen months older. Earlier in the afternoon he had been helping his mother with the baking. Now he comes back into the kitchen as his mother is taking the baking trays out of the oven. He hears a loud, metallic "crack" and asks for an explanation.

Example 3

James: Who did that?

Mother: I expect it was the tin contracting

James: Which tin?

Mother: The one with your pastry in

James: Why did it make that noise?

Mother: Well, when it was in the oven, it got very hot and stretched a bit . I've

just taken it out of the oven, and it's cooling down very quickly, you see, and that noise happens when it gets smaller again and goes back to its normal shape

James: Oh, was it a different shape in the oven?

Mother: Oh, not very different . just a little bigger

James: Naughty little tin . you might get smacked if you do it again

In all three of these examples, the mother willingly responds to the child's interest and provides information to explain the significance of what the child is seeing or hearing, even when, in the first, this interrupts the mother's plan. All three cases show how the child's participation in the activity with the adult assures that there is intersubjectivity of attention to what interests the child and this enables the mother to provide relevant information. Clearly, this is a form of "instruction"; however, it is spontaneous and contingent on the child's interest rather than presented as part of a pre-planned curriculum.

The third example is particularly interesting from this point of view, as the phenomenon of interest to James requires a somewhat technical explanation. At some point in the future, no doubt, the expansion of metal when heated, and its subsequent contraction when removed from the heat, will figure in the school science curriculum in relation to the systematic study of heat; here, however, it is an interesting side-effect of baking and the mother's explanation, while technical in content, is couched in everyday language rather than in the abstract terms of scientific generalization. As Hasan (2002) has observed:

the discourse of *quasi* specialised knowledge occurs in the 'middle of' daily activities, and by necessity it calls for a readiness on the mother's part to entertain contextual shifts, to be willing to reclassify the context of the on-going discourse. The tendency to move with the child's moving discourse, the readiness to re-classify context, is a discourse characteristic of the same group of mothers who frequently ask questions made precise by qualification, and who attend to their children's questions, and provide them with well developed answers (p.123).

Not all children experience this sort of highly informative response to their interests, of course. On the basis of a substantial corpus of mother-child interaction, Hasan (2002), following Bernstein (1982),

distinguishes between “visible “ and “invisible” semiotic mediation. Whereas the examples quoted above all treat the joint activity and the child’s question as deserving of further exploration in an explicit, “visible” mode, the topics of many other children’ contributions to activity and interaction are treated by the parent as “obvious”, and therefore as not requiring explanation. In this sense, the mediation of the culture’s beliefs and practices remains “invisible”: this is the way the world is and the topic does not merit further discussion. Example 4 below provides a good illustration.

Example 4

Mother: Put it up on the stove and leave it there

Karen: Why?

Mother: 'cause ..

Karen: That's where it goes?

Mother: Yeah

And a little later

Karen: How did you get that? \*\* you didn't get out of [?]

Mother: I walked over and got it, didn't you see me?

Karen: Nup

Mother: You must be blind

(from Hasan, 2002)

The two brief extracts in example 4 are typical of a very different style of interaction from those considered earlier. Here, the parent’s emphasis on getting the child to conform to the local culture’s ways of acting and thinking effectively suppresses the child’s curiosity and desire to understand; it also makes it less likely that the child will grow up questioning the *status quo* and participating in efforts to change and improve it.

Finally, before leaving the topic of learning through talk in joint activities, it is important to consider joint activity in the context of play. Vygotsky (1978) considered play to be the leading activity in the pre-school years, as it encourages the child to explore the possibilities of semiotic mediation through the use of present objects that can be made to represent other non-present objects and through role play, in which language creates an imaginary world. In example 5, James, now aged 3 years and nine months, is sitting on the arm of a sofa, driving an imaginary train with his mother as a passenger.

## Example 5

Mother: There we are . I'll sit to the side . Right, are you ready? All set?  
Right . off with the brake

James: I'll start it up

Mother: Oh, sorry . Right

James: Mum, you don't steer it yet

Mother: Oh . well

James: [makes a noise, pretending to start the engine]

Mother: Oh! That's a quick starting engine . very good . Got enough coal at the back? Have you shoveled enough coal on, James?

James: Yes

Mother: Good . away we go then . Wave goodbye to your friends

James: [Engine noises accelerate. He chuckles and makes the sound for the engine whistle]

Mother: We're going very fast now . Can you feel the carriages swaying?

James: Yes

Mother: Oh, they're rolling me about . oh, all my breakfast is rumbling in my tummy . oh! oh! oh!

James: [Makes engine noises]

Mother: I think we'll have to slow down, don't you?

James: Mm (agreeing)

Mother: I think we're going a bit too fast ...  
That's better . that's easier now, isn't it?

James: Mm (agreeing)

Mother: [Hums] Look at the cows in the field, James

James: Mm

Mother: And there's a farmer, look . the farmer's waving to you

Like shared storying, which is another important joint activity at this age, imaginary play also has an important function in preparing the child to exploit the power of language “to create a world through words”. As will be discussed below, this use of language to represent non-present objects and events and

the relationships among them takes on very great significance in the context of typical public schooling, where it provides the principle mediational means through which much of the curriculum is encountered (Wells, 1986).

In sum, with the exception of extract 4, all the preceding extracts are clear examples of an adult “working in the child’s zone of proximal development” (Vygotsky, 1987), as they engage in interaction in the process of carrying out the activity in which they are jointly engaged. As Vygotsky (1987) emphasized, in collaborative joint activity the child can always do more than he can independently. The activity provides the organizing framework, within which some of the talk directs and comments on the activity and some explores issues to which it gives rise. In this context, the adult makes available for the child’s appropriation not only specific information that is responsive to the child’s interest but also a stance toward experience that values an attitude of inquiry. By treating the child’s questions as worthy of explicit response, the adult supports the development of a disposition to pose questions and to seek answers to them through further inquiry (Wells, 1999).

### **The Role of Activity in Education**

Although “education” is often used synonymously with “schooling”, broadly interpreted, education has been going on throughout the child’s early years and, indeed, as was seen above, there are many occasions when a coparticipant in ongoing activity provides explicit instruction. However, education - in the sense of schooling - tends to be very different from the sort of activities illustrated above. Most importantly, in schools, the instruction is both deliberate and systematic, and is governed not by the students’ interests, but by a curriculum that has been designed by experts who are unfamiliar with the students who are to be instructed. As a result, what is taught in school is often unrelated to what children are most interested in learning and many fail to benefit from the opportunities that schooling should provide.

In earlier sections of this paper, it has been argued that learning is not an end in itself but an integral aspect of mastering new forms of activity that have meaning and value for the learner’s development, both as a member of a community and as an autonomous, unique individual. As Vygotsky emphatically

pointed out, it is learning that leads development and instruction should be organized to assist this process.

Instruction is only useful when it moves ahead of development. When it does, it impels or wakens a whole series of functions that are in a stage of maturation lying in the zone of proximal development. (1987, p. 212.)

The central question for schooling must therefore be how to offer instruction so that it is relevant to students' developmental trajectories and appropriately pitched in their zones of proximal development. And the second question is how to provide assistance to individual students so that their learning does indeed enable them to move ahead in their development.

In attempting to provide answers to these questions, the concept of 'leading activity', together with that of recapitulation of the developmental sequence of modes of knowing, can provide a useful beginning. On entry to school, children have largely mastered the modes of knowing associated with action, mimesis and speech (Nelson, 1996). What they now need is an apprenticeship into the modes of knowing associated with written language and the various kinds of symbolic representation that are derived from it - mathematical, scientific, musical, etc.. That is to say, they need to learn to use these forms of representation as tools to mediate deliberate, reflective communication and thinking and to appropriate the different domains of theoretical knowing that have been cumulatively constructed by previous generations with the aid of the affordances of "external memory" (Donald, 1991).

The recapitulation of cultural historical development maps the long-term trajectory for formal education in schools and tertiary institutions. But even more important, in attempting to answer the central questions posed above, is to determine effective procedures for organizing the smaller steps that make up the lessons, curricular units, and yearly syllabuses along this trajectory. Building on the ideas presented in previous sections of this chapter, two principles appear self-evident. First, educational encounters need to be recognized to be "joint activities" in which all participants contribute to the agreed upon goals to the best of their abilities and, second, the giving and receiving of assistance by all participants should be the established norm. A third principle that follows by implication is that there can be no universal best way to engage with any aspect of the curriculum, since every class varies in the experiences and interests that its members bring and in the culturally learned values and practices that

motivate and direct their engagement with the new knowledge and skills that they are expected to master.

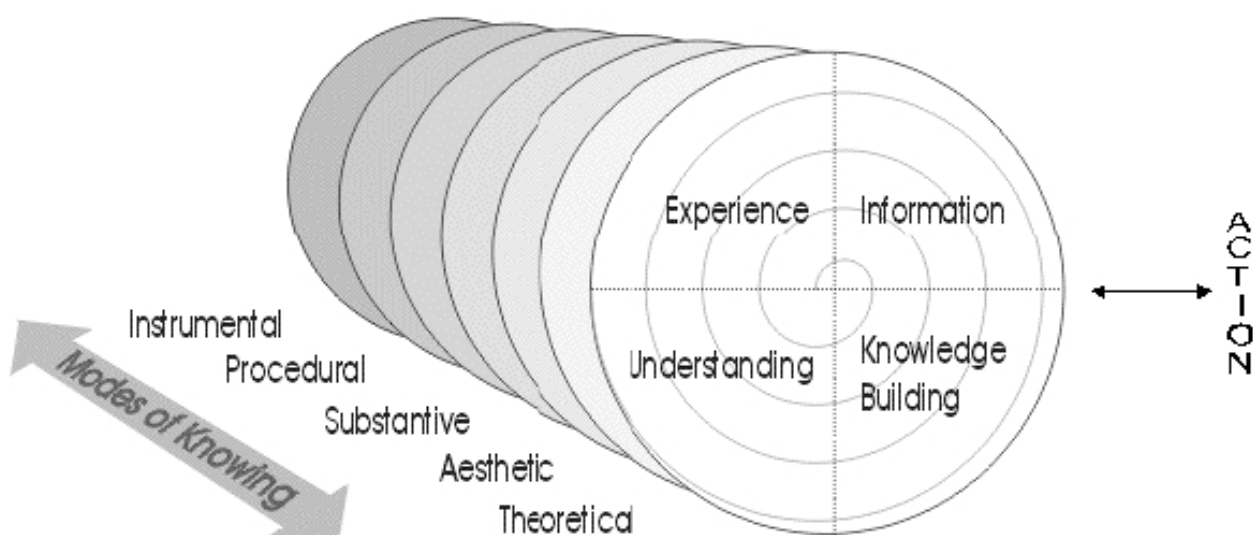
Although it is always important, the requirement to recognize, value and build on students' prior experiences has become even more necessary as migration, both within and between countries, has grown in significance and as ethnic, class and religious differences between communities have led to ever more diverse school and classroom communities - and this is even more the case where a substantial proportion of students is learning the language of the classroom as a second (or subsequent) language. Such diversity in cultural background and prior experience is generally seen as a problem that needs to be overcome in countries where curriculum designers aim to standardize instruction in order to achieve identical outcomes for all students, as is the case in the United States today. However, when the differences among people in terms of experience, values and practices are recognized to be both normal and desirable, this diversity can become an asset in the classroom, since the alternative practices and points of view to which it gives rise can enrich the classroom community and lead to valuable discussions in which taken-for-granted beliefs are challenged and a deeper understanding achieved of the issues under consideration (Wells, 1999).

In this context, I have found it helpful to think of school-based learning in terms of a spiral of knowing, where enhanced understanding is the intended outcome of each cycle through the spiral (Wells, 1999) (see figure 3). In the first phase, as the class embarks on a new curricular topic, it is important to encourage students to share their relevant prior experiences since, as researchers in many different fields have shown (e.g. Freire, Piaget, Rosenblatt, Vygotsky), these experiences provide the point of departure for their learning, whether they are publicly recognized or not. By discovering what students already know and what they are interested in exploring further, the teacher can also plan the unit in cooperation with the students (Donoahue, 2003). The second phase in the spiral involves various encounters with new information – through teacher exposition, print or media presentations, or in the form of feedback to the students' own actions and investigations. It is important to recognize, however, that the reception of new information does not, in itself, ensure an enhancement of understanding. For that to occur, the new information must be articulated with existing understanding and with relevant past experience, then put to the test, through action into the world that produces feedback (further information) and/or through dialogic knowledge building with others, in which the aim is to arrive at a consensual choice among

alternative theories, claims or interpretations on the basis of a consideration of relevant evidence and argument. Finally, to consolidate the new understandings gained, it is valuable for the whole class to reflect together on what they have learned and on the knowledge building processes in which they have engaged, on what implications their new understanding has for their own actions - both outside as well as inside the classroom – and on what important questions they now have to drive their further inquiries. In other words, the final phase in the cycle involves the community in “going ‘meta’” (Olson & Bruner, 1996), that is to say, taking a metacognitive perspective on their own learning, which, over the millennia, has probably played an important role in the development of each of the modes of knowing in Donald’s (1991) account of cultural historical development.<sup>3</sup>

Figure 3: The Spiral of Knowing

Figure 1: The Spiral of Knowing



Several further points need to be made about this spiral. The first has to do with the incomplete and provisional nature of understanding; it is always open to improvement through further cycles through the spiral. The second concerns the essentially social and interactional nature of individual and community growth in understanding: it occurs through participants’ efforts to make their own meanings clear to others and, in turn, to take account of and respond to those of others (Bakhtin 1986). Third, it needs to be emphasized that growth in understanding involves a further spiraling between the different modes of knowing, since most of the challenges and problems that occur in settings beyond the classroom call

upon procedural, substantive and aesthetic as well as theoretical knowing, and each mode has a contribution to make to the achievement of comprehensive solutions that significantly enhance understanding. Finally, in the representation of these relationships in figure 3, the spiral also brings out the interdependence of the individual and the community. While experience and understanding are essentially individual in nature, they grow out of and take on their significance from the individual's participation in the exchange of information and engagement in knowledge building in the larger community of which he or she is a member.

Unfortunately, many educators do not understand these fundamental relationships and so their instruction is not conceptualized and planned in ways that are optimal for students' development. As several recent studies have shown (Langer & Applebee, 1987; Nystrand & Gamoran, 1991), in the majority of classrooms, it is the banking conception of knowledge (Freire, 1970) that governs practice, according to which the purpose of classroom-based instruction is for individual students to be prepared to score well on tests rather than to extend their understanding. Given this orientation, the activities in which students are asked to engage are determined by the curriculum guide or the textbook rather than by the teachers' knowledge of the interests and abilities of the particular students for whom they are responsible, and it is what Tharp and Gallimore (1988) refer to as the "recitation script", interspersed with individual seatwork, that dominates the daily routine. Furthermore, plans for how to proceed are, not surprisingly, unilaterally imposed rather than being made on the basis of decisions taken by the classroom community as a whole, and the general ethos is one of competition rather than of collaboration.

However, as I have argued elsewhere (Wells, 1986, 1999, 2002a), this is not the only mode in which schooling can be conducted – despite the long history of recitation, which goes back more than three thousand years to the earliest institutions for training scribes and administrators to read and write (Cole, 1996) But it is likely to be the default mode if schooling is seen to be a preparation for "adult life" rather than a critical stage of development which is worthwhile and meaningful in its own right. As Vygotsky argued about the mastery of literacy, "teaching should be organized in such a way that reading and writing are necessary for something ... Writing should be incorporated into a task that is relevant and necessary for life" (1978, pp.117-118). And, by "life" he meant not life in the future but the totality of the learners' current interests and concerns.

In the last few years, projects have been reported from a variety of countries, in which university educators have attempted to create conditions for “authentic learning” in classrooms. In all of these projects, a central place has been given to collaborative activities which, alternating between individual, small group, and whole class participation formats, involve students in exploring a central topic through practical as well as theoretical investigation and in critical and constructive discussion about their findings and about the implications for further action. Space does not permit a discussion of these projects individually here, but what can be said about all of them is that, in their different ways, they both honor students’ interests and prior experiences and aim to assist them to develop the disposition to seek understanding rather than the simple accumulation of information and to value collaboration rather than competition as the means for achieving this goal.<sup>4</sup>

In this context, it is worth drawing attention to various after-school settings, such as the Fifth Dimension, where participation in self-chosen activities - often computer-based – requires children to master skills that are also necessary for schooling and provides opportunities for them to interact with university volunteers on an equal footing (Brown & Cole, 2002). Similarly, some museum-based programs (Leinhardt et al., 2002) and various forms of outdoor education also capitalize on students’ interests to engage them in challenging activities that call for knowledge building dialogue and decision-making comparable to those found in the classroom settings referred to above.

Finally, if the practices that are being pioneered are to take root and influence public education more widely, it is essential that teachers have similar opportunities to develop the dispositions and the expertise necessary to act as agents of change and leaders of reform in the institutions in which they work. It is therefore encouraging to see that, despite the policy-makers’ emphasis on standardized curricula and measurable outcomes, some programs of teacher preparation and professional development encourage teachers, on the basis of inquiries into their own practice, to make their own decisions as to what should be taught and how, and to share the outcomes of their inquiries with colleagues. This has been the thrust of my own work in recent years, as I have engaged in collaborative research with teachers to create and sustain communities of inquiry both in classrooms and among the teachers themselves.<sup>5</sup>

## Summary

In this paper I have tried to show that, on all the time-scales from the gradual evolution of the species to particular situated events, it is in and through engagement in tool-mediated joint activities that both individuals and societies develop in mutual interdependence. Because such activities are goal-directed and collaborative, their success requires the negotiation of meanings among participants concerning the tools and practices available and their optimal employment to achieve agreed upon goals. For this reason, the development of the human species, of cultural groups and of individual persons is dependent on the representational tools available to them and on the modes of knowing that these support. In order to ensure its continuity, each society enculturates its young through apprenticeship into its ways of acting, communicating, thinking and valuing. However, rightly conceived and practiced, education can do more. By equipping students with the resources of skill and knowledge achieved by previous generations and by providing them with appropriate guidance and assistance as they collaboratively explore issues and problems of shared interest, educators can enable them to develop the disposition to seek for and extend understanding that empowers responsible action and, in the process, to transform themselves, their societies and the world they inhabit.

## Notes

1. There has been much debate about the temporal sequence implied by this formulation and, indeed, about the implication of movement from outside to inside that it suggests. My own understanding of what is involved in appropriation is much better captured by the example of learning to dance through engaging in the activity with others (Wells, 1999). In many cases, there is no separation between earlier and later or between outer and inner and there is no need for demonstration or explanation. Instead, by being involved in the joint activity, the novice is, literally, physically entrained by the movements of coparticipants while at the same time constructing an inner organization – and perhaps even a schematic representation – of the bodily movements involved. Over time, this scheme is so well organized that the novice becomes an expert who is able, in turn, to induct others into the activity. This, I take it, is what Lave and Wenger (1991) and Rogoff (2003) mean by development through participation in cultural activities.

2. I am grateful to Natalia Gajdamaschko and Steve Gabosch for their helpful discussion of this distinction during the XMCA online course on cultural historical activity theory, April 2003 (<http://www.clmer.csulb.edu:8000/xmcaCourse>).

3. Although included in table 1 above, this mode of knowing was not discussed there as the explicit recognition of this important mode of knowing is extremely recent (Brown, 1975). However, that does not mean that it is, in itself, a new phenomenon.

4. For some representative examples, see Brown et al., (1994); ;Lampert et al., (1996); McMahon et al., (1997); Mercer (199 ; Palincsar et al., (1998); Scardamalia et al., (1994).

5. Together, we form a collaborative research group, DICEP (Developing Inquiring Communities in Education Project) (Wells, (Ed.) 2001).

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<sup>1</sup> There has been much debate about the temporal sequence implied by this formulation and, indeed, about the implication of movement from outside to inside that it suggests. My own understanding of what is involved in appropriation is much better captured by the example of learning to dance through engaging in the activity with others (Wells, 1999). In many cases, there is no separation between earlier and later or between outer and inner and there is no need for demonstration or explanation. Instead, by being involved in the joint activity, the novice is, literally, physically entrained by the movements of coparticipants while at the same time constructing an inner organization – and perhaps even a schematic representation – of the bodily movements involved. Over time, this scheme is so well organized that the novice becomes an expert who is able, in turn, to induct others into the activity. This, I take it, is what Lave and Wenger (1991) and Rogoff (2003) mean by development through participation in cultural activities.

<sup>2</sup> I am grateful to Natalia Gajdamaschko and Steve Gabosch for their helpful discussion of this distinction during the XMCA online course on cultural historical activity theory, April 2003 (<http://www.clmer.csulb.edu:8000/xmcaCourse>).

<sup>3</sup> Although included in table 1 above, this mode of knowing was not discussed there as the explicit recognition of this important mode of knowing is extremely recent (Brown, 1975). However, that does not mean that it is, in itself, a new phenomenon.

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<sup>4</sup> For some representative examples, see Brown et al., (1994); ;Lampert et al., (1996); McMahan et al., (1997); Mercer (199 ; Palincsar et al., (1998); Scardamalia et al., (1994).

<sup>5</sup> Together, we form a collaborative research group, DICEP (Developing Inquiring Communities in Education Project) (Wells, (Ed.) 2001).