

Cultural–Historical Activity Theory

Laboratory for Comparative Human Cognition, University of California, San Diego, San Diego, CA, USA

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A long-standing challenge in educational research is to describe and explain the complex dynamics of learning and development that occur in educational settings. This article summarizes ways in which qualitative methods are essential to this enterprise from the perspective of scholars who approach the issues using the theoretical lens of cultural–historical activity theory (CHAT). After summarizing basic principles of this theoretical approach we provide four examples involving different levels of analysis and methodologies. (Methodology is used to refer to the ensemble of methods that mediate between theoretical statements and data used to evaluate them.)

To some researchers who employ qualitative methods, the very fact that we enter into this topic guided by a theoretical framework disqualifies our claim to be qualitative researchers. Smith argues that “qualitative approaches in psychology are generally engaged with exploring, describing and interpreting the personal and social experiences of participants. An attempt is usually made to understand a small number of participants’ own frames of reference or view of the world rather than trying to test a preconceived hypothesis on a large sample” (Smith, 2003: 2).

Our approach involves small samples, and we are interested in participants’ own understandings; however, we do operate from a preconceived theoretical base and in that sense we have preconceived hypotheses. Moreover, the approach we espouse does not preclude quantification. However, such quantification is more likely to be used for purposes of comparative analysis of qualitatively different activities (Cole *et al.*, 1978) or summary evaluations of products than for a deep analysis of the process of change (cf., Hayes, 1997).

The Theoretical Framework

CHAT refers to an interdisciplinary approach to studying human learning and development associated with the names of the Soviet Russian psychologists, L. S. Vygotsky, A. R. Luria, and A. N. Leontiev. (There has been a lively debate in recent years about the extent to which these three thinkers represent a single theoretical perspective. According to one line of interpretation, those who follow Vygotsky have focused attention on processes of mediation, adopting mediated action in context as a basic unit of analysis (Wertsch *et al.*, 1995). This line of work is often referred to as sociocultural research. By contrast, followers

of Leontiev are said to choose activity as a basic unit of analysis (Kaptelinin, 1996). For our present purposes, these distinctions are not central and we will treat the differing formulations as expressions of a single family of theoretical commitments.) The following are some theoretical principles of this approach:

1. *Mediation of experience through artifacts.* The initial premise of the cultural–historical school was that human psychological processes are bound up with a form of behavior in which material objects (e.g., hammers, pictures, gestures, and vocal sounds) and corresponding ideal objects (e.g., meanings and values) are incorporated into human actions and modified over generations as a means of regulating humans’ interactions with the world and each other. Artifacts incorporated into human action do not both change a person’s conditions of existence, and react back to that person’s psychological processes. Consequently, such artifacts are both symbolic and material mediators. Vygotsky referred to this kind of mediated action as the cultural habit of behavior which enables human beings to begin to regulate themselves from the outside.
2. *Activity as the essential unit of analysis.* The analysis of human psychological functions must be situated in relation to historically accumulated forms of human activity which are the proximal loci of human experience. The early Russian CHAT theorists demonstrated that at least in some institutional settings (among which schools and classroom activities were a major focus of attention) it is possible to make mediated-actions-in-activity/context a genuine object of study. Contemporary research has enormously broadened the range of activities and institutions to which scholars have been able to turn their attention (Engeström *et al.*, 1999).
3. *The cultural organization of human life.* Implied by the dual emphasis on mediation and activity is the centrality of culture in human life. Culture is present in the form of the tools, signs, cultural practices, architectural arrangements, social institutions, etc., that mediate human activity. It consists of all the material/ideal artifacts accumulated over the social group’s history, whether that history is of long or short duration.
4. *The primacy of the social.* From a CHAT perspective, children’s relationship to the world is, from the beginning, a social relation. However, especially in the beginning, children are maximally dependent upon adults not only

because of their physical immaturity but because they have no knowledge whatsoever of the cultural tool kit of the social group into which they are born. Thus, social others have a primary role in the development of psychological processes because it is only by already-enculturated adults arranging for the child to appropriate the cultural heritage of the social group that specifically human, culturally mediated, forms of psychological life become possible.

5. *Genetic analysis.* Vygotsky (1978) used the notion of genetic in the sense of seeking the origins of current phenomena by studying their history. Individual human development (ontogeny), he held, is the emergent outcome of processes of phylogenetic, cultural–historical, and microgenetic history.

CHAT Approaches to Learning and Development

A critical issue in CHAT approaches to education is the relationship between learning and development.

Learning

Vygotsky (1978) discusses learning in terms of the ideas of E. L. Thorndike, whose theory represented the original framework of behaviorism. According to Thorndike, learning is the result of trial and error during which associations form between stimuli and responses. Such associations or habits become relatively stronger or weaker when certain responses come to dominate others because they lead to rewards. According to Vygotsky, Thorndike proposed that:

[...] learning is the acquisition of many specialized abilities for thinking about a variety of things ... which does not alter our overall ability to focus attention but rather develops various abilities to focus attention on a variety of things. According to this view, special training affects overall development only when its elements, material, and processes are similar across specific domains. (p. 83)

Development

Vygotsky (1978) strongly differentiated learning from development. In his words:

Our concept of development implies a rejection of the frequently held view that cognitive development results from the gradual accumulation of separate changes. We believe that child development is a complex, dialectical process characterized by periodicity, unevenness of the development of different functions, metamorphosis or qualitative transformations of one form into another,

intertwining of external and internal factors, and adaptive processes which overcome impediments that the child encounters. (p. 73)

Vygotsky and his colleagues emphasized that not only are there changes in specific psychological functions (e.g., word meaning or memory) but that “the entire history of the development of higher psychological functions is nothing else than the alteration of primary interfunctional relations and ties, and the appearance and development of new psychological functional systems” (Vygotsky and Luria, 1930/1994: 167).

The Relationship of Learning to Development

Vygotsky (1934/1987) famously argued that school instruction should be organized in such a manner that “instruction moves ahead of development. When it does, it awakens a whole series of functions that are in a maturation” (p. 212). The kinds of functions Vygotsky had in mind included logical memory, abstraction, comparison, and differentiation. “These complex mental process,” he argued, cannot simply be learned in completed form, “like a mental habit” (p. 170).

But how is such arranging to be done? The problem does not arise for those who believe that learning equals development. For them the answer is clear: by direct instruction in which teachers provide appropriate stimuli and students are rewarded when they provide appropriate responses, that is, drill and practice with clear-cut consequences. However, as many critics of this form of instruction have noted, this method is inadequate:

The teacher who attempts to use this approach achieves nothing but a mindless learning of words, an empty verbalism that simulates or imitates the presence of the concepts in the child. Under these conditions, the child learns not the concept but the word, and this word is taken over by the child through memory rather than thought. Such knowledge turns out to be inadequate in any meaningful application. (Vygotsky, 1934/1987: 170)

It is to solve this problem that Vygotsky introduces the idea of a zone of proximal development (ZPD). The task confronting the teacher is to create a system of culturally mediated social interactions, organized in such a way that the student can, drawing upon prior and ongoing learning, achieve a qualitatively distinct new understanding, a conceptual re-organization that enables conscious control over the newly acquired knowledge. Creating such instructional circumstances is easier said than done. Although Vygotsky offered various suggestions about how to implement a ZPD, he never offered a systematic methodological system. (As Kozulin and Gindis (2007) comment, “Consequently, One can ... be true to the word and meaning of Vygotsky’s theory of the ZPD, but

one cannot follow or deviate from Vygotsky's ZPD assessment methodology for the simple reason that he never spelled it out" (p. 353).

Examples of CHAT Research

Recognition that the development side of the learning/development dance that constitutes successful academic education is a complex, dialectical process orients us to study the qualitative changes over time (longitudinally), at an appropriate genetic time scale. These dynamics involve the kinds of complex interactions between individuals in groups that routinely occur in instructional settings. CHAT-inspired research captures this complexity by focusing simultaneously on the activities or practices that contextualize these interactions. It also focuses on micro-genetic changes, ontogenetic changes, and cultural historical changes in relation to one another. Appropriate methods of data collection include digital voice and video recording, interviewing, structured and informal observation, participant observation, and quasi-experiments. Each example below represents the study of qualitative changes that occur in interaction under different levels of constraint in different social settings (dyadic teaching, a classroom lesson, weaving instruction in a Mexican village, and a small-group reading intervention).

Example 1: Puzzles

An early American study illustrating the centrality of structured observational method to CHAT research was carried out by James Wertsch and his colleagues (Wertsch *et al.*, 1980). In this work with middle-class families whose children attended preschool, mothers were asked to assist their infants (1–4 years of age) to copy a jigsaw puzzle depicting a cargo truck created from different regular shapes and colors. The researchers' particular interest was in the dynamics of adult and child discourse in relation to the child's puzzle-constructing actions. They hypothesized that these dynamics would change in conjunction with various adult communicative behaviors aimed at helping the child copy the puzzle.

Numeric registers alone, such as the number of times that a child glanced at the model when seeking to put a piece into the copy would yield a puzzling finding: The children all gazed at the model for roughly an equal amount of time. Careful analysis of the pattern of interactions indicated that the children had all learned names for the colors and shapes of the pieces of the puzzle, and the mother's often used the terms shape and color when seeking to assist them. However, it turned out that there was a regular change with age in who regulated the gaze at the model – sometimes the child gazed spontaneously, and sometimes the gaze seemed to require some sort of communicative gesture from the mother. In this respect, the children differed greatly: the youngest children were

least likely to attend spontaneously to the model. In Vygotskian terms, these data reveal a change in the inter-functional relations between attention and problem solving that had to be understood in terms of the developing child in relation to the enculturating mother. The mother's prior cultural knowledge, embodied in child-directed speech in conjunction with the children's prior learning (which in turn was mobilized by the mothers' when the children experienced difficulties), served to constitute the ZPD.

Example 2: Gazzinta and the process of long division

Petitto (1986) observed the process of teaching long division to fourth graders who were encountering it for the first time. Classroom interactions were videotaped. The data permitted the researchers to explore students' ZPDs as well as qualitative transformations in the interactions.

The children were expected to have learned their multiplication facts ($6 \times 7 = 42$) and simple division as reverse multiplication ($? \times 7 = 42$), as a preamble to the development of a qualitatively new form of arithmetic understanding – division that leaves a remainder. The teacher told the children that the seven *gazzinta* (goes into) 46 problem is solved in the same way as simple division, by finding a number which, when multiplied by seven produces a number close to 46 except it does not go over and then subtracting to find the remainder. The fourth graders seemed to have a difficult time grasping the *gazzinta* relation; however, with repeated examples using multiplication tables, over time the children began to catch on to what was being requested of them.

During a conference attended by several researchers from Japan, Petitto described the children's difficulty understanding the goes-into operation. Her description made perfect sense to members of the research team who had been discussing the work for some time, but the Japanese researchers were baffled. Eventually, one of them raised his hand to ask for an explanation of this new concept, *gazzinta*. Andrea was nonplussed. "Goes into" she said, slowly and with exaggerated intonation, and then demonstrated the entire procedure for determining how often seven *gazzinta* 46.

A fourth grader encountering long division for the first time faces a far more difficult task than the Japanese colleagues who knew the concepts involved in division. The child hears the word, *gazzinta*, and seeks, like the Japanese visitors, to figure out its meaning. But teachers do not say what *gazzinta* means. In fact, it probably is not possible to give an unambiguous explanation of *gazzinta*. *Gazzinta*, for long division with remainders, involves an iterative estimation procedure that is a combination of multiplication and subtraction carried out in no specifiable sequence on the number line. Faced with the difficulty of explaining the concept of *gazzinta*, teachers create a procedure to assist

the child, often putting the requisite times tables nearby. This offloads the work of retrieving the fact that $6 \times 7 = 42$, which is too little, and $7 \times 7 = 49$, which is too much, allowing the child to realize that seven *gazzinta* 46 six times, and that after subtraction, four will be remaining. The child must form the concept of *gazzinta* under the constraints provided by the adult and the cultural conventions for representing long division.

Researchers also noticed a strange phenomenon that further demonstrated the problematic relation between direct instruction and conceptual development. There were times when the teacher and a child were unknowingly talking about different parts of the same problem (e.g., the teacher said something about the quotient, the child understood it to be about the dividend) but there was no noticeable disruption in the conversation and the child arrived at a correct answer. It was as if the teacher and child were in close enough coordination, despite local discrepancies in the precise part of the problem they were referring to, to permit the action to unfold.

Petitto's work shows how instruction operates within a medium created by graphic symbols and classroom routines that provide constraints for, but cannot provide direct instruction for, mastery of a new concept.

Example 3: Remediating reading difficulties

Despite significant differences among them, modern approaches to reading have distinguished two, presumably distinct, major components of the reading process: decoding (the process by which letters of the alphabet are associated with corresponding acoustic patterns) and comprehension (the process by which meaning is assigned to particular visual/acoustic representations). Within this seemingly obvious dichotomy, theorists differ on the question of how to sequence instruction (code emphasis first vs. meaning emphasis first), how best to help children break the code (by teaching phonetic analysis or by teaching whole words), and how to motivate children to engage in reading (Burns *et al.*, 1999).

The following example seeks to solve these problems by creating a scripted, small group activity in which all of the theoretically important aspects of reading are brought together in a routine, coordinated, manner. The core of the procedure (described in more detail in Cole, 1996) was to create a set of roles or division of labor, each of which specified a different role in the overall process of reading. The roles were printed on index cards and every participant was responsible for fulfilling at least one role. The roles were:

- the person who asks about words that are hard to say;
- the person who asks about words that are hard to say what they mean;
- the person who asks a question about the main idea of the passage being read;

- the person who picks the person who has to answer the question at hand; and
- the person who asks about what is going to happen next in the text.

All the participants were given pencil and paper to jot down words, phrases, or notes (in order to answer questions about the text) and their card to remind them about their role. There was also a kitchen alarm to signal the start of reading time, and when it was over, the scripted activity of going through the roles in order to come up with a question about the main idea of the passage began. After a few sessions, the children and adults were able to engage in question–asking–reading, including children who still were unable to read for comprehension. The whole act of reading was not the responsibility of any one participant, but rather, was constructed for all in the act of working through the roles collectively and coming up with a question about the main idea.

Evidence for the way in which this procedure worked is derived from several sources to reveal qualitative differences in the children's ability to read and changes in those abilities over time: videotaped recordings of the instructional sessions, children's written work on the quizzes that completed each session, and various test results. Although data were gathered from the beginning of the first session, the crucial data for analysis of the process of reading development came after several sessions when the children had learned the overall script so that the group was working as a coordinated structure of interaction. Under such circumstances, different children became disoriented in different ways. Some children had difficulty saying how a written word sounded; others had difficulty understanding the meaning of the word; all had difficulty, at first, figuring out what the main idea was or using the information in the text to anticipate what would follow.

Data were also analyzed for instances in which misunderstandings moved up from decoding the comprehension of individual words to emerging comprehension of the text as a whole. Both forms of data helped the researchers to identify children's ZPDs and how the persons involved, the scripted procedures, and the cultural tools used contributed to change over time in both the participants and the activity.

Example 4: Developmental changes in learning to weave

In the 1960s, Patricia Greenfield and colleagues began to study the social organization and cognitive consequences of learning to weave among the Zinacantan Maya of Chiapas, Mexico (Greenfield and Childs, 1977). The researchers carefully described the way that mothers introduced young girls into weaving, analyzed mother–child interactions, and of the kinds of woven products produced. In the 1990s, they returned to the same village and conducted

parallel observations of parents (former child subjects) inducing their children into weaving. Greenfield emphasized the interconnectedness of historical change in economic activity, including exposure to new products and practices from contact with the modern sector of Mexican society, socialization practices (in particular, modes of socializing girls into weaving), and cognitive processes involving the mental representation of the patterns in woven cloth (Greenfield, 2004).

The instructional mode characterizing the mother-child weaving sessions in 1970 emphasized a long process of gradual apprenticeship involving many roles preparatory to weaving itself. When children first began to weave, mothers hovered close by and guided children with their own hands and bodies, using little verbal instruction. The entire system appeared to focus on maintenance of tradition and was characterized as interdependent cultural learning. In the 1990s, mothers who were more involved in the modern economy (e.g., weaving products for sale) instructed their children verbally from across the room. The mothers sometimes asked older children to take over instruction and only kept an eye on the processes, which were characterized by a good deal of explicit verbal instruction. Over time, the types of interactions changed as well as the number of artifacts used as a part of instruction. The gradually transformed participation in production of the 1970s gave way to increased verbal instruction and work with simplified weaving tools in the late 1990s.

In conjunction with changing verbal and nonverbal instructional practices, young girls were provided with simplified weaving tools of two levels of complexity. The simpler of the two was a tool for winding thread that maintains the orientation of the threads that would later be used in weaving the cloth; the more complex tool involved doubling the long (warp) threads around a dowel. This more complex approach required the weaver to visualize the extended warp (undoubled) rather than simply see it. Greenfield and her colleagues argue that the complex warping frame required the ability to engage in mental transformations while the simplified winding frame did not.

The changes in instructional practices came with an increased respect paid to individual innovation, seen in changes in the variety of products. In the late 1960s, the variety of products was limited, reflecting a very small set of right ways to weave. By the 1990s, there was no longer a small set of simple, correct patterns, but an efflorescence of patterns of great variety and complexity. This change was also shown in the way children represented weaving patterns in an experimental task, with children who attended school being more likely to create novel patterns. Overall, these results nicely illustrate several general theoretical claims derived from a CHAT perspective: the interconnections between cultural-historical change and ontogenetic experience, the ways in which microgenetic, minute-by-minute forms of interaction provide the

proximal locus for ontogenetic change, the primacy of the social in organizing specific cultural practices, and the changing nature of the artifacts that are employed to mediate these developmental processes at different scales of time.

Discussion

We have now presented four examples of research in the CHAT framework. They are characterized by two common elements. First, there is a shared focus on change over time in individuals, groups, and the activities in which they interact, even as the temporal and spatial dimensions of the activities under study vary greatly. Second, all four studies are explicitly theoretically informed. In Table 1, we summarize how each of the studies exemplifies different levels of analysis, different time and spatial scales, and different methods appropriate to each study.

These research examples highlight how qualitative methods are used to test the theoretical constructs we described as central to a CHAT approach. In our examples, the unit of analysis is not the individual learner, the teacher, or the learning environment. In all four examples, the unit of analysis is joint-mediated activity, which includes two or more individuals in interactions mediated by cultural artifacts (e.g., puzzles and terms for shapes and colors, a blackboard, math notation, times tables, texts, and a scripted process for reading and asking questions, and weaving tools and procedures).

All four examples, involved data collection that permitted analysis on at least two levels. In example 1, the role of social interaction in the development of problem solving involved analysis of primary social relations which are the source of the cultural resources the child will be expected to obtain and deploy as an adult. This example also illustrates the need to take into account, modes of discourse as they relate to qualitative changes in individual ontogenetic development associated with the acquisition of higher (e.g., culturally mediated) psychological functions. Methodologically, the brief temporal extent of example 1 indicates that it is focused on relatively short-term (microgenetic) interactions provoked by a puzzle task in a laboratory setting. It might also be considered a quasi-experiment.

In example 2, learning/instruction in a classroom, in particular, long division and the ineffable process labeled *gazzinta*, is the complex phenomenon being studied. The methods used included a series of observations and videotapes of math lessons on long division and subsequent analysis of discourse. In addition to the location of the study in a math classroom, the interaction data collected focused on microgenetic processes embedded within routine lessons.

Originally, analysis focused on the process of instruction, changes in the children's understanding, and the group processes and tool use that mediated those changes.

Table 1

Example	Level 1: Sociocultural phenomenon	Level 2: Areas of specific focus	Temporal/spatial scale	Methods used
1. Puzzles	Development of primary social relations	Mother–child interactions, discourse	Microanalysis: Short-term interactions in lab	Structured observation
2. Long division (<i>gazzinta</i>)	School-based math instruction	Classroom instruction, teacher–students	Microanalysis: Sequence of class periods, <i>in situ</i> in math classes	Natural observation
3. Question – asking–reading	Practice of reading school-based reading	Scripted activity as medium for experience of mature reading	Microanalysis of artifact-mediated social interactions over time, mesoanalysis of the scripted learning activity, ontogenetic changes in reading ability.	Design intervention
4. Weaving	Practice of weaving	Mother–child interaction, practice of instruction, practice, and artifacts of weaving	Microanalysis: Sequence of instructional interactions over time, <i>in situ</i> in homes Cultural–historical: Changes to the practices of weaving and instruction of weaving	Ethnography, and structured observation

Questions from Japanese visitors prompted analysis of the assumptions underlying the assumption that *gazzinta* was transparent as a term and a concept. A focused analysis of the complex cognitive routines involved in *gazzinta* – the meaning of *gazzinta* – remains to be conducted.

In example 3, rather than a quasi-experimental study in a laboratory or an observational study *in situ*, the research involved design of a learning environment in which a set of scripted procedures was used by adults and children to mediate the development of reading comprehension. The learning environment and the scripted procedures comprised an intervention, which the researchers hypothesized would permit participating children to experience qualitative change in their reading comprehension. In this study, group interactions were tracked over time in order to gain understanding of the microgenetic social and mediational processes related to individuals' changes in reading comprehension. At the same time, the development of the learning environment itself over time, a mesogenetic process that is longer than microgenetic interactions, but of a much shorter time scale than the cultural history of the practice of school-based reading, was tracked and analyzed. This allowed for a process of iterative design and ongoing refinement of the learning environment itself, even as the social interactions and individual changes in reading behaviors and comprehension provided particularly acute insight into the distinct strengths and weaknesses of each participating child, providing an ideal medium for remediation of their difficulties.

The timescales in example 4 are both microgenetic (instructional interactions) and cultural historical (change in the practices of weaving and weaving instruction over 30 years). The methods used included observation and

video recording *in situ* as well as ethnography that included both households and the political economy of the national context in which the activities of those households took place. This example illustrates the value of a historical lens in making sense of human interactions and practices such as instruction, which change in relation to societal changes, that is often not considered directly in educational research.

In all four example studies, the processes by which artifacts and social interaction with adults or more experienced peers helped to regulate children's behavior was of interest. In each case, the studies focused on the ways in which actions and the arrangements of artifacts were organized in order to promote or restrain learning.

In each case, there is a dual-mediational process at play. On the one hand, learning was mediated by more capable partners – mothers' communicative gestures, a teacher building on prior knowledge of multiplication tables and simple division, adult guides using a game-like script for reading instruction, and mothers and siblings using the traditional practice, verbal instruction, and modified tools for weaving. In all four examples, the children internalized or appropriated the use of symbolic tools (e.g., terms for color and shape, math language, the procedural rules in a script, written text, and visual and verbal instructions) in order to coordinate their roles in the different activities with the adults and other children. In all four examples, there were qualitative changes in observed behaviors, that is, the children's participation in the activities that indicated development. Observation of these changes and the social and mediational processes related to them required systematic collection of multiple forms of data over time and rigorous analysis of those data.

Conclusion

CHAT is a genetic and generative approach to understanding the living processes of learning and development. Research in the CHAT tradition is complex, but the rewards are many. As CHAT methods are deliberate models of cultural practices, there is an immediate reciprocal relationship between theory and practice. The ultimate criteria for success are not the discoveries and explanations that the research generates, but the uptake and the deployment of this knowledge by the educational communities crowding our country where education is woefully inadequate to the challenges of modern economic life.

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