

Some cognitive tools of literacy

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Introduction

For the educator interested in such topics as how to engage children in becoming more fluently literate, Vygotsky has offered a crucially important insight. Prior to his work—and, of course, still commonly the case for those who have been unable to see its richer implications for education—approaches to education generally have tended to take one or more of three general approaches. We will sketch them very briefly below, and then indicate in what way Vygotsky's insight into the role of cognitive tools helps us to transcend the limitations of the three traditional approaches.

The main purpose of our paper, however, is to explore some new implications of Vygotsky's insight, seeking to unfold it in ways that enable educators to discover new pathways to successfully engage students in literacy. We think, also, that this analysis of the cognitive tools that come along with literacy provides a novel expansion of Vygotsky's insight in ways directly applicable to education.

Three traditional conceptions of the educator's task

The first, and most ancient, conception of the educator's task is to engage the young learner in what today we call an apprenticeship relationship with an expert. The child would, consequently, learn by doing with an expert on hand to guide and correct the novice. This kind of learning has been perhaps the commonest in human cultures across the world, and was almost the exclusive

mode of instruction in hunter-gatherer societies. And, for the teaching of certain kinds of skills, it remains of significant value to the educator.

The invention of writing transformed the educator's task. Increasingly, as literacy developed, significant amounts of knowledge were stored in coded form. Access to this store was attained only through becoming skilled in literacy. Consequently, all literate cultures invented some formal system of education into coding and decoding knowledge. The trouble with this task has been that at one level it seems as though it ought to be easy to teach the principles of the decoding system, and then all the stored knowledge would be available to the newly literate person. But it doesn't work so easily, partly because of the difficulty many people have in learning to become literate in even basic ways, and also because of the complexity of what is stored in the codes of literate cultures. Not only does one have to teach the systems of coding and decoding, but one also has the harder task of trying to bring back to life the meanings inherent in those desiccated codes. The size of the problem was recognized early on; Plato said that anyone who wrote something down and assumed that another would be able to understand just what the writer meant is a fool.

The conception of education that derived from this accumulation of coded knowledge was one in which the task was to teach as much of certain privileged forms of knowledge as possible—privileged in the sense that they provided the learner with the fullest and truest account of the world. These accounts were systematically coded into forms of knowledge which came to be known as mathematics, history, science, literature, and so on. The mark of an educated person was her or his elaborate familiarity with these forms of knowledge. In this

tradition, the mind was conceived largely as an epistemological organ; the educated mind was recognized as such because it contained a great deal of the most important knowledge.

The third conception of the educator's task grew out of the recognition that, somehow, just accumulating lots of important knowledge did not always produce a satisfactory kind of person. Something was missing, and the element that was missing was seen to be something to do with the fact that the mind's development was not exclusively an epistemological matter. During the past two centuries, it became increasingly recognized by many that the mind also seemed to have a distinctive form of development of its own. Jean-Jacques Rousseau forcefully expressed this idea.

Since Rousseau's time, attempts have been made to uncover and describe this underlying process of mental development, perhaps most spectacularly in the work of Jean Piaget. Increasingly the mind has come to be seen as a psychological organ, with its own schedules of development that are more or less independent of the particular forms of knowledge being learned. Educators were persuaded to see their task, then, as supporting the development of this internal developmental process, to further as far as possible this psychological conception of the mind's development.

The trouble for us today is that these different conceptions of the educator's task are not entirely compatible, and yet they all remain as having some claim on schools and on teachers' time and activities. Also, each of the conceptions by itself has problems. We don't intend to discuss these problems here (but see Lamm, 1976; Egan, 1997); they have been staples of polemics

through the past century, with "traditionalist" educators pointing out the shortcomings of "progressivist" educators, and those concerned about "vocational" education deriding those "liberal" educators, and vice versa. Our concern, rather, is with an alternative conception of the educator's task that emerges from Vygotsky's work.

A cognitive tools approach

Two difficulties educators have had with, for example, the Piagetian model of psychological development concern, first, just what is the model describing, and, second, how can it be integrated into the earlier epistemological conception of education. That is, first, are those detailed stages Piaget characterizes really descriptions of some spontaneous mental development, or are they rather artifacts of cultural contingencies and his research methods and assumptions, etc? And, second, how does the Piagetian image of Formal Operations characterize an aim of education, and how can history and literature be accommodated to his stages? Much ingenuity has gone into answering these questions, but the results "at the chalk face" of schools have not sustained much confidence. The psychological conception of the educator's task has been consistently offered with the promise that if educators just attend to the new psychological theories about the mind, then a revolution in learning will take place. It is a century and a half since the beginnings of this progressivist/psychological promise, in the work of Herbert Spencer (1820-1903), and the revolution has stubbornly refused to occur. Indeed, maybe we

should extend it to two hundred years in the work of Johann Pestalozzi (1746-1827).

The alternative conception Vygotsky offers is to see the mind as a psychosocial and cultural organ, and the cognitive tools we learn as providing the educator with a focus of attention that can make better sense of the task before us.

The psychological conception, exemplified by Piaget's work, and enormously influential still in education despite the decline in Piaget's reputation and increasingly radical criticisms of his work, still sees the educator's task as to accommodate to some model of psychological development. Vygotsky's crucial insight was to recognize that education should not be seen as "a superstructure built on the foundations of psychological functions, [rather] educational activity is seen a process radically changing these very foundations" (Kozulin, 1998, p. 16).

Kozulin goes further in elaborating this conception by pointing out that, through formal schooling, people in developed and developing societies today, "become exposed to a wide array of symbolic tools that not only become indispensable as cognitive tools but to a certain extent form the very 'reality' of the modern individual" (Kozulin, 1998, p. 17.) So instead of a the current assumption that we have some kind of independently developing psychological substructure to which educator's efforts must be made to conform, we may accept the liberating insight that the "Cultural devices of behavior do not appear simply as external habit; they comprise an inalienable part of personality itself, rooted in

its new relations and creating their completely new system” (Vygotsky, 1997, Vol. 4, p 92).

“Even now,” Vygotsky continues, “many psychologists are inclined to consider the facts of cultural changes in our behavior from their natural aspect and think of them as facts of habit formation or as intellectual reactions directed toward a cultural content” (Vygotsky, 1997, Vol.4, p.92).

Consider, for example, the case of written language. According to Vygotsky, most of the difficulties in teaching literacy come from misunderstanding what written language is. He remarked that neither in theory nor in practice is written language being viewed as a “special system of symbols and signs the mastery of which signifies a critical turning point in the whole cultural development of the child” (Vygotsky, 1997, Vol. 4, p.132).

Instead, researchers commonly, and mistakenly, focus on written language as though it is a phenomenon similar in nature to habit formation (like dressing up or forming any other mechanical habit) that could be taught “naturally”. We see such assumptions constantly asserted in, for example, the Whole Language movement. The WL classroom, we are told, is designed to conform with the way children naturally learn; it is like “homes where children are allowed and encouraged to be learners from the day they are born” (Peetboom, 1988, p. 246).

Relatedly, if asked how the child arrives at the conscious understanding of literacy, the answer is that the child “discovers” it. “The key to whole teaching and learning is the active involvement and enjoyment of children as they play with, manipulate and construct language through exposure to fun, enjoyable, rich, and meaningful literature” (Polette, 1990, p. 19). Children are viewed as accomplished

learners when they arrive at school and “the teacher should intrude only minimally into this process of discovery” (Altwerger, 1994, p. 40). Herbert Spencer’s belief that the teacher should merely facilitate the child’s own active discovery is a central tenet of WL: “Teaching is not ‘teaching’ at all. It is an act of guiding and appreciating” (Martin, 1990, p. 3)

In Vygotsky’s words:

[T]he basic difficulty consists in overcoming the traditional prejudice closely linked with intellectualism, which still continues its cryptic dominance in child psychology. The basis of the intellectualistic view of the process of development is the assumption that development occurs like a logical operation. To the question as to how conscious use of speech develops in the child, the intellectualistic theory replies that the child discovers the meaning of speech. In attempts to substitute a simple logical operation for the complex process of development, not noting that such approach involves an enormous difficulty because it assumes as given that which requires explanation” (Vygotsky, 1997, Vol.4, p.94).

So, Vygotsky concludes. “Where researches thus far saw either simple discovery or a simple process of the formation of a habit, the true study discloses a complex process of development” (Vygotsky, 1997, Vol. 4, p.95).

Approaching literacy from the Vygotskian perspective as a much more complex cultural phenomenon, we need to recognize that literacy will bring a new set of cognitive tools to the child. It is not only the mechanics of writing to which a child is being introduced in school but the whole new system of cognitive psychological tools that literature has historically stored within itself.

Our purpose for the rest of this article is to try to elaborate Vygotsky's insight by considering some of the cognitive tools that come along with literacy. We will explore how they contribute to forming aspects of the "reality" of modern individuals, and show how these cognitive tools provide a key to how best to educate students within this modern world.

There is a tendency to think of cognitive tools as discrete elements that might be deployed in thinking. Perhaps the unfortunate word "tools" encourages this kind of somewhat mechanistic tendency. But our concern is with forms of consciousness, or kinds of understanding, that are created by the deployment of such tools. The complex nature of the cognitive tools of literacy, if introduced properly in teaching, encourages not only development of logical operations but development of imagination, self-reflection, emotions and an awareness of the child's own thinking. So the kinds of categories that we will explore below might initially seem rather odd, perhaps surprising. They are not, certainly, the usual kinds of topics one sees in psychological discussions of education. Nevertheless they are the categories we have arrived at by taking Vygotsky's arguments seriously and exploring their educational implications.

Some cognitive tools of literacy

The limits of reality and the extremes of experience

“The imagination of the adolescence is different from the play of the child in that it breaks the connection with real objects.” Vygotsky (1998, p.161, Vol.5)

If you tell a typical five year old the story of Cinderella, you are not likely to

be asked, “What means of locomotion does the Fairy Godmother use?” But if you tell a typical ten year old the equally fantastic story of Superman, you will need to explain his supernatural powers by reference to his birth on the planet Krypton and to the different molecular structure of our Sun from that of his home star, and so on. For the younger audience, magic is entirely unobjectionable as long as it moves the story along. One way to simplify what we see happening between five and ten through such an example is to say that with literacy we begin to focus on what we come to call reality. It has been a part of the folk-lore of teaching that if you want to teach students about reality you must begin with what they already know, with what is familiar in their everyday environment, with “where they are at.” This is a principle that derives from a focus on students’ logico-mathematical thinking. But if we also consider that their thinking is not limited by logico-mathematical capacities but also has access to the range of cognitive tools that literacy provides to the imagination, we see something quite different from what this principle leads us to expect.

Consider for a moment, if you want to engage students’ imaginations on a Friday afternoon whether a unit on “The structure of your neighborhood” or one on “Torture instruments through the ages” would do the job better. This is not a curriculum recommendation (!), but it exposes something that seems profoundly at odds with the recommendation that we begin with what the student already knows. The resolution, of course, is that the students do already know about pain and horror and cruelty. That is, if we consider the cognitive tools of their imaginative lives in what they “know,” we can save the principle.

But we should reformulate that principle if it is to offer clearer guidance to

teaching. The most casual observation of what engages adolescents' imaginations shows that materials that deal with the limits of reality and the extremes of experience are most engaging: the most courageous or cruelest acts, the most bizarre and strange natural phenomena, the most wonderful and terrible events. The Guinness Book of Records exploits this characteristic, most profitably for its publishers, as do T.V. shows, comics, films, books, and so on, that focus on the bizarre, the amazing, the extreme, the exotic. The initial exploration of the real world mirrors precisely this fascination with the wonders and extremes of reality (see, for example, Herodotus's Histories). This capacity for engaging the real world by such dramatic tools constitutes one of the powerful means students have to learn about reality.

So let us discard the logical principle that students' understanding moves along associations from the known to the unknown; clearly they can directly engage new knowledge that is affectively engaging and deals with some extreme or limit. In place of the logical principle we can try the reformulated one that we should bring out some exotic or extreme feature of any topic. This does not mean that every class must become an eye-popping extravaganza of the bizarre, but it does require the teacher to locate in the material something that is strange, wonderful, or extreme.

This principle is not intended to lead to empty sensationalism, but is designed rather to put students in touch with the boundaries, the limits, the context of the material they are dealing with. After all, attention to the limits and extremes is a perfectly sensible strategy for exploring the world being exposed by expanding literacy. We begin sensibly by locating the limits, setting clearly in

place the context of our world. The principle of “starting where the student is” need not be mischievous as long as we remember that the student has an imagination, and “where the student’s imagination is” can be in the valleys of the moon as well as in their local neighborhood. We make sense of our neighborhood no less in terms of our imagination of the valleys of the moon than we make sense of the valleys of the moon in terms of our understanding of our neighborhoods. There is, that is, constant dialectical play between what we know and what we imagine. If our beginning principle focuses only on what we know in some simplistic logical sense, ignoring how that is enlightened by what we imagine, we will unnecessarily constrict our teaching, our curricula, and students’ learning, and we will incidentally likely bore them mindless.

”What is substantially new in the development of fantasy during the transitional age is contained precisely in the fact that the imagination of an adolescent enters a close connection with thinking in concepts; it is intellectualized and included in the system of intellectual activity and begins to fulfill a completely new function in the new structure of the adolescent’s personality.” (Vygotsky 1998, Vol.5, p.154). It is this new and closer connection of imagination with thinking in concepts during adolescence that allows more freedom and new ways to deal with the extremes and limits of reality.

Transcendence within reality - the heroic

“We can say that creative images produced by an adolescent’s fantasy fulfill the same function that an artistic work fulfills for the adults. It is art for oneself. It is

for oneself, in the mind, that poems and novels are produced, dramas and tragedies are acted out, and elegies and sonnets are composed” (Vygotsky 1998, Vol.5, page 165).

Adolescents are relatively powerless, but grow increasingly aware that the society that hems them in and constrains them is one of which they are becoming a part. A common imaginative response to the constraints on their lives, such as the rules of parents, of schools, of authorities of all kinds, is to associate with those who seem best able to transcend, to overcome, the constraints that most irk the student. So a pop-singer or basketball star might form the object of a “romantic association” because she or he might seem to embody the reckless disregard of conventions or the independence and strength the students lack or cannot express in their lives. The student associates with the confidence, self-reliance, persistence, ingenuity, strength, or whatever, of the heroic character and so shares the transcendence.

But it is not so much the heroic character with which the student associates, but rather with the transcendent quality the character embodies. So it is not so much that we need to find heroic characters all the time, Sir Galahads or Florence Nightingales, but we can locate transcendent qualities, such as courage, compassion, persistence, energy, power, ingenuity, and so on, in almost anything in the world. It could be the tenacity of a weed on a rock face, the serene patience of a cat, or the endurance of standing stones in a gale; almost any feature of the world can be imbued with a transcendent quality if we conceive of it romantically. Associating with the transcendent involves the student in imaginatively

inhabiting the object in some degree.

A principle that follows from this common observation is that we might plan to encourage students to see some transcendent quality in the material being studied with which she or he could romantically associate. The trick is to see how one can easily “heroize” anything: that discarded styrofoam cup, instead of being conceived simply as environmentally-destructive litter, can be conceived, if only for a moment, as the product of immense ingenuity and the patient work of chemists over centuries; we can hold our fingers within millimeters of scalding liquids and not be burned or even discomforted. For a moment we can see it as an object of wonder. This capacity to highlight anything and hold it in a transcendent light is something we can turn on anything at anytime. It isn’t exactly Wordsworth’s “visionary gleam” but is perhaps a little sibling of it that the teacher can call upon to stimulate imaginative engagement with any material.

Image and concept

“A real concept is an image of an objective thing in its complexity” (Vygotsky, 1997, Vol.4, p.53).

Bringing the cognitive tools of the literate imagination to the fore in thinking about education raises the question of the role of affective images in teaching. We have inherited ideas and practices of education that give pride of place to the disembedded concept and seem to have neglected or forgotten what all the most powerful communicative media in our cultural history make plain to us--that the affective image is crucial in communicating meaning and

significance.

Certainly affective images are not necessary to all imaginative activity. We can define imagination as the capacity to think of things as other than they are, or of things as possibly being so (White, 1990) or even as “the subjunctive mood” (Sutton-Smith, 1988). But however we define it, it is clear that somehow significant to imaginative activity is thinking and feeling using mental images. The kinds of images that come along with literacy are perhaps not so obviously new in our experience, but features of them are clearly distinct from those of childhood.

The images that seem to have most power are those we generate ourselves from words. Films, for example, rarely capture the emotional vividness and force of literature. This is to emphasize that we are not suggesting that there is a need for more visual illustration of materials, but rather that the teacher be more hospitable to the mental images evoked by any topic. In planning teaching, to draw a principle from this observation, we should dwell not just on the concepts that are important, but give at least equal time to reflecting on the images that are a part of it. It is the images that can vividly carry the concepts most richly to the students’ understanding. The image can carry the imagination to inhabit in some sense the object of our study and inquiry. By such means mathematics and physics, history and auto-mechanics are conceived not as external things that the student learns facts about but become a part of the student; students thus learn that they are mathematical, historical, mechanical creatures.

So, for example, in teaching poetry this principle will lead us to attend to images not only as things to be observed in the mind’s eye and understood in the

overall structure of the poem, but also as things the student can inhabit or get inside of, so to speak. Poetry, then, is not something we do, but something we are. Perhaps this principle is more urgent for the science or the mathematics teacher, where the image is more commonly neglected, but, even though images might be the focus of much poetry teaching, the affective power that can come from inhabiting them could probably be more frequently drawn upon. If teaching William Blake's *The Tiger*, one can encourage the students to evoke as vividly as they can "the forests of the night" and then the "Tiger! Tiger! burning bright" within them. What are the students' forests of the night - the dread places of their imaginations? On a re-reading, ask them to be the burning tiger, being violently constructed piece by piece; to feel the distant deeps that become the fire in their eyes, their massive pounding heart, the deadly terrors of their brain. On a further re-reading, ask them to build an image of the maker of this deadly terror; twisting sinews in the awful factory with its inconceivable hammer, chains, furnace, and anvil, then after constructing this demonic horror perhaps turning to compose the Lamb. The images will likely not be precise quasi-pictures, so much as intimations of power, terror, immensity in the fragmented, flashing images Blake uses to express a very particular kind of awe and wonder.

Vygotsky argues that "the false interpretation of fantasy consists in the fact that it is considered from one aspect alone, as a function connected with emotional life, with a life of drives and attitudes; the other aspect, related to intellectual life, remains in shadow." (Vygotsky, 1998, Vol. 5, p. 153). Vygotsky was warning us about the possibility of making a mistake and disconnecting concept and image in education. He attributed this mistake to the traditional

psychology point of view on how concepts develop: “From formal logic, traditional psychology adopted the idea of the concept as an abstract mental construct extremely remote from all the wealth of concrete reality” (Vygotsky, 1997, Vol.4, p.53). In such a tradition, thinking about concepts is viewed as removed from concrete reality as a result of the process of generalizing and abstracting from concrete traits of reality. Highly abstract concepts become increasingly “poorer, scant and narrow” from the point of view of content.

Vygotsky argues that traditional psychology made a mistake in describing concept development in what he called a “mechanical way”:

Not without the reason are such concepts frequently termed empty abstracts. Others have said that concepts arise in the process of castrating reality. Concrete, diverse phenomena must lose their traits one after the other in course that a concept might be formed. Actually what arises is a dry and empty abstraction in which the diverse, full-blooded reality is narrowed and impoverished by logical thought. This is the source of the celebrated word of Goethe: ‘Grey is every theory and eternally green is the golden tree of life’.

This dry, empty, gray abstraction inevitably strives to reduce content to zero because the more general, the more empty the concept becomes. Impoverishing the content is done from fateful necessity, and for this reason, proceeding to develop the teaching of concepts on the grounds of formal logic, presented thinking in concepts as the system of thinking that was the poorest, scantiest, and emptiest” (Vygotsky, 1997, Vol.4, p.53).

The true nature of concepts must be viewed in their inseparable connection to the image: “A real concept is an image of an objective thing in its complexity. Only when we recognize the thing in all its connection and relation, only when this diversity is synthesized in a word, in an integral image through the multitude of determinations, do we develop a concept” (Vygotsky, 1997, Vol.4, p.53).

Idealism and revolt

“A new active persona enters the drama of development, a new, qualitatively unique factor—the personality of adolescent himself (Vygotsky, 1998, Vol.5. p.180).

Increasingly during adolescence, students recognize that the world that constrains them is also their inheritance. It is a period of adjustments, from powerlessness to growing independence and power. Inevitably students will sometimes feel that the adult world is not according them appropriate independence and power; parents are unjustly restrictive, schools are excessively restraining, society at large treats them too inconsiderately. Typically, students respond with revolt, even if only in the muted form of sulking reluctance to conform or quiet resistance. More visibly it takes the forms of flaunting styles of hair, clothing, music and dancing, that confront adult conventions and values.

It is the world’s failure to live up to some ideal that justifies the revolt, in the student’s eyes. The sense of the ideal world typically shifts unstably during

these years, as does students' views of their ideal selves. We see them trying on roles; the serene lady, the rebel, the fashion plate or dandy, the hoyden, the macho, the tease, the socialite, the cool dude, the iceberg, the friendly innocent, and so on. These are reflections of roles played out more fantastically in the imagination—the waster of cities, the film-star beloved of millions, the swashbuckling savior of nations, the preserver of the planet from polluters, and so on.

We routinely observe, and no doubt remember, this characteristic of adolescence. But how do we extract from it a principle for more imaginative teaching? It is a cliché that adolescents develop varied forms of revolt and begin to fashion ideals, and that these two are connected. At the simplest level, material to be learned can be given a heightened “romantic” power of engagement by being shown in a context of revolt against unjust or inadequate and constraining conventions.

Even if it is just punctuation and paragraphing that we want to teach, we might see how it can be made more meaningful and engaging if we see these as revolts against constraining conventions in early manuscripts. So we might see their introduction by revolutionary figures like Hugh of St. Victor (Illich, 1993) whose daring new ideas made texts easier to decipher and read. What this suggests in general is the desirability of re-embedding knowledge we want students to learn in the emotional and imaginatively reconstructed reality of people's lives from which typical textbooks usually rip it. The idealism and readiness to associate with those who revolt against unjust constraints is another cognitive tool that comes along with this curious tradition of literacy.

Details, details

“Self-control and the principals and means of this control do not differ basically from control over the environment . . . [T]he bare hand and the mind taken in themselves do not mean much--the deed is done with tools and auxiliary means” (Vygotsky, 1997, Vol. 4, p.218).

The cognitive tool we saw at work in the engagement with the extremes of reality represents one strategy newly literate students may choose to explore the world. It is reflected at the other end of the scale by another strategy that we see at work in students' collections or obsessive hobbies. By discovering everything about something, one can gain further intellectual security. The typical profile of a hobby or collection is that it gets seriously underway at about the time literacy becomes internalized--about seven or eight in our culture--peaks at about eleven or twelve, and begins to lose energy at about fifteen.

Students may collect almost anything; ornamental spoons, memorabilia of a favorite pop-singer--records and tapes and C.D.s, tour T-shirts, pictures, etc.--hockey cards, dolls in national dresses, comic sets, beer bottle caps, the books of some author in a uniform edition, stones or shells, leaves, illustrations of costumes through the ages, or whatever. The object of the collecting instinct or the hobby seems arbitrary, what matters is the intellectual control of some feature of reality and the intellectual security it can provide.

This urge to master something in exhaustive detail is perhaps the most

powerful learning drive that one sees in the typical adolescent. It is a drive exploited more by commercial interests than by educators, however, and seems largely ignored by educational research. But how can this observation lead to a principle for more imaginatively engaging teaching and learning? Obviously any material dealt with in schools can become a focus for detailed work. The trick here seems to be two-fold. First, one of the other principles needs to be deployed to engage students with a particular topic and, second, the teacher needs to focus on material within the topic that is exhaustible. Simply indicating material that might be studied in greater detail does not meet either of these two criteria. What is needed to meet the second criterion is material about which the student can learn everything, or at least learn securely what the scale of the topic is. Even if the students cannot learn everything, they can learn what would have to be known to exhaust the topic—as the collector of hockey cards may not have all of a set but knows which further cards comprise the whole set.

Humanizing knowledge

“We must not forget for a moment that both knowing the nature and knowing personality is done with the help of understanding other people, understanding those around us, understanding social experiences” (Vygotsky, 1997, Vol.4, p. 50).

As any journalist knows, information can be made more engaging if given a “human interest” angle. That is, knowledge seen through, or by means of,

human emotions, intentions, hopes, fears, and so on, is not only more directly comprehensible but is also more meaningful and engaging than if presented disembodied from its human source. Every teacher knows how the illustrative anecdote, particularly if it involves extremes of human endurance or foresight or ingenuity or compassion or suffering, grabs students' attention. Can we generalize from this widely recognized practice, seeing why it is so engaging of students' imaginations and develop a more widely applicable principle? The ability to see text not merely as an object but as a product of another human mind, provides a further cognitive tool that comes along with literacy.

The structure of typical textbooks with neatly organized and segmented knowledge tends to support the belief that the textbook or the encyclopaedia exhibits the ideal form of knowledge. This bizarre idea is no doubt one of the more peculiar consequences of literacy. In the face of this seemingly unconscious assumption it is necessary to emphasize constantly in education that books do not contain knowledge. Books contain symbolic codes, which serve as external mnemonics for knowledge. Knowledge exists only in human minds, and in minds its meaning derives from how it connects with our hopes, fears, and intentions, and with our imaginative lives.

In emphasizing the difference between inert symbolic codes in books and living knowledge in human minds, we want to draw attention to something significant, and often neglected, about teaching. The point is not to get the symbolic codes as they exist in books into the students' minds. We can of course do that—training students to be rather ineffective 'copies' of books. Rather, the teaching task is to reconstitute the inert symbolic code into living human

knowledge. The point about knowledge living seems crucial. Knowledge in our minds is a function of the organization of our living organism; it is not some interchangeable code we can pick up, like computer data.

The educational task, then, involves the resuscitation of knowledge from its suspended animation in symbolic codes. The task is to convert, re-animate, transmute the symbolic codes into living human knowledge in students' minds. This is the challenge whether the knowledge is about earthworms or is a literary text. The codes do not carry guarantees of meaning. The instrument best able to ensure the transformation from codes to living knowledge is the imagination. The student can most easily resuscitate knowledge if they learn it in the human context in which it was first generated or discovered.

Vygotsky views knowledge as a cognitive and semiotic tool that serves as a means of mediation for human activities. From this point of view, the emphasis on the mediator, without respect to the fact that knowledge is a tool for development and mastery of cultural behavior, leads to an inadequate approach to education. As Vygotsky reminds us constantly through his writing, knowledge should be viewed as serving two purposes—mediating human activity, on the one hand, and mediating development of higher psychological processes, on the other:

We must not forget for a moment that both knowing nature and knowing personality is done with the help of understanding other people, understanding those around us, understanding social experiences. Speech cannot be separated from understanding. This inseparability of speech and understanding is manifested identically in both the social use of

language as a means of communication and in its individual use as a means of thinking (Vygotsky, 1997, Vol.4, p.50).

The narrative mind

Focus on the cognitive tools of imagination brings to the fore, as has been noted already, the emotions. The emotions in turn are not subject to neat categorization, but seem to be expressible only in narratives. The main narrative we have for clearly conveying emotional meaning is the story: “man is in his actions and practice, as well as in his fictions, essentially a story-telling animal” (MacIntyre, 1981, p.201). Any event or behavior or information “becomes intelligible by finding its place in a narrative” (MacIntyre, 1981, p.196.) As Barbara Hardy famously put it: “We dream in narrative, daydream in narrative, remember, anticipate, hope, despair, believe, doubt, plan, revise, criticize, construct, gossip, learn, hate and live by narrative” (1968, p.5). The focus on the imagination leads to the bold but entirely plausible claim that “the mind is . . . a narrative concern” (Sutton-Smith, 1988, p.22).

Jerome Bruner’s Actual Minds, Possible Worlds (1986) has helped popularize within educational research a conception of the mind that gives renewed prominence to the role of narrative in our ways of making sense of the world and of experience. The conception of the mind as, in whatever degree, “a narrative concern” is supported by a wealth of modern research, from Bartlett’s celebrated studies on memory (1932), to Bransford’s and associates’ (1972, 1975)

and Rumelhart's (1975) work in the 1970s, to the recent and current large scale focus on scripts, schemata, and narratives.

The capacity to increasingly think of the world and experience in narrative terms represents a further cognitive tool that comes along with literacy. Narrative provides us with one of the main tools for orienting our emotions to the contents of our narrative, and consequently gives us the power to make increasingly complex meaning of our lives and of the world around us. The narratives that come along with literacy are different from the stories of our "oral" childhood in that they incorporate many of the cognitive tools we have mentioned earlier.

Conclusion

What we have tried to do, in a somewhat preliminary way, in this paper is unfold some of the cognitive tools that are embedded within the larger cognitive tools of literacy. So we may see literate students' minds as routinely deploying such tools as a ready engagement with the limits of reality and the extremes of experience, and a desire for a sense of transcendence within reality, which finds one exemplar in the interest in the heroic, and a complex construction of mental images and concepts, and an emotional response to forms of idealism that lead to a tendency to revolt against conventions, and a desire to exhaustively explore something in great detail, and an easy engagement with knowledge by means of its human and emotional contexts, and a disposition to make sense of the world and experience in narrative terms.

Now, of course, these are qualities of our cognitive and emotional lives about which the word "tool" is hardly ideal. In what sense can we meaningfully talk of a desire as a tool? Well, what we see develop with literacy are certain set dispositions of minds, certain characteristic ways of engaging and being engaged by the world and experience. We do not have a very good vocabulary to talk about such characteristics of the mind. And what vocabulary we have has been largely formed in the context of views of the mind that are inhospitable to Vygotsky's ideas. We may call them mediators—things we learn that we then use to make richer sense. It may be that the metaphoric extension of the word "tool" is as good as we can find. One of their most distinctive features, after all, is that they do for our minds something like what tools do for our bodies. They extend our powers.

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