# Teaching and Learning in a Community of Thinking[*]

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# Abstract

The article develops a theory and practice for teaching and learning in a Community of Thinking. According to the theory, the practice of traditional schooling is based on four "atomic pictures:" Learning is listening; teaching is telling; knowledge is an object; and to be educated is to know valuable content. In order to change this practice of schooling, educators must replace these pictures in their consciousness. On the basis of alternative pictures, we developed a new practice of teaching. The practice of teaching and learning in a Community of Thinking is based on three stages: fertile question, research and a concluding performance. These stages are supported by a continual process of initiation by which students form the common knowledge basis necessary for creating questions and conducting research. This framework was initiated by educators at the Branco Weiss Institute for the Development of Thinking in Jerusalem. It is currently being implemented in eighteen schools in Israel.

# Teaching and Learning in a Community of Thinking

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A *picture* held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably.

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Ludwig Wittgenstein, *Philosophical Investigations*, no. 115

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Policymakers and educators in Israel, like their colleagues in the western world, gradually are realizing that traditional schooling has run its course, that trying to improve by a policy of "more of the same" is senseless. Indeed there are a number of signs point to radical change in the traditional "factory school". Although schooling is far more tenacious than has been assumed by those who have hastened to proclaim its demise, powerful and far-reaching processes undermine its existence, among these matters are new technological possibilities, demands of high-tech industries (the information economy), the revolution in the state of knowledge (the information explosion, the easy access to information,  and the perception of knowledge as relative), the penetration of the democratic spirit into social institutions, and new and persuasive theories about the nature of effective learning and teaching. Each of these factors create conditions congenial to a "frontal assault on *every* aspect of schooling."[1]

An alternative vision for schooling, based on the "Community of Thinking" model developed at the Branco Weiss Institute for the Development of Thinking in Jerusalem, currently is being implemented in eighteen schools in Israel and one school in Australia. This article presents the model's theoretical basis and discusses its practical structure and principles.

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[1] Edward Fiske, *Smart Schools, Smart Kids: Why do Some Schools Work?* (New York: Simon & Schuster, 1991): 14

# Pictures of Schooling

Traditional schooling is based on four fundamental or "atomic" pictures: *learning is listening; teaching is telling; knowledge is an object;* and *to be educated is to know valuable content*. These pictures are deeply embedded in the consciousness of students, teachers and decision-makers, and are maintained daily by school structure and activity.

These basic, "atomic" pictures of schooling constitute school life and are constituted by it. They are not explicit always, but implicit in authoritative teaching aimed at transmitting truths "as they are" and in what Sarason has called school "regularities"[2] – the routines and norms guiding action in and outside the classroom. We ask the question: what kind of pictures are in the teacher`s minds (or expressed in their actions) as they lecture, examine, design exercises, refer to textbooks, enforce discipline and engage in other activities known collectively as "teaching"? Teachers who engage in these activities "think" that learning is listening, teaching is telling, knowledge is an object and being educated means knowing the knowledge learned in school.

The "atomic" pictures of schooling are revealed in everyday language (Note sentences suc as: "I shall repeat it, so those who did not understand please listen;" "This boy has an empty head;" "She doesn`t absorb anything;" "There is a lots of material to cover;" "My child isn`t getting enough mathematics.") and are imbedded in western conciousness, and therefore, they appeal to our common sense. The atomic pictures of schooling are bound to each other and are derived from each other. Together they form the basis of the "grand picture" of schooling.

## The grand picture of schooling

The grand picture of schooling is like a molecule composed of the four "atomic" pictures. Like the "atomic" pictures, it is more implicit than explicit in school activities. Its central principle is one of *imitation*. According to the principle of imitation, student learning is the last link in a mimetic chain: scientists copy the world; curriculum experts copy the sciences; teachers copy the curricula; and the students copy their teachers.

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[2] Seymour Sarason, *The Culture of the School and the Problem of Change* (Boston MA: Allyn and Bacon, 1971).

This grand picture conceives of consciousness as a "mirror of nature." According to it, the world is composed of facts containing inner qualities, e.g., physical facts, historical facts. Scientists observe the world and organize the facts into theoretical disciplines according to their qualities: for example, facts concerning the movement of objects to physics; facts concerning the past of national groups to histor. Curriculum designers copy from the sciences selected chapters and include them in textbooks in a well-digested version suitable for teachers and students. Teachers copy this "material" from the curricula prepared by the experts, and fashion it into lessons, which they teach to their students.
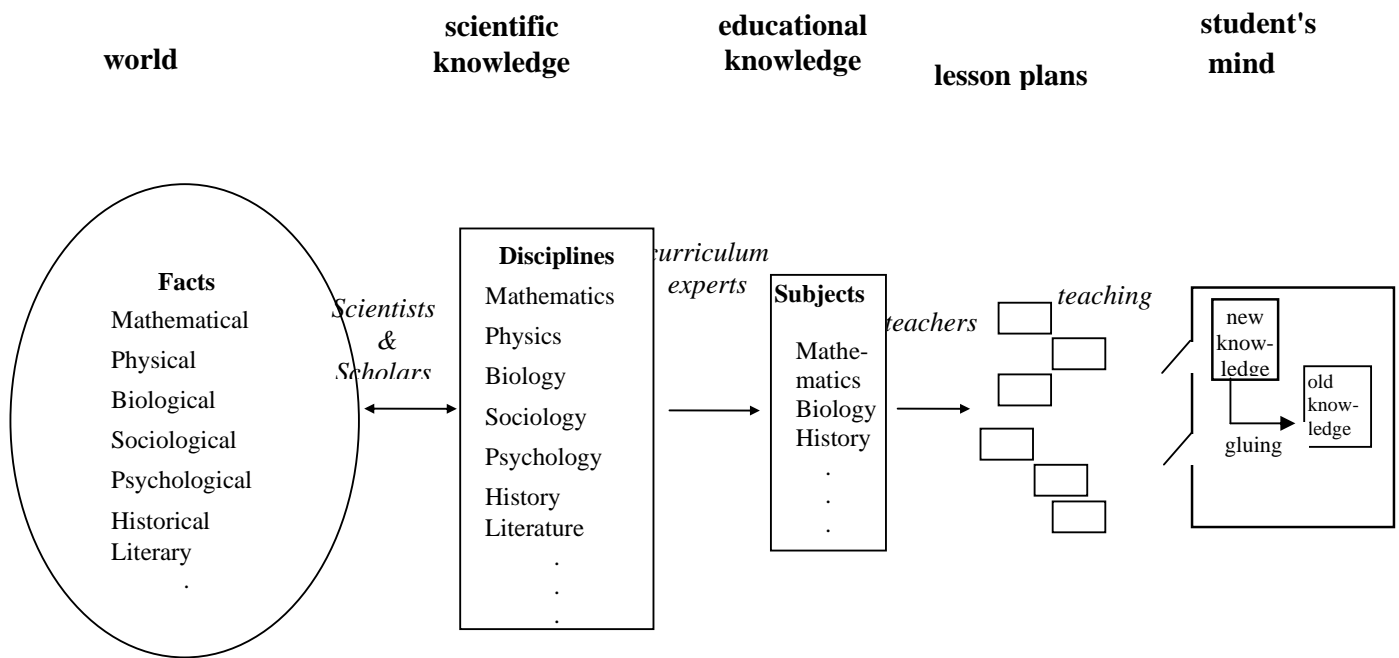
Strauss and Shiloni described this process of "transmission of material" from teachers to students in their research regarding how teachers think that children think.[3] They note that teachers carve the "material" into "knowledge packages" (lesson plans) which fit into the "entries" in the children's minds. In order to introduce the "knowledge packages" into the "entries," the teachers must open the "shutters" that block them. They therefore perform several motivation-raising activities (e.g., praising, censuring, stimulating, tempting, threatening). After the "shutters" are open and the content has been penetrated, teachers require students to exercise in order to "glue" the new content onto previously learned material.

This *chain of imitation* ends when students – who have copied the teachers who have copied the curricula that have copied the sciences that have copied the world – know about the world. They have a reliable representation of it. They adequately have learned. (See table 1).

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[3] Sydney Strauss & Tamar Shilony, "Teachers' Models of Children's Minds and Learning,", *Mapping the Mind*, ed. L. A. Hirschfeld & S. A. Gelman (Cambridge University Press, 1994), 455-473.

**Table 1: The grand picture of schooling**

| world | scientific knowledge | educational knowledge | lesson plans | student's mind |

**Facts**
Mathematical
Physical
Biological
Sociological
Psychological
Historical
Literary
.

*Scientists & Scholars*

**Disciplines**
Mathematics
Physics
Biology
Sociology
Psychology
History
Literature
.
.
.

*Curriculum experts*

**Subjects**
Mathe-matics
Biology
History
.
.
.

*teachers*

*teaching*

new know-ledge

old know-ledge

gluing

# Beyond the traditional pictures of schooling

### Learning is more than listening

Listening is an important element of learning though it is only one of many elements that comprise effective learning. Furthermore, listening fostered in school is often passive and disinterested, "functional" listening to an all-knowing teacher in order to succeed on an examination. What is *effective learning*?

This model defines "effective learning" as an *involvement* in it`s process, and *understanding* in it`s product.

According to John Nicholls[4] there are two kinds of involvement: "ego involvement" in which a person cares about himself, and "task involvement" in which a person cares about the task at hand. Task involvement in it`s most intensive state is a state of unity between the subject who learns and the object which is learnt. Csikszentmihalyi calls it "Flow."[5] The Community of Thinking cultivates task involvement state of mind.

"understanding is a complex process that is itself not well understood."[6] It has three components: *location*, *application*, and *performance*. To understand a concept is *to locate* it in a net of relevant conceptions ("To grasp the meaning of a thing, an event, or a situation is to see its *relations* to other thing."[7]); *To apply* it to new contexts, different from the one in which it was learnt ("An individual understands a concept, skill, theory, or domain of knowledge to the extent that he or she can apply it appropriately in a new situation."[8]); and *to perform* flexible, intellectual moves with it ("in a phrase, understanding is the ability to think and act flexibly with what one knows... learning for understanding is like learning a flexible performance."[9]). These three conceptions are interrelated. The third one – the performances conception of understanding – is most useful from pedagogical point of view, and it directs the teaching and learning in the Community of Thinking.

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[4] John Nicholls, *The Competitive Ethos and Democratic Education*, Harvard University Press, 1989.

[5] Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience* (New York: Harper Perennial, 1991).

[6] Howard Gardner, *The Unschooled Mind : How Children Think and How Schools Should Teach* (New York, BasicBooks, 1991), p. 179

[7] John Dewey, *How We Think* (Boston: Houghton Miflin Company, 1933/1998), p. 137.

[8] Howard Gardner, *The Discplined Mind* (NY: Simon & Schuster, 1999), p. 119.

[9] David Perkins, "What is Understanding?" in *Teaching for Understanding*, ed M. S. Wike (San Francisco: Jossey-Bass Publishers, 1998), p. 40.

Ten conditions for effective learning gleaned from current theories about learning, are important.

1. *Effective learning is an outcome of active construction*: Effective learning is not a result of passive absorption of contents, but of their active construction. The meanings of statements, actions or situations are the outcome of an active and creative mind – of assimilation, adaptation, interpretation, meaning making and other mechanisms of construction.[10]

2. *Effective learning results from undermining*: This essential claim is rooted in the Socratic dialogues, in John Dewey's theory of thinking and in Piaget's constructivist theory. People learn when their cognitive schemes – concepts and action patterns – are undermined by their encounter with their environment. This undermining motivates people to learn in order to restore their lost equilibrium.[11]

3. *Effective learning results from the "echoing" of learned content in the learner*: When content "echoes" – when the learner finds in it an answer to his vague insights, concepts and values – she tends to delve into it. This content does not reflect that which she already, but clarifies and reorganizes her rudimentary understandings. (The second condition – the "classic" assumption of constructivism – is a rather pessimistic view about the drive to learn. Therefore, this "echoing" assumption adds power. Exsitentialist philosophers wrote about "the hunger for meaning"; Lipman wrote about its educational implications.[12]

4. *Effective learning results from intrinsic motivation*: Learning is the product of an interest in the topic studied and not (only) from the expectation of a reward or a fear of punishment resulting from learning or not learning it. "Task involvement" yields better learning than does "ego involvement". Learning needs both intrinsic and extrinsic motivation, but the former must be stronger than the latter.[13]

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[10] Cf. Catherine Fosnot (ed.), *Constructivisim: A Psychological Theory of Learning* (New York: Teachers College Press, 1996).

[11] Leslie Steffe & Jerry Gale (eds.), *Constructivism in Education* (Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1995).

[12] Matthew Lipman, Ann Margaret Sharp, and Fredrick S. Oscanyan, *Philosophy in the Classroom* (Philadelphia: Temple University Press, 1980).

[13] Cf. John Nicholls, *The Competitive Ethos and Democratic Education*, (Cambridge, Mass: Harvard University Press, 1989).

5. *Effective learning is a function of the alignment of teaching style and content to the learner's learning style and intelligences*: People learn best when instructional methods and content are adapted to their individual learning styles and profile of intelligences.[14]

6. *Effective learning occurs in a dialogic environment*: All good learning contains an essential ingredient of dialgoue, consultation, offering and accepting support and criticism, in all good learning. Two heads are better than one; "distributed intelligence" is better than one "closed" in the individual mind.[15]

7. *Effective learning entails engaging in authentic problems*: Learning is at its best when it occurs in an authentic context, in which the learner grapples with a problem that is experienced by him as "real" and "urgent", a problem that bothers him, that involves his life plan or identity. Learning like thinking starts with an experienced problem.[16]

8. *Effective learning is advanced by ongoing informative feedback*: Learning is facilitated when learners are given timely and rich information regarding their performances and achievements and how to improve them, when assessment is formative and sustaining.[17]

9. *Effective learning is a result of positive attitudes*: When students feel that they are accepted by their teachers and peers, and when they feel comfortable in the educational environment, they tend to invest themselves in learning.[18]

10. *Effective learning is the result of a productive theory of learning*: Learning is affected by the learner's implicit theories about learning. When the learner relates her learning and achievements to her efforts and not to her ability, environment or luck, her learning will be more effective.[19] (cf. Dweck, 2000).

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[14] Cf. Sternberg, Robert, *Thinking Styles* (New York: Cambridge University Press, 1997); Howard Gardner, *Multiple Intelligences: The Theory in Practice* (New York: Basic Books, 1993).

[15] Cf. Gavriel Salomon (ed.), *Distributed Cognitions: Psychological and Educational Considerations* (Cambridge England: Cambridge University Press, 1993).

[16] John Dewey, *How We Think* (Boston: Houghton Miflin Company, 1933/1998); Jonathan Baron, *Rationality and Intelligence* (New York: Cambridge University Press, 1985).

[17] Cf. David Perkins *Smart Schools: From Training Memories to Educating Minds*, (New York: Free Press, 1992).

[18] Cf. Robert Marzano, *A Different Kind of Classroom: Teaching with Dimensions of Learning* (Alexandria, Virginia: ASCD, 1992).

[19] Cf. Carol Dweck, *Self Theories: Their Role in Motivation, Personality and Development* (Philadelphia: Taylor Francis, 2000).

Other conditions for effective learning can be added (e.g. effective learning is a result of supportive environment[20]; of participation and apprenticeship[21]; of mindfulness[22]; of "less is more"[23]; of a meaningful narrative[24]; of systematic mediation[25]; a process in the "zone of proximal development"[26]). The main point is that effective learning is a multi-faceted process that cannot be reduced to mere listening. Moreover, effective learning is not a neutral concept; it is a normative one. Listening obediently to authority undermines a critical and a creative attitude to oneself and the world.

The concept of "effective learning" as used here refutes the first atomic picture – *to learn is to listen*. Learning based mainly on listening is both ineffective and "uneducational": that is, it educates learners to be passive, conformist and narrow-minded.


**Teaching is more than telling**

When learning is considered to be listening, teaching – as its possible mirror image – is considered to be telling. Thus this second atomic picture – *teaching is telling* – is superficial and based on our direct life experience. The question, "What time is it?" answered by "It's five o'clock." The person told, another listened and learned something new. However, this analogy is not productive for effective learning (in this example the asker had an interest. Students in school very often do not have an interest. Therefore teachers add repetitions, exersices, and tests). At best, this analogy may be true of teaching only simple information. When complex ideas are taught, *telling* them simply is not good enough. Instead of declaiming information, teachers must create the conditions for effective learning. When effective learning is perceived as a complicated process of construction, as having a "soft" nature not amenable to full control and planning, teachers must move from direct to *indirect teaching*.

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[20] Carl Rogers, *Freedom to Learn* (New York: Charles E Merill Publishing Company, 1969).

[21] Cf. Jean Lave & Etienne Wenger, *Situated Learning : Legitimate Peripheral Participation* (New York: Cambridge University Press, 1991).

[22] Ellen Langer, *The Power of Mindful Learning*, (New York: A Merloyd Lawrence Book, 1997).

[23] Theodore Sizer, *Horace's Compromise: The Dilemma of the American High School* (Boston: Houghton Mifflin Company, 1985)

[24] Neil Postman, *The End of Education: Redefining the Value of School* (New York: Knopf, 1995).

[25] Reuven Feuerstein, *Instrumental Enrichment: An Intervention Program for Cognitive Modifiability* (Baltimore: University Park Press, 1980).

[26] Lev Vigotsky, *Thought and Language* (Cambridge, MA: The MIT Press, 1986).

A split between "old education" and "new education" dominates much educational discourse. In the former approach, the curriculum is in the center, whereas in the latter approach the student is in the center. Teaching in a *Community of Thinking*, as advanced here, does not follow a single approach. In a *Community of Thinking* the *encounter* between the cuuriculum and the child takes center position. In the *Community of Thinking* approach to teaching, individuals may develop, "realize their potential," only within certain cultural contexts, which constitute their very existence.

**Knowledge is not an object**

The third picture of school education – *knowledge is an object* – is metaphoric. He who possesses knowledge can transmit it *as if it were an object* to him who lacks it. The pattern of teaching that dominates most schools – the telling  instruction – embodies this picture. One of the meanings embodied in the metaphor of knowledge as "object" is that people pereive it as existing outside of human consciousness and not affected or "infected" by it. Human consciousness, for its part, is not affected or "infected" by "non-rational" elements (e.g., drives, emotions, interests, socio-cultural environment). Rather, it is "transparent", an impartial medium of the world as-it-is.

This picture of knowledge and consciousness is transmitted through the teaching pattern of the schools: teachers authoritatively transmit to students "closed" knowledge packages. A short "ping pong" question-and-answer session occurs, manifesting that every important problem is well-defined, possesses a short and correct answer based on indisputable facts and more, that someone knows the answer. While this practice transmit the picture of knowledge that knowledge is an object (or objective. Foerster: "Objectivity is the delusion that observations could be made without observer."[27]), this picture empowers this practice.

An alternative picture of knowledge (stems from Kant's "Copernican revolution" through Nietzsche's "will for power" till the the post-modern philosophers who disrupted the the realistic concept of reason truth as mirrors of nature) depicts knowledge as dependent on active consciousness in contingent contexts. This picture forms a complementary picture to those of *effective learning* and *indirect teaching*. (1) If effective learning is active learning that creates its own knowledge and does not just absorbs it, as

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[27] Ernst von Glaserfeld, *Radical Constructivism: A Way of Knowing and Learning* (London: The Palmer Press, 1995), p. 1

is, from an external source, then knowledge and meaning are conditional and have "arbitrary" components. (2) Indirect teaching that encourages learners to construct their learning in the framework of accepted processes of rational thinking and on the basis of dialogue with former knowledge, with colleagues, and with a professional coach, transmits through its overt and covert curriculum a more critical and contemporary picture of human knowledge.

Knowledge, therefore, is not an object and is not a copy of the world. Knowledge is a structure or even a "story that works." Man is *homo narrativus*, one who tells himself stories about the world in order to endow it with order and meaning, understand it and act within it. Human knowledge is mainly a narrative that explains past events and raises expectations about those of the future. Such a picture of knowledge is a basic condition for critical and creative thinking. Children may form it through direct experience in the creation and criticism of knowledge (subjected to accepted standards of knowledge construction. Knowledge as a "story" or "structure" does not lead to a "vulgar relativism."[28])


## To be "educated" is not (only) to know but (mainly) to know how to relate to knowledge

The fourth atomic picture – *to be educated is to know* – is of major importance. It is a prescriptive rather than descriptive picture. It states the aim of education, the "product" of the educational process. Teachers' practice in the classrooms is the source of it. Teachers transmit knowledge by lecturing and demand that students externalize it in answers to questions in the classroom, in homework exercises and in examinations, in order to check whether the knowledge transmitted was properly absorbed. Satisfactory externalizations are rewarded as motivation for students to learn, and students adapt accordingly. The common externalizations in school require the recycling of knowledge, through its memorization and "retention" until the time ot the ritualistic externalization. The result of this process is what Perkins has termed "fragile knowledge syndrome."[29] Knowledge becomes inert (inactive, useless knowledge that is not transferred to contexts other than

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[28] Richard Rorty, "Hermeneutics, General Studies and Teaching," ed Steven Cham, *Classic and Contemporary Reading in the Philosophy of Education* (New York: The MacGraw-Hill Company, 1997).

[29] Cf. David Perkins *Smart Schools: From Training Memories to Educating Minds*, (New York: Free Press, 1992), pp. 21-27.

that in which it was learned), naive (intuitive, incorrect pre-school knowledge), and ritual (useful to demonstrate knowledge in school, sufficient for school tasks, but not entailing real understanding). In other words, school knowledge is intended for externalization and, therefore frequently is not internalized.

In this "era of knowledge" knowledge should not be glorified and imparted as if it were "large rocks". Rather, teachers should foster a favorable, critical and creative attitude toward it.  An "educated person" is not one who knows, who has many "objects" in her head. Rather, an "educated person" knows how *to relate* to knowledge. She is challenged by it and is at home with it. She treats knowledge critically, passes it through an "inner locus of evaluation." She tries to reinterpret it creatively, to view it from additional perspectives, and to add to it.

Schooling is based on and guided by four basic conceptual pictures reflected in all our activities: learning is listening, teaching is telling, knowledge is an object, and to be educated is to know. The Community of Thinking model replaces these pictures with the following ones: to learn is to be involved and construct understanding (Piaget: "to understand is to invent"[30]); to teach is to create conditions for effective learning; knowledge is a human structure or "a story that works"; and to be educated is to relate to knowledge in a postive, critical, and creative manner.

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[30] Jean Piaget, *To Understand is to Invent: The Future of Education* (New York: Grossman Publishers, 1973).

# A Community of Thinking

Teacher to pupil: "What are you doing?"

Pupil to teacher: "I'm thinking."

Teacher to pupil: "Well, stop it and get on with your work."

Michael Barber, *The Learning Game*

An alternative framework for teaching and learning is based on the alternative pictures. Our proposed school model is called *Intel-Lect School* (Intel Electronics of Israel supported our project), and its proposed classroom model is a *Community of Thinking*. The idea of a Community of Thinking has no pretenses to be a conceptual or practical breakthrough. It provides a framework for teaching and learning whose roots are embedded in Dewey's ideas and branches out to contemporary concepts of teaching, learning, knowledge, the individual and society in our times.

The Community of Thinking is an alternative framework to that of the traditional classroom. It is a *community* because it deals with a group of learners working together on a common problem by accepted means. It is a *thinking* community because its main "work" is intellectual.

In this community, thinking is grasped in a "strong sense," i.e., not merely as procedures of calculation and deduction or "thinking skills", but as a multi-faceted cognitive activity with social, conceptual, linguistic, emotional, motivational, physical, and other dimensions. From the point of view of teaching and learning, the most important dimension of the model is motivational: The first, basic step in fostering thinking in learners involve them in thinking about the subject being learned, motivate them to think, encourage them to think by themselves ("Sapere aude! – Have courage to use your own reason!" in Kant`s famous phrase). Fostering thinking encourages students to think with full involvement and to find the joy of thinking. ("The use of reason is a passionate business," said R. S. Peters.[31])

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[31] R. S. Peters, "Reason and Passion" in ed. G. Vesey, *The Proper Study* (London: Macmillan, 1971), p. 101.

Not only does traditional schooling not give its students the chance to experience this sort of thinking, but that schooling is constructed in such a way that students cannot experience it ("Students in school," John Holt remarked, "are too busy to think."[32]). A "smart school," according to Perkins, is simply a school in which students think about that which they are learning.[33] The emphasis on involved thinking, intensive thinking about that which students are has far-reaching educational significance to methods of teaching and school organization.

## The pedagogy of questioning: inventing fertile questions

### On the nature and nurture of questioning

The activity of creating questions is a human trait *par excellence*. Man is a *homo quaerus* – a questioning man, incessantly asking questions in his quest to understand himself and the world around him. This human trait – the ability and the inclination to ask questions – has some basic, paradoxical characteristics of practical educational significance. Four such characteristics include:

*Questioning is a creative activity*: Contrary to popular belief that questioning is a valueless, sometimes annoying characteristic that does not attest to any impressive personal quality, questioning is by nature a creative activity. Questions are human inventions that do not exist in the world like other objects – stones, houses or people. Objects do not appear in the world together with questions about them; on the contrary, they appear as whole and complete. The ability to ask questions is the ability to go "beyond the reality given," beyond what is directly present. The asking consciousness removes itself from what is present toward the reasons for it that are absent – from that which *is* to that which is *not* that may explain it.

*Questioning is a special elaboration of previous knowledge*: According to popular belief in school teaching, those who do not know have questions. Questions therefore have a dubious status in society and especially at school. Clever students have answers; lazy

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[32] John Holt, *How Children Fail* (New York: Delta, 1982), p. 155

[33] David Perkins *Smart Schools: From Training Memories to Educating Minds*, (New York: Free Press, 1992).

students have questions (they did not listen to the teacher, did not do their homework, were absent from class etc.). This belief about questioning as based on "absences" (of the person himself or of his attention), justified or unjustified, is generalized to all questions. However, good questions do not indicate "absences," rather they reveal a strong presence – involvement in the subject and deep understanding of it.

*Questioning simultaneously blocks motivation and awakens it*: Contrary to popular belief that people tend to ask about the nature of phenomena in the world – to wonder about them – people do not tend to ask such "big" questions. Questions of this king undermine the cognitive equilibrium people work so hard to preserve. This loss of equilibrium creates distress. But when a "big" question was invented, it may be a great source of energy for investigation. Striving for renewed equilibrium, for an answer or solution, motivates human learning.

*Questioning fashions the answer*: Contrary to common belief that there is an absolute gap between question and answer – the question is known and the answer to it is completely unknown and its possibilities are open-ended – the answer is vaguely imbedded in the question itself. The concepts of the question and the suppositions concealed in them shape the conceptual framework of the answer.

Teaching focussed on questioning rather than on the ability to produce "correct answers" must adapt itself to the basic characteristics of questioning and all that derives from them. It must (a) create an educational atmosphere that enables and encourages creativity through respect for the autonomy of the learners, i.e. for their questions; (b) present knowledge in such a way that will stimulate questions; (c) undermine the cognitive constructs of the learners, so as to motivate learning; (d) bind knowledge to questioning, so as to show how each piece of knowledge is conceptually (as well as motivationally) determined by the questioning which preceded it.

**A fertile question**

The pedagogical model of a Community of Thinking places the question at the center of teaching and learning. It deflects teaching from its focus on a "correct answer" to a focus on "a fertile question." The first stage of teaching and learning in a Community of Thinking is to find or to invent a fertile question. A fertile question has six basic characteristics:

(a) *An open question*: a question that *in principle* does not have one definite answer, but actually several answers different from and even contradictory to each other.

(b) *An undermining question*: A question that undermines the basic assumptions and fixed beliefs of the learners; one that casts doubt on the "self-evident," on "common sense;" uncovers basic conflicts lacking a simple solution, and requires thinking about the roots of things.

(c) *A rich question*: A question that requires grappling with rich content indispensable to understanding man and the world; that is impossible to answer without careful and lengthy research; that tends to break up into sub-questions.

(d) *A connected question*: A question relevant to the life of the learners, to the society in which they live, and to the discipline and subject within which it was asked.

(e) *A charged question*: A question having an ethical dimension. Such questions have a strong emotional and ethical charge able to motivate learning and inquiry.

(f) *A practical question*: A question that can be developed into a research question; a question about which information is available to students.

**Table 2: Examples of fertile questions asked in Israeli Communities of Thinking**

The Human Genome Project – a curse or a blessing? (biology)

Why do we sleep? (biology)

Human beings – a product of environment or genetics? (biology)

Why is the sky blue? (physics)

Is Jerusalem really united? (geography)

Is there a geographic entity called "the Middle East"? (geography)

Is it possible to establish a "New Middle East"? (geography)

When was life better – in the Middle Ages or today? (history)

Why did the farming class obey the gentry and the church, although these exploited and oppressed it? (history)

How did it happen that the same generation that called the First World War "The war to end all wars" initiated the Second World War within two decades? (history)

Is Israel on the verge of a civil war? (history)

Is there progress in history? – The case of the 19$^{th}$ century" (history)

Our Independence Day is the Palestinian *Anakba* [catastrophe] – Was this an inevitable process? (history)

What makes a "good story"? (literature)

Who is "the other"? (sociology-anthropology)

Why do people marry? (sociology-anthropology)

What is love? (from a sociological point of view)

What is love? (from a biological point of view)

What is love? (from the point of view of certain literary works)

"How should Israel develop in the next fifty years?" (multi-disciplinary)

Australia – west or east? (multi-disciplinary)

In a Community of Thinking, the fertile question is Archimedes' fulcrum of teaching and learning, not a given, but an invention (In novice communities of thinking, the teacher poses it; in more advanced communities students are drawn into the process and begin to pose the fertile question).

**Table 3: From a given problem and solution to a non-given problem and solution**

|  | Problem | Means | Solutions |
|---|---|---|---|
| **Level 1** | given | given | given |
| **Level 2** | given | given | to be found |
| **Level 3** | given | to be found | to be found |
| **Level 4** | to be found | to be found | to be found |

The progression from level 1, typifying teaching and learning in school, to level 4, typifying teaching and learning in a Community of Thinking, is major. It entails many difficulties during an initial period that lasting one or two years, perhaps longer. Just as one cannot expect a smooth and painless passage from playing in a fire brigade band for a long time to playing in a jazz band, so a smooth passage from a normal classroom framework to a Community of Thinking must not be expected.

Teachers in a Community of Thinking suggest to learners a fertile question (one meeting the above criteria), in the framework of the school subjects that they teach. The Community of thinking model converts the traditional school subject into "pedagogical discipline".

**Teaching in a pedagogical discipline**

Teaching in a *Community of Thinking* aims to foster disciplinary thinking for several reasons: The theoretical disciplines are the best tools available to man for understanding

himself and the world, for organizing his knowledge, for disciplining his thinking, for criticizing existing knowledge, and for producing new knowledge. These theoretical disciplines enable us to understand the "deep structure of the world," i.e., to transcend our direct experience, our intuitions, and to understand natural and human phenomena in a deeper, more abstract way. (Perkins: "The world does not wear its deep structure on its sleeve"[34]). Moreover, as against the many thinkers who think that thinking tools (heurstics, strategies, tactics, etc.) are the most important component of good thinking, the presumption of the Community of Thinking model is that disciplinary knowledge is the most important thinking tool – the crucial component of good thinking.

Yet, the Community of Thinking model does not propose to organize knowledge for the purpose of school teaching in the framework of theoretical disciplines. Instead it offers a new concept – *a pedagogical discipline*. In the lively discussion between those supporting disciplinary teaching and learning and those who advocate inter-disciplinary teaching and learning, both groups wrongly assume that schools teach disciplines. The "conservative" group wishes to continue doing so, whereas the "progressive" group advocates various combinations of disciplines.

As a matter of fact schools do not teach disciplines but *school subjects*. The school subject is a unique school creation. It differs from the theoretical, academic, research discipline in several essential aspects: The aim of the subject is to impart existing knowledge, whereas the aim of a discipline is to create new knowledge. The questions asked in teaching of the school subject are closed, whereas the questions asked in the framework of a discipline are open ("scientific puzzles"). In teaching school subjects, the emphasis is on accepted knowledge, whereas, in disciplinary research, the emphasis is on controversies and dissent within the paradigm. Thinking fostered by teaching a school subject is pre-disciplinary and static, whereas the thinking fostered in disciplinary research is thinking from a narrow disciplinary perspective. Information used in teaching a school subject usually comes from school sources, mainly textbooks and the teacher's words, whereas a discipline's research has at its disposal primary sources, e.g., observations, laboratory experiments, historical documents. The number of school subjects studied in school may range from five to ten, whereas a researcher is involved with one discipline only, occasionally "digressing" to related ones.  Students in school are expected to recycle

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[34] David Perkins, *Outsmarting IQ: The Emerging Science of Learnable Intelligence* (New York: The Free Press, 195),  p. 271.

information transferred to them, whereas researchers are expected to create new knowledge.

These examples illustrate some of the essential differences between a research discipline and a school subject. Still, this distinction does not imply that the school should change from teaching subjects to teaching disciplines. The role of the school is not to produce able researchers. The Community of Thinking model replaces the term "school subject" with that of "pedagogical discipline."

The concept "pedagogical discipline" recognizes organizing human knowledge for an "internal" educational purpose, e.g., development of learners' ability to think in an involved, skillful way, on the basis of knowledge. *The aim* of the pedagogical discipline is to develop thinking by dealing with productive and organized knowledge; to understand through the perspective of a given discipline without necessarily researching in it. *The nature of the questions* asked in this framework is examplified by the term "fertile question". *The approach to knowledge* in a field stresses the central ideas and controversies of the discipline. *The quality of thinking* it fosters is systematic and multi-faceted (derived from involvement in several communities of thinking and active engagement in meta-disciplines – "higher order knowledge"). *The sources of information* feeding it are various and depend to some degree on the interests of the learners. *The number of knowledge areas* in which learners are simultaneously deeply engaged depends on their ability to do so, and appears to number three. *the main cognitive performance* is undersanding, the basis for critical and creative thinking.

Thus, fertile question asked, therefore, in the framework of a pedagogical discipline is the "field" on which the Community of Thinking "plays."


**Initiation**

Questions arise from initial, vague responses to them. Certainly, previous knowledge is needed in order to ask a good, fertile question. *Initiation* into disciplinary knowledge is conducted alongside the process of finding or inventing fertile questions, and facilitates it. Initiation is conducted by means of various teaching methods (e.g., lectures, supervised text reading, cooperative learning, peer teaching). Its questions focuses on (a) connecting knowledge to the questions that created it ("archaeology of knowledge"); (b) awareness of questions raised by responses to original questions (every "solution" creates additional

problems); (c) creating a *question bank*: questions around which inquiries may be conducted. The process of initiation, forming the common knowledge basis necessary for creating questions and conducting research, continues throughout the process of learning and teaching in the Community of Thinking. Initiation occurs during questioning, during research, and during preparing the concluding performance.

## The pedagogy of inquiry: treating questions systematically

The second stage in teaching and learning in a Community of Thinking is research. After the community has chosen a fertile question, it divides into small research teams that choose research questions – sub-questions of the fertile question. One characteristic of a fertile question is its *richness,* its possibility of being broken up into (or spawning) many sub-questions. The research teams examine sub-questions, which are aspects of the fertile question.

A good research question must be *interesting* to students, and possibly also interesting "objectively" (e.g., an original question, a question that sheds new light on a phenomenon, a question that shakes taken for granted convictions); *open* (requiring that the researcher take a position and not only report facts); *rich* (requiring deep and reasonably lengthy research; *connected* to the main fertile question and to the domain of knowledge; *practical* (can be turned into a focused research question).  Research teams must show how the sub-question they've constructed adheres to these criteria.

*Elaborating the crude question* into a successful research question is the task of the teachers and the students of the Community of Thinking. The students often raise vague questions, questions based on faulty conceptual understanding or questions that do not really interest them. The adult coaches must spend time with each team to thoroughly elaborate the problem, mobilizing the whole community in this task.

Learning in a Community of Thinking is based on cycles of teamwork and whole class discussions and lessons. The whole Community of Thinking  is mobilized at various stages to aid the research teams. One such stage is the discussion of the research questions of the teams. The teams present their questions and the community examines them according to the agreed criteria, and suggests improvements or alternative questions. The stage of elaborating the question is critical; it determines the fate of the research that will follow.

**Molding the question for research purposes**

After the research questions have been approved by the coach and learners, the research teams begin the research itself using an *agreed method*. This phase includes a general component and a discipline-dependent component, as well as *pre-research* directions for the *research itself*. Pre-research directions may be for example:

1. Formulate your research question.

2. Try to raise preliminary thoughts or hypotheses to answer the research question.

3. Break the research question into sub-questions.

4. Specify possible and available information sources.

5. Define your research tools.

6. Present a preliminary research proposal.

7. Make a preliminary decision about the concluding performance.

8. Set a timetable and formulate short-term and long-term tasks; allot the work among the members according to interest and ability.

9. Examine your research question once again: is it interesting, open, connected, practical?

10. Prepare a list of essential and practical questions to ask the coach in order to receive guidance for further work.


This general procedure contains a discipline-dependent component. The questions, hypotheses, information sources, tasks, the concluding performance, the research tools, the rules of verification are dependent to some degree on a given realm of knowledge. Guidance about the research itself is even more dependent on the nature of the discipline in which the research question is asked.

In the course of research, the learners encouraged to search for information outside the school. One of the key terms in a Community of Thinking is *the world as a text*, that is, the learners learn to see in the world – in people, industrial centers, shopping and recreation centers, films, exhibitions, and of course in the Internet, libraries and scientific institutions – an inexhaustible source of information relevant to the question on hand, as well as a setting for various points of view and interpretations.

After formulation of the research question and submission and approval of the research plan, the teams begin their research with the aim to answer the question according to their research plan. This is a difficult stage to manage. Teachers must orchestrate an entire class of teams each of which is autonomous, yet lack experience and discipline. The educational effectiveness of this stage, and of the Community of Thinking as a whole, depends to a large extent on the ability of the teachers to reach and guide each research team. Original solutions must be found to increase the working time of the coach with teams, such as working with research groups after school hours, introducing other adult coaches (e.g., parents, university students or retired people with appropriate skills, training older students to guide younger ones).

Work in the entire Community of Thinking continues alongside the research work of the teams. It is used for *initiation* as well as for *reciprocal teaching:* research teams that have formed a "first draft" of their research present it to the entire community in order to get feedback. The cyclic character of work in a Community of Thinking – from the entire community to research teams and back to the entire community – epitomizes the dynamics of working in a Community of Thinking. The aim of this cycle is to place each group's research in the overall picture created by the whole community.

Research occurs as the "creation of knowledge" within the discipline in whose framework the teams are working. However, the aim of the pedagogy of research is not to train young academics (e.g., mathematicians, biologists, historians, literary critics), but to expose the learners to "realms of meaning" and to teach them to think systematically, to plan, organize, cooperate, listen, discuss, initiate, create, criticize and understand. Therefore, linkage to the disciplinary research method is subject to pedagogical considerations that focus on the learners' development.


## The pedagogy of the concluding performance: putting knowledge to use

The third stage in a Community of Thinking – the *concluding performance* – encourages the learners to *do* something with their knowledge. The operation of knowledge – its creation, criticism, analysis, composition, application, reinterpretation, presentation – is not only a manifestation of its *understanding*, but also the means to understanding's *construction*. The concluding performance stage replaces the traditional, pencil-and-paper examination.

This concluding performance includes two parts: *teams' performances* and *communal performance*. In the first part, each team presents its project (written paper mostly, but possibly, documentary film, dramatic performance, work of art, etc.) to a committee of teachers, experts, students and parents in order to get a formative assessment (based on criteria that were disscussed and defined by students and teachers); in the second part, the entire Community of Thinking presents to the entire school community the various ways in which it had grappled with the fertile question. The communal performance is done in a festive like evening in which the students celebrate there achievements in front of an audience.

The possibility to express learning and its achievements in a medium of expression of learners' choice is a strong motivational factor typical of the stage of concluding performance. The Community of Thinking focuses on the *rehabilitation of learner motivation*, on their involvement in the process of learning. An element of motivation is present in each of its stages – fertile question, research and concluding performance (see Table 4). In *the fertile question stage*, the undermining nature of the question is intended to create motivation in order to restore the lost equilibrium. In the *research stage*, focused research involves learners in the topic under study in order to cause intellectual and emotional "investment" (investment of "the self" in an object. Freud called this process "cathexis"). In the *concluding performance stage*, the possibility to express oneself by means of a medium of one's choice, to see a finished product and to *exhibit* it to others arouses motivation.

**Table 4: Components of internal motivation in the three teaching and learning stages in a Community of Thinking**

| Stage | Foci of motivation |
| --- | --- |
| The fertile question | Undermining accepted knowledge and beliefs, which thereby motivates learning through a desire to restore equilibrium |
| The research | Investing the "the self" in the research topic (cathexis); gaining interest |
| The concluding performance | Self expression by means of a medium of choice; pride in a finished product; presentation |

**Understanding performances**

John Holt wrote in the classic *How Children Fail* (1964):

It may help to have a picture in our minds of what we mean by understanding. I feel that I understand something if and when I can *do* some, at least, of the following: (1) state it in my own words; (2) give examples of it; (3) recognize it in various guises and circumstances; (4) see connections between it and other facts or ideas; (5) make use of it in various ways; (6) foresee some of its consequences; (7) state its opposite or converse. The list is only a beginning; but it may help us in the future to find out what our students really know as opposed to what they can give the appearance of knowing, their *real learning* as opposed to their *apparent learning*.[35]

At Harvard's Graduate School of Education and Project Zero this concept of understanding is called "understanding performances".[36] This concept complements the concept of understanding as a representation, a reflection in consciousness of the state of affairs in the world. It defines thinking moves with knowledge – understanding performances – as construction and manifestation of understanding. This is a very productive concept from an educational point of view, in as much as it extracts understanding as an internalized representation from its mystery and passivity and converts it into something "public" that may be seen and fostered – understanding performances that one may define, discover, give feedback to, and thereby foster.

This concept of understanding as intellectual performances is vital to the stage of concluding performance – both for the performance and its assessment. The understanding performances (see Table 5) are used as central criteria for the concluding performances of teams and community alike, and for their assessment by the learners, teachers and outside experts.

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[35] John Holt, *How Children Fail* (New York: Dell Publishing co., Inc. 1964), pp. 136-137.
[36] Martha S. Wiske, (ed.), *Teaching for Understanding:Llinking Research With Practice* (San Francisco: Jossey-Bass Publishers, 1998).

**Table 5: Understanding performances**

Types of understanding performances may be understood as learners

express knowledge in there own words,

bring examples of knowledge,

generalize from an item of knowledge,

identify knowledge in different contexts,

place knowledge in context,

explain phenomena by the use of knowledge,

give arguments for knowledge,

justify knowledge and provide evidence for its justification,

compare cases, phenomena, and claims

transfer knowledge from one domain to another and to life experience,

discover contradictions and tensions in knowledge,

formulate knowledge that contradicts knowledge (or claims),

foresee possible results of knowledge,

break knowledge into its components (analysis),

unite components of knowledge (synthesis),

criticize knowledge on the basis of knowledge,

create knowledge on the basis of knowledge,

identify basic presumptions of knowledge,

create a simulation, metaphor, or model,

present knowledge in interestenig and clear way,

ask a (fertile or non-banal) question

Table 6 schimatically portrays the process of teaching and learning in a Community of Thinking using.

**Table 6: Flowchart of a Community of Thinking**
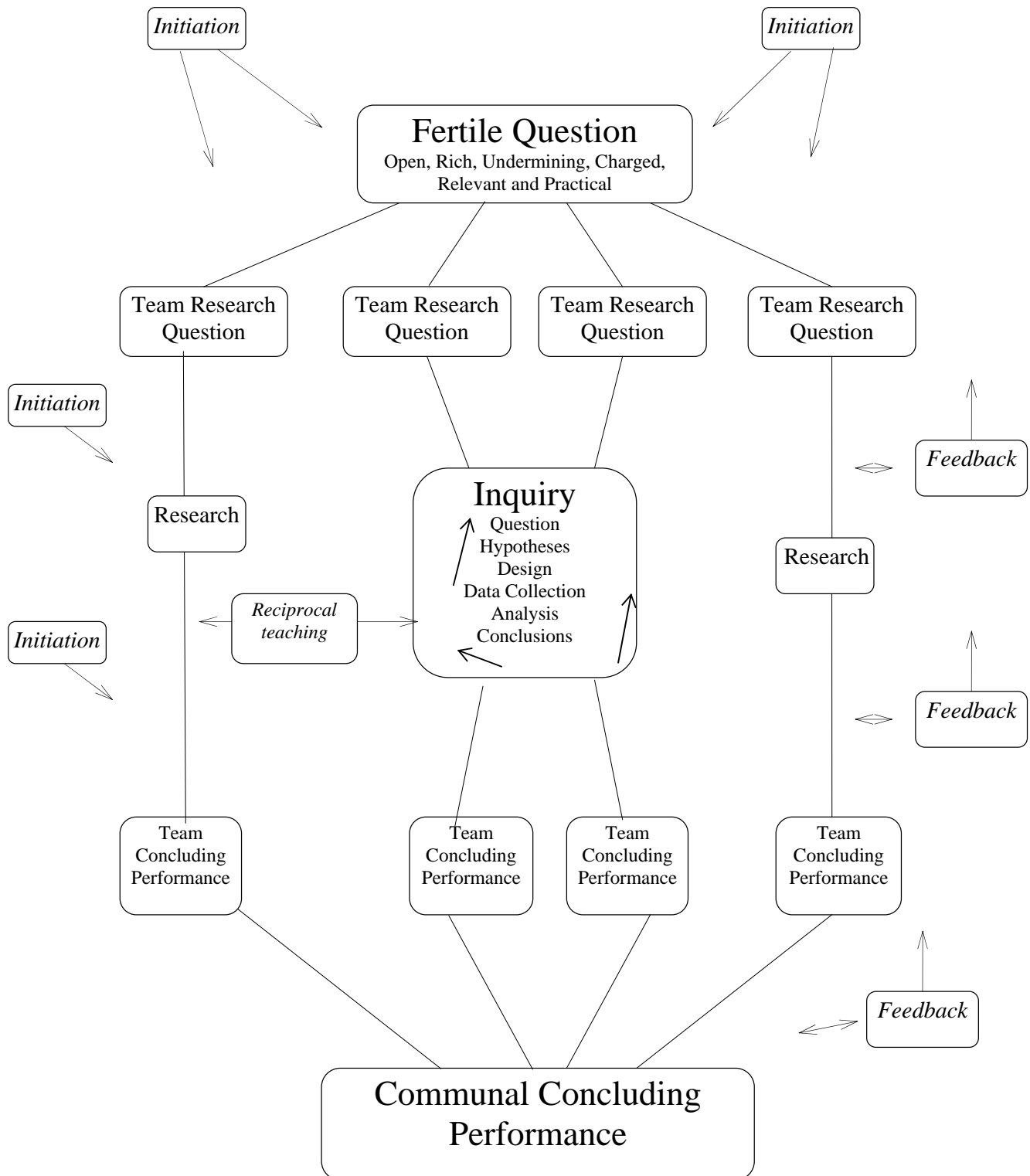
## Final comment

School is a coherent system. Therefore significant second-order change must affect not only the classroom but also the entire school. In other words, meaningful changes in teaching and learning in school may be understood as points on two main axes: *teaching method* – since in teaching the medium is the message: the pattern of instruction is the (real) content of instruction;[37] and the *school's organizational structure*, since the practical routines or regularities of school determines the essence of school education.[38] We aim to change the teaching method in school into that of a *Community of Thinking*,[39] and the general organizational structure of the school into a structure of an *Intel-Lect school.* The outlines of the structural change will be described in a separate article.[40]

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[37] Cf. Neil pstman and Charles Weingartner, *Teaching as a Subversive Activity* (New York: Delacorte Press, 1969).

[38] Cf. Seymour Sarason, *The Culture of the School and the Problem of Change* (Boston MA: Allyn and Bacon, 1971).

[39] Yoram Harpaz and Adam Lefstein, "Communities of Thinking", in *Educational Leadership*, Nov. 2000, pp. 54-57.

[40] The book my collegues and me wrote it (*Community of thinking: on the Road to Intel-lect School*) exists only in Hebrew. I hope to translate it to English in the future.