

Practical Intelligence for Success in School

Students can be taught to meet the implicit expectations of their teachers—they don't have to rely on osmosis.

Education . . . is a process of living and not a preparation for future living (Dewey 1964).

We knew the change had begun when we heard about "Carla" [all names of students in this paper are fictional]. During the first semester, Carla had been either late to the new Practical Intelligence class or not there at all. By the second week of the second semester, she had started to wander into class just before the bell rang. Although she hung back a little from the rest of the group, she was attentive and soon began to participate in her own way.

Carla had started the gradual process of dropping out (Bonikowske 1987) by 7th grade. Year after year, her performance suffered as she made the same mistakes, over and over again. Her teachers had not neglected her, but they were working under the assumption that she had learned what school expected of her, she had not. They saw their role as primarily one of teaching subject-matter in a variety of

disciplines. They believed that she was either rebelling or not trying. But Carla had simply never learned what we call the *tacit knowledge* of school.

Unspoken Expectations

Teachers have a wide array of expectations for students, many of which are never explicitly verbalized. Students

Students must learn how to use their intelligence effectively in school because that's where so much of their lives take place.

who cannot meet these implicit expectations may suffer through year after year of poor school performance without knowing quite what is wrong. Their teachers expect them to know how to allocate their time in doing homework, how to prepare course papers, how to study for tests, how to talk (and not to talk) to a teacher—if they never learn these things, they will suffer for it.

The concept of tacit knowledge was introduced by Polanyi (1946, 1976). Later, Sternberg (1985) and Wagner and Sternberg (1986) used it to describe knowledge that is not explicitly taught or even verbalized, but is necessary for an individual to thrive in an environment. The concept applies in a variety of settings. For example, level of tacit knowledge is an excellent predictor of performance in management (Wagner and Sternberg 1985, 1986). It is also crucial for successful performance in school. Indeed, our research indicates that it is as good a predictor of college success as are academic

types of tests (Sternberg and Wagner 1989). Of course we should teach students the skills they will need for life outside the school, but too often we forget the point of Dewey's quote at the beginning of this article—life in school is not just preparation for life; it is life. Students must learn how to use their intelligence effectively in school because that's where so much of their lives take place.

Our program—the Yale Practical-Intelligence-for-School (PIFS) curriculum—was developed to help students like Carla learn the vital tacit knowledge they need to succeed in school. This paper details the development of the PIFS curriculum, explains our teacher training procedures and lesson designs, and reports on our field-test and evaluation of the program at a middle school in a middle-class suburb of Connecticut.

Practical Intelligence

Since 1987, our Yale University team of investigators and Howard Gardner's Harvard University researchers have engaged in a joint effort to develop the

theory-based curriculum, practical intelligence for school. The program is an outgrowth of a merger between two theories of human intelligence: Howard Gardner's (1983) theory of multiple intelligences and Robert J. Sternberg's (1985, 1988b) triarchic theory of human intelligence. The way we have combined the theories is illustrated in Figure 1. Gardner's theory expresses the domains in which intelligence manifests itself: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. Within Sternberg's triarchic theory, the componential subtheory identifies the mental processes that are exercised in these domains; the contextual subtheory defines the practical, "relevant-to-life" ways in which the processes are applied; and the experiential subtheory deals with the transfer of skills to new situations. Note that in Figure 1, under the contextual subtheory, the practical applications include both in-school and out-of-school problems.

Our Yale and Harvard research teams came up with a total Practical Intelligence curriculum which in-

cludes two parts:

- The Yale portion of the curriculum, designed to teach skills used across content areas. This is taught by content teachers separately for two to three periods per week, ideally for a period of a year.

- The Harvard portion of the curriculum, which emphasizes individual subject-matter infusion of skills within the content class.

The two teams work together. They generate ideas and provide feedback as the curriculum is developed. This report focuses on the Yale portion of the curriculum.

The Curriculum

The organization of the Yale Practical-Intelligence-for-School (PIFS) curriculum is based upon the three kinds of tacit knowledge that Wagner and Sternberg (1985) have found critical to adaptation to any environment: managing oneself, managing tasks, and working with (managing) others (see fig. 2). The curriculum consists of both a student text and a comprehensive teacher's manual that describes in

Fig. 1. Intellectual Operations

Componential → Contextual → Experiential			
Intellectual Domains (Multiple Intelligences)	Examples of Mental Processes:	Practical Application:	Transfer to New Situations:
Linguistic	Selecting the steps needed to solve a problem.	How to organize your thoughts in order to write a book report.	Writing a history report. Writing a letter. Giving directions to someone.
Logical-Mathematical	Ordering the components of problem solving.	How to complete a math worksheet accurately.	Figuring out the steps for balancing a budget.
Musical	Selecting relevant information.	How to pick out the melody from the harmony.	Recognizing the main theme in a musical work.
Spatial	Selecting a mental representation for information.	How to make pictures in your mind to help you remember what you read.	Using a schematic to assemble a piece of electronic equipment. Reading a map.
Bodily-Kinesthetic	Allocating your resources.	How to pace yourself throughout a long-distance run.	Adjusting your physical exertion during a basketball game or ballet performance.
Interpersonal	Solution monitoring.	How to understand your teacher's comments on your history report.	Restating what someone is telling you to be sure you understand him or her.
Intrapersonal	Identifying a problem.	Figuring out that something bothers you in school.	Figuring out that you are getting annoyed by your brother's teasing.

Fig. 2. Practical Intelligence for School Curriculum

<p>I. Managing Yourself</p> <p>A. Overview of Managing Yourself</p> <ol style="list-style-type: none"> 1. Introductory Lesson 2. Kinds of Intelligence: Definitions and Principles 3. Kinds of Intelligence: Multiple Intelligences 4. Kinds of Intelligence: Academic or Practical Intelligence 5. Understanding Test Scores 6. Exploring What You May Do 7. Accepting Responsibility 8. Collecting Your Thoughts and Setting Goals <p>B. Learning Styles</p> <ol style="list-style-type: none"> 9. What's Your Learning Style? 10. Taking In New Information 11. Showing What You Learned 12. Knowing How You Work Best 13. Recognizing the Whole and the Parts <p>C. Improving Your Own Learning</p> <ol style="list-style-type: none"> 14. Memory 15. Using What You Already Know 16. Making Pictures in Your Mind 17. Using Your Eyes—A Good Way to Learn 18. Recognizing the Point of View 19. Looking for the Best Way to Learn 20. Listening for Meaning 21. Learning by Doing 	<p>II. Managing Tasks</p> <p>A. Overview of Solving Problems</p> <ol style="list-style-type: none"> 22. Is There a Problem? 23. What Strategies Are You Using? 24. A Process to Help You Solve Problems 25. Planning a Way to Prevent Problems 26. Breaking Habits 27. Help with Our Problems <p>B. Specific School Problems</p> <ol style="list-style-type: none"> 28. Taking Notes 29. Getting Organized 30. Understanding Questions 31. Following Directions 32. Underlining—Finding the Main Idea 33. Noticing the Way Things Are Written 34. Choosing Between Mapping and Outlining 35. Taking Tests 36. Seeing Likenesses and Differences in Subjects 37. Getting It Done on Time 	<p>III. Cooperating With Others</p> <p>A. Communication</p> <ol style="list-style-type: none"> 38. Class Discussions 39. What to Say 40. Tuning Your Conversation 41. Putting Yourself in Another's Place 42. Solving Problems in Communication <p>B. Fitting into School</p> <ol style="list-style-type: none"> 43. Making Choices—Adapting, Shaping, Selecting 44. Understanding Social Networks 45. Seeing the Network: Different Roles 46. Seeing the Network: Figuring Out the Rules 47. Seeing the Relationship Between Now and Later 48. What Does School Mean to You?
---	--	---

detail how the course can be taught effectively.

The course opens with instruction on how students can manage themselves. The first units, on self-management, provide an overview of students' multiple intelligences. The teacher and the students discuss styles of thinking (see Sternberg 1988a, 1990) and how students can best exploit their own individual styles. This unit on self-management also deals with crucial aspects of adaptation to school, such as taking in new information, showing what you have learned, using what you know, and implementing what you have learned.

The second part of the course—managing tasks—deals with topics such as getting organized, setting up strategies for problem solving, breaking bad habits, seeking help with problems, and thinking about time management. This part of the course also deals with

understanding questions, following directions, and taking tests.

The third part of the course—cooperating with others—presents such topics as how to handle yourself in class discussions, knowing what to say when, putting yourself in another's place, and solving communication problems. It also involves learning how to take a long-term perspective in dealing with other people.

Lesson Designs

The lesson designs in the teacher's guide follow a format based on the four-prong model of Sternberg and Davidson (1989). This model draws upon Vygotsky's (1978) idea that learning is most effective when it occurs first in a social context and is only internalized later.

The teacher is provided with lesson sections that describe the global purpose of the lesson and give the under-

lying theory or rationale for teaching it. The objectives and time planner help the teacher become quickly aware of the specific skills to be taught and the timing of the lesson. Information concerning prerequisite skills, an estimate of the amount of time needed for the lesson, and necessary materials facilitate preparation.

The teacher starts out by giving students an orientation to the concept being taught. First, the teacher taps the students' prior knowledge, which gives the teacher an opportunity to correct incorrect information and a chance to see the way students have learned to think about the topic. The teacher presents new information via lecture, discussion, questionnaires, and the text.

Students then meet in small groups to try to apply their new knowledge and skills. This part of the lesson includes games, activities, and work-

sheets as well as small group work. It allows for greater variety in the lessons, creating a sense that "something new may happen" in the Practical Intelligence class. Afterwards, students evaluate their use of the new knowledge or skill. They also critique their work and the material being taught.

Finally, the teacher provides integration activities that encourage the students to apply their new knowledge in their own lives. These activities are intended to help bring about the transfer of the new knowledge or skills to situations other than school.

Teachers and Teacher Training

Three teachers at our Connecticut field-test school received six after-school and one full-day inservice training sessions. Training focused on the two theories of intelligence, strategies for teaching, and problem solving. Teachers were supported during the implementation phase by weekly opportunities to interact with one or more of the coauthors. Five after-school meetings were conducted to develop plans and discuss concerns.

The Evaluation

Countless programs are introduced into schools either without evaluation or with evaluations limited to students and teacher comments. We did not want our program to become one of these; rather, we wanted to know whether the program we devised would genuinely improve students' practical intelligence for schools. And because this was the first time the curriculum would be implemented, we were as concerned with using the results of our evaluation to improve the curriculum as we were with using them to test its validity and practicality.

One hundred 7th grade students participated in the study. We targeted the course to these students because grade 7 marks the point where school becomes much more complex: students need to learn how to shuttle between multiple classes and how to negotiate the demands of multiple teachers.

Three reading classes (a total of 61

Rather than merely hope that students have learned school survival skills in their previous grades, we can directly teach these skills to all students.

students) were used as the experimental group, and two others served as a control (a total of 39 students). The experimental students received our course materials; the controls, the standard basal reader. Both groups were almost evenly distributed by gender. Because the program was administered over only one semester—three days per week for about 50 minutes per session—only about half the material was covered.

Three different tests were administered to the students before and after the course: *The Survey of Study Habits and Attitudes* (SSHA) (Brown and Holtzman 1967), *The Learning and Study Skills Inventory* (LASSI) (Weinstein and Palmer 1988), and the Practical Intelligence section of the *Sternberg Triarchic Abilities Test* (STAT). The STAT was included as a transfer test. None of the skills measured in the STAT were directly taught, but we hoped these practical-intellectual skills would improve as a result of the training.

On the SSHA, the experimental group showed statistically significant gains on all four scales (Delay Avoidance, Work Methods, Teacher Approval, and Education Acceptance). On the LASSI, experimental-group students showed statistically significant gains on nine of ten subscales: Attitude, Motiva-

tion, Information Processing, Selecting Main Ideas, Study Aids, and Self-Testing. Only the subscale Test Strategies did not show a significant gain. Results of the evaluation indicate 14 intergroup differences significantly favoring the experimental group, 1 significantly favoring the control group, and 2 favoring the experimental group nonsignificantly. These results suggest that the PIFS program was quite successful, even in one semester, in improving practical-intellectual skills as measured by two tests of study skills and one of practical intelligence.

Tacit Knowledge Is Teachable

The usually unspoken knowledge that is crucial to practical intelligence for school is teachable. Rather than merely hope that students have learned school survival skills in their previous grades, we can directly teach these skills to all students.

But teaching practical intelligence for schools is anything but easy. For many teachers, successfully teaching it requires a fundamental reorientation of attitudes and teaching style. In particular, teachers need to come to value a kind of knowledge that they usually do not teach, despite expecting students somehow to learn it. And they must realize that this practical knowledge will be learned by students only if it is, well, *practical*. Students must see how to apply it in their daily school lives—we would not want students to acquire this knowledge in an isolated, encapsulated form that is not useful to them. We all want children to succeed in school; teaching practical intelligence for school can foster that success.

Finally, it's important to find out what the students thought of the class. After a lesson on memory, Bill said, "I'm bad at math. I always thought I would be bad at math even if I tried. I hate it so I just rush through it. Now I take my time with it. If I take my time to study it, I understand it better."

Nadia spoke up during a lesson on self-management. "This year I had trouble in social studies. I was too shy to ask the teacher. Then I got a D, so I asked the teacher for help when I

didn't understand. The next time I got an A in social studies."

Erin reported, "In social studies I changed the way I was studying. I went through every single chapter and tried to think of the main idea. I went from 60s to 80s in that class."

Jim said, "I didn't really think I could reach level 4 on the computer game. Now I'm top score. Now I believe I can improve by working hard."

The course also seemed to have a positive effect on students' attitudes toward others. One gifted student remarked, "Before, I thought that intelligence—practical and academic—was all one thing. I didn't realize it had different parts. It will help me recognize that someone might not be able to read but may be really smart in being able to repair a car. I used to think that other people were dumb. Now I think that they can be more intelligent than me in other categories. Before, I might have said to myself (not out loud, but in my head), 'You're so stupid.' Now I won't think of them as dumb anymore."

And Carla? She's still in school, in mind as well as in body, and doing just fine, thanks. □

References

- Bonikowske, D. (1987). *Truancy: A Prelude to Dropping Out*. Bloomington, Ind.: National Educational Service.
- Brown, W. F., and W. H. Holtzman. (1967). *Survey of Study Habits and Attitudes, Form H*. (SSHA) New York: The Psychological Corporation.
- Dewey, J. (1964). "My Pedagogic Creed." In *John Dewey on Education. Selected Writings*, edited by R.D. Archambault. New York: Modern Library.
- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.
- Polanyi, M. (1946). *Science, Faith and Society*. London: Oxford University Press.
- Polanyi, M. (1976). "Tacit Knowledge." In *Theories in Contemporary Psychology*, edited by M. Marx and F. Goodson. New York: Macmillan.
- Sternberg, R. J. (1985). *Beyond IQ: A Triarchic Theory of Human Intelligence*. New York: Cambridge University Press.
- Sternberg, R. J. (1988a). "Mental Self-Government: A Theory of Intellectual Styles and their Development." *Human Development* 31: 197-224.
- Sternberg, R. J. (1988b). *The Triarchic Mind*. New York: Viking.
- Sternberg, R. J. (1990). "Thinking Styles: Keys to Understanding Student Performance." *Phi Delta Kappan* 71: 366-371.
- Sternberg, R. J., and J. E. Davidson. (1989). "A Four-Prong Model for Intellectual Skills Development." *Journal of Research and Development in Education* 22: 22-28.
- Sternberg, R. J., and R. K. Wagner. (1989). "Individual Differences in Practical Knowledge and its Acquisition." In *Individual Differences*, edited by P. Ackerman, R.J. Sternberg, and R. Glaser. New York: Freeman.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Mass.: Harvard University Press.
- Wagner, R. K., and R. J. Sternberg. (1985). "Practical Intelligence in Real-World Pursuits: The Role of Tacit Knowledge." *Journal of Personality and Social Psychology* 49: 436-458.
- Wagner, R. K., and R. J. Sternberg. (1986). "Tacit Knowledge and Intelligence in the Everyday World." In *Practical Intelligence: Nature and Origins of Competence in the Everyday World*, edited by R. J. Sternberg and R. K. Wagner. New York: Cambridge University Press.
- Weinstein, C. and D. Palmer. (1988). *Learning and Studies Skills Inventory*. Clearwater, Fla.: H & H Publishing Co.

Authors' note: Preparation of this article was supported by a grant from the McDonnell Foundation. We are grateful to Howard Gardner and his research group at Harvard for their collaboration in all phases of the PIFS Project. Alice S. Jackson was the primary liaison with the school in all aspects of this study. We thank Lenora Manzella, Sandra Wright, and Elizabeth Neuse for their assistance in the preparation of this report. Requests for reprints or information about the Yale portion of the PIFS program should be sent to Robert J. Sternberg at the address, below.

Robert J. Sternberg is IBM Professor of Psychology and Education, **Lynn Okagaki** is Associate Research Scientist, and **Alice S. Jackson** is Associate in Research II, Yale University, Department of Psychology, P.O. Box 11A, Yale Station, New Haven, CT 06520-7447.

PLAN LESSONS on a COMPUTER

PLAN TO TEACH



software for the Apple Macintosh

Features include:

- *formats for daily, weekly, & individual lesson planning
- *a substitute letter
- *flexible seating charts
- *checklist of management skills
- *4 lesson plan formats
 - ☐ three-prong
 - ☐ 6-step
 - ☐ social skill
 - ☐ social/cognitive
- ***"help card"....if you need to review (i.e. task analysis, set)
- *thought provokers: summaries of effective teaching research

COST: \$95 + shipping

(site license available)

PLUS texts *Managing to Teach & Teaching Makes a Difference*

Send to: Teaching Inc. PO Box 788
Edmonds WA 98020 (206) 774 0755

Name _____
Address _____

Please send:
____ Software preview \$10
____ Plan to Teach software \$95
____ Site license information

Copyright © 1990 by the Association for Supervision and Curriculum Development. All rights reserved.