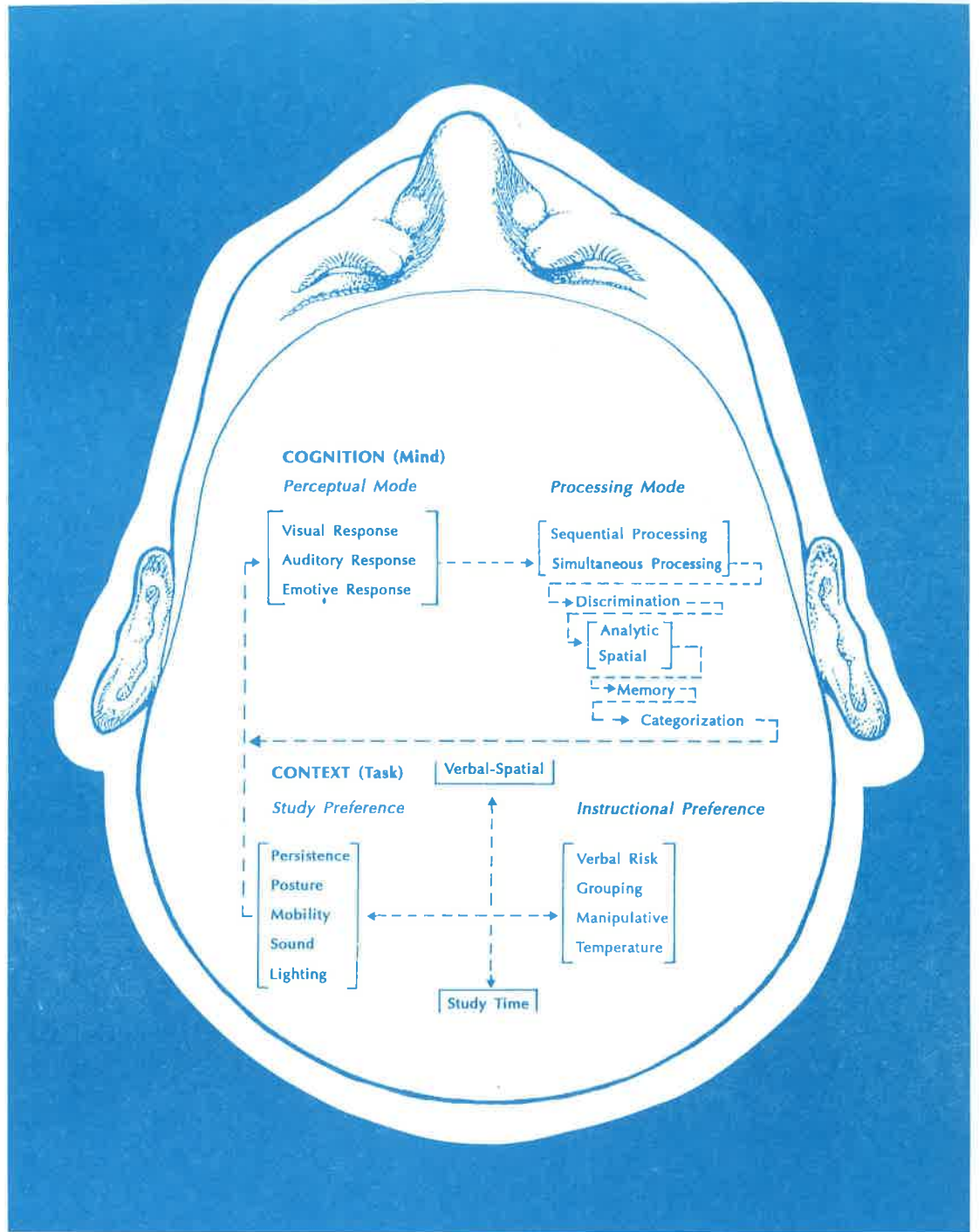


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IN EDUCATION



Improvement of Instruction: New Models

Issue Editors: Frank Bazeli and Carla Cooper Shaw

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The *Publications Manual* of the American Psychological Association (Sec. Ed. 1974) should be followed in preparing manuscripts.

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Subscription Information. Subscription rates are as follows: one year \$20.00, two years \$39.00, three years, \$57.00. For foreign subscriptions other than Canadian add \$4.00 more per year. Send to Editor, *Thresholds in Education*, P.O. Box 771, DeKalb, IL 60115.

Thresholds is a refereed journal published quarterly in February, May, August and November. ISSN 0196 9641

Evolution of Instructional Models Within Teacher Subcultures

by Frank P. Bazeli

It is a bit of conventional wisdom that teachers teach as they were taught. Induction into the profession is a guild-like experience by which new practitioners, after years of preconditioning as students, are socialized through modeling into specific teacher subcultures. Within each subculture is shared, with varying degrees of sophistication and agreement, an ideology about the nature and processes of instruction and the professional roles teachers ought to play. As a consequence, despite heroic effort by some, teacher educators have had surprisingly little immediate impact on the instructional models used in practice (Zeichner and Tabachnick, 1981). However, over time, new ways to teach, derived both from external sources and through internal invention, do become widely accepted and adapted to daily classroom activities. In this article teacher subculture ideology is reviewed as a framework for better understanding how instructional models evolve in practice.

Cultural Norms

As in any culture the teaching force in the United States adheres to a general set of norms and beliefs. There are further divisions into more specific subcultural patterns. Elementary school teachers in rural areas, for example, have a set of perspectives which differ from that of mathematics teachers in urban high schools. Despite this, they share an overarching professional knowledge base and an identification with key beliefs and practices.

Researchers, such as Lortie (1975), Bicklen (1983), Jackson (1968), and Lampert (1984), have identified com-

mon cultural norms among teachers. Some of these are identified below.

1. Teacher authority is universally held to be essential for the promotion of learning and the prevention of chaos. Faculties are very concerned that their authority and control are not eroded by lack of discipline among individual teachers (Hoy and Rees, 1977).
2. Close, nurturing-type relations with students, are considered to be important especially among elementary school teachers, for motivating students to learn (Burden, 1979; Lampert, 1984).
3. Relative isolation from peers is a condition of work among teachers. In fact it is looked upon as desirable by many. Teachers are expected to solve their own problems. They do not discuss their work under ordinary circumstances. Teacher lounge discussions revolve around politics, gripes, home life, and personalities rather than around curricular and instructional issues (McPherson, 1972).
4. Teaching peers do not directly offer unasked for professional advice or enter other teachers' classrooms without acknowledging territoriality. Advice, according to Newberry (1977), is provided in a very circumspect manner, usually as a reference to the existence of alternative instructional approaches.
5. Teachers do not look to principals for guidance in instructional matters under ordinary circumstances. They tend to consider principals first as threats and second as no better than they in this area. They expect principals to manage the school, to act as buffers from outside pressures, and to support them in maintaining discipline and authority (Bicklen, 1983).
6. Typically, teachers prefer only limited contact with parents. They hope that parents will support but not challenge their authority (Lightfoot, 1983; Lortie, 1975; McPherson, 1972).
7. Because teaching has offered limited extrinsic rewards it has attracted those who focus on intrinsic considerations. These include pride in student achievement (Wise, 1979), collegial and personal relations with peers (Little, 1982), a sense of service to society (Lipsky, 1980), a parenting need (Burden, 1979), and the sheer love of some field of study and joy in related teaching activities (Mitchell, Ortiz, and Mitchell, 1982).
8. For the most part, typical teacher responsibilities remain unchanged from the first day to the thirtieth year. There has not been established career ladders within teaching. Patterns of upward mobility include teaching at higher grade levels, lateral movements to more prestigious specialist positions, and movement out of teaching into administrative positions or into teacher education (Darling-Hammond, 1990).
9. The educational expectations of the profession have increased approximately one year for each generation in this century. Presently, the master's degree is the expected level of education for career teachers. Beyond the master's degree, coursework tends to be non-degree related self-improvement programs (Bazeli, 1989).

These teacher force norms provide a background description of a general culture that is individualistic and basically intrinsically oriented. Teachers in most cases are not involved in sustained efforts in their schools to reflect on and improve the effectiveness of practice. However, they are socialized into a pattern of continuing professional education at the graduate level.

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Professional Knowledge

The teaching force has not been able to convince the public that there is much to teaching. In the expressed opinion of many political and business leaders, as well as a few educational researchers, teachers possess no special professional knowledge. Any reasonably intelligent and educated adult can become an effective teacher with a few weeks of orientation and some teaching tips from an experienced mentor. This is the key assumption that underlies most alternative teacher preparation and certification programs. To one who believes this, elaborate licensure requirements need to be stripped away in order to allow talented persons to be brought in, apparently for not very much money, to relieve shortages and to bring some fresh ideas to a nearly dead institution (See for instance Finn, 1990).

Some researchers, who have examined what teachers do, assert that teachers as a group do not exhibit applications of a unique and sophisticated body of knowledge. Lortie (1975) goes further. He argues that there is no technical culture in education which is empirically derived and which can be translated into pedagogical practice. Teachers, some researchers say, have what Feiman-Nemser and Floden (1986) and Elbaz (1983) call practical knowledge, that is, sets of skills related to practical experience. Doyle (1990) calls it classroom knowledge, Shulman (1987) case knowledge, Hatton (1989) bricolage, and Schon (1988) knowing-in-practice. This sort of knowledge is treated with varying degrees of respect or criticism by these authorities.

Teachers in elementary and secondary schools are immersed in a hectic daily world that leaves very little time for reflection. Classrooms are complex environments in which teachers must make rapid fire judgments and decisions about group management, student activities, equipment, media and facilities utilization, record keeping, the handling of interruptions and disruptions, the organization of content, and the teaching procedures to use. Jackson (1968), for example, found that elementary school teachers engage in 200-300 interactions each hour of the school day. Most often teachers attend to more than one activity or condition at any given moment. They must an-

ticipate problems, referee student-to-student interactions, and do it all within the constraints of specific time limits.

The press of total involvement causes many teachers to look to what Jackson (1968) calls simple explanations of classroom phenomena based more on feelings and intuition than on reflective thinking. Teachers favor narrow patterns of pedagogy traditionally used within their subcultures and are skeptical of practices which are different. They strongly resist proposals for changes that cannot be accommodated easily within this reality, which do not have immediate pay-off, and which take too much precious time and energy to learn and incorporate. They have, according to Doyle and Ponder (1977), a practicality ethic that is a key criterion for the acceptance or rejection of new pedagogy. Therefore, the practice of teachers is characterized by simplicity, routine, familiarity, and concrete practicality.

Hatton (1989) pictures teachers' work as similar to the concept of bricolage as proposed by Levi-Strauss. Hatton suggests that, like bricoleurs, teachers are professional do-it-yourselfers. They do not study a project and then ask themselves what tools, materials, and processes are needed for its successful completion. Rather, they review available resources and ask themselves how these might be used to complete, or approximately complete projects. Their stores of resources are collected unsystematically in anticipation of some future usefulness. Resources are used repeatedly in a variety of ways to fit different projects. While imaginative, these applications are not based on professional theory or craft knowledge. They are based primarily on past experiences and practical problem solving. Thought processes are characterized by Levi-Strauss as the exercise of the science of the concrete, a primitive, but rational system of explanation. It is limited by its concreteness to a narrow set of solutions to instructional problems. As a consequence Hatton (1989) suggests that teacher subcultures exhibit characteristics such as those listed below.

Conservatism. Coping strategies used by teachers are technologies to accommodate, rather than to go beyond, constraints on practice. They are generally teacher survival and

comfort related.

Limited Creativity. Creative solutions to instructional problems are limited by the instructional context. The perspectives of the teacher subcultures on what constitutes good teaching preclude much radical experimentations and departures from that norm.

Repertoire Enlargement. Additions to pedagogical skills tend to be nonprincipled. As do artists, teachers select new ideas on the basis of subjective judgments about their personal utility.

Use of Theory. Teachers borrow their explanations of classroom phenomena from theories generated by parent disciplines and other professional fields. Much of the time knowledge of these theories is watered down, incomplete, and outdated. Focus tends to be on practical, short-term solutions to survival problems and dilemma resolutions. Advice by experienced teachers to novices consists of situation-specific and atheoretical recipes.

Hatton paints a picture of teacher subcultures as being too constrained by the lack of resources and time, by the rigidity of school organizations, and by powerful belief systems to adapt theoretical and reflective orientations to their work.

Doyle (1990), Shulman (1987) and Schon (1983) are among researchers who are more positive about professional knowledge exhibited by teachers. They propose that this sort of knowledge be studied and used as a foundation for teacher education. Teaching for Doyle requires a highly developed ability to manage events. It is a cognitive activity based on knowledge of the probable trajectory of events in classrooms and the way specific actions affect situations. Methods of instruction are useless without a basic understanding of classrooms. Doyle suggests that professional knowledge is event-structured and based on past experience related to how to teach specific chunks of content. It is case knowledge involving the development of programs of action. These feature an academic task, a representation of the content in some form, a curriculum script, that is, the sequence of steps leading to the attainment of the task objective, and with accompanying classroom management

strategies. Case studies of teaching involving these components, Doyle believes, would make a more powerful teacher education program than traditional methods of instruction based solely upon psychological theory.

Shulman (1987), working in the fields of medicine and education, reports that medical doctors as well as teachers do not follow the practice procedures sanctioned by their professional schools. For example, Shulman was surprised to find that, rather than the combinatorial analysis procedure he expected, medical doctors diagnosing patients in his study surfaced an hypothesis about the source of illness within thirty seconds, and several more within another minute. All were held in mind while confirmation was sought. These findings are similar to those by Schon (1983) who further suggests that all professionals practice what he calls reflection-in-action procedures. In essence, the approach used by practitioners is hypothetical-deductive in character and content specific.

Teachers in most cases are not involved in sustained efforts in their schools to reflect on and improve the effectiveness of practice.

Schon makes a clear distinction between knowledge drawn from reflection-in-action and knowledge derived from a technical-rational paradigm, that is, experimental research and theoretical constructs. Knowing on the part of practitioners includes subjective framing of problems and value judgments. Practice to Schon, Doyle, and Shulman is not the application of theory. Theory provides the organizing background for the development of effective practice through long years of personal analysis

of educational problems and cases as they are encountered in the classroom.

Evolving Instructional Models

It can be argued forcefully that there exists a body of professional knowledge that can inform practice (see for example Wittrock, 1986; Houston, 1990). This technical knowledge has been developed over centuries of practice and more recently as a result of intensive research efforts and theory building. To the extent that teachers apply this knowledge base in instruction can they be differentiated from those with just academic background and years of experience as students.

The evolution of teaching models within teacher subcultures is largely a matter of accommodation with the evolving ideology of the subcultures and their adaptation to the working realities of the schools. Changing school organizations allow for greater opportunities for experimentation and adaptations.

Traditional instruction methods often evolve to new forms as a result of developments in content fields and the increasing availability of new media, resources, and delivery systems. For example, textbook-based lectures on history can be modified in many directions with finger-tip access to video disk recordings of every major speech by key world leaders in World War II.

New ways to teach, ranging from simple protocols to complex systems, also stem from the promotion of, and responses to, changes in educational objectives and goals expected by the general society, and from such sources as educational research, developing theories of learning and instruction, philosophies of education, social and developmental psychology, and adaptations of ideas from other fields. The ferment in our society in the 1960s, for example, generated models of teaching, such as inquiry training and values clarification. The use of simulators, and simulation-gaming has spread from military and business training to public school classrooms. Systems such as programmed instruction, mastery learning, and behavior modification resulted from the introduction in the 1950s of the operant conditioning paradigm into education practice. These continue to

exist side-by-side with applications of newer cognitive psychology paradigms, such as, collaborative learning methods and critical thinking strategies. They continue to exist in large part because when expertly executed these differing pedagogies achieve worthwhile, but different, educational objectives with various learner populations.

Novice teachers are only minimally prepared by undergraduate programs to cope with the complexity of the classroom.

Novice teachers are only minimally prepared by undergraduate programs to cope with the complexity of the classroom. As a result they frequently fall into learning-by-modeling modes. They simply follow the patterns they observe around them and those they remember as students. Survival is the game. Experienced teachers do reflect on practice to varying extent, depending on the complexity of their cognitive perspectives. Once survival is assured to a degree, most teachers focus on successively more sophisticated considerations within the instructional context. The process of moving from novice to expert, that is, the process of developing increasingly complex schemas about teaching, is developmental and centrally related to attention to and interpretation of cues within that context. Novices notice little more than primary cues and interpret them in simplistic ways. Expert teachers go beyond the obvious to attend to subtle and tertiary cues. They use them to interpret conditions with greater sophistication and these result in in-progress alterations of plans and processes. As Clark and Peterson (1986) point out, expert teachers become researchers on their own teaching effectiveness.

Within every teacher subculture there exists a body of practitioners rep-

resenting a full range of sophistication. The characterization of an entire subculture of practitioners in terms of the thought processes of the mean ignores the reality of variations in expertise. It fails to notice the processes of evolution within that society. To the degree that a large enough leadership cadre demonstrates theory driven reflection on teaching, that teacher subculture will evolve into higher levels of professional practice.

Pursuit of advanced degrees in the evenings and during summer terms is a familiar cultural pattern among teachers. Along with sporadic district-oriented staff development and personal invention, it is the primary vehicle for improvement in the profession. In general, graduate programs in education offer the first and best sustained encounter with the professional knowledge bases and their lines of research. Coupled with reflective experience, these programs, although uneven in quality, provide key opportunities for developing professional schemas among practitioners.

New skills and theoretical constructs encountered by individual teachers are filtered through the frames of reference of the teacher subculture and the complexity of professional

schemata each teacher possesses. It is proposed here that acceptance of innovations by individual teachers tends to follow predictable patterns. In order of ease of acceptance are:

First: Practical and concrete personal teaching skills connected to improving the teacher as a performer. These include such skills as the use of props and personal devices to capture and hold student attention, and improved patterns of questioning, explaining and evaluating.

Second: Classroom management skills including logistical management and discipline control devices, as well as such considerations as wait time, increasing academic learning time, and transition control.

Third: Curriculum scripts featuring steps leading to learning of specific chunks of content in a teaching field.

Fourth: Teaching procedures of some complexity that expand instructional skills repertoires to better achieve common and less common instructional objectives.

Fifth: Adaptations of new instructional technology systems that make instruction quicker, easier, and better but require effort to learn and the overcoming of fear of technical equipment.

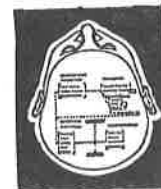
Sixth: Major shifts in instructional methodology based on paradigm changes. These are very difficult to achieve. The key appears to be whether, or to what extent, the new practices violate teacher perspectives on authority, individuality, established intrinsic reward systems, and the rules for upward mobility as they are evolving in the subcultures.

The pattern of expected level of education for practicing teachers has increased about one year for each generation in this century. At present it rests at the master's degree level. Conditions are in place for that level to increase to a sixth year of preparation within the next decade. Combined with the increasingly sophisticated lines of research on teaching which are adding to the professional knowledge base, and the replacement of a large portion of the teaching force because of retirement, there is likely to be an increased rate of evolution of ideology within teacher subcultures in this same decade. These conditions will make it possible for greater professionalization of practice to occur. Whether it occurs depends to a large degree on how teachers are educated.

References

- Bazeli, F. (1989). The post-master's degree of education teachers. *Teacher Education and Practice*, 5(2), 33-37.
- Bicklen, S.K. (1983). *Teaching as an occupation for women: A case study of an elementary school*. Syracuse, NY: Education Design Group.
- Burden, P.R. (1979). *Teachers' perceptions of the characteristics and influences on their personal and professional development*. Dissertation Abstracts International, 40, 5404A. (University Microfilms No. 80-08.776)
- Clark, C., & Peterson, P. (1986). Teachers' thought processes. In Wittrock, M. (Ed.), *Handbook Research on Teaching* (3rd Edition), 255-296, New York: Macmillan.
- Darling-Hammond, L. (1990). Teachers and teaching - signs of a changing profession. In Houston, W.R. (Ed.) *Handbook of Research in Teaching*, 267-290, New York: Macmillan.
- Doyle, W., & Ponder, G. (1977). The practicality ethic in teacher decision making. *Interchange*, 8(3), 1-12.
- Doyle, W. (1990). Classroom knowledge vs. a foundation of teaching. *Teacher College Record*, 91(3), 347-359.
- Elbaz, F. (1983). *Teaching thinking: A study of practical knowledge*. New York: Nichols.
- Feiman-Nemser, S., & Floden, R. (1986). Cultures of teaching. In Merlin Wittrock, (Ed.), *Handbook of Research on Teaching* (3rd Edition), 505-525, New York: Macmillan.
- Finn, C. (1990). The biggest reform of all. *Phi Delta Kappan*, 71(8), 584-592.
- Hatton, E. (1989). Levi-Strauss' bricolage and theorizing teachers' work. *Anthropology and Education Quarterly*, 20, 74-95.
- Houston, W.R. (Ed.) (1990). *Handbook of research on teacher education*. New York: Macmillan.
- Hoy, W., & Rees, R. (1977). The bureaucratic socialization of student teachers. *Journal of Teacher Education*, 28(1), 23-26.

- Jackson, P.W. (1968). Life in classrooms. New York: Holt, Rinehart, and Winston.
- Lampert, M. (1984). Teaching about thinking and thinking about teaching. Journal of Curriculum Studies, 16 1-18.
- Lightfoot, S.L. (1983). The lives of teachers. In L.S. Shulman and G. Sykes (Eds.), Handbook of Teaching and Policy, 241-260, New York: Longman.
- Lipsky, M. (1980). Street-level bureaucracy: Dilemmas of individuals in public services. New York: Russell Sage Foundation.
- Little, J.W. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. American Educational Research Journal, 19, 325-340.
- Lortie, D. (1975). Schoolteacher. Chicago: University of Chicago Press.
- McPherson, G. (1972). Small town teacher. Cambridge, MA: Harvard University Press.
- Mitchell, D., Ortiz, F., & Mitchell, T. (1982). Final report on controlling the impact of rewards and incentives on teacher task performance. Riverside: University of California.
- Newberry, J. (1977). The first year of experience: Influences on beginning teachers. Paper presented at AERA, New York. (ERIC Document Reproduction Service No. ED 137 299)
- Shon, D. (1983). The reflective practitioner: How professionals think in action. New York: Basic Books.
- Shulman, L. (1987). The wisdom of practice: Managing complexity in medicine and teaching. In Berliner, D., & Rosenshine, B. (Eds.), Talks to Teachers, 369-386, New York: Random House.
- Wise, A. (1979). Legislated learning: The bureaucratization of the American classroom. Berkeley, CA: University of California Press.
- Wittrock, M., (1986). Editor, Handbook of Research on Teaching. New York, NY: Macmillan.
- Zeichner, K.M., & Tabachnick, B.R. (1981). Are the effects of university teacher education washed out by school experience? Journal of Teacher Education, 32(3), 7-11.



Learning Style-Based Instruction

by James W. Keefe

Much has been written recently about the importance of higher order or critical thinking skills. Cognition is the subject of theoretical and practical treatments in the journals of our profession. Both professors and practitioners argue the value of training students in study skills, content thinking, metacognitive strategies, and a host of techniques. Little mention is made in this literature, however, of the basic role of cognitive controls and the importance of contextual factors in thinking and learning.

Learning style encompasses the characteristic cognitive, affective, and physiological behaviors that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Cognitive styles or controls are information-processing habits that are internal to each learner's mind. Some minimal skill in these processes is requisite to all learning; such capabilities as analysis, spatial reasoning, categorization, and memory. Various affective and environmental preferences influence these cognitive controls—persistence, time-of-day preferences, reactions to environmental conditions, etc. The gestalt of cognitive, affective, and environmental elements is what we call learning style.

Research Background

Current efforts to explain the underlying processes of learning and teaching reflect three lines of research. The first line of research emphasizes the cognitive style dimension. Most cognitive styles are bipolar like analytic vs. non-analytic or reflective vs. impulsive. Kolb (1976) and Gregorc (1978) developed similar bidimensional cognitive models that are still widely used. Letteri's (1980) Cognitive Profile is a

sophisticated multi-dimensional version of this approach.

A second group is working with applied models of learning style (e.g., Hunt et al., 1978; Dunn & Dunn, 1978). Interview techniques or self-report questionnaires are used to identify student perceptions of their own characteristic traits. This approach often uses research similar to Aptitude-Treatment Interaction (ATI) analysis (Bronbach & Snow, 1977). ATI is a systematic attempt to relate individual differences in aptitude, including aspects of cognitive and affective style, to instructional method.

The third line of research rests heavily on personality theory, particularly the psychological type theory of Carl Jung. Several analyses of the Jungian thesis have been formulated and application made to learning style, teaching style, and instructional diagnosis (Lawrence, 1979; Silver & Hansen, 1980; Myers & Myers, 1980). Cognitive approaches also look to Jungian and non-Jungian personality theory for one of their ultimate justifications.

In 1982, the National Association of Secondary School Principals assembled a distinguished task force to examine current conceptualizations and instrumentation of learning style. The task force spent four years examining some 40 elements of style, developing a conceptual model, and initiating massive factor analytic studies leading to a new instrument of learning style.

The NASSP published the new learning style instrument in 1986—the NASSP Learning Style Profile (LSP). The Profile (Keefe & Monk, 1986) is second-generation technology, yielding independent scores on 24 discrete elements of style, building on the research and design of earlier work in the field. Its purpose is to provide educators with a well-validated and easy to use instrument for diagnosing the cognitive styles, perceptual response tendencies, and study/instructional preferences of

middle level and senior high school students. The Profile offers school practitioners a way to personalize the instructional process, to identify the dominant stylistic characteristics of students, and to plan instruction accordingly.

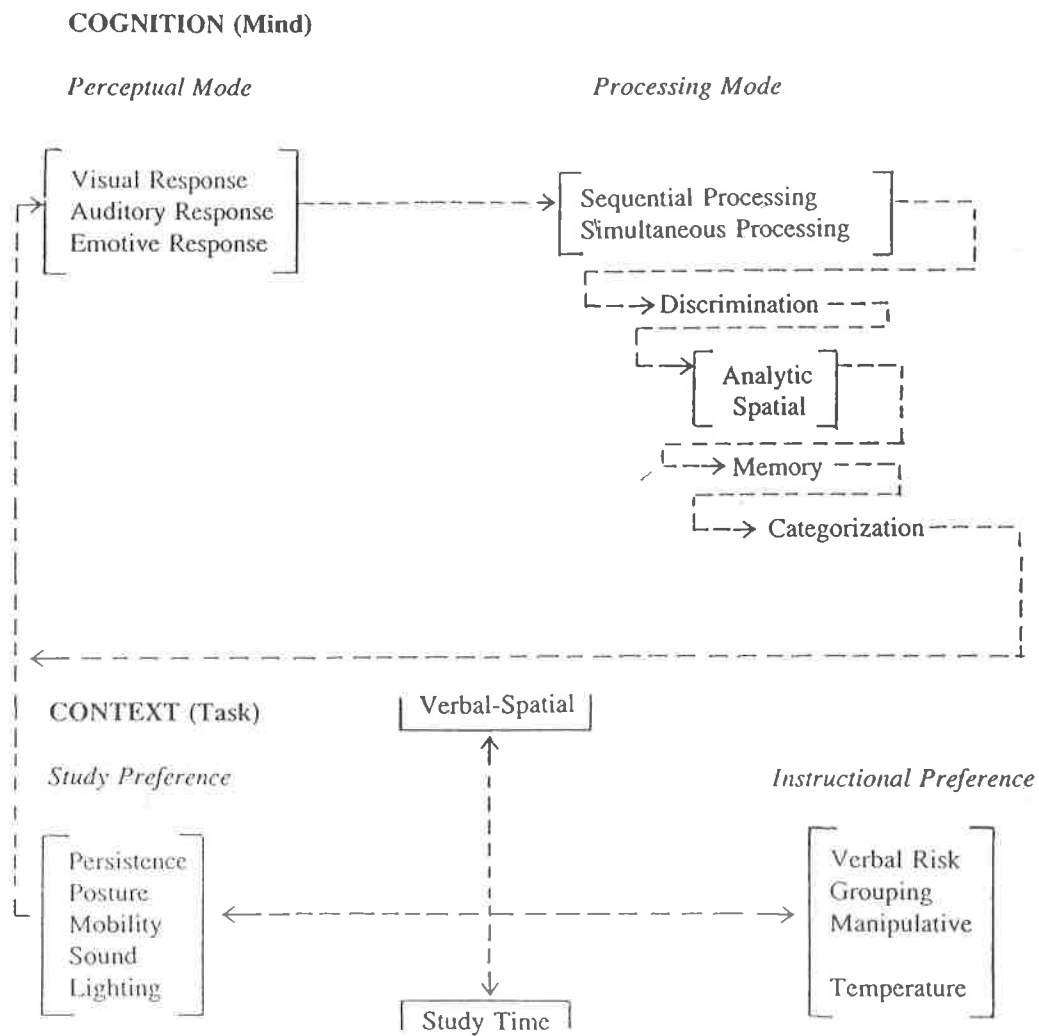
NASSP taskforce research identified three perceptual responses, eight cognitive styles, three motivational orientations, and ten environmental preferences. Second order analyses grouped these elements into four higher factors:

1. Three perceptual responses (visual, auditory, emotive);
2. Eight cognitive or information processing elements (sequential processing, simultaneous processing, discrimination, analytic, spatial, memory, categorization, and verbal-spatial);
3. Six study preferences (persistence, posture, mobility, sound, lighting, and afternoon study time; evening study time preference did not load in this analysis, but may be thought of as a study preference);
4. Six instructional preferences (verbal risk, grouping, manipulative, temperature, early and late morning study time).

These factors can also be conceptualized in information processing terms as cognition and context (see Figure 1). Cognition includes perceptual responses and cognitive controls. Context covers the study and instructional environment. The relationships among LSP perceptual response subscales and cognitive controls shown in Figure 1 are based on typical human information processing patterns. The individual responds to external or internal stimuli (perceptual mode), and the information is automatically processed both sequentially and simultaneously. The individual exercises personal preference in discriminating among sequential and simultaneous data. The data are further subjected to analytic and

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Figure 1. NASSP Learning Style Profile Subscale Relationships Based on a Human Information Processing Model (James W. Keefe, 1988)



spatial controls, held in short term or working memory and then categorized in long term memory (or rejected). This processing all takes place in the context of verbal-spatial, study, and instructional preferences. (See the *LSP Technical Manual*, Keefe & Monk, 1988, for more detail.)

The Profile provides, for the first time, easily usable information on the cognitive elements of style, as well as measures of perceptual, affective, and environmental styles. If a student has good cognitive skills, he or she is ready to learn efficiently and successfully. A student with weak cognitive skills will benefit little from an analysis and matching of other style elements. Even supportive learning environments may be of little value.

Fortunately, cognitive skills can be strengthened. Many of the clinical training exercises developed by Charles Letteri (1985) for the augmentation of cognitive skills have been adapted for use in group settings and are available in NASSP's *Learning Style Profile Handbook*, Volume I (Jenkins, Letteri & Rosenlund, 1990). Various ways to enhance the learning environment for learner needs and preferences are presented in Volume II of the handbook (Keefe, 1989). These strategies and activities are based on the field work of educators with wide experience in innovative schools. They are keyed to the perceptual, study, and instructional elements of the Profile.

Use of the Profile

The Learning Style Profile was developed as a first-level diagnostic tool. The scales are deliberately short in order to generate a range of information on each student. The Profile provides an overview of the tendencies and preferences of each learner (see Figure 2). LSP computer scoring programs automatically generate individual profiles and class rosters. They can also produce class (group) profiles and flag rosters if schools assign identification codes before testing.

Individual profiles are useful for advisement and highly motivational to students. Flag rosters are particularly helpful for instructional planning. They list the scores of a class or group using a set of abbreviations to 'flag' the extremes on each subscale (Figure 3).

Teachers can see at a glance the major tendencies and preferences, strengths and weaknesses of a given class and plan instruction accordingly. The flag roster also alerts teachers if a majority of a class or group are strong or weak, high or low on a particular subscale.

Existing research suggests that students with very strong or very weak learning style skills, responses or preferences are particularly amenable to instructional arrangements that optimize those capabilities.

Flag rosters highlight only those subscale scores that fall at the extremes of response. The flags point out students with weak to very weak or strong to very strong skills or preferences. The mid-range of response is deliberately omitted to emphasize the dominant tendencies within a group. Students with very strong visual responses, for example, are less likely to learn if instruction is strictly verbal (lecture or question and answer). Those with very strong emotive responses or high need for 'hands-on' activities may reject typical auditory or visual instruction. Those with strong study time or instructional preferences learn best under personalized or matched learning conditions. Flag rosters provide information to teachers that makes personalized education possible even in self-contained classrooms and with a mandated curriculum.

Teachers find LSP diagnostic profiles helpful in organizing instruction for students with similar cognitive strengths or weaknesses, similar perceptual response tendencies, or similar instructional preferences. Students with

analytic skill and categorization skill deficiencies, for example, may need focused problem solving training. Those with afternoon or evening study time preferences may function better in the morning with matched instructional and study preferences. Those with low verbal risk orientation may fare better in smaller groups where embarrassment is minimized and interaction can be optimized. Careful diagnosis of student characteristics is the foundation of all really successful instructional planning. The Learning Style Profile makes realistic planning not only possible but advisable and productive.

Style-Based Instruction

Existing research suggests that students with very strong or very weak learning style skills, responses or preferences are particularly amenable to instructional arrangements that optimize those capabilities. Students with strong cognitive skills, for example, are ready for challenging instruction and capable of working at or beyond grade level. Those with weak skills usually need help before they can learn successfully and feel good about further learning.

Planning learning style-based instruction involves several steps:

1. Diagnosing individual learning styles;
2. Profiling class or group tendencies and preferences;
3. Determining significant group strengths and weaknesses;
4. Examining subject content for areas that may create problems for learners with weak skills;
5. Analyzing student prior achievement scores (curriculum-referenced tests, skill tests, etc.) for patterns of weakness similar to cognitive skill weaknesses;
6. Augmenting (remediating) weak cognitive skills using exercises from the *Learning Style Profile Handbook*, Volume I;
7. Assessing current instructional methods to determine whether they are adequate or require more flexibility;
8. Modifying the learning environment and developing personalized learning experiences to support the preferences of students with adequate cognitive skills.

Figure 2. Individual Learning Style Profile

Learning Style Profile

This profile is for: Boris Sherry A

Birthdate: 5/17/73 Sex: F Grade: 7 Race: W

Date: 2/12/86 School: 21000 Class: 20

Skills—General Approach to Processing Information

	Score	Weak	Average	Strong
Analytic	62			xxxx
Spatial	35	xxxx		
Discrimination	38	xxxx		
Categorization	46		xxxx	
Sequential	33	xxxx		
Memory	26	xxxx		

Perceptual Responses—Initial Response to Verbal Information

	Score	Weak	Average	Strong
Visual	55		xxxx	
Auditory	43	xxxx		
Emotive	50		xxxxx	

Orientations and Preferences—Preferred Response to Study or Instructional Environment

	Score	Low	Average	High
Persistence	39	xxxx		
Verbal Risk	47		xxxx	
Manipulative	42		xxxx	

Study Time:	Score	Low	Average	High
Early Morning	51		xxxxx	
Late Morning	52		xxxxx	
Afternoon	44		xxxx	
Evening	38	xxxx		

	Score	High	Neutral	High
Verbal-Spatial	**	Spatial	Missing	Verbal
Grouping	36	Small	xx	Large
Posture	47	Informal	xx	Formal
Mobility	43	Stillness	xx	Movement
Sound	46	Quiet	xx	Sound
Lighting	54	Dim	xx	Bright
Temperature	40	Cool	xx	Warm

Consistency Score: 3 Normative Sample: 1986—National
 NASSP—National Association of Secondary School Principals, Reston, Va.

Figure 3. Flag Roster

NASSP Learning Style Profile Class Flag Roster

Date: 2/12/86 School: 21000 Class: 20

Name	Skills						Perceptual Response			Orientations			Study Time Preference						Other Preferences						Cons
	AN	SP	DI	CA	SE	ME	VI	AU	EM	PE	VR	MA	EM	LM	AF	EV	VS	GR	PO	MO	SO	LI	TE		
Ambrewster John L	S	S	W	W	W	W			H	H	H	H	H	H	L			I					C	3	
Boris Sherry A	S	W	W	W	W	W	S	S	L	L	L	L	L	L				S		Q				3	
Bradley Christine M							W	W	H	H	H	H	H	H				S				D	D	4	
Daniel's Chris A	S	S	W	W	W	W	W	W										S		Q		D	C	2	
Iberman Dianna R							W	W	L	L	L	L	L	L				F		Q		D	C	3	
Jones Nick G							S	S										F		S		D	C	3	
Kent Peter							W	W										S		S		D	C	8	
Lawson Jessica D	S				W	S			LL	LL	LL	LL	LL	LL	L			S		Q		D	C	2	
Leeks Shari A							W	W										S		S		B	C	4	
Leplace Tiffany L	W						W	W										S		S		D	C	5	
Loxley Jennifer A							W	W										SS		I		D	C	8	
Maxton Jimmy L	W	S					S	S	L	L	L	L	L	L	L			S		M		D	C	5	
Milton Shelly J							W	W										S		S		D	C	2	
Purdy James M							W	W										S		S		D	C	2	
Rock Richard R	S	S					W	W	H	H	H	H	H	H	L			S		Q		D	C	1	
Saylor Sharon LK	W	S	W	W	W		W	W	LL	LL	LL	LL	LL	LL				S		S		D	C	2	
Schmit Daniel S	W	S	W	W	W		W	W										S		S		D	C	6	
Settner Lilly K	S	S					W	W	L	L	L	L	L	L				S		S		D	C	3	
Smith David D							W	W										S		S		D	C	7	
Storke Jimmy K	S						W	W	L	L	L	L	L	L	L			S		Q		D	C	3	
Tod Allison K							W	W										S		S		D	C	2	
Vargus R Charles	W	S	W	W	W	SS	W	S	LL	H	L	L	L	L	L			S		S		D	C	10	
Wilson Aaron D	W	S	W	W	W	W	W	W	H	H	L	L	L	L	L			S		S		D	C	3	
Wist. Lilly D	W	S	W	W	W	SS	W	W	H	H	H	H	H	H	L			S		Q		BB	C	1	
All Class Members																		S		S				3	

Steps 1–5 above are essentially diagnostic. Step 6 requires the augmentation or remediation of cognitive skill weaknesses. Augmentation can be accomplished in two ways. Schools can establish a clinical center with one teacher trained as a cognitive resource teacher to work with students individually or in small groups.

This approach is similar to the reading labs or resources rooms found in many schools. Alternately, schools can train regular classroom teachers to help individuals or small groups in existing classrooms. Augmentation exercises developed at the University of Vermont, the University of Florida Laboratory School, Ohio State University, or NASSP may be used effectively with either approach. The following examples are taken from the *LSP Handbook*.

Analytic skill requires that learners break down an idea or problem into its component parts and then put it back together again. Students weak in analysis have difficulty recognizing the elements of a problem or task and may not know how to begin or proceed. Analysis involves skill in breaking down, sorting out, identifying and labeling parts, and seeing the parts in the whole. Two sample analytic activities are outlined below.

- **Practice Activity: Flowcharting.** A flowchart is a diagram that represents a sequence of events. It can be an effective way to give directions, illustrate steps or stages, or outline a new skill. The common symbols of flowcharting and an example adapted from "How to make a phone call" (Black & Black, 1985) look like this:

flowchart

- **Social Studies Content Activity: Map Skills.** Writing verbal directions for getting from one place to another is an excellent exercise in analysis. Students must first understand the customary maps symbols (mileage charts, borderlines, roads, landmarks, etc.). They must locate the point to begin their written directions and follow any guidelines. (Will the route be the fastest or the

most scenic?) Teachers model the first direction and then let students work independently. When everyone is finished, the results are shared and compared. (Which words seem to communicate the information most effectively?)

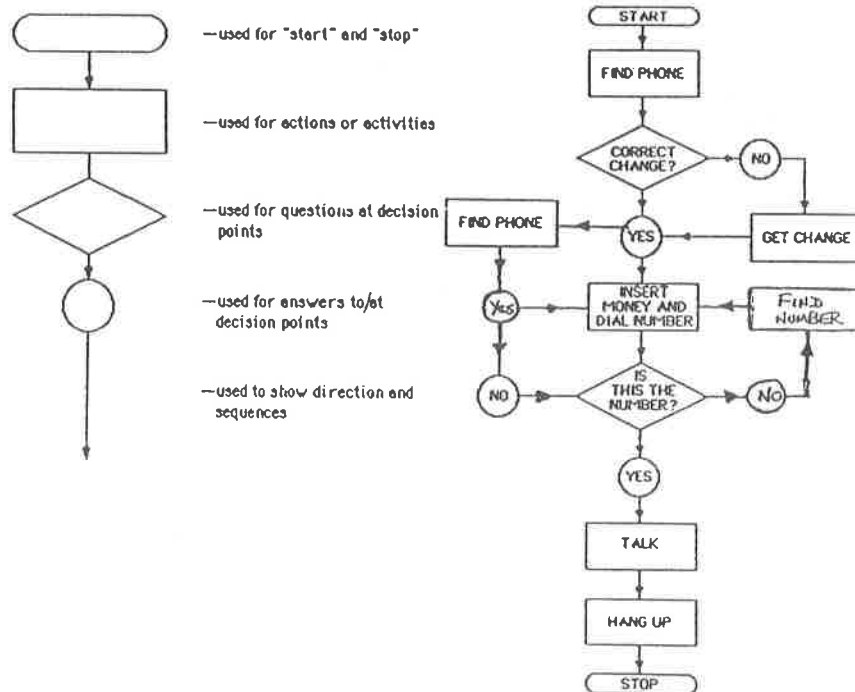
Simultaneous Processing Skill is one of two modes of information processing available to and used by all individuals. (Sequential processing is the other.) Simultaneous processing strength involves grasping visuospatial relationships and seeing the bigger picture. It involves relational thinking—perceiving an overall pattern among component parts. Driving skills are the classic example of simultaneous processing. Comprehending an elaborate plot from a complex descriptive narrative is another.

- **Social Studies Content Activity: Guided Imagery.** Students are asked to relax and close their eyes. The teacher

tells them that they will be transported back in time so that they can actually experience a real historical event. An excerpt is played from Audio Library Classic's audiotape of Stephen Crane's *The Red Badge of Courage*. When the excerpt is finished, different students are asked to tell what they imagined, how the soldiers must have felt, what they must have experienced. These experiences are compared and contrasted with those of other wars. (This activity can be applied to scientific discoveries, skilled athletic performance, and other content related mind adventures.)

Steps 7–8 above involve enhancing the learning environment. The Learning Style Profile identifies a number of perceptual, study, and instructional preferences that characterize the perceptual, motivational, or environmental

FLOWCHART



responses of learners. These orientations or biases reflect the learner's preferred response to the school environment. These preferences likely result from predominantly environmental and cultural influences during the early, impressionable years of the learner's growth and development.

The Learning Style Profile Handbook offers teachers various suggestions for adapting the learning environment to these needs and preferences of learners. These strategies help students with particular style proclivities to respond to the demands of different kinds of learning. Volume II of the handbook presents the following kinds of strategies and methods.

Verbal Risk Orientation involves a willingness to express opinions in a group and to speak out even in the face of opposition. Students with strong verbal risk orientation tend to speak up in class or in groups. For introverts or the less well informed, however, the group experience can be trying. Small groups of various kinds are good vehicles for

encouraging verbal risk. The groups must be small enough to give everyone an opportunity to participate and thus not allow the timid to hide. **Cooperative Learning Activities** are particularly useful in this regard. In 'Jigsaw,' for example, students are assigned to six-member teams to work on subject matter broken down into sections. Each student studies his/her section, meets with members of other teams with the same section in 'expert groups,' and then teaches his/her own teammates about the section. For more on cooperative learning activities, see Slavin (1983) and Johnson and Johnson (1984).

Sound Preference involves individual reactions to auditory stimulation. Some students prefer a quiet study area while others need background sound like music as a screen against other distractions. Accommodating sound preferences in an ordinary classroom usually takes a few 'quick and dirty' techniques. Dunn, Dunn and Freeley (1984) suggest seating those who prefer quiet away from traffic and activity patterns or carpeting some areas

of classrooms. Those who prefer background music can use radios or tape players with earphones.

Conclusion

The Learning Style Profile opens up new avenues for principals, teachers, and students to create caring and effective schools, places where learners and learning are important, where every student can be reasonably successful in acquiring the knowledge and skills necessary for a productive life. Many of the instructional implications of differing student styles have yet to be investigated, but one thing is certain. Students who understand their learning styles and who exercise active control over their cognitive skills do better in school. They are better adjusted, have more positive attitudes toward learning, and achieve at higher levels than their less skillful peers. They take charge of their learning. That, needless to say, is the whole point of schooling.

References

- Black, H. & Black, S. (1985). How to make a phone call. *Building thinking skills*, Book 3-Verbal. Pacific Grove, CA: Midwest Publishing.
- Cronbach, L.J., & Snow, R.E. (1977). *Aptitudes and instructional methods*. New York: Irvington Publishers.
- Dunn, R., & Dunn, K. (1978). *Teaching students through their individual learning styles*. Reston, VA: Reston Publishing.
- Gregorc, A.F. (1978). *Transaction ability inventory*. Columbia, CT. (Currently the Gregorc Style Delineator, 1982).
- Hunt, D.E., Butler, L.F., Noy, J.E., & Rosser, M.E. (1978). *Assessing conceptual level by the paragraph completion method*. Toronto: Ontario Institute for Studies in Education.
- Jenkins, J.M., Letteri, C.A., & Rosenlund, P. (1990). *Learning style profile handbook*, Volume I. Reston, VA: National Association of Secondary School Principals.
- Johnson, D.W., & Johnson, R.T. (1984). Cooperative small-group learning. *NASSP Curriculum Report*, 14(1).
- Keefe, J.W. (1989). *Learning style profile handbook*, Volume I. Reston, VA: NASSP.
- Keefe, J.W., & Monk, J.S. (1986). *Learning style profile*. Reston, VA: NASSP.
- Keefe, J.W., & Monk, J.S. (1986). *Learning style profile: Technical manual*. Reston, VA: NASSP.
- Kolb, D.A. (1976). *Learning style inventory: Technical manual*. Boston: McBer & Co.
- Lawrence, G. (1979). *People types and tiger stripes*. Gainesville, FL: Center for Application of Psychological Type.
- Letteri, C.A. (1980). Cognitive profile: Basic determinant of academic achievement. *Journal of Educational Research*, March/April, 195-199.
- Letteri, C.A. (1985). Teaching students how to learn. *Theory Into Practice*, XXIV(2), 112-122.
- Myers, I., & Myers, P. (1980). *Gifts differing*. Palo Alto, CA: Consulting Psychologists Press.
- Silver, H.F., & Hanson, J.R. (1980). *User's manual: The learning preference inventory*. Moorestown, NJ: Hanson Silver & Associates.
- Slavin, R.E. (1983). *Cooperative learning*. New York: Longman.



On Restructuring American Schools: An Interview with Beau Fly Jones

by *Carla Cooper Shaw*

Beau Fly Jones is Program Director of the North Central Regional Educational Laboratory in Elmhurst, Illinois. The author of numerous articles related to the improvement of instruction, she is senior editor of *Strategic Teaching and Learning: Cognitive Instruction in the Content Areas*, co-author of *Dimensions of Thinking: A Framework for Curriculum and Instruction*, both published by the Association for Supervision and Curriculum Development in 1987 and 1988, respectively. She serves as Project Director of the Video Series Project Team of *Restructuring to Promote Learning in America's Schools*, a series of nine interactive video conferences now being presented by the NCREL and PBS. Dr. Jones discusses the video conferences for the *Thresholds* reader. Shaw: Please give us an overview of your teleconference project.

Jones: The teleconference project is called "Restructuring to Promote Learning in American Schools." It's a nine part, national interactive teleseries that will be broadcast in twenty or so states and British Columbia. The entire series is based on the premise that before you restructure the schools you need to reconsider the vision of learning that drives the hardest part of schooling, which is curriculum and instruction and assessment. So the first teleconference of the nine starts with what is that vision of learning from a perspective of cognitive psychology plus the multicultural perspective. It also deals with the need for change and the need for different kinds of objectives and tasks — out-

comes that are driven by the changes that society is rapidly undergoing. The first teleconference starts off by addressing why we need to change and what some of the things are that we need to be moving towards. Then we dig into the research that tells us how research can offer structure to those kinds of goals — the teaching of learning processes. The second, third, and fourth teleconferences deal with curriculum and instruction and assessment, respectively, and I think that our titles really capture what we're aiming for — which is "The Thinking Curriculum," "Cooperative Classrooms," and "Multidimensional Assessment."

The fifth, "Schools as Learning Communities," has to do with the social organization of the school and its relationship to the community. Basically, it argues that if you believe these visions of the learner being an active participant, you have to apply those same standards of learning not only to young students, but also to adults who live and work in the schools and adults who live and work in the community. It argues that the same changes that are driving our needs to change the model of schooling are also driving adults to continue education so that we're talking about the whole notion of lifelong learning. You want to structure your schools to have semi-permeable boundaries so the people inside of the schools can use the resources of the community outside, and actually, in many cases, perform actual services and surveys and that sort of thing. The community can come and serve as a resource inside the schools so that you have parents who serve as aides and role models and who are actually imparting knowledge in many of the same ways that teachers do. In summary of the fifth teleconference, first, you have these semi-permeable boundaries

in schooling. Second, there is lifelong learning and you must deal with the issue of children learning both before they reach school and after they graduate.

The next two teleconferences are contained in "Many Roads to Fundamental Change" in which we argue that the school does not necessarily have just one way to get started. Many different strategies obtain, but a key issue in the change process is the need to develop a consensus or cohesiveness about your belief system regarding learning before you start the change process, which is something the change literature does not address very effectively.

The eighth teleconference is "Staff Development," and the ninth is "Reconnecting to Address the Learning Process," because we feel that the policies in place right now inhibit learning for low achieving students in many important ways. We need to re-think the policies and practices of learning for those students, not only in terms of what we consider remediation and pull-out programs, but also the whole notion of special education. We strongly support special education and its regular education initiatives in keeping those students in the classroom and using strategies which are functional for all students, because the issue of their being pulled out and separated is dysfunctional, as is the actual substance of the instruction they receive.

Shaw: In your 1986 'Educational Leadership' article, you advocated cognitive instruction, or explicit instruction in higher order thinking skills, for low achieving students. In what context do you see this instruction taking place — during subject matter instruction, separately, or at both times?

Jones: I think there may be some circumstances whereby you want to

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give low achieving students some additional instruction and practice in the use of thinking strategies, but what should drive that instruction and drive their day-to-day learning is embedding the teaching of complex thinking skills in their daily classes in the subject areas. Even when students have an adjunct course to provide extra practice, that extra practice should be in the complex tasks in which they are engaged in the regular classroom; the extra practice should not be just a learning strategy for something entirely unrelated. I think some older student, beginning with middle school, may be able to benefit from these kinds of thinking strategy courses, and I know that they do help achievement, but that's the sort of strategy for after the horse has left the barn. I don't think you'd have a need for them if you taught thinking skills on a daily basis. There are plenty of strategies that have been proven effective for students in the regular classroom. Cooperative learning, for example, is for heterogeneous groups, in which the higher achieving student and the lower achieving student really share. As it turns out, they have much to share, particularly in literature, whereby their personal experiences allow them to bring a richness to the classroom.

Shaw: Would you say that instruction in metacognitive strategies should be part of thinking skills instruction?

Jones: Absolutely. I think it's a part. The whole notion of planning and revision and monitoring is extremely important in the process of learning. In the PBS series on the mind, the particular program called "Thinking" defined thinking almost entirely in terms of planning, as a way of distinguishing thinking from other types of intellectual behavior that they covered on that show. I think it is certainly the heart of a lot of the learning process.

I was extremely interested to notice in rereading the McGuffey reader, that the readers are very metacognitive in nature. The stories frequently talk about the learning process. There is a story of a king who can't read and he sends out for a page and the boy can't read. Finally they find a girl and she pauses before she reads and the king says, "I thought you could read." She says, "I can read, but I need to think about how I'm going to approach the reading process." Not only does the McGuffey reader have

stories dealing with the process of modeling the metacognitive processes that are necessary for learning, actually integrating them into the substance of the stories, in addition, they have this egalitarian notion of the sexes which I thought interesting for the day. But I don't want to imply by that example that we should go around creating all these stories. I've done that in some of the short instructional passages I've created for students at risk. That's fine very occasionally, but I think it's more meaningful to find that kind of modeling in really good literature, as opposed to the characters being more cosmetic. On the other hand, one of the reasons why I believe Philosophy for Children is so successful is that the novelettes Matthew Lipman created for that series are basically portraying the minds of children as they wonder and puzzle. So, as in the McGuffey reader, children are puzzling about the subject matter.

*... is outstanding
for several reasons.
First, it challenges
the assumptions
that little kids can't
think in philosophical
and complex
ways and have
meaningful learning
at a high
abstract level.*

Shaw: It has been said that metacognitive strategies may be among the most transferable of mental competencies. How would you respond to that?

Jones: I think they are transferable because they are the ones that are the most generic. Every subject matter benefits from planning, monitoring, and revision, but, at the same time, each subject has its own information. Planning in particular disciplines is driven by the subject matter, such as in math with the

estimation of numbers. So you can't really talk about metacognitive behavior that is entirely generic, but I think one of the powers of metacognitive behavior is that it empowers learners to take responsibility for their learning. It empowers learners to be active and to direct their own learning, which the other particular strategies don't really deal with. There is an emotional or psychological component of the metacognitive skills that is not present in the purely cognitive skills.

Shaw: You have said that one of the goals of cognitive instruction is to help students become independent learners. Do you see instruction in metacognitive strategies as one way to achieve that goal?

Jones: I think it is, although the notion is expressed a little bit differently by cognitive psychologists today than when I used the term, "independent learning," back in 1986. Now the stress is on self-regulated learning, which reflects the notion of empowerment to the individual — a notion not necessarily present in independent learning. Independent learning implies that you go off and teach yourself and do independent study — which is not what self-regulated learning means. Self-regulated learning has more interdependence with the teacher because it is a shared process, but also the individual takes ultimate responsibility for learning and for helping to mediate others. These ideas are not really implied in the term, "independent learning." I think one of the things that killed Dewey was that the misinterpretation and misapplication of his focus on independent learning caused people to emphasize that students could go out entirely on their own and almost disconnect themselves with the classroom. People allowed themselves to consider that to be independent learning and of course, it really isn't. It's disconnected learning as opposed to independent learning. Another feature of self-regulated learning, which is not reflected in the term, independent learning, is that it's very social. Self-regulated learning is acquired by interaction with others and by learning and internalizing the criteria for self-regulated learning and task excellence in a community in which there is a lot of dialogue to consider. So, there are two or three components in self-

regulated learning that are quite different and have come up since 1986.

Shaw: How would you characterize the role of the teacher in instruction that aims toward self-regulated learning?

Jones: Many words would be appropriate. The ones I have emphasized in the literature are "model" and "mediator." Modeling is not only thinking aloud and demonstrating when necessary, but also making analogies and providing explanations that are sensible and connect to prior knowledge.

Learning is thinking and comprehension is thinking. The more complexly we think, the greater the learning is, the greater the comprehension is. So we must start out with that principle.

In addition to modeling, there is mediating. I have a looser or more expanded definition of mediating than perhaps others do. Not only does it include helping students understand information when the task is difficult or when the information is inadequate — when there's some kind of comprehension or learning problem — but mediating, in my perspective, also means providing opportunities for sharing and for students to mediate themselves. I think that providing opportunities for students to function as teachers is also a part of what I would call mediated learning, because that's the epitome of children taking responsibility for their learning. Then they take that responsibility into group contacts and are able to share their experiences and impart knowledge as well as to actually help other people to solve problems.

Shaw: You mentioned connecting new knowledge to prior knowledge. Do

you think that deliberate instruction in schemata development is possible or advisable?

Jones: I think that is possible. Consider the classic restaurant schema. Can this be imparted informationally from one person to another, or do you learn the restaurant schema from your past experience? I think that both are true. Most subject matter schemata are acquired by extensive practice and exposure to different conditions, different environments, different elements of a task, but there are some generic schemata, particularly with regard to frames and graphic organizers, that can be communicated and taught across the board, which would then become schemata for helping kids to organize what they don't know. For example, take a child who knows very little about history, who has not come from a background with an oral tradition in which history has been shared in any way, before he or she comes to school. If you can teach that kind of child to understand a problem-solution frame or comparison and contrast, then you give them tools for hooking into what they're learning. Through internalizing those matrices and using analytical processes in determining which frame is most appropriate and how to arrange the information in it, students are learning to link up the new information to their prior knowledge. Particularly as they ask the important questions about how the pieces and parts are related and coming back to and readjusting the configuration of the frame each time new information is gleaned, all that information processing will cause them to internalize subject matter much better than if they didn't have those internal structures onto which to place information.

Shaw: These internal structures, or schemata, would then serve as a sort of scaffolding.

Jones: Right.

Shaw: What do you see as the relationship between schemata development and metacognition?

Jones: My definition of metacognition has to do with thinking about thinking. Take summarizing for example. When you're actually summarizing something and applying the skill to subject matter, I believe you are using the cognitive skill of summarizing, but when you start thinking about how you're going to summarize, you are

using a metacognitive skill. So, if when you're having a conversation with yourself or others as to how to go about learning about schemata, that's a metacognitive discussion. But when you actually develop a schema, you're using a cognitive skill. Some may well disagree with that and say that any time you self-question, you're engaged in metacognition. In one sense you are, but I think it is helpful to keep the distinction between thinking about thinking and the process of applying a particular skill like summarizing. Even though summarizing and planning are almost fundamentally metacognitive in nature, there is a difference when you talk about summarizing and planning as opposed to when you're doing it. I think that metacognition, the way I see it, helps us keep that distinction in mind.

Shaw: Which thinking skills programs currently in operation do you see as being particularly promising?

Jones: I think several are promising from different perspectives. I believe that Matthew Lipman's Philosophy for Children is outstanding for several reasons. First, it challenges the assumptions that little kids can't think in philosophical and complex ways and have meaningful learning at a high abstract level. Second, I think that the concept of a community of learners, which is embedded in Philosophy for Children and its novels, is a wonderful role model for classrooms. Philosophy for Children is not really an adjunct skills program. It is a philosophy program and so it is its own subject matter as well as its own teaching and planning and strategy course. Certainly the data are probably as strong for that program as for any of the others, and I would certainly go for the most strongly researched ones as being outstanding.

The Odyssey Program, which was originally developed as part of Project Intelligence by Marilyn Adams and others, is extremely well documented in South America and to a less extent, well documented here. Odyssey is more of a middle school program.

Another program I'd like to mention is Stan Pogrow's Higher Order Thinking Skills (HOTS) program. I would choose as outstanding those programs that are designed and implemented for younger children and low achieving children. I think Stan Pogrow's program does that. It is par-

ticularly interesting because it uses computers; it not only teaches children about the thinking processes, but also about the process of becoming technologically more literate. HOTS is an adjunct program, which, if poorly coordinated with the regular program, is not as powerful. I'm not sure there's an extremely active effort to do that.

Another program with massive data, some of which are inconsistent, is Reuven Feuerstein's Instrumental Enrichment. I find it very interesting that frequently he has found results of improved reading achievement, which is not at all an intent of the program. The problem with Instrumental Enrichment is that it is content free. Compared to other programs, it is the most content free because there is such a focus on math and geometric figures. I think he's aware that there needs to be much more explicit transfer, and the mechanism for transfer is embedded in the program under the concept of bridging, which content area teachers conduct. Bridging has done some good things, but, at the same time, teachers find it difficult. I find it difficult to bridge that way in the course of regular instruction. I think we distinguish sharply between content area driven instruction and skills driven instruction. If you're focused on content driven instruction, then you decide which of the skills you need to address your content objectives. What actually happens in some classrooms with Instrumental Enrichment, even at its best, is that the content teachers think, "How can I teach it compared to yesterday?" So, they may create little lessons to apply. For example, they compare and contrast skills students learned with geometric figures to the content area. I think it would be even more ideal to have a teacher design the objectives based on the best content sequence and then draw upon the school of strategies. But I don't think it happens that way very often; only the best teachers do either type of application very well. I think that the problem of transfer is fundamental, because there is such a distance between the content free aspect with its geometric figures and the content area that it is hard for content area teachers to make the necessary connections. However, the instruction is so sophisticated in terms of what the students get through interaction with the teachers, the roles of both teachers and

students are so powerful and the concept of mediation is taught so beautifully that there is a trade off. Those components are not really present in many other programs.

Shaw: Could you identify a few lines of research that have especially strong implications for classroom practice in improving students' higher order thinking skills?

Jones: First, I think you have to be careful about using phrases like "higher order thinking skills." As I have said for years, especially when the economy was so powerful, one of the largest mistakes that teachers have made in American schools is the notion that you have to learn rote comprehension or definitions and facts before you can learn higher order thinking skills — when, indeed, the research that we understand now argues that you only learn the definitions and facts by using them and thinking about them. Learning is thinking and comprehension is thinking. The more complexly we think, the greater the learning is, the greater the comprehension is. So we must start out with that principle.

In terms of research that applies to the teaching of thinking, I think that the whole movement to embed thinking in content areas is very promising. There are two or three strategies and concepts I think are very useful. One is the concept of frames and graphic organizers that David Perkins and I and others have used, because these are generic strategies which traverse many kinds of areas. Without any question at all, the more organized a person's information is the better he or she will understand it and recall it to use. Frames and organizers definitely help in the process of organization.

There are other specific strategies that are very promising, such as those contained in research on the teaching of problem solving in which the whole thrust is toward cooperative/collaborative learning. In some kinds of cooperative learning, particularly in math, tasks are extremely structured around very small skills and there may or may not be much socially mediated learning within the heterogeneous group, because each one is off doing his or her own thing. Basically, this kind of cooperative learning is teacher led, while the concept of collaborative learning implies that the teacher shares the role of learn-

ing and that there's a lot of good learning being mediated informally by any of the students in the group. Since any of the students can mediate, it's not teacher led. The kinds of roles that are defined in collaborative learning are often somewhat more sophisticated than the roles in cooperative learning.

... we must get rid of the models that are driving schools into assembly line, isolated learning of facts. I see a critical mass approaching of schools and researchers and practitioners increasingly flexing that model and looking for alternatives.

Also, the skills are being learned much more holistically than with a lot of cooperative learning, especially in math. There the skills are learned in tiny steps, whereas in collaborative learning with a complex skill like summarizing, you apply it to a relatively simple passage and then graduate to more difficult tasks. I think the procedures are quite different in collaborative learning and cooperative learning. Finally, I think there's a big distinction between very interactive recitation, which is frequently the case for cooperative learning, and real discussion in which kids actually bounce ideas off each other. They feel they're in an atmosphere where they're free to talk openly and share ideas. I think cooperative learning has much more competition built into it, because it's structured to involve students in a variety of games. Both are valuable, but I think it's very important to ascertain when it's appropriate to apply cooperative learning as opposed to collaborative learning. One final point about

these two strands of research is that one of the most important things that collaborative programs and some cooperative programs do is to teach the social skills that are necessary for effective problem solving and communication in the kinds of tasks that we need to be doing for today and tomorrow's world.

One topic I'd like to discuss is the need for a much greater focus on multicultural learning, because, in part, society is changing and providing a markedly more diverse student population. There is an even greater need now than in the past to honor the diversity of students, to value different perspectives, to build on the strengths of students, and to emphasize social skills. We need to start integrating the notion of multicultural education with the kinds of instruction that we do on a day-to-day basis. We need to embed multicultural education as much as we need to embed the teaching of thinking.

There are two basic ways we get a multicultural education. One of them argues that we should do a lot of very explicit and specific things to honor different cultures. With this approach, we see the whole notion of activities designed to commemorate the Holocaust and Martin Luther King and an emphasis on the meaning of "ethnic" and "ethnic group"—and so you have, as James Banks does, very explicit instruction on what it means to be an ethnic group. With Banks' instruction, there's a great deal of comparison between people and an emphasis on the notion of the value of people as pertaining to what they are and not to which ethnic group they belong.

The other way to go, which is absolutely crucial, is the approach that Hubert Dyasi emphasizes in the first teleconference — linking new information to the cultures and background experiences of students. This linkage is especially important for minority students, because their language often has not met the standards of the dominant group. They have to learn more or even become bilingual in that regard. Because of this situation in which the non-

dominant groups may not be heard very well, there is more of a need to link new information to their prior experiences. This linkage is important not only for minority students, but also for children of dominant cultures. One of Banks' arguments is that the main reason these children learn so well — in science, for example — is because some middle class homes teach it before the children get to school. It's not the instruction of the schools that is okay for them and not okay for others. Instruction for everybody, in his opinion, is limited, because as long as science does not link new information to prior knowledge for everyone, it's not good instruction. So, this is a really different thrust that is much more implicit and more sophisticated and probably a lot more difficult for teachers to understand. I would definitely add that as a major area of research to be pursued.

*... the videodisc
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The last area has to do with the growing sense that we must get rid of the models that are driving schools into assembly line, isolated learning of facts. I see a critical mass approaching of schools and researchers and practitioners increasingly flexing that model and looking for alternatives. One of the old thrusts of assembly line learning is standardized teachers, standardized criteria, and standardized products, so that all students learn pretty much the same thing. I think that in the future, education will be much more special-

ized and tailored to the needs of the individual student populations. That's the way it should be, so that we have this customization in education that is also happening conceptually in other areas, such as the banking and garment industries. We should look very, very carefully at how we can best maximize this individualization. I specifically do not mean individualized learning. I'm talking about the personalization of the school in relationship to whole student populations and their cultures in their language development.

The final topic I would like to address has to do with research on the use of technology. First, we have to make our students a great deal more computer literate. Second, we must be able to think in more complex ways using imagery and visualization of complex phenomena. I think the primary way that we have to do that is through computer models and through patterns that may not be easy with pencil and paper, but possible through computer technology. John Bransford has argued that the videodisc will be equivalent to the wheel and the printing press in terms of its impact on education. In Bransford's argument, there is contextual learning with video; that is, with the videodisc, a great deal of information occurs implicitly and in a content, as it does in real life. Only by using the video can we ask students to look at the whole context of what is to be learned. In a book, you just get linear information from the author, but a video can provide the contextual conditions. Many of our major discoveries have occurred only as people have visualized the solutions that they could not articulate in words. The more we deal with technology, the more that will be true, and very quickly we must learn how to teach our students to be much more visually literate than they have been. Essentially we've been keeping one eye closed, which was the eye that was on the verbal print, and the other eye was on the richness of the imagery of the content.



Where in the World Are the Tortoise and the Hare? Comparison of Problem Solving Styles

by Carla Cooper Shaw

During the past two decades, computer assisted instruction (CAI) has provided fertile ground for research into its effects on student achievement. The literature is fairly straightforward regarding the positive effects of drill and practice and tutorial software at improving basic skills (e.g., Burn & Bozeman, 1981; J. Kulik, C.C. Kulik, & Bangert-Drowns, 1985; J. Kulik, Bangert, & Williams, 1983; Visonhaler & Bass, 1972; Edwards, Norton, Taylor, Weiss, & Dusseldorp, 1975). However, the literature yields decidedly more equivocal findings regarding the effects of using other kinds of software on higher order thinking skills (e.g., McClurg, 1985; Melnick, 1986; Norton & Resta, 1986; Pogrow, 1985; Sperry, 1977). These other kinds of software include "software of the second and a half kind" (O'Brien, 1983), which exists on a continuum between drill and practice and tutorials and LOGO, a graphics programming language. Such programs are often presented as educational games and simulations in which students must exercise higher order thinking skills, such as perceiving analogous relationships, determining cause and effect relationships, and reasoning deductively and inductively, in order to solve problems efficiently.

Like those studies investigating the effectiveness of CAI at improving basic skills, the studies investigating the effectiveness of CAI at improving higher order thinking skills have been experimental in nature and have used quantitative data. As such, the reports of these studies provide little description of students' actual thought processes

and problem solving styles while using software of the second and a half kind. In contrast, the current study used qualitative data in a naturalistic manner to explore and compare the cognitive styles of effective and ineffective problem solvers while using "Where in the World is Carmen Sandiego?". In keeping with naturalistic research, this article will follow an inductive format. Following descriptions of the software and the study, findings will be discussed and considered in light of relevant theory and research. Finally, recommendations for related instructional practice will be proposed.

The software

An award winning piece of instructional software of the second and a half kind, "Where in the World is Carmen Sandiego?" (CSD) (Bigam, Portwood, & Elliot, 1985) is a "challenging and entertaining" detective simulation with varying levels of difficulty and "attractive" graphics ("Simulations," 1987). Following is a brief description of a sample run.

After signing in and receiving a description of the crime -- committed by a member of a vast, international crime ring -- the detective has four options: See (travel) Connections, Depart by Plane, Investigate, or Visit Interpol. Selecting Investigate, the detective has choices of going to the hotel, the bank, or the stock exchange. Going to the bank, a teller informs him that a suspicious woman with a limp recently changed her money into lira. The detective then might visit Interpol, enter pertinent data -- "female" and "limp" -- into the agency's computer, and receive a list of

suspects with those characteristics. Referring back to the bank teller's clue, the detective might use the almanac, which comes with the program, to find out which country uses lira. The detective then decides to See Connections -- flights are available to London, Rome, and Lima -- and then Departs by Plane to Rome (with precious time ticking away), where he continues investigating. Eventually, through entering characteristics of the suspect into Interpol's computer, the detective discovers his/her identity and receives an arrest warrant. After travelling and investigating further, the detective finally succeeds at tracking down and apprehending the criminal (Shaw, 1986).

Upon successfully solving cases, students progress in rank, with the highest rank being the Hall of Fame.

The study

The detectives in this study were seventh graders from two social studies classes of mixed ability in a small town in southern Illinois. After using CSD for two hours a week over six weeks, with computer use alternating with regular instruction, the best and worst detectives were identified on the basis of rank achieved. The two BEST pairs achieved the ranks of Sleuth after entering the Hall of Fame two times and the rank of Rookie after entering the Hall of Fame one time. The two WORST groups, one a pair and the other a group of three, both achieved the rank of Private Eye. All students selected for analysis had no experience with CSD prior to the study. The data were collected through observing and interviewing these students

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during two trials following the six week period of computer use.

The findings

Given the criterion of rank achieved, which derives from the number of cases solved, efficiency in regard to time assumes importance in the play of the game. In CSD, time is understood in two senses. First, "real time," the actual time, was consumed during the course of play. Since cases in progress could not be saved for later play, solving the case at hand before the bell rang served as motivation to work quickly. Second, simulated time created a sense of urgency. All cases began at "9:00 a.m. on Monday" and had to be solved by "5:00 p.m. on Sunday." Simulated time elapsed throughout the game -- when investigating, visiting Interpol, seeing flight connections, travelling, and sleeping.

A number of playing strategies proved to be efficient, and they constituted a common pool for BEST and WORST detectives. These strategies were:

- obtaining two to four clues about the suspect before going to Interpol to enter characteristics in the Crime Computer in order to obtain a warrant;
- not returning to Interpol once the warrant was obtained, even if additional suspect characteristics were revealed;
- in general, looking up in the almanac place clues related to flags and currency before checking clues that were more difficult to find, such as those concerning history, topography, and language;
- engaging in a division of labor, with one student operating the keyboard and another using the almanac;
- when more than one almanac were available, both students using almanacs at the same time;
- engaging in deductive reasoning and "narrowing down" to determine the next

location toward which to travel.

Similarities in the use of strategies were more marked than differences. However, one BEST pair engaged in strategies which saved additional time. After investigating and obtaining clues, the students bypassed See Connections and went directly to Depart by Plane, since the latter option also displayed connections. In Investigating, the same pair made a habit of visiting first the place listed second, since they sometimes selected the first place by mistake. Efficiency, then, drove this BEST pair's use of idiosyncratic strategies. In comparison, whimsy, or perhaps the desire to inject reality into the game, prompted one WORST group's strategy of first investigating at the hotel in any given city, "because he [the suspect] has to sleep somewhere." This same group made a practice of writing down clues.

Of the strategies used by both BEST and WORST detectives, the use of deduction proved to be central in that without it, the other strategies would be useless. As used here, deduction does not necessarily mean reasoning from the general to the particular. Rather, it means inferring, or arriving at conclusions based on facts. In the case of CSD, students used deduction to decide to which city to travel. For example, given clues related to a red, white, and blue flag, dollars, and skyscrapers, the detective would opt for New York over Paris and Singapore. The student would eliminate Paris, although it also has skyscrapers and France has a red, white, and blue flag. Similarly, Singapore is eliminated, although it has skyscrapers and uses dollars.

In the context of CSD, deduction assumes a meaning closely akin to that in popular detective fiction; it involves narrowing down possibilities. For example, given three clues related to llamas, a red and white flag with an insignia, and sols (currency), and presented with the options to travel to Tokyo, Colombo, or Lima, the student may know or have a hunch that llamas are from Peru, but has no ideas as to the origins of the flag or currency. Thus, he looks up Peru first in the almanac and saves himself the time of looking up Japan or Sri Lanka. Without this prior knowledge or hunch regarding llamas, he might have to check out all three countries -- provided he did not happen

to look up Peru first. He would then be less efficient.

This degree of efficiency in deductive thinking distinguished between BEST and WORST detectives. In turn, two factors -- knowledge and confidence -- appeared to influence the efficiency of students' thinking. With regard to knowledge, its existence in the student's mind prior to playing, as well as its accessibility and flexibility, played important roles.

Table 1 - Use of Resource Materials by Best and Worst Detectives shows the number of times BEST and WORST detectives consulted the almanac to locate or verify information and the map to identify countries for given capitals over the course of two trials. Since all the cases involved comparable amounts of facts, it can be assumed that less use of the almanac and map meant more readily available information. Clearly, then, the BEST detectives had access to more knowledge than the WORST detectives. Even when the BEST resorted to the almanac, their investigation seemed driven by prior knowledge. This conclusion is supported by comments from the BEST groups during the two trials:

Presented with a clue containing "cashews," a student said, "I've heard of that before ... India." She then looked up India.

"Tokyo's in Japan, right?"

"Yeah. That's where Mount Fuji is, isn't it?"

"It's also where shoguns are."

Reading a clue, one student said, "Outback." In unison, the two students said, "Australia."

Given clues involving temples and tribes, a student followed a hunch and looked up India.

Provided a clue concerning dollars, a student said, "U.S. or Canada."

Both pairs of BEST detectives attributed their success with CSD to the existence of prior knowledge. While only one pair said that they remembered information from social studies class, both pairs claimed that they remembered facts from past play of CSD:

"I've heard that clue nine million times."

"The almanac helped me a lot at first ... [We] weren't too good at first, but started remembering more stuff."

On the other hand, one WORST pair appeared to have less knowledge. For example, one of the BEST pairs remembered from social studies class that Mount Olympus was in Greece. The WORST pair from the same class did not recall this fact, and unable to find it in the almanac, had to be informed by

detective said, "I'll look up England," and her partner replied, "It might be under Great Britain or United Kingdom." In comparison, a WORST group had to be told that Russia might be located under the U.S.S.R.

However much more knowledge the BEST groups appeared to have,

confidence was not. Few comments indicating confidence surfaced during the WORST groups' play.

In comparison, remarks connoting confidence abounded during the BEST groups' trials. A few examples follow:

"I have all this stored in my brain."
 "It's Singapore. I know it."

Resource Material	BEST					WORST				
	March		April		TOTAL BEST	March		April		TOTAL WORST
	CSD Only	CSD Plus	CSD Only	CSD Plus		CSD Only	CSD Plus	CSD Only	CSD Plus	
Almanac	8	7	8	5	28	7	9	19	23	58
Map	3	6	2	5	16	7	5	6	10	28

TABLE 1 - Use of Resource Materials by Best and Worst Detectives

the investigator that Mount Olympus was in Greece. In other cases, what knowledge this pair did possess appeared to be inaccurate, or, in the following example, out of date:

"What about the Pharaoh?"

"Pharaoh would be president, right?"

Sometimes this WORST pair needed prompting to recall knowledge, as the following exchange illustrates:

INVESTIGATOR: Do you know what a pyramid is?

STUDENT 1: Yeah.

STUDENT 2: Yeah.

INVESTIGATOR: Do you know who's buried inside the pyramid?

STUDENT 1: Pharaoh.

INVESTIGATOR: Do you know where the pyramids are?

STUDENT 1: Egypt.

STUDENT 2: That'd be it.

In addition, the knowledge possessed by the BEST detectives seemed to be more flexible, which affected facility with using the almanac. For example, regarding alternate almanac designations for countries, a BEST

sheer amount of knowledge, or even the ability to recall and use it to make deductions, did not define the BEST. A feeling of sureness regarding prior information, or confidence, seemed to distinguish between the two kinds of problem solvers. While both BEST and WORST used the almanac to verify hunches, the WORST were inclined to do so more often. For example, encountering a clue about the Eiffel Tower, one WORST detective said, "I've heard of that before. I think it's in Europe." She went on to decide with near certainty that the Eiffel Tower was in France. However, neither she nor her partners appeared to trust her information, so they looked it up. Unable to find it in the almanac, they looked up the other two clues, undeterred by time ticking away. With a different clue, the same detective said, "I'm pretty sure it's in New York." She looked up New York anyway, in addition to the other two cities. While this group's lack of trust in prior knowledge and subsequent hunches was characteristic of the WORST groups, this particular detective's expression of initial con-

One detective was quite irate when she felt that the case was progressing counter to her information. Upon failing to solve a case in time, she complained repeatedly, "It's not fair." She saw the failure as lying with CSD, not with herself.

One pair's play was sprinkled with frequent sarcasm: "That's a slight clue" and "Hindi. Oh, that's so obvious. It's really hard."

"Teak. Oh, I bet it's Thailand." She looked it up. "Hold on. Industries. OK. Of course. Teak is exported. Thailand. Bangkok."

Confidence in one's partners also appeared to affect efficiency of play. "Your instincts were right!" typified comments among the BEST detectives, while the WORST often demonstrated lack of confidence in and exasperation with their partners, as evidenced by the following exchanges:

"What was the first one [clue]? You didn't look at it."

"Yeah, I did."

STUDENT 1: Depart by plane.
STUDENT 2: Wait a minute. Wait.
(He looks up something.)

INVESTIGATOR TO STUDENT
1: What is he looking up now?"

STUDENT 1: Same thing I just did.

In the other WORST group, one student, apparently exasperated over her partners' slowness in locating information and reluctance to make a decision, announced, "I'm going to New York!" The same group demonstrated a tendency to argue during play.

In summary, then, of the comparison of the problem-solving styles of BEST and WORST detectives, both groups used a common set of strategies, which promoted efficiency in regard to time. While the two kinds of detectives used idiosyncratic strategies, those employed by the BEST tended to be more efficient than those used by the WORST.

Deductive thinking emerged as the prime strategy in playing CSD. The efficiency with which this process of narrowing down took place was influenced by knowledge -- its existence in the detective's mind, as well as its accessibility and flexibility. Confidence in prior knowledge impinged upon the efficiency with which detectives used prior knowledge to formulate hunches. Confidence in one's partners further affected efficiency of play. Taking a holistic view, then, the optimum, most efficient problem-solving style for CSD consisted of a combination of deductive thinking, accessible and flexible knowledge, and confidence.

A characterization of the two kinds of detectives serves to distinguish succinctly between the two problem solving styles. The BEST detectives played quickly and took risks by following their hunches, using the almanac during these trials primarily to verify hunches. In contrast, the WORST detectives played slowly, even ploddingly, and were unwilling to take risks. They used the almanac frequently to locate information and to check hunches beyond a shadow of a doubt. With CSD, the BEST detectives might be likened to the hare and the WORST to the tortoise -- except, in this case, the hare wins the race.

The findings in light of research and theory

Research regarding problem solving styles provides a perspective with which to view the current findings. In comparing the styles of academically successful and unsuccessful college students, Bloom and Broder (1950) found that unsuccessful students tended to take an impulsive approach as they

Instruction, then, should provide opportunities for students to use knowledge to guess, to put forward hunches, and to formulate hypotheses in a nonthreatening environment in which risk-taking is rewarded rather than punished.

rushed through problems, made guesses based on poorly interpreted information, and thought in a passive fashion. Successful students, on the other hand, took an active, reflective approach as they carefully read the problems, drew on their stores of pertinent information, and engaged in fairly complex sequential analyses before arriving at solutions. Dirkes (1985) observed that proficient problem solvers spent a good deal of time using the metacognitive skill of planning before beginning and were aware of when they probed memory. By contrast, poor problem solvers engaged in "fragmented local planning," depended on recall, and quit thinking when memory failed. Pictures materialize, then, of good problem solvers as being reflective and deliberately analytic and of poor problem solvers as being prone to premature, impulsive problem solving behavior. Good

problem solvers possess well honed metacognitive skills, while poor problem solvers appear to possess crude ones at best.

Based on these descriptions, one would expect the BEST and WORST detectives in this study to exhibit similarly dichotomous problem solving behaviors. That is, the BEST would engage in planning, while the WORST would not; the BEST would take a reflective approach, and the WORST would work more impulsively; the BEST would use strategies deliberately, while the WORST would use them in a random fashion; the BEST would use the almanac frequently, and the WORST would depend on recall and give up when memory failed. Such, however, was not the case.

Unlike the problems used in the previously cited studies, which required the consideration of a variety of approaches, CSD posed the same, specific problem time and again, so that with repeated play, the strategies for solution appeared to become automatic, requiring little planning. The need for planning, as well as for the other metacognitive skills of monitoring and evaluation, was further lessened by the game's constant presentation of feedback. Aware of his status at any given point in the case, the detective had little need or motivation for engaging in metacognition. Further, the structure of the cases actually precluded planning. That is, each city contained clues from which the detective deduced to which city to fly next and choice of city was limited to those presented by the program at that point. The deductive decisions were made ad hoc and thus, it was impossible to plan ahead.

Regarding reflectivity and impulsivity, both BEST and WORST detectives engaged in reflection. Concerning the use of strategies, both BEST and WORST appeared to use strategies in a deliberate, rather than a random, fashion. Regarding the use of the almanac and dependence on recall, use of the almanac naturally decreased with repeated play, while dependence on recall increased for both groups, although the BEST problem solvers came to rely on recall more. Neither BEST nor WORST appeared to give up when memory failed.

As the findings indicate, the primary difference in problem solving

styles with CSD revolved around knowledge. Glaser (1984) discusses the role of knowledge as it relates to problem solving, and many of his conclusions corroborate and illuminate the conclusions drawn from the analysis of the data. He says that "a major component of thinking is seen to be the possession of accessible and usable knowledge" (p. 97). The implication is that novices' difficulty in solving problems, then, derives from inadequacies in their knowledge bases, rather than from their processing capabilities. With CSD, all students proved capable of deductive reasoning, but its relative efficiency was strongly influenced by the existence of prior knowledge.

Glaser (1984) says that the relationship between the structure of the knowledge base and the problem-solving process is mediated through the "quality of the representation of the problem". That is, an adequate knowledge base is prerequisite to conceptualization and subsequent representation of the problem. Although the problem type did not vary in CSD, for those with insufficient amounts of knowledge, the process of narrowing down became more difficult. Thus, the problem was "larger" and more amorphous than for those with adequate amounts of knowledge.

Glaser (1984) poses additional distinctions between expert and novice problem solvers, which are of relevance to this study. As Table 1 - Use of Resource Materials shows, experts spend less time searching, they use knowledge in an "efficient and automatic manner", and they manage working memory processes more effectively. Experts have a higher degree of "conceptual" knowledge, which appears to correspond to the "flexible" knowledge possessed by the BEST detectives.

Instructional recommendations

Not only did the BEST detectives have sufficient amounts of flexible knowledge, that knowledge was readily accessible, which accords with Glaser's (1984) notion of a schema as a

mechanism for cognitive organization of information, as:

a pedagogical mental structure, one that enables learning by facilitating memory retrieval and the learner's capacity to make inferences on the basis of current knowledge.

Rather than leaving the development of schemata to chance, the teacher might deliberately provide students with a metaphor, or model, for mental organization. Within the context of CSD, the almanac might serve as such a model. Upon each encounter with new knowledge, the student might be encouraged to place facts into mental categories -- such as People, History, Economy, Religion -- which correspond to those in the almanac. Such mental organization would likely enable retrieval of information for the purpose of solving cases.

The purposes Glaser ascribes to the schema and his description of it as a "scaffolding" onto which to place subsequently acquired knowledge coincide with Ausubel's (1960) characterization of the advance organizer. In order to ensure that students are indeed using the schema, or advance organizer, to facilitate retrieval of information and the ability to make inferences, the teacher might engage in the instructional phases of the advance organizer model as described by Joyce and Weil (1986). Following Phase One, presentation of the advance organizer -- in the case of CSD, the almanac as mental metaphor -- the teacher would initiate Phase Two, the presentation of the learning task or material, or CSD itself. Finally, the teacher would periodically engage students in Phase Three, strengthening cognitive organization, in which students might collapse or expand categories they had used during play and, in general, examine their own organization of new knowledge.

Other instructional models might serve the function of prompting students' awareness of the acquisition and organization of knowledge just as well as Ausubel's. The point is that given the importance of knowledge in problem solving in general and in using CSD in particular, deliberate instructional attention should be paid to the ac-

quisition, organization, and retention of knowledge.

As was found in the current study, the possession of adequate knowledge bases alone did not spell success with CSD. Confidence in one's knowledge was also necessary. Instruction, then, should provide opportunities for students to use knowledge to guess, to put forward hunches, and to formulate hypotheses in a nonthreatening environment in which risk-taking is rewarded rather than punished. Whenever possible, students should then use reference materials or real-life consequences to verify the correctness of their hunches and hypotheses. Such learning behavior would likely lead to increased confidence with knowledge and thus, increased proficiency with CSD and other problem-solving situations.

The final recommendation concerns the way in which CSD might best be used in the classroom and incorporates most of the recommendations mentioned here. Given the limitations of computer languages, it is probably unreasonable to expect a single computer program to stimulate a wide range of thinking skills necessary for effective problem solving. Thus, if the instructional goal is to promote the growth of problem solving skills by having students think like detectives, CSD might be incorporated into a unit. In addition to the use of CSD, activities might include reading and analyzing detective fiction; posing solutions for unsolved mysteries and police cases recounted in the newspapers; using other software of the second and a half kind which emphasizes relevant thinking skills; playing board games like Clue and 221B Baker Street; participating in noncomputerized simulations; devising mystery simulations; and discussing the thinking skills involved in the foregoing activities. As well as bringing a variety of activities to bear on a set of thinking skills, this unit provides a number of excellent opportunities for students to take risks with the knowledge they possess -- to develop the confidence necessary for success as detectives in particular and as problem solvers in general.

References

- Ausubel, D.P. (1960). The use of advance organizers in the learning of meaningful verbal material. *Journal of Educational Psychology*, 51, 267-272.
- Bigham, D., Portwood, G., & Elliott, L. (1985). Where in the world is Carmen Sandiego? San Rafael, CA: Broderbund Software.
- Bloom, B.S., & Broder, L. (1950). Problem-solving processes of college students. Chicago: University of Chicago Press.
- Burn, P.K., & Bozeman, W.C. (1981). Computer-assisted instruction and mathematics achievement: Is there a relationship?. *Educational Technology*, 21 (10), 32-39.
- Dirkes, M.A. (1985). Learning and transfer through problem solving and metacognition. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago. (ERIC No. ED 260090)
- Edwards, J., Norton, S., Taylor, S., Weiss, M., & Dusseldorp, R. (1975). How effective is CAI? A review of the research. *Educational Leadership*, 33 (11), 147-153.
- Glaser, E. (1984). Education and thinking: The role of knowledge. *American Psychologist*, 39, p. 97; 98; 99; 101.
- Joyce, B., & Weil, M. (1986). *Models of Teaching*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Kulik, J.A., Bangert, R.L., & Williams, G.W. (1983). Effects of computer-based teaching on secondary school students. *Journal of Educational Psychology*, 75, 19-26.
- Kulik, J., Kulik, C.C., & Bangert-Drowns, R.L. (1985). Effectiveness of computer-based education in elementary schools. *Computers in Human Behavior*, 1, 59-74.
- McClurg, P.A. (1985). A study of the effects of playing selected microcomputer games on the spatial ability of fifth, seventh, and ninth grade males and females. *Dissertation Abstracts International*, 46, 3237A.
- Melnick, L. (1986). Investigation of two methods for improving problem-solving performance of fifth grade students. Unpublished doctoral dissertation, Loyola University, Chicago.
- Norton, P., & Resta, V. (1986). Investigating the impact of computer instruction on elementary students' reading achievement. *Educational Technology*, 26 (3), 35-41.
- Pogrow, S. (1985). Helping students to become thinkers. *Electronic Learning*, 4 (7), 26-29, 79.
- O'Brien, T. (1983). Software of the second-and-a-half. *Classroom Computer Learning*, 4 (2), 32-34, 36.
- Shaw, C.C. (1986). Integrating thinking skills software into the curriculum. Paper presented at the Annual Meeting of the National Council of States on Inservice Education, Nashville. (ERIC No. ED 280441), pp. 10-11.
- Simulations. (1987). *Classroom Computer Learning*, 8 (3). 32; 37.
- Sperry, J.W. (1977). Computer simulations and critical thinking in school biology. *Dissertation Abstracts International*, 37, 5730A-5731A.
- Visonahler, J.F., & Bass, R.K. (1972). A summary of ten major studies on CAI drill and practice. *Educational Technology*, 12 (7), 29-32.



Improving Undergraduate Education in Physical Education

by E. Constance Fox

The task of improving undergraduate education is not one to be taken lightly and is one of great concern and discussion in curricular circles. In physical education, as in most areas, the task is further complicated because curriculum committees have difficulty identifying the goals and objectives of undergraduate education. Goals are nebulous because underlying value positions are not clearly stated. While most public school programs can be identified as academic rationalists (Eisner & Valence, 1974), physical education programs of the same value position are called disciplinary mastery programs (Jewett & Bain, 1985). These programs are easily identified by curricular scope and sequence charts listing a variety of sports and games. Students in these programs are expected to learn how to play the sports and to have a knowledge of rules and history of the sports because 'knowing' the sport is the objective in and of itself.

Several recent writings concerning curriculum theorizing have exposed a wider variety of value positions to educational possibilities within physical education (Bain, 1978; Hoffman, Young & Klesius, 1981; Hellison, 1978; Corbin & Lindsey, 1983; Logsdon et al., 1984; Lawson & Placek, 1981; Siedentop, 1980; Jewett & Mullen, 1977). Most of these theoretically derived models are not based on disciplinary mastery, but are based on several different value positions. This opens the possibility of alternative curricula leading to different outcomes. However, most of these models exist in theory only. Very little has been done to apply theory to practice and to then evaluate the worthiness of the knowledge derived from the curriculum.

The problem of identifying objectives for undergraduate programs is further complicated by the identification of the target population. The objectives of an elementary program are not the same as a secondary program, which are again unlike a higher education program. Elementary programs are generally movement education based with some simplified sport skills, secondary are sport skills and games while higher education is generally a recreation based program. However, higher education programs which offer the physical education major require those students to exceed in sports skills. Thus, the target population in an undergraduate program may be the major or non-major student, and they are exposed to very different courses although the course title may be exactly alike (i.e., 'basketball').

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As the curriculum committee attempts to define the objectives, they are faced with a multiplicity of decisions prior to defining objectives. They must identify a target population, then identify a value position. For undergraduate non-majors, a recreational program is most likely to be an objective. Courses are proposed which allow students to

'play the game.' Little emphasis is given to skill development on the assumption that skills for the game were previously developed. However, instructors very quickly learn that necessary skills are often not developed to the point where students can safely play or can achieve success while playing. Because higher education programs offer the last organized instruction available to students, a need is clearly seen to teach students how to move in order to play more effectively. Since these students have not learned to move well, or have not learned a particular skill in the secondary schools, it is obvious that repeating a secondary program will not help. Thus, higher education must move away from disciplinary mastery toward a value position which has another set of objectives. One such model has been the development of kinesiological studies. This movement toward the basic foundations of human movement is also reflected in recent attempts to change the name of the field from physical education to kinesiology or human movement art and sciences (Corbin, 1989). The study of kinesiology examines movement, which includes games and sports, from a disciplinary foundation including biomechanical analysis of movement, physiology of exercise, motor learning and development, psychological and sociological aspects and humanities. The American Alliance for Health Physical Education, Recreation and Dance (AAHPERD) has endorsed this concept in a series of texts aimed at teaching these concepts. The Basic Stuff (AAHPERD, 1981) series includes six texts explaining each concept and three texts illustrating their use in the elementary, middle and secondary schools. Higher education instructors can easily apply the information to their classes.

Using a Basic Stuff approach means that classes are designed to teach kinesiological concepts of movement through the use of a particular game or

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sport. The activity is not an end unto itself, but is a means by which kinesiological principles can be learned and understood. These principles transfer from activity to activity. Therefore, when a student understands and can apply a principle to movement in one sport, that principle can be applied to another sport. For example, the biomechanical concept of object projection can be applied to setting a volleyball. More force is gained when the knees are bent, then straighten on contact. Similarly, in shooting a basketball free throw, force to get the heavier ball to the basket is generated by bending the knees then straightening on release.

Without a conceptual base, the teacher would teach each skill in isolation and would tell each student when to bend and straighten the knees. Using a biomechanical principle learned in a kinesiological model, the student would apply the principle across several activities in order to generate force to a projected object, including a tennis serve, a swimming dive and a long jump.

Undergraduate physical education programs also gain academic respect when the focus of instruction is biomechanical principles rather than playing basketball. Students are also learning more information that can be applied to a greater variety of situations. They learn more important information when they buy a textbook on psychosocial aspects of moving rather than none on basketball rules.

When students understand the concepts behind movement, they are more

likely to execute skills correctly and to achieve success. Even in beginning level collegiate courses, most students have 'had' the activity. If they learned and habituated poor skills and incorrect execution, their playing success will be limited. However, because they have had some success, they aren't willing to change. Using a kinesiological approach, students can easily see why their performance is limiting and how to change it.

When students are taught how they move instead of being given a directive to move, they learn more.

In a recent study of two beginning volleyball classes and two swim conditioning classes, the differences between the kinesiological approach and the traditional approach was seen. All four classes were taught by the same instructor who had extensive teaching and coaching experience with both sports. One volleyball and one swimming class were taught using a traditional recreational approach (RV and RS). One vol-

leyball and one swimming class were taught using a kinesiological approach (KV and KS).

Classes within each activity displayed similar skill and knowledge levels prior to instruction and had approximately equal numbers of students and distribution of males and females. The volleyball classes were extremely poor players and also were poor athletes. The swimmers were highly capable, many were former swim team members, many had taught swim lessons and most were highly fit. Basic Stuff kinesiology, physiology, and motor learning were used in both KV and KS. Traditional basic skills of the activity, drills and recreational games were taught in the RV class. Workouts were given to the RS class based on level of fitness. In the KV and KS classes, a concept was introduced and activities were provided to illustrate each concept. Two-thirds of the way through the course (8 weeks in volleyball, 16 weeks in swimming) the KV and KS classes were presented with a 'problem' to solve using the concepts they had acquired and were asked to develop skill proficiency by applying the concept.

At the conclusion of each course a paper and pencil test was given which required knowledge of rules, movement skills, analysis of movement errors, techniques and strategies. No difference was found in knowledge of the rules between RV and KV or between KV and KS. However, significant differences in knowledge of all other areas were found (see Table 1) when examining the value of *t* using $\alpha < .05$.

In addition, each student was given a performance test in both a basic game skill and in a novel skill (or a basic skill used in a novel situation). Students were told that each skill test would be repeated two days later and they could count the better of the two. Thus, the time was built in to correct errors in both a 'learned' skill and in a 'new' skill.

In the learned skill and the novel skill, few differences were found between the classes. Although the KV class and the KS class was better in the novel skill, the differences were not significant (see Table 2). With the novel skills, two things happened. The kinesiological group improved on the second day to the point where they were better than both the recreational group

Table 1

Knowledge tests Means

	Rules	Skill Analysis	Movement Analysis	Technique	Strategy	
RV	4.7	2.7	2.4	2.4	3.6	n = 36
KV	4.6	3.7*	3.9*	3.8*	4.2*	n = 34
RS	4.3	2.6	3.2	3.2	3.1	n = 27
KS	4.5	3.5*	4.1*	4.3*	4.3*	n = 29
	n = 5	n = 5	n = 5	n = 5	n = 5	

Total of 25 questions.

*Probability $< .05$ KV > .RV and KS >RS

and better than their own previous performance.

Therefore, undergraduate physical education can be improved by using a kinesiological model based on the Basic Stuff series. This model assumes a disciplinary mastery value orientation (Eisner & Vallence, 1974), yet places conceptual bases of movement as the objective rather than a sport or game as the focus. When students are taught how they move instead of being given a directive to move, they learn more. When students are able to be somewhat self-directed in applying principles and concepts, and they begin to see the entirety of their movement and the integration of movement, they learn more. Learning to play basketball, even as popular a lifetime sport and spectator sport as it is, is not a highly valued activity in the academic community. But learning valuable principles on which all movement is based, and learning to apply principles in order to achieve success in any sport may be valued.

A second major thrust in improving undergraduate education is the shift to an alternate value position altogether. Traditionally, in physical education, activities are taught. More recently, activities are enhanced by Basic Stuff, which includes a conceptual movement basis for activities. Both of these models presume disciplinary mastery. However, as the amount of information increases and more games and sports are available to learn, students and teachers are overwhelmed by the volume of material to be learned. The difficulty of identifying the knowledge of most worth and the impossibility of learning it all has led to a shift in value positions.

The learning process value position contends that how information is learned is as important as what is learned (Jewett & Bain, 1984).

The learning process value position contends that how information is learned is as important as what is learned (Jewett & Bain, 1984). The focus is on teaching children how they acquire skills while using skills to demonstrate acquisition. This is the approach currently in vogue, in elementary education, where 'whole language' is the terminology. In physical education, the Motor Process Approach is a model suitable for teaching children how they acquire motor skills.

Many traditional physical education programs include these four levels. However, most ask students to refine before they are ready, causing emphasis to be placed on outcome of the skill (i.e., how many baskets can be made, how far can a ball be thrown, how fast can a distance be run) rather than the process of acquiring the skill and the need for biomechanically correct execution. The Motor Processes emphasize form of movement rather than outcome, and they emphasize development of the

Table 2
Performance Test Means

	Learned Skill Day 1	Novel Day 1	Learned Day 2	Novel Day 2
RV	41.9	4.3	42.7	4.1
KV	43.1	5.1	46.1	7.1*
RS	14.2	8.1	14.2	8.3
KS	14.1	9.1	14.3	10.4*

*Probability .05 KV₂RV₂ and KS₂RS₂

The Motor Processes were developed by Jewett and associates (Jewett & Mullen, 1977), but until recently, have had little application in public school education. In higher education, the theory is introduced to physical education majors, but application is typically not available.

The Motor Processes Approach is a curricular model which assumes that motor skills are acquired through a hierarchical ordering of activity. To learn a skill, it must be perceived (cognitively understood in terms of its movement sequences, forces and its use in the activity), then patterned (responded to motorically in an attempt to execute the movement). After a rudimentary pattern is developed, the skill must be accommodated (used in specific settings or under specific conditions prescribed by the teacher), then refined (improved to eliminate movement errors and to habituate the skill).

process. Once students have refined a skill, they are ready to use the skill more creatively. The skill must now be varied (using the skill in a novel way following a conscious decision, by the mover, concerning how to use the skill), then improvised (making changes in the skill without precognition). Finally, students are ready to compose (put together a combination of skills unique to each student). Traditional programs put students in game situations well before they can play effectively. A game is composed of novel situations and requires ready adaptations of skills. If students are still learning how to do a skill, they can't adapt to meet game situations. If they have learned how to learn and have accommodated in a variety of ways and have refined those accommodations, they can improvise when learned skills are inadequate and they can compose their own plays and strategies. Much emphasis is placed on the ability of the

Table 3

Means of Skill Tests, Paper and Pencil Test and Teacher Evaluation

	Serving	Setting	Forearm Pass	Knowledge	Teacher Knowledge	Students Learning	Follow- up Set- ting
Traditional Volleyball	24.3	37.4	30.4	18.1	4.1	4.3	34.9
Motor Process Volleyball	27.7*	43.6*	37.1*	22.5*	2.7*	4.4	32.1*

* Significantly greater at alpha = .05 **Significantly less at alpha = .05

students to determine what they need to know and how they can know it.

This approach has tremendous implication for undergraduate education. Physical education programs offer many more courses or activities than a student will be able to take. Thus, students are benefited if they can apply concepts from one course to another. Once students are able to identify the process by which motor skills are learned, they can virtually teach themselves any skill. In baseball, the student develops the ability to strike a moving object, and learns the process of how striking is learned. Then the student may pick up a golf club, watch golfers in order to perceive the pattern and apply striking concepts with modification for use in golf. The student knows to develop a pattern, then accommodate for different clubs, refine and so forth. The student has learned how to self-teach.

In a recent study of beginning volleyball players, comparisons between traditional physical education/recreation and a Motor Process Approach were made. Four classes of students were randomly assigned, two to each teaching method. All were pre-tested on basic volleyball skills and an ANOVA revealed no differences between the classes. Each eight-week class was taught by the same instructor and each class was approximately the same size and same distribution of males and females. At the conclusion of the course, students were given the skills test again, were given a paper and pencil test of techniques and rules and were given a teacher evaluation. Data were analyzed for each test by way of

an ANOVA using an alpha level of .05 for rejection.

Results are evidence that classes taught in a Motor Processes Approach are significantly better on all three skills tests. They have significantly more knowledge about the game and techniques of skills and they differ in their perception of teaching effectiveness (see Table 3).

It is obvious that the Motor Processes will allow students to refine motor skills at a greater proficiency than traditional classes perform. For all three skills tests, the traditional classes were performing at or below the national 50th percentile, and Motor Processes classes were between the 60th and 70th percentile. In addition, 20 students from each method were randomly selected to return three months after the course to repeat the setting test (see Table 3 - follow-up setting). Again, an ANOVA revealed significant difference between the two methods. The Motor Processes group was more skilled on the follow-up than the traditional group. Both groups were less skilled on follow-up than on the original, but not significantly so. In addition, the Motor Process group declined less on follow-up than did the traditional group.

The differences in perception of teacher effectiveness is very interesting. The Motor Processes classes indicated that their teacher knew significantly less about the sport than did the group with traditional instruction. Both methods were taught by the same teacher. Perhaps the explanation lies in the student expectations. Traditionally, students expect teachers to demonstrate and design drills for each skill. The teacher tells the student how to do it, then puts

them into a game situation. The Motor Process teacher relies heavily on questioning students and getting students to identify how a movement feels, how they might correct errors and how they might modify movement. Students are rarely told how to perform but are asked to discover how they performed. This puts the responsibility for learning on the student. This is so different from what usually happens that they perceive the teacher as unable to answer their questions. However, when asked how much they thought they had learned, there was no difference in responses from the two groups.

To aid in using the Motor Processes in teaching, another significant development has occurred. Mossten and Ashworth (1986) have identified ten styles of teaching/learning in physical education. Tradition has it that the 'command' style is most frequently used. The command style is inappropriate with a Motor Processes Approach. The other nine styles allow decision-making on the part of the student. The decision-making is essential for using Motor Processes or any model based on a learning process value orientation. Because a variety of styles are available for the teacher, the possibilities of improving instruction are limitless.

Thus far, improvements in undergraduate instruction in this paper have not addressed the undergraduate physical education major. Many ideas for improving the major are being discussed in the field. Traditional programs prepare students for teaching and coaching. Emerging fields of sport management, sport medicine, fitness leaderships and sport psychology require the under-

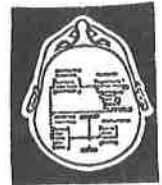
graduate preparation to be increasingly specialized. These changes in the field certainly call for changes and improvements in the major. However, it is beyond the scope of this paper to discuss improvement in the undergraduate professional preparation program save to indicate that improvements are necessary for the teacher preparation program.

If undergraduates are expected to enter the teaching profession, they must be equipped to teach in the school programs which exist, but they also must be equipped to create improved programs. Unless undergraduate programs teach students to use the Basic Stuff, to use the Motor Processes and to use Mossten and Ashworth's teaching styles, the improvements in higher education will not lead to improvements

in elementary and secondary programs. Undergraduates must be taught to integrate course information, to synthesize methods over a variety of courses, to transfer concepts and apply them in a variety of situations and to develop teaching skills which will enable their students to do the same. Physical education must shift from teaching games and sports to teaching children how to learn games, sports and fitness.

References

- AAHPERD. (1981). Basic Stuff I and II. Reston, VA: AAHPERD.
- Bain, L.L. (1978, March). Status of curriculum theory in physical education. JOPERD, p. 25.
- Corbin, C.B. (1989, October). Our name, our mission, our future. JOPERD, p. 11.
- Corbin, C.B., & Lindsey, R. (1983). Fitness for life. Glenview, IL: Scott, Foresman and Company.
- Eisner, E.W., & Vallence, E. (Eds.). (1974). Conflicting conceptions of curriculum. Berkeley, CA: McCutchan.
- Hellison, D. (1978). Beyond balls and bats. Washington, DC: AAHPERD.
- Hoffman, H.A., Young, J. & Klesius, S.E. (1981). Meaningful movement for children. Boston: Allyn and Bacon.
- Jewett, A.E. & Bain, L.L. (1985). The curriculum process in physical education. Dubuque, IA: Brown.
- Jewett, A.E., & Mullan, M.R. (1977). Curriculum design: Purposes and processes in physical education teaching-learning. Washington, DC: AAHPERD.
- Lawson, H.A. & Placek, J.H. (1981). Physical education in the secondary schools. Boston: Allyn and Bacon.
- Logsdon, B.J., Barrett, K.R., Ammons, M., Broer, M.R., Halverson, L.E., McGee, R., & Robertson, M.A. (1984). Physical education for children. Philadelphia: Lea & Febiger.
- Mosston, M. & Ashworth, S. (1986). Teaching physical education. 3rd Ed. Columbus, OH: Merrill.
- Siedentop, D. (1980). Physical education: Introductory analysis. Dubuque, IA: Wm. C. Brown.



Metaphorical Thinking as a Teaching Skill

by Leigh Chiarelott

Over the past five or six years, the topic of thinking has captured the attention of educators and the pages of professional journals to such an extent that even the popular press has jumped on the bandwagon. It is not uncommon to hear parents refer to the importance of teaching thinking skills (especially to their "gifted" children) as early as possible in elementary school. All this attention has crystallized the need for effective curriculum materials to teach critical thinking, and teacher education programs have begun to include the teaching of critical thinking as part of both general and special methods courses. The focus on critical thinking is, of course, well deserved. As a consumer skill, a citizenship education skill, a critical reading skill, critical thinking should be an essential element that links together the various content areas taught in schools.

However, the emphasis on critical thinking is not gained without some costs. There is the distinct possibility that the teaching of critical thinking, if defined narrowly, could result in the development of "apposite" thinkers as opposed to "generative" thinkers (Weaver & Prince, 1990). In their discussion of the potential benefits of Synectics, Weaver and Prince suggest that apposite thinkers tend to limit their analysis to data that are immediately relevant to the problem being considered and thus may discard material that at first appears unconnected, illogical or highly speculative. Generative thinkers combine both critical and creative thinking by trying to connect divergent material to make ideas more workable (Weaver & Prince, 1990). I would suggest that this important distinction implies that linking generative thinking

with metaphorical thinking is essential to the success of any model designed to teach thinking skills. Further, if the purpose of a thinking skills model is to coalesce the skills of critical and creative thinking, then it is essential for teacher education programs to provide opportunities for metaphorical thinking within the teacher education curriculum.

Exactly where to interject metaphorical thinking into the teacher education program is open to debate. However, many programs offer general methods courses, and this may be a logical place to incorporate the use of metaphor in teaching. By focusing on such part-skills as set induction, closure, stimulus variation, the use of examples to teach concepts and the development of questioning skills, general methods courses have already identified a structure that lends itself to the use of metaphorical thinking.

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In the following sections, I will explore the techniques that comprise the skills enumerated above and examine how metaphorical thinking can be developed through these techniques. Because general methods courses tend to stress the replicative nature of teaching skills (e.g., students are frequently required to reproduce a particular skill in a microteaching lab) the demonstra-

tion of teaching skills frequently becomes mechanical. By incorporating metaphorical thinking in the utilization of a particular teaching technique, the focus is placed on creatively presenting the concept or skill thus stressing the applicative nature of teaching rather than the replicative nature of demonstration.

Set Induction

As a teaching skill, set induction is generally viewed as one of the most crucial for a beginning teacher to master (Cooper, 1990). Because of its importance as an instructional device and a management technique, effective set induction is frequently credited with being the difference between a successful learning experience and a disconnected set of activities. Generally, set induction can serve three different functions — (a) gaining student attention; (b) providing a transition from previous experiences to a new experience; and (c) apprising students as to what they are to learn.

Gaining student attention is frequently employed as a tactic to create interest and to immediately get student "on task." At its worst, it is literally an attention getting device, i.e., flicking the lights on and off, making a loud noise, or telling a humorous story. Because these tactics are not correlated with the concept or skill being taught and the objective to be attained, their purpose is extremely limited. The most effective tactics to gain student attention are related directly to the concept or skill and flow smoothly into the developmental phase of the lesson.

The use of set induction as a transitional device occurs either at the beginning of a lesson or whenever the teacher shifts topics, teaching strategies, or grouping patterns. It may also occur when students introduce a new direction to the lesson that seems to be a valuable path to follow. Transitions are most commonly needed when there is little or

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no material connection between the content and the learners' experiences. Since the connection frequently is not apparent between the content of the school curriculum and the learners' experiences, transitions are needed quite frequently.

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Either the teacher must create an experience for the entire class to share in common or she/he must find a link between the salient concept or skill and the learners' existing schemata. In either case, the transitional activity provides a critical point of reference for the remaining phases of the lesson.

Learning occurs most efficiently when the learner is apprised of what he or she is to learn. This seems to be a reasonably sensible principle of learning, yet many beginning teachers (and some of their more experienced colleagues) fail to provide learners with a clue as to the purpose for the lesson until the point at which the learners begin to exhibit some signs of confusion or frustration, or both. As a tactic to reduce learners' anxiety, to encourage participation, and to enhance the chances for successful attainment of the lesson's objective(s), set induction that reveals the purpose of the lesson is especially critical.

Closure

As a complementary teaching skill to set induction, closure serves the purpose of completing the act of learning. As humans, we tend to desire closure in our daily experiences especially when task completion is related to our overall satisfaction. Closure does not always occur immediately nor does it always signal the completion of an experience. Closure in one experience might trigger the set induction of another experience. As in the case with set induction, closure

contributes significantly to successful learning.

Closure can take one of three forms in a given learning experience (Cooper, 1990). It may be attained through a summary or review of the key points of an experience, through the transfer of learning from the controlled learning task to a totally new situation (application) or through guided practice. Occasionally closure occurs naturalistically by serendipitous means, and these occasions are ones to which a creative teacher must be sensitive. Serendipitous closure cannot be planned so the use of metaphor in that situation is more spontaneous and usually the result of generative thinking among the learners.

In summary or review closure, the purpose is to highlight the critical elements in a lesson recognizing that not every moment during the class has a significant relationship to student learning. Either the teacher or the students can conduct the review/summary, but in either case the intention is to signal to the students what they know, feel or can do at the end of the lesson that they didn't know, feel, or do before the lesson began. At the very least, it answers the question, "What did you learn in school today?"

Closure that is designed to facilitate transfer of learning to a new situation stresses the need for application in the lesson. The learner must develop pattern recognition to transfer learning from one situation to another. This requires that closure involve the identification and use of the critical attributes of a concept or the part skills of a psychomotor activity and the projection of those pieces of learning onto an entire conceptual pattern. Through application, the learners become more adept at the construction and/or recognition of appropriate patterns.

Guided practice as a closure activity enables learners to attempt to use a concept or skill under the supervision of a more experienced mentor. This type of closure tends to work best in situations where the learning task has fairly clear cut correct and incorrect responses. These convergent activities are generally designed to facilitate the teaching of foundational concepts and skills that are being used as building blocks for later applicative, divergent, or evaluative learning. Guided practice is particularly important when the

teacher is trying to establish a pattern of successful learning in the learner and as a base for introducing subsequent learning activities that require more risk-taking.

Using Examples to Teach Concepts

Whether one is teaching conjunctive, disjunctive or relational concepts, the use of metaphors as exemplars can be an effective way to link learners' experiences with unfamiliar content. Concepts are made up of criterial attributes and these attributes serve as the source for positive examples. Non-criterial attributes serve as the source for non-examples and are used in situations where the juxtaposition of examples and non-examples reinforces concept learning. Ideally, criterial and non-criterial attributes have concrete referents that become the examples used to illustrate the concept. When dealing with conjunctive concepts (i.e., those that have only one set of criterial attributes, such as truck, sonnet, or triangle), concrete referents are usually readily available, and they can be presented in auditory, visual, or tactual/kinesthetic modes.

In the case of disjunctive concepts, however, there are multiple (two or more) sets of criterial attributes that define the concept, and frequently these concepts require more abstract examples to illustrate them. Similarly, relational concepts are comprised of abstract attributes that require the learner to understand the phenomenon of perspective or point of view. Disjunctive and relational concepts lend themselves to metaphorical examples because learners rarely have experienced the broad spectrum of attributes necessary to understand them. Hence, the invasion of a foreign country and the overthrow of a dictator can be illustrated metaphorically as either an act of liberation or an act of terrorism depending upon whether one views "invasion" as the injection of an antibiotic into an infected organism or as the infection itself. The use of metaphor can be an effective way to concretize an abstract concept for an unsophisticated learner.

Varying the Stimuli

It is one thing to capture student attention through set induction and quite

another to maintain that attention throughout the lesson. By varying the stimuli at key points in a lesson, a teacher can create a high level of student involvement while at the same time reinforcing the concept/skill being taught. The use of metaphorical thinking as a device to vary the stimuli addresses both these concerns effectively.

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Varying the stimulus can take many forms and can be employed at any phase of a lesson. Included among the methods to vary the stimuli are kinesic variation (moving around the room), shifting senses (especially auditory, visual and tactual), and shifting interaction patterns (moving from lecture to discussion to group work, etc.).

In the Synectic Model designed to encourage new perspectives on problems and conditions the strategy of Personal Analogy uses both kinesic variation and metaphorical thinking. In this strategy, students become the concept they're learning. For example, in teaching about the structure of cells, the students could take the role of each of the component parts (nucleus, cell wall, mitochondria, etc.). They could re-enact how white blood cells fight infections, how cells divide and grow, and how a phenomenon such as diffusion occurs in cells. If students are studying how metals expand and contract when heated and cooled, they could take the role of molecules in the metal. Finally, while studying sentence structure and syntax,

students could become parts of a sentence to show how parts of speech can be manipulated to change the meaning of a sentence.

Sensory stimuli can be shifted as well through metaphorical thinking. Students can be asked to use objects to create physical analogs for an abstract concept (e.g., the structure of the atom). Visual images of seemingly familiar phenomena can incorporate metaphorical thinking as well (e.g., the flag representing patriotism and love of country). Students could analyze how symbols communicate feelings metaphorically.

In a similar fashion as noted above in the Synectic Model, interaction patterns can be shifted through the use of metaphor as well. In addition to using analogies and metaphors in a lecture, teachers could encourage learners to explain an abstraction through a concrete metaphor and analyze false analogies in a class discussion. They could also challenge learners in collaborative groups to create a metaphor that their classmates could easily identify with and use that metaphor to teach their classmates a difficult or unfamiliar concept. In each of these three typical methods for varying the stimuli (kinesic variation, shifting sensory stimuli, and shifting interaction patterns) metaphorical thinking can and should play an integral role.

Using Metaphors in Questioning

The final teaching skill that typically comprises the core of a general methods course is that of questioning. Usually, the skill of questioning implies that the teacher is proficient in asking a series of hierarchical questions that requires the learner to think about the concept in greater and greater depth. Working from an information base established through a variety of recall and convergent questions the learner is challenged to process the information in a creative and/or evaluative way through a few carefully selected activities. Because these activities require a learner

response they are generally categorized as questions.

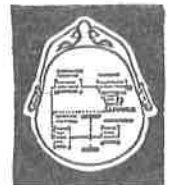
As noted earlier, generative thinkers make connections where none are apparent, speculate on hypothetical situations, and see logical patterns in phenomena that others perceive as illogical. All of these characteristics typify the higher levels of cognition which are considered as desirable outcomes of questioning. If, as argued earlier, generative thinkers are facile in the use of metaphors, then one would expect them to be proficient in using these metaphors to express divergent and evaluative thought patterns. This suggests that the teaching of questioning skills, especially at the higher levels, should involve teacher candidates in the writing of questions and creation of activities using and encouraging the use of metaphors. Thus, divergent activities (questions) can be used to develop metaphors and analogies to represent scientific phenomena, political structures, historical events, mathematical constructs and language patterns. Evaluative activities (questions) can then be used to judge the accuracy, vividness, power, and persuasiveness of the metaphors and analogies that have been created.

The five teaching skill areas of set induction, closure, using examples, varying stimuli, and structuring questions hierarchically have been described and analyzed as though they exist and are employed in a distinct, mutually exclusive way. In reality, they are inextricably intertwined, and the effective teacher weaves them together into an instructional tapestry. By reflectively analyzing the conscious and unconscious use of metaphor in implementing the five teaching skills, teacher candidates will be able to move beyond the technocratic delivery of lesson segments to the imaginative richness and rhythm of a "whole" lesson. As an extension of critical thinking, the use of metaphor can integrate the cognitive and affective dimensions of thought in a global connected manner.

References

Cooper, J.M. (Ed.), (1990), *Classroom Teaching Skills*, (4th edition), D.C. Heath: Lexington, MA, P. 87-108.

Weaver, W.T., & Prince, G.M. (January 1990), Synectics: Its Potential for Education. *Phi Delta Kappan*, Vol. 71:5, p. 378-388.



Book Review

DiSalvo, L. (1989). *Virginia Woolf*. Boston: The Beacon Press.

by Frances O'Neill

"Biography," Samuel Johnson once observed, "is, of the various kinds of narrative writing, that which is most eagerly read and most easily applied to the purposes of life." If one's purposes of life include the education of children, then Louise DiSalvo's biography, *Virginia Woolf: The effect of sexual abuse on her life and work*, should be of vital interest.

The effects of sexual and emotional abuse on children are felt in every classroom, yet many teachers remain ignorant of the causes of their students' problems. Even in our age of diminished sexual reticence, incest is still a subject about which the victims rarely speak. Shame, guilt, and a shattered self-concept replace the violated trust between family members to such an extent that, even under analysis, some incest survivors cannot articulate their past. It is Virginia Woolf's decision, made at an early age, to use her pen and her literary gifts to render audible the inchoate feelings of the abused child, which, in DiSalvo's view, commends her work to educators everywhere.

As DiSalvo points out, every one of Woolf's novels describes

a child abandoned, a child ignored, a child at risk, a child abused, a child betrayed... Taken together, Woolf's portraits constitute one of the most impressive and significant galaxies of children and their experiences as 'prisoners of childhood' in the world's literature.

Their significance lies in their authenticity for, as DiSalvo starkly asserts at the outset of her biography: "Virginia Woolf was a sexually abused child; she was an incest survivor."

DiSalvo paints a horrifying picture of Victorian family life, arguing that the situation in the Leslie Stephen household was far from unique. Stephen, a widower with one child, had married Julia Duckworth, a widow with three older children. The new marriage produced four more children within its first five years, the next to the youngest, Virginia. It was a household

in which incest, sexual violence, and abusive behavior were a common, rather than singular or rare occurrence, a family in which there is evidence that virtually all were involved in incest or violence or both, a family in which each parent had lived through childhood trauma. The evidence which has survived presents a frightening picture of a family in the most desperate disarray, with its children at supreme risk and adversely affected for a lifetime...

The courage it took to transmute disarray to literature was incredible. Woolf wrote at a time when, as she has observed, "a finger was laid across our lips." So strong were the constraints on women's discourse, that victims of abuse literally had no one in whom to confide. Victorian piety had wrapped its victims in a cocoon of cotton wool, a favorite image used by Woolf to describe her childhood. Metaphor was her only hope of being heard through the cotton wool and she used it early as a cry for help. After her mother died, when Woolf was thirteen, she was regularly abused by her older half-brother

George Duckworth. In a short story she wrote during this period she described a young girl drowning in a pond covered with duckweed. She sent it to an older family friend, urging her to "read my work carefully—not missing my peculiar words."

Drawing extensively on current research on sexually abused women and on the extraordinary Berg collection of Woolf manuscripts, DiSalvo identifies Woolf's imagery with that used by incest survivors. Further, she notes the persistent question raised both by research and Woolf's fictional alter-egos: how could society overlook the abuse of its children? As she grew older, Woolf blamed education as the primary agent responsible for the traumatized lives of so many English women, particularly the class she described as the "daughters of educated men."

She was to argue more and more forcefully that the cruelty and brutality so typical of the all-male private boarding schools stunted a boy's sensitivity. Further, by denying girls access to education, boys were encouraged to regard their gender as superior. The combined effect of superiority and brutality fostered, in her view, a misogynist attitude among many Victorian husbands and fathers which permitted the abuse she had suffered as a child. British education, Woolf suggested, had led to a gender-dominated society in which women were as absolutely oppressed as any Jews in Nazi Germany. Addressing working women in 1940, and anticipating the arguments of Freire and Kozol by some thirty years, Woolf urged that literacy was the best guarantor of empowerment.

All Woolf's works deal with the stultifying effect failure to educate the daughters of its educated men has had on British life, her later works much

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more explicitly. For this reason DiSalvo describes Woolf as

a significant, if often overlooked, contributor to both the history and philosophy of education...

The insights and assistance which DiSalvo provides the reader go far to render that contribution more accessible to educators. Although the reader could wish that DiSalvo had employed fewer such phrases as "one suspects...", "it is entirely possible that...", "it is safe to assume...", or "it is fair to say...", the ex-

tensive bibliography gives credence to these conjectures. DiSalvo has unlocked the metaphorical cage within which Virginia Woolf was constrained to write. Her cries, and the cries of all abused children, are now stunningly audible to all who care about children.



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Book Review

Mathews, J. (1988). *Escalante, the Best Teacher in America*. New York: Henry Holt and Company.

by *Isabelle Marti*

At Garfield High School in 1982, a Latin American immigrant, Jaime Escalante, succeeded in motivating fourteen students to take and pass the Advanced Placement Calculus examination administered nationally by the Educational Testing Service (ETS). However, the reputation of the school as a place of delinquents in a poor Mexican neighborhood urged ETS agents to require a retake. To their amazement, the results remained unchanged. Garfield had set unexpected academic standards and demanded unquestioned respect. This intriguing event fascinated Jay Mathews who decided to meet Escalante and develop his life story in a book.

Originally, Escalante lived with his wife and children in Bolivia where he was a teacher. He realized that he would be better off pursuing his life in a more prosperous country so he migrated to the USA in 1963. Once he had crossed the border, he was faced with a striking reality—he could not teach with a Bolivian degree in an American institution. Therefore, he accepted a janitor's job to support his family. Attending school part time was the only possibility of repeating a college degree which would open the door to teaching again. Finally, he succeeded in being hired to teach at Garfield High School. Since 1982, he has made a difference in teenagers' lives.

Mathew's book shows that a teacher needs personal qualities and effective teaching techniques to achieve success. Escalante was motivated and

set high expectations for his students right from the beginning. Had he conformed to the dominant idea that Hispanics from poor family backgrounds are bound to be academically mediocre, he would not have reached his goal. He taught not only during the school day, but also in the evening and on Saturdays. No time schedule stopped him in his mission, not even his family. He ended up having a gall bladder attack from overwork. A student commented,

I'm not going to class because I want to, but when you see all the efforts he puts into the class, you begin to want to put out just as much.

In other words, Escalante gave so much of himself that the students were touched. If working parents did not have time for their children, at least their teacher was present and thereby acknowledged their worth.

Escalante did not struggle alone. His principal, Henry Gradillas, shared his dedication and faith in Garfield students. Gradillas, before he became the principal of Garfield, made an experiment with his students:

He had two basic biology classes, period 2 and period 3. Period 2 became his pet. Period 3 became his scapegoat. He gave period 2 an initial test and, without bothering to look to the results, told them the next day: "You guys are good. I just gave you an exam and on the face of it, it shows you've had some background, a little training." The good Gradillas spread his hands grandly and grinned. "I think you're going to do a good job. You're college material. Don't worry, Don't worry, I'm going to work with you." Period 3 suffered the Bad Gradillas, a pessimist from the start. "You know, I've checked that test, and all I can conclude is that you are all

very lazy, not worth a hill of beans. You're all a bunch of Latinos, and it shows. Some of those grades were the worst ever. I don't think there is any hope."

The result was that period 2 at the end of the semester had skyrocketing scores whereas period 2 had mediocre ones. Gradillas learned that his strong belief in his students' academic performance was a key factor to their success.

Mathews also reveals some techniques that these teachers used to obtain an effective result. One of them was expressed in Escalante's attempt to teach mathematics to some students before he worked at Garfield. The first time he entered the classroom, the students asked to hear about sex instead of a cold subject such as mathematics. To their request, Escalante answered using the same language "We're going to talk about sex after this...(lesson in mathematics)." The students were startled by the reply and started concentrating on the class material. They became so involved in mathematics that they did not have time for class discussion about sex. Escalante's experience tells us that the teacher needs to speak the student's language if he wants to get his message across.

Speaking the students' language is helpful, but it is not enough. The place where the classes are held plays a part, too. At Garfield, in reaction to the pitiful outlook of his room,

Escalante invited every student he could trust with a can of paint to come by Saturday and help bring the room up to his standards.

Through this cooperative effort, the students felt included in achieving a common task. From being proud of the building rearranged for them and by

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them, they had gained self respect. They were psychologically ready to start studying.

To conclude, Mathews has pointed out in his book some basic qualities and teaching techniques that characterize good teaching. Motivating and setting high expectations are determining factors that lead to the student's academic achievements. Escalante aroused some

hatred and jealousy, as Mathews mentions:

His notoriety after the 1982 triumph had brought many accolades, but also the kind of hate mail and threatening telephone calls that trouble many celebrities.

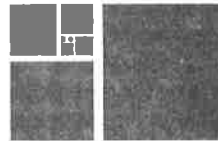
Yet indifference would have been much more painful to him. It would have proved the lack of acknow-

ledgment of his teaching excellence. To learn how to be good and effective teachers at the secondary level, students should read this book. It will enlighten them about the challenges of and possible triumphs of schools in minority neighborhoods.



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Book Review

Nehring, J. (1989). *“Why Do We Gotta This Stuff, Mr. Nehring?” Notes From a Teacher’s Day in School*. New York: M. Evans and Co.

Reviewed by Roberta W. Nauman

Its title notwithstanding, “Why do we gotta...” is far more than notes from one of James Nehring’s days in school. The reader witnesses the events of one of Nehring’s days as an English and social science teacher at Ameseley Junior-Senior High, as they are filtered through Nehring’s reflections on the work he does, the children he teaches, the person he was and is, and the forces that set the stage for each day’s unfolding drama. This is not a great book; however, Nehring is a talented storyteller who weaves a tale rich in wit and wisdom.

The ‘why do we gotta’ question resurfaces periodically throughout the book. Clearly, Nehring believes teachers need to think about the question—the why of what they do and what they ask their students to do—and students are entitled to know the whys so they can become more invested in the educational process. Nehring also uses the question as a diagnostic tool to initiate a process he terms ‘thinking backward.’ He interprets the question as a signal that a student has become lost, and through a questioning process which begins in the present and works its way backward in time and the learning sequence, Nehring is able to discover the point at which the student became lost, so that he may assist the lost individual to rejoin fellow students in the present learning task.

Unlike many of his colleagues and practicing teachers at large, Nehring does not dismiss the content of teacher

education courses as useless—he believes that he and his colleagues use it all the time, but many fail to recognize that it underlies much of what they do and the decisions they make.

Much of Nehring’s own educational practice is an outgrowth of something he learned in an education class or created from that knowledge—a Venn diagram in which the circles representing subject matter content and student experience overlap, and the area of overlap is or should be the class lesson. He shares with the reader in some detail three lessons along with his observations and reflections on them—Ghandi’s non-violent resistance to the British, a lesson on term paper writing, and a stage-setting activity and discussion with his English Eleven S (for Slow) class on whether the United States should have dropped the atom bomb on Japan.

In the first he is able to use the fact that some of his students have seen the film *Ghandi*, but he finds he must remind them of Ghandi’s commitment to non-violence, since their own experience is clearly lacking in this respect. At the end of the lesson, we suspect that they have at least walked a block in Ghandi’s shoes and the circle of student experience has been enlarged ever so slightly.

Similarly, he leads his students to realize that research is looking for answers to questions one cares about—questions which may not have unequivocal answers. Footnotes or endnotes, whatever system one uses, are simply giving credit to someone whose thinking or scholarship one has used in the search for answers. In the end, when

three students would simply like to write term papers in the less taxing way they have done in the past, he is firm in his refusal. True knowledge and understanding does not come easy.

The S-for-Slow class is a concern to Nehring for many reasons, both practical and philosophical. He teaches in a school which is ‘untracked’ by fiat of a new superintendent, except for the lowest 5% of students. These students, none so slow that he or she is deceived by the ‘S’ designation, are placed in small classes with a teacher who frequently does not expect enough.

With respect for their limitations and for them as persons, with no backup lesson plan if his discussion fails (this latter despite his education classes), Nehring sets out to prove that the shared student experience of reading about a sixteen-year-old Japanese youth dying of radiation can lead students to explore what they would have done had they been President in the closing days of World War II. For his painstaking efforts he is rewarded with his self-designated criterion of success—his ‘S’ students continue discussing the day’s topic on their own time as they leave class and make their way down the hall.

Nehring is skilled at recreating the culture of school, in this instance a white upper middle class suburban school, the kind in which this reviewer’s teacher education students wish to teach. For this reason it is one of two books I assign as supplementary reading for the purpose of gaining insight into the cultural setting in which they may work. (The other book is Stuart Palonsky’s *900 Shows a Year*.) Anyone who has

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taught in one of these institutions will surely experience a sense of *deja vu* as Nehring captures the flavor of the faculty lounge, summit meetings on discipline and school rules, the In School Suspension room, or a staffing on a Harvard-bound student whose ambitious parents feel she is not being sufficiently challenged. His verbal candid camera subtly supports his use of the circus metaphor for school

The school day is often little more than a parade of clownish acts that entertain more than they enlighten. (p. 183).

or the welfare system

Public school is like a poorly administered welfare system that seduces creative minds into mindless conformity. The system encourages poverty of mind. (p. 141).

Part of what makes Nehring a skillful disciplinarian and teacher is that he

is in touch with his own adolescence and the adolescent still lurking within. This awareness is both a strength and a weakness, as it gives him more insight into his male students than his female students, a limitation which he acknowledges but does not really attempt to change. Upon sharing with the reader a composite of students in one class, Nehring's preference for Andrew and Peter over grade-conscious Crissy is evident. In an altercation in ISS, he is concerned about any physical injury a young man may have suffered at the hands of one Belinda Ballou, yet he reveals no concern for the psychic pain behind her lashing out at her tormentor. Occasional remarks could be construed as sexist, such as "Jodi is an adorable schemer"(p. 67), when in fact Jodi had seen the relevance of a protest on TV to Ghandi's non-violent tactics—the area of overlap in the Venn diagram—which, to his credit, Nehring sub-

sequently pursues. Others, such as "Rosemary is robust, buxom, and sweetly pugnacious"(p. 170) or "I am a sucker for big, round pleading eyes"(p. 182) may appear innocent, but this reviewer fears that they tend to reveal a tendency to undervalue the intellectual potential of female students at a time in their development when the valuing of those young women by a respected male teacher could be very important to their viewing intellectual achievement as compatible with femininity.

Notwithstanding this shortcoming, parents, teachers, future teachers, school administrators, or anyone interested in secondary education and adolescents would find much of interest from a skillful, thoughtful professional in "Why do we gotta do this stuff, Mr. Nehring?"



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