DOCUMENT RESUME

ED 330 712 TM 016 287

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TITLE Problem-Solving and the Standard Curriculum.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE 20 Mar 91
NOTE 31p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 3-7, 1991). Research also sponsored by the Cleveland Education Fund.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Children; *Curriculum Development; Economically Disadvantaged; *Educational Improvement; Ghettos; Grade 7; Grade 8; Inner City; Junior High Schools; Junior High School Students; Low Income Groups; *Mathematics Curriculum; Middle Schools; *Problem Solving; Public Schools; *Secondary School Teachers; *Social Problems; Teacher Role
IDENTIFIERS *Cleveland Public Schools OH; Ohio (Cleveland)

ABSTRACT

The efforts of Cleveland's intermediate level mathematics teachers to change their curriculum from computation to a dual emphasis on application and computation are described. This paper reports on the second year of a project to enhance mathematics instruction. A natural history ethnography was conducted, which focused on the work of seven representative teachers and the school and non-school activities of seventh- and eighth-grade students in the four schools in which the teachers taught. Particular attention was given to public housing projects (ghetto neighborhoods). Excerpts from cases are provided. The teachers' pursuit of mathematics curriculum reform was hampered by intrusive and explicit public policy and by the ghetto children's oppositional survival culture. It is concluded that: the American urban context, aggressive state legislation, poorly informed public policy, and prohibitive politics led to expectations of curriculum and instruction that avoid fundamental concerns for learning; the city's most deserving children may be colonialized for life in the projects; and second-wave reform literature may be just rhetoric. A 23-item list of references is included. (SLD)

PROBLEM-SOLVING AND THE STANDARD CURRICULUM

by

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This research was sponsored by the Cleveland Education Fund and the National Science Foundation. This article was presented in a Division B paper session at the annual meeting of the American Educational Research Association held in Chicago, Illinois, April 3 - 7, 1991.

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Abstract

The article reports on Cleveland's intermediate level mathematics teachers' efforts to change their curriculum from computation to a dual emphasis on application and computation. The researcher conducted a natural history ethnography focused on the schoolteachers' work and the children's school and non-school activities. Particular attention was given to public housing projects--ghetto neighborhoods where the city's poorest children lived. The teachers' pursuit of mathematics curriculum reform was hampered by intrusive and explicit public policy and by the ghetto children's oppositional survival culture. The American urban context, aggressive state legislation, poorly informed public policy, and vulgar politics have led to expectations of curriculum and instruction that avoid fundamental concerns for learning. The city's most deserving public school children may be colonialized for life in the projects. Second wave reform literature may be just rhetoric.

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PROBLEM-SOLVING AND THE STANDARD CURRICULUM

Introduction

This is a second-year research report of Cleveland intermediate level teachers' problem-solving infusion project. The primary purpose of the National Science Foundation funded project was to enhance the intermediate level mathematics instruction. Through meetings, lectures, workshops, and demonstrations the teachers were to reorganize their mathematics curriculum, giving special emphasis to improving their students' problem-solving ability. The grant proposal listed the project's two important underlying motives as (1) to meet the new standards for school mathematics and (2) empower teachers to make curriculum decisions.

The first year of the grant's operation produced mixed results (see Bruckerhoff 1990). Teachers' collaborative curriculum planning was seen as a practice teaching exercise. During faculty meetings, shop talk and grousing were routine teacher activities. The project's curriculum writer acknowledged

that theoretical aspects of instruction and mathematics were lacking, but believed that a problem-solving workbook would greatly improve their chances to teach the new mathematics curriculum.

The problem-solving infusion project's second year was different from its first year. There was little or no grousing. Shop talk and practice exercises continued during in-service sessions, but with emphasis on problem-solving concerns. In general, the problem-solving infusion project was showing the teachers a different way to think about mathematics and teaching. However, now the project's apparent success was becoming a problem at the classroom level. After two years of in-service, these teachers' mathematical knowledge had improved, but they seemed to be teaching problem-solving less. Why? The teachers' shift from their usual practice to concepts and strategies required for problem-solving encountered two obstacles--public policy and the school's social context.

The school authorities' primary concerns were to meet public policy and achievement expectations and to maintain safe, orderly buildings. Following directives from the State Department of Education and the local School Board, Cleveland's central administration established policies that were increasingly intrusive and explicit. The district's building principals organized their schools along traditional lines and standard procedures. Rather than process-oriented teaching and learning--to be consistent with public school policy and expectations and to manage the urban classrooms--the mathematics teachers relied on traditional methods and standard materials. Failure to do so could be grounds for non-renewal.

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Besides hindering the problem-solving project, the school district's standard curriculum also might be seen as a colonialization program for its ghetto children (see Popkewitz 1988). Many Cleveland public school pupils had long family histories of welfare dependency. Many had suffered seriously from various forms of neglect and abuse. They entered school personally equipped with unique coping strategies and tendencies to behave in confrontational or oppositional ways. Cleveland's pupils were not traditional and were not accustomed to standard operating procedures. They were urban waifs with pariah status. Despite the school's educational mission, academic achievement was low, drop out was high, and very few actually escaped from the conditions into which they were born (see McDermott 1974 and Wilson 1987).

The present report will discuss the teachers' difficulty with adopting a problem-solving approach. Common elements of the urban children's lives, such as deception and violence, are seen as oppositional survival strategies that are antithetical to school organization (see Ogbu 1988). The problem-solving infusion project has an important role in changing mathematics to meet the new standards and empower teachers, but its successful implementation depends to a considerable extent on curriculum leadership, school reorganization, and public housing redevelopment. To the extent that school change discourse--including new school policy--neglects the social context of the urban poor, it may be seen as rhetoric that scarcely affects urban school practice.

In what follows there is first a discussion of the research methodology. Next, the problem-solving infusion project is described in the light of two school district issues--a standard curriculum and proficiency tests. Then,

there is a description of life in Cleveland's public housing that suggests the kinds of personal and social problems that urban children typically bring to school. The next two sections describe the urban mathematics classroom and indicate how the teachers' efforts are constrained by the social context and public policy. In the end there are suggestions for addressing these issues.

Methodology

Field work focused on the natural history of this curriculum reform project (see Bruckerhoff 1991 and Smith 1986), during a ten month period from April 1990 through March 1991. The researcher used ethnographic methods, chiefly, recording descriptive and historical data gathered from observations and interviews with teachers, students, building principals, public housing tenants, police officers, social workers, and health professionals. To help interpret the urban children's in-school behavior, the researcher rode with Cleveland city police officers, who were assigned to the public housing area, and accompanied social workers, who were visiting public housing clients.

Seven teachers were chosen on the basis of their active, long-term involvement in the problem-solving project, positive recommendation by supervisors, and willingness to allow themselves and their students to be research subjects. The teacher group included men and women; blacks and whites. All of the teachers who were contacted agreed to participate, giving as their reason their commitment to improve mathematics instruction. All had been teaching in the Cleveland public schools for at least 20 years. They were respected by their colleagues and supervisors for having continually

demonstrated a strong commitment to teaching and school improvement. Some had served as department chairpersons or were serving in that capacity at the time.

The teachers worked in one of four different intermediate level public schools, each with approximately 650 students. In addition to taking field notes, the researcher made video tape recordings. These recordings covered the housing projects where the children lived and complete class meeting periods between mathematics teachers and their 7th or 8th grade students.

The total Cleveland Public School pupil population was approximately 72,000. A majority was black (68%) and economically and educationally disadvantaged. Smaller percentages came from other minority groups, chiefly Hispanic, Puerto Rican, Asian, and Appalachian and were also disadvantaged. Approximately 9 percent of Cleveland public school children lived in public housing projects.

Problem-Solving and School District Issues

The problem-solving infusion project's purpose was to encourage teachers to shift from textbook computation and word problems to problem-solving. Instead of passive drill and practice, students' mathematical work would entail active manipulation of physical materials involving realistic, Cleveland-based problems. The curriculum writer would coordinate the new mathematical problems with the district's course of study and pupil performance objectives, all of which would be in agreement with the new standards. These goal statements reflect a process orientation and, if

pursued faithfully, could transform students' classroom experience from textbook computation and word problems to real problem-solving.

However, results showed that standard teacher in-service and traditional classroom practices prevailed. One night per week after school, the teachers met with the curriculum writer, who had prepared new word problems. During these faculty meetings, the curriculum writer supervised the teachers' problem-solving practice with these problems. On subsequent days, teachers might assign to their students as bell work the same word problems, to be solved using the same procedures. Plans were to continue in this manner until it became clear how these particular problems would be coordinated with the course of study and pupil performance objectives. In their classrooms teachers continued traditional lessons, occasionally substituting a problem-solving activity for a textbook word problem. This was a slight modification in practice and not, as the curriculum project required, a transformation.

The teachers' response may be explained in part by the profession's conservatism (see Lortie 1975, 54). However, the State's public policy and the school district's standard curriculum have contributed substantially to the discrepancy between the project's intentions and its results. A district course of study, mandated by the State of Ohio, listed pupil performance objectives, making explicit what mathematical topics or skills were to be taught and when. A textbook was acceptable to the district on the basis of its overlap with the district's course of study and enjoyed district-wide use. When a new textbook was purchased, but was significantly different from the old one, adjustments were made in the pupil performance objectives. Although

considerations for length do not permit adequate discussion, other district policies that maintained a standard curriculum were cross-town busing, Average Daily Membership, and competency based instruction.

The teachers' practice supported further standardization. In response to chronic student absenteeism and history of home abuse, teachers had adopted a routine called the homework curriculum, that consisted of five phases: bell work assignment, bell work check, homework check, homework lesson, and homework assignment (see Bruckerhoff and Popkewitz 1991). The negative effects of standardization notwithstanding, the homework curriculum at least gave teachers and students some assurance that mathematics would be taught.

Proficiency tests, recently mandated by the State of Ohio, are now administered annually in 3rd, 6th, and 9th grades. It remains to be seen how the proficiency test results will influence public policy. The first administration of proficiency tests occurred in November 1990 and the results showed that 90 percent of Cleveland's pupils failed and had the lowest scores in the State in math (Rutti 1991, 4C). When the results were published, an assistant superintendent with the Ohio Department of Education said that "the test would force some study at the administrative level of districts and. . . drive the curriculum" (Rutti 1991, 1B). Some teachers have responded to the proficiency policy by making practice for the proficiency test the mathematics lesson for several weeks prior to the examination date. As external pressures increase, the schoolteachers' temporary adjustment, known as teaching for the test, could operate continuously as the hidden curriculum's new standard for mathematics instruction.

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Problem-solving, at least as it was defined for this NSF project, was to change mathematics instruction from its singular emphasis on computation to application (or problem-solving) and computation. Due to the local school officials' negligence and to the State's public school policy, instructional and mathematical theory did not guide Cleveland's mathematics curriculum. Particularly lacking was a theory-based notion of problem-solving itself (cf., Oliver and Gershman 1989; Polya 1973). Instead of meeting the new standards and empowering teachers, the problem-solving infusion project was lame and impotent because of state and local public policy. Another main factor was the schoolteachers' desperate efforts to cope with the urban school district's social context. The article will now describe what it was like to live in Cleveland's public housing projects.

Life in the Bricks

Cleveland's public housing units are scattered around the city, but most are located in poverty stricken areas. Usually referred to as "the projects," they are densely populated, high transfer, urban neighborhoods that have specific names, like the King-Kennedy Estates and Longwood Estates. Most are red or yellow brick, multi-unit apartment buildings that are rented by single women--mostly black and Hispanic--with several children. Some families have been dependent on public assistance or welfare for 5 or more generations. The area where this research took place contained three housing projects that occupied several city blocks on Cleveland's near east side.

According to the Cleveland Metropolitan Housing Authority, the total

population living in the projects was approximately 16,000, of which 1,679 were under 5 years old; 2,855 were between 5 and 11 years old; and 1,658 were between 12 and 17 years old. Thus, there were at least 6,192 children living in the projects. Unofficially, the housing authorities said that at least 1,000 additional, transient people lived there with families, but were never included in the record. Tenant mobility rate was approximately 25 percent.

People who lived in the public housing projects called them "the bricks." Bricks and tenants were two constant features in a continuous destruction and rebuilding process. Year after year tenants and vandals stripped and destroyed some apartments. Year after year the Cleveland Metropolitan Housing Authority rebuilt them. Some project buildings were in bad condition, with broken doors and windows, leaking pipes, and so on. These were the poorest, occupied apartments. Other apartments had collapsed internally, with doors and windows ripped out and floors and internal walls rotting. These were unoccupied, except temporarily by gangs and drug traffickers. Some project apartments were in good condition, having been recently rebuilt. A few were new single-family, owner-occupied houses. Except for the new houses, most project lawns were mud flats or dirt plots, depending on the season.

Dramatic apartment contrasts provided clues to the tenants' disparate life styles. One apartment was clean and well furnished, with beds for adults and children, dinner table and chairs, sofa, radio, television, etc. The next door apartment had little furniture. Dirt, grime, and debris were everywhere. Cockroaches covered the walls. Mattresses, if there were any, laid on the

floor and children were sometimes forced to sleep in the hallway. In the former a single mother was using every available resource to provide for her family. In the latter another single mother was suffering a dysfunctional family life, including some combination of drug addiction, alcoholism, or physical abuse. Adult males, if present, were usually the household's temporary guests.

In the bricks there was always some kind of activity and some tenants' life styles encouraged chaos and opposition. People were outside at all hours of the night, at any time of the year. Small groups hung out in doorways, alleys, and streets. Older men gathered at special meeting places on a regular basis to talk, smoke, and drink beer or liquor. Children ran errands during the day and night, sometimes to sell drugs. Working men and women went to or from the bus stops. Men repaired cars in the parking lots as a front for their drug dealing. Female drug addicts, called strawberries, walked the streets as prostitutes. Suburban johns cruised the streets in new cars to pick strawberries for sex or drug deals. Children were up most nights because the police arrived frequently at their apartment or next door to prevent domestic violence, raid drug dens, arrest fugitives, and so on.

In the bricks people did things willfully that were unhealthy and dangerous. For instance, at 3:00 a.m. during the hot summer months, mothers often took their children--infants included--to a nearby pool. Other men and women joined them. Someone would cut through the protective fence, allowing anyone to enter and swim without a lifeguard present. Drinking and drug use accompanied the event. Broken bottles littered the pool. Fisticuffs broke

out. People were seriously injured or someone drowned.

Many people who lived in the bricks suffered from chronic drug abuse or alcoholism. These addictions and diseases explain not only the flourishing drug trade, but also various forms of physical, sexual, and emotional abuse--including self-inflicted injuries, child abuse, and neglect. For example, mothers--children themselves--occasionally left their infants with friends or relatives and disappeared. Authorities often found 2 and 3 year old children wondering the streets or alleys during the severest weather, unaccompanied, hungry, and poorly dressed. When these children were returned to their homes, their parents or guardians were usually unaware of the children's absence or whereabouts and were "zoned out" on drugs. The apartment was extremely dirty; there was no food and no furniture.

Despite the daily efforts of some parents to shield their children from dangerous and illegal activities, they could lose out to the severely depressing local conditions and the indigenous drug culture. As an example, one evening police officers responded to a call from a woman, Abbey Hill, who reported a break-in at her apartment. Ms. Hill said that the thief threw a brick into the first floor window, unlocked the door, and stole $140 dollars from her purse. She knew the thief--it was her 18 year old daughter. Police officers and social workers reported that this kind of robbery was a common event.

Abbey Hill was the mother of 7 children, her oldest child was 18 and the youngest 1 year old. It was the first week of the month and Ms. Hill had just received her welfare payment. Earlier that evening she and her daughter had

argued about money. Her daughter demanded money to buy a dress, so that she could attend a funeral. Ms. Hill insisted that a new dress was not necessary and--as always--there was scarcely enough money to provide for the family's basic needs. Ms. Hill told the police that her daughter was hanging out with a bad crowd, that she was most likely involved in the drug trade, possibly a user. Ms. Hill gave this further explanation:

> I hate to do this to my own daughter (initiate an arrest warrant), but look what she's done. Now we don't have any more money. She's out with her friends and who knows what's happened to the money.
>
> I'm mad at her, but I am not going to let her ruin our chances. I've told her again and again: you're single, got no kids, got good looks, you're bright, and look at what you're doing to yourself.
>
> Last month I gave her more money than the other kids because she had to pay for graduation materials. Then, I found out that she flunked out. She don't want to work; she don't want anything but money.
>
> I've pushed these kids to do well in school, to go in the right direction. Now my oldest one falls for this crap (drugs). I'm not going to let it get me down. This daughter of mine will not ruin it for all of them. I'm getting out of these bricks by this time next year.

This story illustrates a woman's determination to improve her family's life chances in the midst of despair and hardship. Ms. Hill's apartment was well kept and had adequate furniture. On the tops of tables and shelves were numerous, organized stacks of magazines, papers, and books. Her living room included a color television, typewriter, sleeper sofa, and study carols. White painted bricks trimmed the lawn outside her front door. In the opinion of police and social workers, Ms. Hill's apartment was unusual. Although Ms. Hill was doing her best for her family, her eldest daughter's conduct was

threatening the whole family's chances to get out of the bricks and make something of themselves.

Ironically, the daughter's behavior was consistent with her mother's desire to get out of the bricks. Social workers called the daughter's entrance into drug or alcohol abuse a common, but desperate escape mechanism. One social worker gave this explanation:

> Children see their moms getting beat up because they don't sell enough drugs or give enough as prostitutes. They find a dead body in the hall. They see a lot more than you or I do--or care to see and it isn't pleasant.
>
> They have gone without soap because they only had enough money for bread. They have gone without supper. They see this and understand. They look for a way out--just like many of their parents--through drug abuse, alcoholism, and prostitution.
>
> So, when these students are sitting there in a classroom staring, it isn't that they are contemplating truancy, they may be wondering where they will sleep and whether they will get a meal that night. Their behavior is strictly from what is going on in the home.
>
> Other kids in school always know who's on welfare and who's living in the worst part of town or in the part that's worse than theirs. These kids see the difference. They are not stupid, just not educated. They see things in black and white and clear.
>
> Parents call here all of the time about children who leave home and don't come back. They want to escape. Most go for the "here and now": cocaine use. The situation is so bad, they want to get away, if even for a few minutes.

Children who lived in the bricks were aware that it was a separate way of life that entailed homelessness, deprivation, and abuse. The common way to cope was to escape through a continuous cycle of alcoholism, drug abuse, and crime. The uncommon way was through education, jobs, and a stable family life. Local conditions made the dignified route appear to be an impossible ideal.

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Unprovoked and unmitigated violence could occur to anyone at any time. Almost everyone who lived in the bricks had suffered some kind of assault. Victims occasionally knew their attackers, but might not reveal the attacker's full name or address to authorities. When victims did identify their attackers, they seldom appeared in court, thus nullifying legal action. Almost no one carried identification, especially a photo ID. Often perceived by authorities as irresponsible behavior, deception and halfhearted efforts were also the poor people's self-protection and further expressions of hopelessness and despair.

For instance, one evening a woman reported to the police that a 17 year old girl ran up to her apartment door with a butcher knife and threatened to kill the woman's daughter. According to the mother, the would-be attacker was "Laurice, her daughter's friend and was all messed up on drugs and liquor." When the police asked for the girl's last name, no one in the apartment could remember Laurice's last name nor where she lived. Before leaving, the police officers told the mother to keep her door locked at all times. Several days later, in what was most likely an unrelated event, news media reported that a girl, who was waiting at a nearby bus stop, was stabbed repeatedly by another girl--a stranger--who said to her victim, "I don't like you." On a nearby street a boy wearing a Raiders football team jacket, was assaulted and shot to death by a man who demanded the jacket as a part of a gang initiation rite.

According to social workers and emergency room staff, the highest probability of theft and violence occurred during the first week of the month when tenants received their welfare checks. Also, police officers and health

professionals reported that a large number of project tenants were high or drunk continuously. Often desperate for money to buy drugs or alcohol, substance abusers commonly resorted to prostitution, theft, and violence. Cleveland's 1990 crime statistics--with high numbers of incidents--showed some increases during 1989: 144 murders (5%), 837 rapes (-1%), 2,939 aggravated assaults (15%), and 4,045 robberies (7%). Gang activity was increasing and contributed its share of crime.

In the bricks drug dealing had replaced numbers running--the poor people's illicit and now defunct lottery--as the most lucrative and dangerous economic activity. The drug trade discouraged many honest business people from opening stores in the vicinity and, in stores that were doing business, it grossly inflated prices for common household items, like coffee tables and vacuum cleaners. Often gang-related, the drug trade was the most attractive occupation to young males who lived in the projects and many were involved. Despite great risk of injury or death in drug deals gone bad and rival gang activity, some adults--including parents and grandparents--employed children in drug trafficking. Life in the bricks taught children this survival lesson: how to deceive, hate or distrust, and escape from authorities--even family members.

For too many black males, life in the bricks included drug trafficking, car theft, assault and battery, time behind bars, and a criminal record. The main effect was called black-on-black crime--a seemingly perpetual, self-destructive force within the urban black community. Major players in the national drug trade operated in Cleveland's public housing projects, assuring

a steady drug supply. Adolescents would rather sell drugs than hold ordinary jobs because the financial rewards were potentially great, earning a seller hundreds or thousands of dollars in a single evening. What happened to people who used drugs and what happened to sellers who went out and never returned were irrelevant questions. What mattered most was making a bundle of money fast. To authorities, including those within the black community it was nightmarish.

The following incident illustrates a common event and suggests potential consequences. One night three boys, ages 15, 16, and 17, were walking across the lawn outside an apartment building. Two police officers were waiting in a squad car across the street. One of the youths dropped a small container on the ground--a telltale sign. The squad car slammed forward, jumped the curb, and raced onto the lawn. The officers immediately grabbed the boys. Frisking turned up 79 rocks of crack cocaine with a street value over $3,000 dollars.

The boys were arrested and jailed until their trials. At the time each was on parole and had a criminal record, including grand theft auto and drug trafficking. They attended the same school and would not return there until they served time in a detention home. The black police officer who made the arrest, told the trio in emphatic street language: that crack's effects on users were measured at the hospital in terms of black people's overdoses, deaths, and addicted infants and he held them personally responsible. In the bricks illegal drug sales and substance abuse continue, despite daily arrests and raids by police, counseling from social workers, and life support from hospital personnel.

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The children in Cleveland's projects suffered from poverty and abuse. Daily existence was contingent upon securing food, shelter, and clothing. Survival strategies, like theft and deception, helped these children to obtain the basic necessities and to cope with ever-present, life-threatening situations. Various forms of criminal activity--especially drug sales, burglary, and assault--were common aspects of their poverty-ridden society. To "get out of these bricks" usually meant escape into the local culture--a self-destructive world of alcoholism, drug abuse, and crime. A real escape, through education to a job, was like winning the lottery--rare and a matter of pure luck.

The Urban Mathematics Classroom

Children who lived in the projects came to school to get away from a bad situation at home, whether it was their parents or the neighborhood. These children were poorly prepared for school and their project culture--a survival mentality that sanctioned illicit activity, such as drug sales, youth gangs, and violence--got them into trouble with teachers and school authorities. Physical confrontations between students and teachers were not uncommon, but student-on-student violence was much greater, most of it was black students attacking other blacks. At all times teachers had to be prepared for serious confrontations.

For instance, one day when an intermediate level mathematics teacher was giving his students a lesson on multiplication of fractions, a male student seated in the back row casually got up from his desk and walked to the front.

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The teacher assumed that the student wanted to sharpen his pencil or request a copy of the day's work sheet. Instead, the boy stopped beside a girl seated in the first desk and punched the girl's face with his fist. The teacher went immediately to aid the girl, pushed away the boy, and sent him to the office. The boy was suspended from school.

The next day the boy's father came to the school and accused the teacher of mistreating his son. In the argument and discussion that followed, the teacher learned that the boy was to go to court the following day and, if the boy could show good behavior, he would avoid going to jail. In the father's opinion, the teacher could have prevented this, if he had not gotten the boy suspended. However, besides being overprotective, the father misunderstood his son's intentions. The teacher's further inquiry revealed that the boy struck the girl as part of a gang initiation rite that included gaining an official record for delinquency, school suspension, and jail time.

On another day the researcher was standing in the school's hallway during class time. Two boys, who were friends and were supposed to be in math class at the time, were racing at breakneck speed for the stairway. When they passed by the researcher, their faces wore a crazed look. The school's counselor reported that one of the boys was dating a girl who was a member of a rival gang. He and his friend were running because he had just received a life-threatening notice from the girl's angry brother and his gang.

Despite a pupils' desire for escape or relief, living conditions typical of the family and neighborhood occurred frequently in the public school. These dangerous and life-threatening incidents negatively affected the

teachers' work. The homework curriculum, with traditional methods and row-by-row seating, gave some assurance that classroom order would prevail.

Nonetheless, as the following example indicates, teachers were affected emotionally by the specter of classroom violence.

> A mathematics teacher was helping her students solve a problem dealing with proportion and variability. Usually well prepared and self-confident, during this period the teacher seemed to be having difficulty. She made some errors that were corrected by the students. The students made some errors in process that were not corrected by the teacher. The incorrect work produced answers that were different from those in the teacher's manual, necessitating rework.
>
> Despite several repetitions, neither teacher nor students appeared to be bothered. Indeed, the students' behavior was typical--four girls had their heads down and appeared to be sound asleep, three boys in the back traded sports hero cards, three girls compared make-up, six students had no text and no paper, and two others stared at the floor. Only 5 students, who were sitting near the front and center, attended throughout the lesson and responded to the teacher's questions.
>
> During class change time the researcher asked the teacher to comment on her lesson. She frankly declared that she needed to spend more time studying that material, but in this instance inadequate preparation was not what caused her confusion and mistakes. She has been moderately disturbed all year about the next class period because most students in it were uncooperative and frightened her. She said, "I'm not sure how much longer I can continue doing this. I've been teaching for over 20 years and the problems with students are getting worse and worse."
>
> The students who were enrolled for the next class filed in and slumped into their desks. Most of the male students were much taller and heavier than their teacher, who was 5 feet 2 inches tall and thin.
>
> The teacher abruptly stopped speaking to the researcher and addressed a male student. She said loudly, "Who gave you permission to enter at this time? Where is your pass?" He had been suspended and had entered the classroom without giving his teacher a pass. Without speaking, he slowly groped into each pocket. Each thrust turned up the wrong piece of paper. The pass

was in the last pocket. He handed it to the teacher.

> The teacher said to the researcher, "There is a rule against coming in late without a pass. They (administrators) never stick to the rules." At the sound of the bell, she started class by immediately telling the students to open their books to page 47. Her voice was louder than during the previous class and she trembled slightly.

The teacher's hasty conclusion stemmed from prior instances when the principal sent students to her class without a pass. It also expressed concern for her safety and for that of other students.

For this teacher mathematics teaching required many preparation hours, including private study, active participation in the problem-solving infusion project, grading papers, exams, and so on. Due in part to the mathematics collaborative, she was not naive about the work requirements for teaching urban students. Also, she expected to have some unruly behavior and used effective classroom management and discipline strategies. However, in recent years the students' attitudes and behaviors suggested that there was now too great of a likelihood that a crazed, irrational student would do something to threaten her well being and that of other innocent students. The classroom's social context frightened her and adversely affected her teaching.

It was apparent to this intermediate level mathematics teacher (and others) that no amount of preparation to teach could mitigate the worsening social context. Her perception seemed to have merit, for when the researcher asked the trauma administrator at St. Vincent's Charity Hospital to give his perception of urban children, he said,

> The most pressing concern is teaching these young people

> about conflict resolution that is short of violence. This is a tremendous area of concern. They see violence. There will always be conflict. But they need to know how to resolve their differences without resorting to violent means.

The trauma administrator's staff routinely treated victims and attackers alike for gun shot and stab wounds, concussions, severe bruises, and so on. Some injuries were fatal. Terrible incidents could occur in the projects at any time and any place and family members were as likely as strangers to be victims. To the mathematics teachers, the prospects for violence were equally likely to occur in the classroom.

The Standard Curriculum

Almost regardless of the children's personal histories, school policy and practice emphasized standard academic achievement and classroom management and discipline. When a school did recognize students' tragic histories, it treated these social and cultural problems as subject matter. For example, one school set aside a class period each week to improve the students' self-esteem with a current video cassette recording that presented its content in lecture format. Low self-esteem, like other subject matter, was a distant, cool subject.

The homework curriculum was the standard practice, but most teachers were unaware of its widespread use. Every teacher who participated in the problem-solving infusion project believed that the other teachers' work was different. In particular, each assumed that the other colleagues were incorporating the problem-solving materials to a much greater extent. One

teacher's remark was representative. She said, "I'm sure that so-and-so has been doing this every day and probably has no trouble fitting it in, but I can't figure out how I can do both problem-solving and the course of study." The researcher's second-year observation of several teachers' classrooms indicated that mathematics teaching was similar across classrooms and schools and that it was typical to find light and inconsistent use of problem-solving. The homework curriculum, tied to the district's course of study, was the standard instructional design. A problem-solving project, if there was one for a class period, was usually a bell work substitute.

During the project's second year, the original teacher group was to expand to other volunteers from the mathematics department, thereby increasing the program's outreach. Observations and interviews suggested that this expansion was occurring slowly. One of the teachers explained.

> There's an abundance of problems--in addition to the social context--contributing to a loss of enthusiasm from the original group to those on the front lines. Don't mistake me, if it wasn't for our Mathematics Curriculum Director and projects like this one...well, I would hate to think where we would be now.
>
> In this building the principal is so puffed up with himself that he thinks everything good here happens because of him. When there's the least noise, he comes running to blame a teacher for starting a problem.
>
> Some principals make teachers worried that they will be transferred or non-renewed for not meeting the competencies. If I'm fearful that my job depends on my performance, then I am not going to take a risk. If this is an extra task, then it will take away from my effectiveness. It's that simple.
>
> Veteran teachers are at fault because they resist change. They don't want to appear ignorant to their students. Some have a daily routine that they have been doing for years and years and require in-service that retrains them. Some teachers won't be

able to do the problem-solving without a recipe.

> Most teachers feel that they are unsuccessful just trying to teach the course of study because of interruptions, absences, and so on. It's almost impossible. Teachers feel that Cleveland's system--with all the requirements and responsibilities already in place--could make it impossible to implement another component beyond the course of study.

In this teacher's opinion (corroborated by others), there were three reasons why the problem-solving infusion project was not expanding according to plans: the teachers' performance-based job was often exacerbated by principals with poor supervisory and poor public relations skills; teachers did not want to appear ignorant to their students, preferring to follow a work routine or recipe; and a typical classroom period had many interruptions, making it difficult for teachers to complete a lesson.

Every teacher believed that problem-solving was an important and long neglected aspect of the intermediate level mathematics curriculum. However, every teacher also believed that problem-solving interfered with the chances of completing course of study requirements. These teachers chose the standard curriculum over problem-solving activities because of intrusive public school policy and the urban school's social context factors.

Summary and Conclusion

This article drew attention to the lives of Cleveland's poorest urban children and attempted to show that a school's mathematics curriculum may be responsive to current calls for pedagogical reform, but may fail to achieve its goals because it neglects simple, political and sociological aspects. The

children who lived in the projects had personal histories that were defined by hopelessness, despair, and violence. Most of these children came to school to escape from a tragic situation at home and not to pursue academic study.

The problem-solving infusion project attempted to improve the students' mathematical skill through inquiry and discovery. Teachers would bring the Cleveland mathematics curriculum into conformity with the new standards and in their new role, would empower themselves as decision makers. Mathematics teaching would include application and computation, using Cleveland-based problems. However, in regard to both authority and curriculum, Cleveland's intermediate level schools were organized along traditional lines. School district policy emphasized order and supported a standard curriculum. The mathematics course of study, including pupil performance objectives, was explicit and thorough. The State's proficiency test requirement reinforced the course of study and was expected by Department of Education officials to "drive the curriculum."

At the building level principals followed central office directives. Some administrators intimidated or threatened teachers with non-renewal for failure to demonstrate improved student achievement. Teachers' responded by maintaining the homework curriculum, a daily routine that protected their jobs and assured standard mathematics instruction. Teachers who were not among the first volunteers for the project, were reluctant to adopt the problem-solving activities because they did not want to appear incompetent to supervisors or to lose face in front of students. Not surprisingly, proficiency tests showed Cleveland's pupils scored the lowest in the State in mathematics.

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The problem-solving infusion project, with its emphasis on teacher decision making and process-oriented learning, required a situation that was conceptually and discursively different from the standard curriculum. In particular, the project called for classrooms that were self-actualizing communities, where continuous student and teacher interactions regularly led to their using mathematics as a vital tool for solving real world problems (West 1991, 5). Principals would have to build organizational structures that were non-threatening and supportive, and welcomed and encouraged teachers' critical role in curriculum planning. Teachers would have to be sufficiently autonomous, self-confident, and effective with planning and implementing a balance of process-oriented and directed instruction (see Bruckerhoff 1990; Oliver and Gershman 1989; Rosenshine 1983). Students would have to be like their teachers in every way--empowered as respectful, democratic individuals bent on mathematical inquiry (see Romberg and Carpenter 1986). Public policy must convert schools into educational communities made up of teachers and principals--committed to this task--who choose one another and cooperatively establish building level organization, policy, and practice.

The new schools would develop home and school services, such as parent education, and coordinate the total educational program with local religious and social organizations. The new school's staff would provide appropriate and consistent guidance, including mentorship and regular visits from minority men and women in various occupations. To the fullest extent possible for each child, the new schools would assure a stable, safe, and caring home and school environment. They would rise out of the community's critical decision to give

pride and history to its poorest children.

John Dewey (1938), encouraged by Jane Addams (1916), recognized the complex issues and problems of an experience-based educational program, especially for tenement house children. Dewey's progressive organization of subject matter would serve well today as a theoretical guide for the education of project children. Coupled with his idea about the nature of work and the sociology of teaching, this notion would provide a reasonable starting point for a new school, classroom, and curriculum. He wrote:

> The educator is responsible for a knowledge of individuals and for a knowledge of subject-matter that will enable activities to be selected which lend themselves to social organization, an organization in which all individuals have an opportunity to contribute something, and in which the activities in which all participate are the chief carrier of control. (Dewey 1938, 61-2)

For the ghetto children, educational opportunity--a real escape from poverty--requires the consolidated efforts of business, industry, government, community organizations, and educators to rebuild not just public housing or schools, but vital, symbiotic communities (see Comer 1980; Levin 1987; Oliver and Gershman 1989; and Wehlage 1989). This idea of planning and building the city for intimate, mutual cooperation is not a new idea (see Mumford 1961, 89), but now our American cities are desperate.

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