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ABSTRACT

Presented are appendices to the final evaluation report of the Project City Science (PCS). The PCS, a program conducted by New York University and funded by NSF, sets as its major goal the improvement of junior high school science instruction in the inner-city environment. The following are some of the 20 appendices presented: (1) first and second Queen's College evaluation reports of the PCS activities (1977-79); (2) summary report of interviews conducted with PCS pre-service teachers and on-site coordinators; (3) PCS revised proposal, goals, tasks, activities section; (4) analysis of questionnaire and interview data; and (5) PCS preservice selection guidelines. (HM)

PROGRAM EVALUATION:

PROJECT CITY SCIENCE

Appendices to the Final Report

Queens College

August 31, 1979

FINAL REPORT: APPENDICES

PROJECT CITY SCIENCE

1979

Report submitted by
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I. OVERVIEW OF THE PROJECT

A. Funding

Project City Science (PCS), a program conducted by New York University (NYU) and funded by the National Science Foundation (NSF), set as its major goal the improvement of junior high school science instruction in the inner-city environment. The project was initially funded by NSF for a thirty-four month period, beginning in May 1974 and terminating on March 31, 1977, though a subsequent proposal indicated that ". . . the intention was for most of the funds to be expended over a two year span ending August 31, 1976. The grant was made to underwrite the initial phase of what hopefully would become a three-phase, fifteen-year plan to greatly improve science teaching and learning in the large cities of America."[1]

In accordance with this plan, a second proposal was submitted by NYU requesting funding for an additional three years of operation, which would constitute the second phase of the original design. Such funds were to insure continuation of the project from September 1976 through the summer of 1979. Thus, the entire duration of outside funding was to extend over a total of five years, though there appeared to be some overlap in the funding provided for Phase I (1974-77) and Phase II (1976-79).

Phase III of the Project City Science was expected to continue for another ten years beyond this initial five-year funding period. This phase was to be entirely self-supporting. The PCS staff would use the funds initially provided to create the structure upon which the continuing operation of the permanent structure of New York University as well as to develop a strong base of support in the New York City schools and surrounding colleges and universities. As the proposal* noted, "at the end of [these years of funding] project functions and activities will be self-sustaining."[2]

B. Project Intent

Project City Science represents an attempt to examine and deal with the problems of education in the urban setting. The proposal noted that although nearly seven out of every ten school children in the United States reside in metropolitan areas, the schools they attend too often reflect the limitations of the urban environment: persistent overcrowding, a rapid flux of ethnic population, a steadily increasing proportion of the very poor to be served, deteriorating physical facilities, and a shrinking financial base. In the view of the proposal writers, one outcome of this is that quality of education in American cities has declined sharply and there is an urgent need to develop means of addressing the problems that have resulted.

PCS was designed to deal specifically with one dimension of that problem, science education, at a particular instructional level, the junior high school. The proposal states the major intent of the project as follows:

> 1) to put together a cooperative effort in New York City involving teachers in the city schools, the teachers' union, administrators at school, district, city and state levels, community organizations, professional associations, and several universities within the city, a coalition that can bring about over a fifteen year period a dramatic improvement in the teaching and learning of science in the intermediate

*Unless otherwise specified, the proposal referred to will be the full proposal dated 12/1/75, which was initially submitted requesting funding for Phase II of the Project.

> schools (grades 6 through 9); 2) to do this in such a way that the reform process becomes continuous and institutionalized; and 3) at the same time, to generate and disseminate knowledge about adolescents, the learning of science in the inner city situation, and the process of improving science instruction.[3]

In a later section of the proposal, what is referred to as the central purpose of the project was restated from the original (1974) proposal: "to help bring about a major, lasting and self-perpetuating improvement, principally in New York City, in the teaching of science in the middle grades between elementary and high school."[4] Although the reasons for placing primary emphasis on science rather than other subjects such as reading or mathematics were not clearly stated, it is evident that the proposers of PCS felt it is an area in which instruction is particularly ineffective. It was noted that "science teaching at the middle school level in New York City and many other cities can only be regarded, on the whole, as gravely inadequate . . . [Further], science education in the city elementary schools remains woefully weak, when not absent altogether."[5]

Having concluded that "improving elementary school science in the cities seem to be an intractible problem of massive proportions,"[6] the project staff apparently decided that the middle school (i.e., grades 6-9) should become the logical focus of their efforts. The reasons offered for this appear to be three-fold. First, a large fraction of inner-city youth do not go on to attend high school and so efforts made at a later stage would be too late. Second, by the time students reach high school, a deep antipathy toward the study of science has already developed and they will usually not choose to take courses in science. And, third, even though many educators believe the junior high school years may be critical for students, very little emphasis has been placed on developing procedures which improve instruction or modernize curriculum at this level, particularly in science.

Thus, project concerns centered not only on science instruction, but on improving the way it is conducted at a particular level in the school organization. The proposal clearly emphasized its junior high school focus. "For many city youngsters, junior high school provides the only formal instruction in science they receive in their lives! . . . it constitutes quantitatively the most science they will formally encounter."[7]

As a result, the project not only emphasized the direct improvement of science instruction in the school, but also the development of a model program for training junior high school science teachers. The intent was to provide science teachers for the New York City middle schools and develop a training model with widespread potential. The then Project Director, interviewed for an article about PCS, indicated the program's major concerns:

> First, we're doing inservice training of teachers who are already in the schools. Second, we're designing a training program for the whole next generation of junior high school teachers. Third, we're working to analyze instructional problems and devise system-wide solutions. . . . Over the long run, [the Director] can envision Project City Science helping to effect a new kind of science teaching . . . . If Project City Science succeeds and it is duplicated in other cities, he says, "in ten years we could replace up to 40 percent with a cadre of science teachers trained for the job . . . What we want to develop is a design that can be used in city schools throughout the country, something that can be adopted quickly by other universities and other school districts."[8]

Project Goals

Since the funding provided for Phase II of the project was substantially less than that originally requested, a revised proposal was submitted to

NSF by New York University restating what was to be accomplished. The goals of the project changed very little, though the revised proposal noted that "At the level of funding [provided] . . . it will not be possible to accomplish [them] as rapidly as originally proposed or with the same probability of success"[9] Nonetheless, the proposal clearly stated that:

> The main purpose of Project City Science remains unchanged: to improve intermediate and junior high school teaching in New York City and to learn something in the process that will be useful to colleagues in other universities and in other urban areas . . . . [Program cutbacks would be] undertaken using three criteria:
>
> 1) The Project's chief characteristics must be preserved. These include utilizing a cooperative and functionally comprehensive approach, keeping the school district as the chief unit of attention, being knowledge-generating, and making and keeping long-term commitments. These features were to be regarded as more crucial than extensiveness and magnitude.
>
> 2) Those activities most likely to lend themselves to institutionalization should be favored. To insure continuing reform, this must be sought in the university, school and community settings.
>
> 3) Whatever is to be undertaken must contribute to the development of a concrete, describable, "visible" entity or product that has dissemination capabilities.[10]

Although the Phase I aspect of the project that was intially funded had 16 separate components, the revised proposal submitted for Phase II functionally reduced these to four areas in which a major effort would be concentrated. "At the level of funding now available, the project will work toward the achievement of four definite 'products.' These are: 1) two model districts; 2) a unique preservice program; 3) a research and evaluation institute; and 4) a strategy model for change and institutionalization."[11]

The development of these four "products," then, is set forth as the major goal of the current phase of the program with which this evaluation is concerned. The report will attempt to clarify the anticipated outcomes of each of the four major aspects of the PCS program and comment on the effectiveness of the effort the project staff has mounted to attain them.* In analyzing these efforts, it is useful to keep in mind the major problems that the proposers of Project City Science felt it was created to address.

> Assuming, then, that there is an especially urgent need to improve science instruction during the transition years, what are the particular problems that must be solved or at least ameliorated? The 1974 proposal explicitly claimed, and Project experience has subsequently supported, that three major problems exist: (1) the failure of teacher training, both preservice, and inservice, to prepare science teachers to deal effectively with the early adolescent child in the inner-city situation;
>
> (2) a continuing reliance on science programs that do not reflect sufficiently what has been learned in the last decade or so about science curricula and new approaches to teaching science; and (3) a scarcity of systematic knowledge about the age group and about what conditions and techniques best promote an interest in a learning science at that age and in inner-city circumstances.
>
> (4) Implicit in the proposal and accentuated by Project experience is a fourth problem: the failure on all sides to identify, organize and bring to bear in a coordinated way the not inconsiderable material and human resources of the state, city, district schools, universities and community at large. Related to this is the problem of establishing a self-sustaining system for continuing reform rather than merely instituting this or that improvement, regardless of how alluring a given reform seems to be in the short run, or however much desired by one or the other agency or institution.[12]

As can be clearly seen from the text cited above, the four components of the project were created as a means of responding to the problem areas defined. Those problems center on the need for improved teacher training,

*For a clear and brief definition of the goals of each of these four areas of the program, the reader is referred to Appendix A, which is taken from the revised proposal submitted by New York University to the National Science Foundation.

better instructional practices, a more informed research effort and an improvement in the way resources are brought to bear on difficulties that have been defined. In summarizing the overall purpose of Project City Science, the following excerpt from Progress Report #11 seems to offer the most concise explanation of both the immediate and long-term purpose of the program.*

> As stated in the Project City Science revised proposal for refunding, the Project is committed to the establishment of four products: two model districts, a unique Preserve Program, a research institute for the study of inner-city science, and a well-articulated model for change and institutionalization. Furthermore, activities undertaken which fall under each of these rubrics would be ones which lend themselves to visible entities with dissemination capabilities. Clearly, from its inception the Project has had a wide scope in mind, with the hope of having its model for educational reform adopted by other major universities and their neighboring school systems throughout the nation. Indeed, this notion is contained in the phrase, mission-oriented Project. To accomplish this broad goal calls for communication with university researchers and administrators and the administrative and teaching personnel of school systems. (p.41).

As can be seen from the language cited regarding Project City Science's intent, the proposers of the Project set very important goals for the program. The Project had high expectations for what it could accomplish in its immediate environment, the schools of New York City. Beyond that, the hope was to establish models and assemble data that would be of interest and use to the broader community of science educators.

As was noted earlier the PCS Project Director believed that the program could help "effect a new kind of science teaching." Each of the four major components of the program were intended to meet not only local, but broad,

*As will be evident throughout, the evaluators feel the most equitable practice in stating project objectives and clarifying intent is to allow the documentation to speak for itself.

long-term goals. A Competency Based Teacher Education (CBTE) document filed with the State of New York describes the preservice program as follows: "The preservice Intermediate School Teaching Program is taking form, acquiring character and before long should have established itself nationally as the highest quality program of its kind."[13] Similarly high expectations were held for each of the other major components of the program:

Dissemination: "We're disseminating what we learn. Eventually we'll have a national network of city school systems that have access to what we've developed and we'll have documentation for them to go to."[14]

Model Districts: " . . . we propose to have within three years two school districts operating in such a way as to stand as visible, visitable examples of what can be attained even in the face of inner-city economic and political problems."[15]

Research: "A comprehensive research program to analyze institutional problems and offer broad solutions [is part of the program]."[16] "The intent is to design a lasting mechanism that will begin to make headway in generating systematic knowledge about the science learning of early adolescents in the inner-city situation and also about how to achieve science teaching in the inner-city schools."[17]

In brief, the task the Project sought to undertake was a serious and difficult one. The goals set were broad in scope and often quite complex in dimension.* Even following two years of experience and facing a reduced

*Appendix B offers the full set of Project goals and a list of attendent activities related to these goals, drawn from the proposal submitted by PCS to implement Phase II.

budget, the Project leadership appeared to feel the accomplishment of the major goals originally set for PCS remained within reach. In the revised proposal, submitted following the announcement of a reduction in the level of funding, some modifications were clearly made. Nonetheless, the broad outlines of the program, down to the sixteen separate elements contained within it, remained essentially intact. The Project staff appeared to conclude that the resources available remained sufficient to accomplish the ends that had been initially proclaimed. There did appear to be some adjustment in which elements were to be stressed. The revised proposal, after reviewing the sixteen separate aspects of the program, concluded by emphasizing the four major components previously noted.

> At the very least, as indicated above, by the end of the five year(s) of Project activities, we expect to have (a) two model districts operating permanently under their own funding in New York City; (b) a new preservice program designed, tested, in operation and officially adopted by NYU, (c) a recognized research institute underway and (d) a well articulated and tested strategy for educational change.[18]

II. Operation of the Project

A. Organization

As in any project of this type, achieving the objectives set up for the program is heavily dependent on the way a staff is chosen and organized. The day-to-day operation of Project City Science activities is conducted by a college staff of six individuals, a number of whom have additional nonproject responsibilities including teaching courses and working with doctoral candidates.* This staff is aided in its efforts by two research assistants, who are themselves doctoral students, and another NYU staff member who is available as a part-time research consultant. The Project also employs six on-site coordinators.** These are doctoral candidates in science education, who spend an average of three days a week in an assigned school. They have the primary responsibility for the conduct of PCS activities in the eight junior high schools in which the Project is located.

The full Project staff meets weekly to discuss progress and share concerns. Additional meetings are also held at different times for the coordinators, preservice interns, and a small group responsible for organizing the research effort. The staff is hard-working. The University faculty put in a long year and accept a far heavier schedule during the regular semesters than is customary. The two research assistants and the six on-site coordinators assume an equally heavy set of responsibilities, combining their project activities with their doctoral studies.

*This group of six included the Project Director who, due to prior commitments, was limited to two days a week with the program during the 1977-78 school year. This small staff also has the responsibility for putting out a monthly publication, <u>citiscience notes</u>, and a triannually produced progress report, detailing project activities.

**One full-time NYC teacher also serves as a coordinator of one school.

The field supervision of the preservice interns is conducted by the on-site coordinators under the general guidance of the Associate Project Director and another faculty member. The Associate Director oversees the efforts of the coordinators and appears to assume responsibility for the maintenance of proper working relationships with school officials in the two cooperating school districts. This role entails visiting the schools, observing interns, meeting with coordinators weekly, and maintaining contact with numerous personnel, including cooperating teachers and building principals. The Associate Director is aided in these efforts by one other faculty member who also visits schools, primarily to observe and supervise interns. This faculty member also teaches two of the courses the interns take as part of their training, and along with the Associate Director conducts a weekly meeting with these preservice trainees. A third staff member does much of the remaining teaching of interns and also is involved in the gathering of data that will be used to develop school district profiles.

The Associate Director also has overall responsibility for the conduct of the model districts phase of the program. The organizational rationale here would appear sound, since the function assumed is a logical extension of duties associated with the preservice program. Both tasks require a close working knowledge of the schools and school district personnel. Since a major goal of this program is to develop outstanding inservice science teachers, the coordinators, who already have a close working relationship with the Associate Director in the preservice area, are also an important part of this program. In dealing with interns, they also have the opportunity to interact with regular staff in the schools who serve as cooperating teachers. The coordinators seek to use their role not only to train interns but to upgrade and improve the instruction of the school staff. The overlap between these two programs is evident and the Project's organizational structure has taken this into account.

The PCS effort to organize a research institute is under the leadership of the Project Director. In addition to the two research assistants and a part-time consultant, one other faculty member is assigned to this task. This group has responsibility for organizing the Project's research program and guiding its efforts. The collection of data related to the research effort is shared by other staff members, including the coordinators and preservice interns.

One of the six members of the Project serves as an administrative aide. The responsibilities connected with this position include maintaining all program records and documents, supervising and editing the Project's two publications, and directing the effort to disseminate knowledge of what PCS is accomplishing to various parts of the educational community. This latter activity has assumed increasing importance as Phase I and II of the Project draw to a close. The continuing existence of PCS for the ten-year period contemplated as Phase III has become dependent on its ability to attract sufficient interest and support, particularly in metropolitan New York communities. The Project is also seeking to share its results with educators in other urban areas as well as colleges and universities throughout the country. This aspect of the dissemination effort is being conducted by visiting a number of national conferences to share program results.

B. Modifications

In the actual operation of Phase II of the Project, one major modification appears to have taken place. As can be noted from the opening section, the original funding proposal referred to four major "products" that the Project was seeking to develop: a unique preservice program, two model districts, a research institute, and a model for institutionalizing change. The latter product seems to have received little attention as the actual conduct of the program has taken place. Though it has not been officially eliminated as a program goal, in practical terms the Project does not appear to have assigned any of its resources to the study and design of such a change model.

Although the hopes for making lasting changes in the schools continue, there seems to be little concentration on the development of a formal model such as that described in the proposal. Neither the staff nor the Project literature appear to treat this as a major purpose any longer. The PCS progress reports (issued three times yearly) are completely silent on this topic. When reference is made in the literature to the four main project components, those reported on are: preservice, research, model districts and dissemination. The staff similarly considers these the four main thrusts of the Project. Thus, to all practical intents and purposes, dissemination has apparently replaced the formation of a change model as one of the major goals of the Project, in emphasis if not absolutely

C. Implementation

An important part of the Project's implementation effort centered on establishing a working relationship with the schools. During its first two years of operation (1974-76), PCS was able to obtain an agreement to work with two school districts in New York City, each of which was highly representative of the inner-city environment for which the Project was designed. During its second round of funding (1976-79), work in one of the two districts was discontinued and another district chosen to replace it. The PCS staff selected four junior high schools in each of the two districts as Project sites. The selection of schools and the orientation of staff to the Project was a major undertaking and at this juncture appears to have been accomplished. The program seems to have been reasonably well received in the schools and there appears to be agreement about the major intent of the Project. Although the program is perceived differently in the separate buildings, it does appear to have been received well by administrative personnel and to have gained the acceptance of teaching staff. The additional help offered by the interns and coordinators is generally welcomed. Thus, project personnel appear to have established a presence in the schools in which they are working.

The Project leaders have also done an effective job of establishing a working rapport with personnel in the higher levels of education in New York City. They have won support for their program from significant figures in the teachers' union and the office of central administration. That support has not been solely verbal, but has been active and useful in nature. The leaders have demonstrated sound judgement and good insight in the way they have enabled the Project staff to obtain experienced advice, remove hurdles, and avoid difficulties they might otherwise have unnecessarily encountered. To have made and maintained such contacts is a solid accomplishment and remains an invaluable asset as the Project strives to obtain its goals.

PCS has been welcomed by the building principals for the support it offers their teaching staff. The on-site coordinator represents a resource for teachers that would otherwise not be available. The coordinators have encouraged teachers to attempt new instructional approaches and to change or modify teaching techniques. They also bring a different perspective about the use of instructional materials to the people with whom they work. These responsibilities are part of the Project coordinator role, but additional tasks have also been assumed. Coordinators in some schools persuaded teachers to write grant proposals to the

State of New York, seeking funding for a variety of science-related topics. It is unclear as yet whether any of these efforts will actually be funded but helping teachers make the effort is in itself a useful exercise and would not have been done without the presence of the Project in the schools.*

The coordinators have also helped conduct science fairs in a number of the schools. Such activities have been well received by parents, teachers, and administrators. Students in the schools are often motivated to greater efforts and the learning outcomes are frequently far superior to other more mundane instructional activities. Teachers also profit from the increased interest and enthusiasm aroused in students. By offering the possibility of approaching science instruction through more imaginative avenues, the Project advertises its presence and underscores the alternatives it seeks to offer. As one principal pointed out, such activities as well as the general presence of the Project in his school, help elevate science teaching to a new level of importance. Beyond the support provided for teachers, he felt that simply having PCS operating in his building was a positive factor, because the Project attracted numerous visitors, including the evaluation staff, who lent an aura of importance to the science program in the school. The effects of this, he felt, were beneficial to both students and teaching staff.

Outside of the schools, the Project staff has also developed some interesting and useful techniques in the training of their preservice interns. They have considered the City itself to be a teaching resource, inviting students to explore the educational potential in some of its industrial, recreational and cultural facilities. Trainees have not simply been told that such visits would be useful. The preservice program has assumed this as an important function

*One proposal jointly submitted by a teacher and one of the Project coordinators has apparently been funded.

and has developed means to demonstrate how such resources can be located, visited, and used. A number of trips are taken early in the semester and the process has been made a formal part of the training program. Some similarly effective efforts have been made in setting up workshops centering on special science related topics. These workshops are not always conducted within the confines of the training program nor as a part of the formal course work. They are generally theme-oriented and process-centered, sometimes taking place at a location that is conducive to the topic being explored. Although the number of such workshops developed has not been extensive, the concept is a useful one the staff can continue to build upon.

In brief, the Project's efforts to offer its services to the schools have been handled with skill. Without overstating the level of success, the PCS staff has managed to avoid some of the pitfalls that are common in school-university relationships; these efforts are to be commended. The staff has sought and obtained the acceptance necessary to allow the project to demonstrate its potential effectiveness in the field setting for which it was created. In its overall attempts at organizing an effort to improve instructional practices, the PCS staff has explored some avenues that hold the promise of contributing to our knowledge of science education. It remains now for the staff members to continue exploiting that promise, identifying their own areas of weakness and correcting deficiencies that would prevent them from making the best use of the opportunities that have been established.

III. Critical Assessment: The Overall Project

A. Need

The rationale developed to explain the need for Project City Science is both logical and compelling. Teachers are poorly trained in science and much of what passes for instruction in this area is unimaginative and lacks depth. There is great need then for the project to examine seriously and in depth the major suppositions, including its own, about science education. A project such as this clearly responds to the desire of the educational community for specialized knowledge about the problems science teachers face and an examination of those prospects that offer the greatest promise of overcoming these problems. A carefully organized, well-orchestrated effort at producing such knowledge is, as the proposal suggests, badly needed. There is, then, little disagreement about the current status of science teaching or the gap between theory and practice in the classroom. The evaluators will accept as a given, the need to improve the state of the art.

PCS has been designed and offers itself as a unique vehicle for examining and suggesting potential solutions to problems in this important area. The single overriding concern of the evaluation team has been to determine whether the program staff has organized itself in the best possible manner to attach those problems that are within reach of the resources that have been provided. We have attempted to do this in three ways: (1) by highlighting areas of concerns: places where the projects goals appear either vague, confused, or at cross-purposes; (2) by suggesting areas where efforts may need to be redirected to improve prospects of success; and (3) by pointing out places where views or project activities might profit from being reexamined or looked at in greater depth. The remainder of this section continues to deal with an overview of the Project as a whole. The following sections offer descriptions and analyses of the Project's four major programs.

B. Coordination of Staff and Resources

As can be determined from the prior section on organization, the Project has sought to implement a broad range of goals with limited personnel. Even a casual comparison of the broad intent of the Project and number of staff available to undertake it gives an immediate indication of the heavy work load that must be imposed. As an illustration, it might be useful to examine one of the Project's major endeavors with this in mind. The research component is responsible for a series of complex and difficult functions, including not only assuming the "knowledge generating" aspect of the project but creating the foundation for a research institute that will become a clearinghouse for the study of inner-city science teaching. To accomplish this PCS has available the Project Director, who has been part-time and also has the pressing responsibilities of leadership; one full-time faculty member who has additional instructional duties, and two research assistants who are pursuing doctoral studies and also teach in the preservice program. The load is more than burdensome. It may be too much to carry.

A project seeking to achieve such ambitious ends with such practical limits on its resources will find its organizational abilities severely tested. This has happened in the case of Project City Science. As noted, the staff is sincere and hard working. They are pressed, however, between two conflicting sets of goals: the need to handle the myriad details demanded by the day-to-day operation of the program and the obligation to study in greater depth those more global, long-range concerns the project is committed to examining. The latter requires a calmer pace, the time to plan studies carefully and the leisure to reflect on results. A hurried atmosphere is generally antithetical to the study of such complex problems. It appears that these long- and short-term functions too often conflict and that the same staff has been responsible for meeting both sets of goals. This has been a necessary result of the thin resources available, which do not allow a greater division of labor. Consequently what could have been compatible under other circumstances instead conflict and compete with one another for time.

Although noting the limitation of resources, one must also point out that the goals of the project are self-selected. Further, that they were chosen with foreknowledge of the available resources. Thus, where difficulties arise, it would seem incumbent upon the project to make necessary adjustments. This may involve a reassessment of priorities--a determination of which goals can most likely be met with the available resources and talent. Redefining purposes under such circumstances would seem not only acceptable but necessary.

It is possible, for example, that the presence of such operational pressures were factors in shifting, or at least relegating to a lesser status, the goal of developing a model for institutionalizing change. As noted, such shifts may be both necessary and beneficial. It is hoped, however, that they would be the result of choices carefully discussed and decisions deliberately made. The absence of any explanation for such an important shift in any of the project literature does not inspire confidence that is was the result of a formal, organizational decision. If not, then it is more likely to represent an example of the staff's inability to meet the many demands rather than their best judgement that other goals are more attainable.

In brief, the Project has chosen to attempt a great deal. The result is that the staff seems harried as it tries to meet its full set of responsibilities. The long-range goals appear to receive inadequate attention because of the demands of maintaining the daily operation of the program. In trying to attempt too much, PCS may end up accomplishing less than it could.* To put it as clearly and directly as possible, it is suggested that the Project is trying to do more than its resources in time and talent will allow. If such a view is accurate, then it follows that the staff should seek to define and determine on the most realistic basis which of their several pursuits are both central and within reach. Such a reassessment should give close consideration to what has already been accomplished, the abilities of the staff, and the availability of additional, outside resources.

C. School-University Relations

For a project of this type to accomplish its most important goals, it seems a special relationship with the schools would be at least useful, perhaps necessary. The two should be brought into a full realistic partnership, one in which they actively support the major purposes of the program. The schools must view themselves as cosponsors, not as passive onlookers, offering their facilities in exchange for some additional help over which they have little control and limited interest. That has been the more common "partnership" that colleges have established with the schools. A truly joint effort would require that the university relinquish some of its power, something it has in the past been unwilling to do. Such a partnership would mean that the university would actually invite the schools to examine the ideas it is seeking to implement, with the right to accept, modify, or reject them. Where differences of opinion

*At a PCS Advisory Board meeting, one member after hearing Project staff comment on improving reading and bilingual instruction through science education made precisely this point. He advised the staff that the whole of New York City would be thankful if the Project would accomplish one small goal, that of improving the quality of science instruction in the schools.

on any aspect of the program occur, true partners would have to find means of resolving them. The university would no longer have the luxury of presenting a fully developed program on a take-it-or-leave-it-basis, where the schools accept the arrangement proposed virtually intact or risk losing what to them are necessary and helpful additional services.

The cost of forcing such arrangements upon the schools has been that they then become passive receivers of services rather than active supporters of an innovative venture. The term passive should not be misconstrued. It does not mean that the schools are amenable to having their more important functions shaped by such external forces. It suggests they commit nothing to it. Schools accepting programs designed by colleges or universities can be neutral, which they often are, or even hostile. What is being suggested is that they should be actively supportive if the program is to be tested realistically and if their more important functions are to be influenced by it.

This Project does not appear to have dealt satisfactorily with this dilema. The major organization of the program appears to be based on a standard model, one which is decidely oriented to the needs and views of the university. The schools are a site for Project activities rather than a partner in an experimental venture. They accept but do not participate meaningfully in directing the services that are offered. Such an approach has been long practiced and has yielded limited success. There is ample evidence that those who control decision making in the schools are not going to make truly important changes until they are personally convinced of their effectiveness. Teachers and administrators want to see the ideas tested in what they are apt to call the "real world." One must concede the view has some merit. In any case, the response is real and the very fact it is believed has real consequences that cannot be ignored. The change desired must prove its superiority.

In this Project, as in so many others, the university has developed a design that relies on sending the inexperienced to the schools as intermediaries. These trainees, through their efforts, are the spokesmen for the university viewpoint, but their attempts are often not taken seriously and perhaps cannot be. Through errors of judgement, maturity, or understanding, they often end up persuading teachers that the idea or approach is of limited use. When supervisors of such trainees are sent into the schools, as in the case of this Project, it is usually as observers and too rarely as demonstrators of the method or approach put forward. Perhaps this is the only alternative. The difficulty may be unavoidable and the dilemma posed incapable of resolution. Nonetheless, the consequences remain, and they do appear to rob many of our attempts at change of any real prospect of success. It seems unlikely that this Project will fare much differently from many that have preceded it; when the Project is removed, the schools return to the practices their structure supports best. It is a structure that remains largely untouched by programs that are field based but university-organized, dominated, and led.

An equally complex and related issue is the influence such arrangements exert on the training model. Although the university generally insists on formal organizational control, what is ignored is its own need to develop relationships with the schools that do not rob the university of its own influence over trainee behavior. The university often does not pay sufficient attention to the powerful and pervasive impact the school as an institution exerts on all who labor under its guidance. This is also a problem for Project City Science. A group of science teachers visiting Project sites immediately noted one aspect of this problem. They raised the question of whether cooperating teachers are trained for their role by the PCS staff. When told they were not, the group raised the question of how these teachers could then help the interns develop the skills the Project felt were essential.

This issue goes to the central poinc in the training of teachers: who exerts the greatest influence on trainees? Most research has indicated that the "reality" of the field experience is by far the most persuasive influence, shaping values and behavior. In important ways, the Project seems to ignore this. Cooperating teachers are not trained and do not necessarily seem to be selected for their compatibility with PCS views on teaching. Such teachers can serve as a bridge between the trainees' previously internalized notions of the role of the teacher* and the current pull, under the pressure of classroom performance, to return to that model. Under the stress of difficult classes conducted at what many agree is the most difficult level in the school system, it is natural to expect novice teachers to ignore a verbally described alternative and resort to a more fully understood approach. This is particularly so if the cooperating teachers are susceptible to or practice that model.

A program that does not take active countermeasures is in danger of having its trainees conformed to the image it is seeking to correct. PCS is not a departure from other programs of teacher training but very similar to them in this important regard. It shares the vulnerabilities to which such approaches have traditionally been subject. Indeed, this Project, by increasing the amount of time spent under the influence or auspices of the school, would appear to further enhance the training potential that much of our research indicates that institution has. Surely there is a need to reexamine the influence the schools exert on trainees and whether it is compatible with what the Project is seeking to accomplish. Certainly the selection of cooperating teachers is a vital element in the training process and needs to be given more attention than it has apparently received thus far.

*Unlike other professions, such as law or medicine, teaching trainees have a clear and detailed conception of the role of the teacher drawn from sixteen years of intimate acquaintance with it.

D. Teaching Methodology

Among the major purposes of PCS is the attempt to upgrade the skills of science teachers in the Project's eight school sites and more broadly, to create a model by which others can be trained for a similar function in the inner city. An important part of this effort is the attempt to demonstrate to both trainees and regular classroom teachers the advantages of a more open-ended instructional style. A central aspect of the instructional methodology the Project has emphasized is what has frequently been described by both staff and students as a "hands-on" approach. Such an approach implies an active rather than a passive role for the student. Rather than attempting to verbally explain important concepts to the learner, the teacher instead attempts to create learning environments. In such environments the students are free to actively examine and manipulate pheonomena presented to them and form their own tentative hypotheses or conclusions about them.

A large body of writing exists explaining, supporting, and commenting on the results of this teaching approach. Though some aspects are new, the methodology itself is not novel. Since this instructional approach seemed to form such an important part of the PCS staff's overall strategy, an observer would have anticipated a more sophisticated view of it by the staff. This would have included a better understanding of its limitations a clearer conception of the conditions under which it would best flourish, and more deliberately developed strategies for its use. The views encountered were suprisingly naive in this regard. The staff has pursued with its interns a view of science teaching that has had wide currency at the college level for a number of years, but one which is now receiving greater scrutiny. Questions are being raised about when, how, and with whom it works best. Such questions do not appear to have been seriously considered or posed by PCS staff members. They seem to apply unquestioningly, a model that even their inexperienced interns recognize needs to be refined, and the conditions under which it will achieve optimum success studied further and stated more explicitly.

As some of the interns have learned, the approach assumes a level of intellectual curiosity that frequently is just not there. Students yield to the temptation to play rather than think. Both activities can be enjoyable. Each has its own attraction. The play, however, yields pleasure at a simpler, easier level of effort and often becomes the dominant choice. Reasonable questions about when such an approach can best accomplish particular teaching ends can and should be raised. What apparently has been left to interns to learn pragmatically--when it will work--is the function of a more experienced, expert college staff to determine and include as part of their training program. At times the trainees have appeared to understand this better than the trainers.

E. Clarity of Objectives

The Project has a major problem in that it appears to be consistently vague about important aspects of the program. This is reported by interns, coordinators, and some of the personnel in the schools. The lack of clarity extends not only to program objectives but to roles, which do not appear sharply defined, often leaving those filling them somewhat confused. The Project seems to rely not solely on the skills of key staff members, which is fair, but also upon their personal definitions of their functions, which seems neither a fair nor reasonable working arrangement.

Several coordinators reflected the view that they were unclear as to what was expected of them when they first began. One coordinator, in seeking to have the role clarified, was told that, "you will get a sense of what the school needs as you go along." Two individuals appeared to define the role as that of a resource person, one that was comfortable in terms of what they felt they had to offer. Others seemed to make different choices. That seems a vague way of defining purpose and implies the Project does not have a clear direction determined in advance for this group. Often, the staff offered make-shift help which seemed wasteful of both time and talent. It also appeared to diminish the Project's potential impact since the staff had not selected key points at which they would attempt to apply leverage. The Project was sometimes reduced to what seemed to be a series of individual efforts instead of a well designed plan. Such help may be useful, but apparently little is learned that can be shared with others.

Another coordinator explained that the group was offered a general role definition, that of a "change agent," but no real plan for what they were to do. This individual pointed out that though they were often free to define their own tasks, still "when something worked in one school, it was expected that it should be tried in others." Without a defined long-range purpose, the demands of the Project leadership to do or try things appeared to occur swiftly and sometimes seemed arbitrary, contradictory, and confusing to staff. The power of not having long-term objectives was greater freedom, but the disadvantage was the suddenness with which changes in direction were announced. One coordinator offered this specific remedy: "I strongly recommend that the Project have long-term goals that can be given in advance as well as allow room for short term decisions and new ideas as we go."

Some of the interns reflected similar concerns about the absence of long-range planning. One described the Project as "very unorganized, nothing is structured." She pointed out that the coordinator would suddenly arrive with a whole new direction from the Project staff. She felt that planning was confused, schedules for activities poorly arranged and that expectations set for classroom work and other details were inadequately explained. It appeared the coordinator sometimes bore the brunt of student criticism for rapid changes in direction, new demands and lack of clarity about what was expected. The intern noted that "the staff made it appear that they knew what they wanted but they didn't have a clear idea. They didn't seem to know what was next." She added the conclusion that "they would be better off if they were a little more rigid." While the choice of terminology appears unfortunate, the sentiment expressed is one that the Project might be well advised to examine.

Part of the Project's problem is the way it has stated its objectives. As noted earlier, many of the objectives of the program were exceedingly ambitious. Many were put forth in terms so broad or so bold, they seemed to defy implementation. When goals are overstated in a way that makes them appear beyond reach, a program may begin operating as if it had no goals. At a minimum, it may develop a tendency to function at an informal level because there is an absence of a formal set of criteria that can be reasonably followed. This appears to be a problem for this Project. For all that the staff is busy and works hard, and they unquestionably do, there remains a casual attitude toward Project outcomes that gives cause for concern. The staff does not appear sufficiently demanding in its pursuit of these outcomes. One must question whether this adoption of flexible informal, personalistic approaches does not often circumvent reality, ignoring issues that are stubborn, persistent, and must be dealt with in a consistent, formalized manner. PCS needs to more openly entertain the view that influencing events in the schools requires a planned strategy with organized follow-up procedures if change is to occur.

To summarize this point, what appears to be a major lack in this Project is that its objectives have not been adequately clarified, that is, set up in operational terms that allow the staff to know when (and to what extent) they have been attained. The evaluators are not suggesting the unnecessary rigidity of a behavioral objectives approach but a clear statement of outcomes the staff is seeking to accomplish and a more realistic concern with how and in what ways they have achieved or failed to achieve them. The staff does not appear to have set up good internal assessment machinery. Its efforts do not seem to be examined in a consistent way at either a formal or even a verbal level. Meetings often appear to lack a reflective quality and the staff does not seem to question sufficiently the results of its endeavors at various levels of the program. This has resulted in a Project that appears to rely too heavily on the informal at the expense of the planned. The imbalance seriously diminishes the prospect of attaining major goals.

IV. Model Districts Program

A. Goals of the Model Districts Program

The term "model district" was first used by PCS staff in its revised proposal for refunding, submitted to NSF around March 15, 1976. It was indicated in the proposal that at the level of funding currently available the Project would work toward achieving four products, one of which was the development of two model districts. This phase of the Project was described in the proposal in the following manner:

> It was decided to contract operations by concentrating on the development of two 'model districts' rather than four. Substituting intensity for extension, the Project will apply itself to working with two selected districts in New York City in an effort to bring them to the highest possible level of intermediate level science teaching.
>
> Within two districts (one carried over from the current set and one to be newly acquired), the emphasis will be on selected programs. Inservice staff development will have the highest priority. The development of a change model focusing on an administrative unversity support system will also receive special attention. For this reason, citiscience notes and the design of resource materials will be continued. All in all, in New York City we propose to have within three years two school districts operating in such a way as to stand as examples of what can be attained (p. 2).

A model district, then, is defined by the staff as one in which there is the highest possible level of intermediate science teaching in the schools and where classrooms are visible and visitable examples of what the Project seeks to attain. Inservice staff development, the publication of citiscience notes, and the design of resource materials were to be the mechanisms for moving toward the development of a model district.

Implicit in the comment "It was decided to contract operations by concentrating on the development of two model districts rather than four" is the existence of a model district--at least as a concept--in the initial proposal

(December, 1975) seeking refunding. There is such a reference where PCS noted the need to "search for new districts C and D in cooperation with a coalition of the Central Board of Education and the UFT."*

Finally, one further set of writings takes the concept of model district--as a concept--right back to the beginning (May 1, 1974) of the project. These comments, especially the latter paragraph, highlight the staff's increasing understanding of the complexity of the task.

In our proposal for refunding, Project City Science made this commitment:

> . . . The Project will apply itself to working with two selected districts in New York City in an effort to bring them to the highest possible level of intermediate school science teaching.
>
> Within the two districts . . . the emphasis will be on selected programs. Inservice staff development will have highest priority. The development of a change model focusing on an administrative and university support system will also receive attention. All in all, in New York City we propose to have within three years two school districts operating in such a way as to stand as visable, visitable examples of what can be attained even in the face of inner-city economic and political problems.

A brash promise! After two years of direct experience trying to accomplish just that, in Districts 4 and 17, we know better than anyone how enormously difficult it will be to pull off.[19]

Thus, although the term model district is first used directly in the revised proposal of March 15, 1976, the development of model districts was an objective Project felt committed to attaining since its inception (May 1, 1974).

What did PCS indicate it was learning about the development of model districts as PCS reflected on its work from 1974 through August of 1976? Quarterly Report #8 offered the following:

> 1) Mutual commitments between the Project and the districts must be specified and agreed to prior to joining hands. Each side must have reasonably firm promises from the other so that each can

* See Appendix P, item 50.

operate from a base of reasonable expectations. For its part, the project has learned that the absence of certain conditions makes it almost impossible to achieve an acceptable rate of improvement toward the stated goals. These conditions must be insisted on as a condition of our entry into any district. By the same token, we must find out what a prospective district considers vital to receive from us and be completely honest (with ourselves no less than the district) in stating whether or not we can deliver. This is not to say that our experience has made us cynical and less trusting, but rather that we now believe that candor at the outset is more trustworthy than vague notions that things will eventually work out for the best because both sides want that to happen. 2) The concept of 'resource teacher' requires reformulation. As a key idea in the original proposal, it was based on several assumptions that have turned out to be mistaken to a significant degree. In particular, we were wrong about the number of teachers in any district who possessed the characteristics we attributed to resource teachers, and we misjudged their capability to function in the role we conceived for them. Our first response to this was to intensify and broaden our inservice programs, but we must now go beyond that to think through afresh the role of resource teachers in our plans to develop model districts. What should a resource teacher be like? How can we proceed, given what we now know, to identify and prepare practicing teachers to become resource teachers in that image? What functions are the resource teachers expected to serve in the model districts as now envisioned? What conditions are essential to enable them to carry out these functions effectively?

3) The strategic importance of preservice graduates in reshaping district science teaching must once again be reappraised. Prior to beginning the Project, the plan had been to replace out-of-license and retiring teachers with specially prepared intermediate school science teachers. Retrenchment and the financial crisis sabotaged that plan (along with many other things). We responded by reducing emphasis on the Preservice Program. Our experience last year seems to have indicated, however, that the preservice teacher may be the key to a strong inservice program. The 'teaching hospital' analogy may apply, but in any case this needs thinking through and clarification.

4) A way must be found to accelerate the process of analysis and assessment of district science programs. In neither District 4 nor District 17 were we able to get such activities underway. Our experience demonstrates that we vastly underestimated the inherent difficulties institutional inertia, the drain on energy and emotions from having to cope with the seemingly devastating problems of the day, and lack of knowledge and experience among teachers and administrators on how to analyze programs systematically, to name only a few. But the need to achieve this analysis and assessment is no less urgent merely because it is more difficult to accomplish than we thought. We need to find or invent a surer way to get this to happen.[20]

In this same report, model districts, as a deliberate program, is defined:

> The purpose of the Model Districts Program is clear enough: to generate a cooperative enterprise that results, in good time, in the development of two inner-city school districts in which the science teaching in the intermediate grades is exemplary in every way. As models, these districts would exhibit what can be achieved and what it takes to do so.
>
> What would such a district be like? As will be pointed out below, one of our foremost tasks is to give that question the full, thoughtful, creative answer it deserves. The program will then consist of the strategies and actions we employ in order to help bring such a district into existence and keep it going. As a preliminary measure only, the following attributes of a model science districts are suggested:
>
> 1) Student achievement in science would be at or above national norms and higher than in the city as a whole. Compared to other inner-city students in their grades, model district students would be more inclined to like studying science, with a larger fraction electing to enroll in science courses in higher grades. The number who elect science-related careers would be at least equal to national norms.
>
> 2) A large proportion of teachers of science in a model district would be outstandingly competent. They would know how to teach science to all kinds of children under a variety of circumstances, and they would enjoy doing so. They would understand and respect both their students and themselves for what they are and for what they are becoming. They also would have a continuing interest in science, and would make a serious effort to deepen their understanding of it and to stay up-to-date on recent developments.
>
> 3) Teachers in a model district would join forces with administrators and university professors to improve science instruction continuously. This means they would conduct periodic studies of all aspects of the science program (including its relation to other programs in the schools) and would take action based on the findings. To this end, the administrators would endeavor to insure that the science teachers have the working conditions and other support they need to achieve improvement goals. As a result of such continuing upgrading the science curriculum, teaching methods and learning materials would reflect the best thinking in the profession at any one time.
>
> 4) The teachers and administration would consider teacher training and research as major responsibilities of the district, because both contribute to the improvement of science teaching in their own district, and because as members of unique and special districts they would be in a position to contribute what others cannot. Thus they would be engaged in a continuing symbiotic relationship with a major university.

> 5) The science program and efforts to improve it would be understood and supported by the parents and other citizens of the community in which the district is located. This would be reflected by the improvement, on the one hand, of parents in the ongoing program assessment activities, and, on the other, by the presence of school science activities in the community.
>
> 6) Most of all, in a model inner-city district there would not only be a receptivity to new ideas and willingness to put them to the test, but also a constant outward flow of ideas, techniques, knowledge. The place would be demonstrably alive.[21]

Finally, this same Quarterly Report #8, reflected the thinking of PCS regarding the "tasks" it saw for itself related to model districts. These were outlined by PCS prior to beginning the first year of its three-year refunding:

> 1) We must quickly identify the two districts we will throw our lot in with for the next decade or so. This is being done systematically, taking into full account our experience of the last two years. Selection criteria have been specified--location, population make-up, potential, administrative commitment, teacher response, etc.--and will be used as guidelines. A case study is being made of the entire process.
>
> 2) The features of what we would consider to be a model district have to be agreed upon. The description, unlike the rough one above, must be coherent, refer to a future that stretches the imagination and yet is not impossible to achieve, and that is expressed in language that avoids aphorisms, sentimentality, and wishful thinking. In other words, we must say now by what observable properties we or anyone else would recognize a model district if one were to be encountered.
>
> 3) As soon as districts have been selected, we must prepare a complete and accurate description of their current science programs the way they are. What we choose to record will depend, of course, on what our model tells us is important. (The process will be repeated three years hence to see if the science programs are in fact different and to ascertain whether they have reached the standards of the model).
>
> 4) At the same time we need to prepare profiles of the two districts, that is to say, of that part of the city in which the school districts are located and of the people who live there. In the form of anthropological case studies, calling upon whatever political, cultural, social or economic data seems pertinent, these profiles will provide an understandable holistic description of the communities, and thus be available to serve as a contextual backdrop for all that we do.

5) Arrangements have to be made to accommodate the student teaching and other field activities of the preservice students.

6) Decisions about the nature and extent of inservice workshops must be made, and suitable follow-up actions taken.

7) At the very beginning agreement must be reached among the teachers, administrators and Project concerning district science assessments. It is crucial that a critical analysis be started that delves into every aspect of the district science program--curriculum, teaching methods, material, teacher continuing education needs, community involvement, etc. The process, viewed as an opportunity for all concerned to learn how to conduct such analyses, is to be considered every bit as important as the findings.

8) A means for monitoring progress toward the various identifiable goals of the Model Districts Program has to be instituted.[22]

Progress Report #11 summarized the attributes and status of the model district program as the PCS staff viewed it one year later (September 30, 1977):

Some preliminary attributes of a model district that were mentioned last year concerned:

1. Student achievement and involvement being at or above national norms and higher than in the city as a whole;

2. Teachers being outstandingly competent, enjoying the challenge of keeping up-to-date recent scientific developments, and of community involvement spreading this to all kinds of children in a great variety of circumstances;

3. Administrators joining with teachers and university professors to support a periodic analysis and assessment toward an improvement of the methods, curriculum and materials in the science classrooms;

4. Teachers and administrators considering teacher training and research as major responsibilities of the district in conjunction with a major university;

5. The community understanding and supporting the school science program by being involved in program assessment, projects, etc.; and

6. General spirit, life and receptivity regarding the flow and testing of ideas, techniques and knowledge.

Once the districts had been selected, all the administrators were sent a letter stressing that the Project needed certain commitments from them involving their positive and active support for the Project's goal and methods.

The senior staff regularly visited the schools over the past year to maintain contact with administrators as well as with teachers regarding these goals which have thus become more specific and more realistic. However, there were often inevitable disagreements between what the preservice interns, the inservice teachers, the administrators and the Project staff considered as suitable components of a district that is a model for science teaching. Studies have been proposed by the research team to access these basic attitudes.[23]

This same report then described the "tasks" related to model districts for 77-78 academic year:

The task for the coming academic year [1977-78] is to draw on last year's data collection and to begin early in the fall with an expanded list of questions about how science is actually taught in the district, ie., the proportion of time spent in lecturing, demonstrating, experimenting or discussing; large or small group work; connections with other programs in the school and/or with community activities, etc. This will be especially important regarding the new schools chosen for involvement. In future years, this information will provide one definite estimate of change in science programs because of Project involvement.[24]

In September of the same year (1977), the Project Director of PCS, in a letter to Dr. Longo, Evaluation Director, states a modified version of model districts:

. . . For the Project to meet its intended goals, we are supposed to develop 'model districts' or at least 'model schools.' Currently our inputs are several: through the intern teachers working with specific teachers, through the on-site coordinators, through the Assistant Principals for Science (APS) and/or through the Science Chairmen. By what mechanisms can we be more successful in increasing the horizontal dispersion of changes in teaching styles to the classrooms of teachers who do not have an intern teacher? Can the on-site coordinators do more, and in what form to augment such all-school involvement? Can the central staff do more, and in what form? What can be done in schools where we have no OSC?

The "history" of the model district phase as revealed in PCS written communication must stop at this point. Progress Report #12 (through January 1978) and Progress Report #13 (through June 1978) were not available at the time of this report.

B. Operation of the Program

"The main purpose of formative observations is to determine the degree of mastery of a given task and to pinpoint the part of the task not mastered."* This section of the report, consistent with the above definition, focuses on two fundamental questions:

(1) What goals for the model district phase of the project have been completed?

(2) What part of tasks (goals) for the model district program have not yet been completed?

Answers to these questions were developed primarily from responses of the Project Director and Associate Director to inquiries generated from PCS literature. Specifically, the "features" or "attributes" of a model district as defined by PCS will be listed along with the responses to the status of these goals. An analysis of this material concludes this section.

These were the PCS defined goals for the model district phase of the program:

1) Student achievement in science would be at or above national norms and higher than in the city as a whole. Compared to other inner-city students in their grades, model district students would be more inclined to like studying science, with a larger fraction electing to enroll in science courses in higher grades. The number who elect science-related careers would be at least equal to national norms.[25]

*(Bloom, B. et al., Handbook on Formative and Summative Evaluation of Student Learning, 1971), p.3.

In attempting to determine the extent to which such goals were achieved, two initial questions were asked. First, what data has PCS collected to evaluate whether student achievement in science in PCS schools and classrooms would be at or above national norms? An then secondly, what data has PCS collected to evaluate their student achievement in science in PCS schools and classrooms would be higher than in non-PCS schools and classrooms in the city as a whole? In both cases, the response was that at this time no such data had been collected. It is unclear whether any plans for the collection of such data have been made.

According to PCS literature, an important attribute of a model district is the quality of teachers one would have working in the field of science. As the proposal points out:

> A large proportion of teachers of science in a model district would be outstandingly competent. They would know how to teach science to all kinds of children under a variety of circumstances, and they would enjoy doing so. They would understand and respect both their students and themselves for what they are and for what they are becoming. They also would have a continuing interest in science, and would make a serious effort to deepen their understanding of it and to stay up-to-date on recent developments.[26]

The Director was asked precisely how was the Project determining whether science teachers are becoming "outstandingly competent" as a result of PCS activities? He responded that this was largely done "through casual observation by PCS staff, especially by the on-site coordinators who were to keep a diary of the school's activities." There apparently is not at this time any more formal means by which such competence is measured.

Another means by which observers would be able to recognize a model district was to be the improved way in which representatives of differing institutions worked together.

> Teachers in a model district would join forces with administrators and university professors to improve science instruction continuously. This means they would conduct periodic studies of all aspects of the science program (including its relation to other

> programs in the schools) and would take action based on the findings. To this end, the administrators would endeavor to insure that the science teachers have the working conditions and other support they need to achieve improvement goals. As a result of such continuing upgrading, the science curriculum teaching methods and learning materials would reflect the best thinking in the profession at any one time.[27]

Obviously, the quality of the resulting studies would be a critical measure of the extent to which this objective had been attained. However, it is apparent from questions posed to staff that no such studies have been completed. Although some preliminary work has been started and some data collected, no study appears to be in any reasonably developed stage at this time. The intent to have teachers "take action based on these findings" has of course been totally impossible because an important part of the knowledge base on which the model districts were to be built is lacking.

Yet another projected attribute of a model district was the willingness of the schools to engage in teacher training and research.

> The teachers and administration would consider teacher training and research as major responsibilities of the district, because both contribute to the improvement of science teaching in their own district, and because as members of unique and special districts, they would be in a position to contribute what others cannot. Thus they would be engaged in a continuing symbiotic relationship with a major university.[28]

To ascertain how well the Project had fared in this regard, the following question was asked: What evidence has PCS collected to indicate that teachers and administrators now consider teacher training and research to be major responsibilities of the districts? Clearly, no such evidence was collected, nor does any plan for collection appear to have been developed.

A number of additional areas were explored during the interview, including the area of parental involvement. The funding proposal stated the intent of the Project to involve parents in important ways in the creation of a model district.

> The science program and efforts to improve it would be understood and supported by parents and other citizens of the community in which the district is located. This would be reflected by the involvement, on the one hand, of parents in the ongoing program assessment activities, and, on the other by the presence of school science activities in the community.[29]

Interviews with the staff, however, indicated that parents have not been involved in any ongoing assessment. No list of the type of school science activities the Project hoped to promote in the community was available.

It is clear from the responses obtained that little progress has been made towards achieving the goals of a model district, at least as originally defined by PCS. What accounts for this lack of progress? Several alternative explanations can be suggested:

(1) The goals for a model district have changed.

(2) The tasks or procedures used by PCS were not consistent with reaching the goals for a model district (as originally defined by PCS).

(1) Have the goals changed? The original goals for a model district program were first described in <u>Quarterly Report #8</u> (August, 1976). One year later, these same goals were listed in <u>Progress Report #11</u>, summarizing the status of model districts through September 30, 1977. It is clear that during the academic year 1976-77, these goals were the operative ones regarding model districts.

In the 1977-78 academic year, however, there may have been some change of emphasis between the stated goals for model districts (<u>Progress Report #11</u>, Summer, 1977) and the Project Director's conceptualization of the model districts program. The stated goals remained identical to those disclosed in <u>Quarterly Report #8</u>. The Project Director, however, in a letter dated September, 1977, modified the concept by setting as a goal not model districts but "<u>at</u> least model schools." Note the set of questions posed regarding <u>the model school</u> as opposed to the model district program: "How can we change the teaching styles of classroom teachers who do not have an intern teacher? Can the on-site coordinators do more to augment such all-school involvement? Can the central staff do more, and in what forms? What can be done in schools where we have no on-site coordinator? "

It appears that these questions posed by the PCS Director in September 1977 would have served as "beacons" for the model district program for the 1977-78 academic year. The progress reports reflecting on the activities of the 1977-78 academic year should provide evidence of this conjecture. As reported previously, however, the progress reports reflecting the work of the 1977-78 academic year were unavailable at the time of this report.

A final comment on the goals of the model district program: In June 1978, an inquiry made to the Project Director concerning a definition of model districts elicited this response: "A model district is not a very useful term or concept. At best, it can be described as an administrative arrangement of support between a sympathetic principal and assistant principal, classroom teachers, and the project." This comment may reflect a shifting of goal orientation for model districts from a generally specific to a generally abstract product. The shift could account for a general lack of progress towards the original objectives this past year, though earlier efforts appeared to make similarly slow progress.

(2) Were the tasks or procedure used by PCS consistent with reaching the goals for a model district (as originally defined by PCS)?

An examination of Quarterly Report #8 and Progress Report #11 indicates a general lack of correspondence between goals and tasks to reach such goals. For example, one goal was that "Student achievement in science would be at or above national norms and higher than in the city as a whole."[30]

Of the eight "tasks" listed to accomplish the goals of a model district, only one task makes any reference to the above goal:

> At the very beginning agreement must be reached among the teachers, administrators and Project concerning district science assessments. It is crucial that a critical analysis be started that delves into every aspect of the district science program - curriculum, teaching methods, material, teacher continuing education needs, community involvement, etc. The process, viewed as an opportunity for all concerned to learn how to conduct such analyses, is to be considered every bit as important as the findings.[31]

The task itself was carried out by sending the following letter to principals in October, 1976:

> It is from these meetings and from Project experience in New York City over the last two years, that we now ask the principals and the assistant principals in charge of science if they are willing to <u>positively</u> and <u>actively</u> support the following:
>
> 1) Evaluation of the science curriculum of the school in terms of the philosophies behind it and the methodologies used to implement it.
>
> 2) Pursuit of reasonable proposed solutions for problems enumerated in the above curriculum evaluation.
>
> 3) Investigation of the necessary support system for science in the school, especially with regard to the budget allocated for science materials, the programming of special rooms for science study and of common preparation to facilitate meetings and informal communications.
>
> 4) Use of "hands-on" experience with simple and inexpensive materials by students working alone or in small groups-<u>when</u> the teacher is willing and able to supervise this.
>
> 5) Study of how science can be joined with the reading, mathematics, bilingual, etc. programs for mutual benefit.
>
> Such investigations assume a cooperative venture, utilizing the knowledge and experience of the principal, the assistant in charge of science, the teachers and the Project staff. They also assume a voluntary commitment of persons concerned as specified by union and school contracts.
>
> If convenient, would you respond to these points in <u>writing as soon as possible</u>. If not, a phone conversation, or personal meeting will be sufficient at this time. Again, the staff of Project City Science is very appreciative of the chance to have visited your school and to have met and discussed the goals and methods of Project City Science with you and your teachers.

An inquiry made to the Assistant Director in June, 1978 revealed: (1) The assumption was made by PCS that a principal's agreement to the issues raised in the letter included the agreement of his teachers. (2) No principal responded in writing. (3) No phone conversations or personal meetings were held. (4) No specific follow-up by any PCS staff was made relative to any of these items.

The Assistant Director agreed that "perhaps it would have been a good idea to get a firm commitment in writing from the principals."

In summary, the activities of the 1976-77 academic year did not move the Project very far toward accomplishing the main objectives of the model district program.

One year later (summer 1977) the Project summarized its 1976-77 model district activities in this way:

> The senior staff regularly visited the schools over the past year to maintain contact with administrators as well as with teachers regarding these goals which have thus become more specific and more realistic. However, there were often inevitable disagreements between what the preservice interns, the inservice teachers, the administrators and the Project staff considered as suitable components of a district that is a model for science teaching. Studies have been proposed by the research team to assess these basic attitudes.[32]

Inquiries made to Project staff regarding the identification of either "goals which have become more specific and more realistic" or "studies proposed by the research team to assess basic attitudes" resulted in no specific response from the staff.

For the 1977-78 academic year, the Project noted these planned activities:

> The task for the coming academic year [1977-78] is to draw on last year's data collection and to begin early in the fall with an expanded list of questions about how science is actually taught in the district, i.e., the proportion of time spent in lecturing, demonstrating, experimenting or discussing; large or small group work; connections with other programs in the school and/or with community activities, etc. This will be especially important regarding the new schools chosen for involvement. In future years, this information will provide one definite estimate of change in science programs because of Project involvement.[33]

Here again, the planned task seems to lack specialty of objectives. Such global statements seem to provide insufficient guidelines for the mastery of set tasks. Since no written reports were available for the 1977-78 academic year, further comments regarding model district goal accomplishments cannot be made at this time. It should be noted that the Project has faced a number of difficulties that must be realistically viewed as mitigating factors. There was a change in project directors this year and six of eight on-site coordinators were new. Thus, a large and important part of the staff had to become familiar with the Project. Included among the reasons the staff gave to account for lack of progress toward the specific goals defining the creation of a model district were: (1) The change in directorship. (2) A lack of aggressive advertising to attract a larger pool of applicants from which to select the intern population. (3) Turnover rate and lack of specific skills and training on the part of the on-site coordinators to carry out the difficult job of supervisor, coordinator, resource person, and change agent. (4) Lack of specificity as to the identification of personnel responsible for carrying out particular tasks.

Other portions of this report and future reports will detail further sets of inquiries into each of these explanations.

Summary

What possible courses of action for the fifth and last funded year (1978-79) of the project might be proposed?

If the project decides to define the model district phase of the program in the specifics of its original five major goals, then it should consider implementing as soon as possible the following agenda.

(1) The collection of data regarding the knowledge of science content and processes from students who are just beginning

involvement in a PCS class as well as from schools in non-PCS classes.

(2) The collection of data regarding the knowledge of science content and processes from students who have spent a year in PCS class as well as from students in non-PCS classes.

(3) The collection of data regarding the knowledge of science content and procedures from PCS-cooperating teachers and from nonparticipating teachers.

(4) In each PCS school, procedures should be initiated that reflect an active community involvement in PCS-related activities.

C. Overall Assessment

Previously this report focused on the three main aspects of the program: (1) the specific attributes of a model district (as defined by PCS); (2) the degree to which PCS has created an enterprise having such attributes; (3) an analysis as to the factors that may account for a lack of progress towards such an enterprise. The report observations showed that apparently limited progress has been made towards meeting the original goals of a model district.

At the same time, however, there is evidence that activities are underway that may enhance the creation of a model district, provided that term is more broadly and generally defined. The objective of this section of the report is to more fully develop this notion.

PCS literature and comments made by its present Director broadly define a model district as "An administrative arrangement of support between participating schools and the Project" or " cooperative enterprise." Consequently, it is important to know what mechanisms, procedures, activities, etc. have been carried out to enhance "a supportive arrangement, a cooperative enterprise" and did the outcomes of these mechanisms, procedures and activities, etc. appear to result in positive consequences?

It is clear that the project employed mechanisms and procedures during its first two years (1974-76) that did not result in a fully cooperative and supportive arrangement (see Appendix I, District 4: Case Study and Evaluation). It is equally clear that the project learned much from this experience, particularly the need to find out what a prospective district considers vital to receive from the project itself. Project staff are now able to report that: "although the needs differ in each school, in general each requested (1) the upgrading of the competence of the cooperating teacher; (2) a supply of preservice interns; (3) resource materials; (4) suggestions for new curricular ideas and (5) better communication among the faculty."34*

* Project City Science revised proposal, January, 1976, P. 4.

How is the project satisfying these needs and hence, developing and maintaining a cooperative and supportive arrangement?

Observations in project schools, an analysis of PCS literature, and interviews with project school staff and PCS staff suggest the following:

(A) The criteria used for selecting cooperating teachers are not sufficiently clear. PCS should specify in advance the criteria used to select the cooperating teachers. If cooperating teachers are to serve as models, it seems reasonable for them to possess strong professional attributes. If, in fact, the cooperating teacher behaviors are to be shaped by the presence and activities of the interns and on-site coordinators, then other characteristics of the cooperating teacher should be identified. In either case, PCS should describe in advance the selection criteria for their cooperating teachers.

Present observations support these conclusions: (1) a wide range of cooperating teachers are now being used; (2) various procedures are used to select them, and (3) some cooperating teachers are strong models while others need to upgrade their professional skills.

Finally, conducting workshops in the school districts was a common suggestion for improving the competence of the cooperating teachers. The Project has done this in the past but gradually the workshops appear to have been relocated at the university. Such a tendency is not expected, but would appear to defeat the purpose of the workshops by making them less available, in practical terms, to teachers.

(B) Most school personnel feel that the quality of the preservice interns is reasonably high. Observation of preservice interns by professional scientists and science educators simply does not fully support this conclusion. These observations, in general, characterize the teaching behavior of the interns as uneven, with much room for improvement in the areas of classroom management techniques and ability to construct an environment within which productive hands-on activities occur with regularity.* Perhaps PCS could plan a more rigorous, more definitive training program for these interns. Microteaching, vidiotaping, increased feedback, and practice-response-practice devices would all seem to be productive avenues to explore. It should also be noted, however, that the mere presence of these interns in the classrooms is greatly appreciated by most of the school staff.

(C) Attempts to provide resource materials and suggestions for new curricular ideas are being made in two ways: First, the publication, citiscience notes, continuously provides ideas for enhancing the science curriculum. This same publication suggests many ways for teachers to easily acquire resource materials. Second, the presence, the quality, and the expertise of the on-site coordinators seems especially crucial in meeting these two expressed needs. Here the selection process seems to be lacking, suffering most, perhaps, from a lack of highly qualified candidates. The training program also appears to be less organized than it must be to accomplish its ends. Project staff must define in advance the selection criteria by which on-site coordinators are chosen and provide them with adequate training for the difficult roles of supervising, coordinating, and serving as change agents in the schools. Perhaps a detailed literature

*See Appendices F-H, a summary of comments made by observers.

research regarding the expertise necessary to initiate changes in school settings would be a reasonable place to begin constructing a model for training personnel in the process of change.

(D) Schools also cited as one of their needs a mechanism for communicating more effectively among faculty members. PCS might consider this a topic for a special consortium of principals, assistant principals, and other district supervising personnel. Surely it would be a topic of vital interest to all of them. Appropriate experts might be invited to facilitate such deliberations.

In summary, the model district phase of the Project, defined as an arrangement of support and cooperation, certainly exists between Project staff and school administrators, but a great deal remains undone. There are some hopeful signs that more concerted efforts will be attempted. A well-designed plan, including an effective implementation strategy are needed Adjustments of effort, including a reassessment of what remains within reach, may help the Project begin to master part of the task it set for itself in its earlier planning stages. It is clear, however, that the original intention of establishing model districts needs to be reduced to manageable proportions if the Project is to make any progress toward its more important objectives in this area.

V. Research and Evaluation Program

A. <u>Goals of the Research and Evaluation Program</u>

When the budget for the second phase of Project City Science was revised downward, the scope of the research program was also reduced. The following four broad goals were spelled out in the revised proposal as constituting the major intent of the Project in this area.

> 1) <u>A Research and Evaluation Institute</u>
>
> The intent is to design a lasting mechanism that will begin to make headway in generating systematic knowledge about the science learning of early adolescents in the inner-city situation, and also how to achieve science teaching in the inner-city schools.
>
> This mechanism is to be named the "Institute for the Study of Inner-City Science Instruction," and would serve as a clearinghouse for research needs, a doctoral and postdoctoral study center, and a synthesizer of knowledge.
>
> 2) <u>A Basic Investigations Program</u> that would develop a "research model" rather than conducting basic research.
>
> 3) <u>A Research Applications Program</u>
>
> This would entail the identification of key questions necessary for the improvement of science teaching in the inner-city intermediate schools, determining the state of present knowledge and matching that to the key questions, and to then identify the most useful research approach, and conducting studies suggested by this process.
>
> 4) <u>A Program Evaluation Program</u>
>
> This goal envisions summative evaluation of various components of the program, disseminating the approaches used in these evaluations, and the institutionalization of these skills in the proposed Research Institue.[34]

These goals, taken together, form a composite picture of the research program. The program would be intensively involved in defining areas of need and proposed models and approaches; conducting both applied research and evaluation studies, disseminating the results of these efforts, and organizing these activites into a functioning research institute.

There is some ambiguity about precisely when the research institute is to be formed. Discussions with the staff indicated that the goal is to have the institute organized by the end of the funding period, and thus it cannot be a focus of the present evaluation. The proposal stated that the institute would be in operation by the end of the grant period (1978-1979). How long it should have been in operation by then was never specified. The current thinking of the staff appears to indicate that it will not actually become operational until the close of the funding period.

B. Documented History of the Research Program

During the four-year funding period of Project City Science, there has been a persistent and insistent emphasis on the need for research in science education in the inner city. The following chronology documents the stages through which the project conceptualized the research focus from the first Quarterly Report through Progress Report #11.

1. December 1974

   A symposium was planned for the American Association for the Advancement of Science convention for dissemiation of information.

   Teachers were interviewed to inquire about general attitudes toward their work.

2. March 31, 1975

   Staff symposia were initiated to determine project goal-related basic investigations. Three were held.

   Results of teacher interviews were reported. How the results of these interviews affected the selection of teachers or planning in the project was not indicated.

3. June 30, 1975

   At a meeting of the National Advisory Board, the need for research in organizational theory and change models was discussed. Subsequent reports do not indicate how or whether this advice was followed up.

"Possibilities" for research studies were listed. From this list it appears that few topics were ultimately adopted. As they were stated, none were precisely used as a basis for further investigation.

4. November 1975

A Research Coordinator was appointed and planning meetings were held. No research projects were as yet planned and no direction seems to be evident for the research program.

5.

A study of student reactions to the school strike was presented. There seems to be no clear relationship to the PCS effort either expressed nor implied in this study.

6. March 1976

Two research meetings were conducted in January 1976 to "formalize plans for the implementation of the Basic Investigations, the Research Applications, and the program Evaluations programs."

Two strategies were discussed: one that would generate basic knowledge to improve science education and one that would involve a cooperative effort among all constituencies involved in PCS. As yet no particular focus had been developed, although broad outlines seemed to be emerging.

Categories of research and dimensions of approach were articulated. A rather lengthy discussion of characteristics of designs, measurements, and topics was presented after consultation with other NYU researchers.

A large number of possible studies was suggested by the participants, but there appeared to be no formal adoption of one strategy. Instead, the participants suggested a literature search as a beginning. This seems to have been followed up in the fourth year of the project, which was two years from the date of this suggestion.

Collaboration with other colleges and universities was described, and several outside specialists were said to be preparing research designs. A complex interaction between schools, students, and science was proposed as a focus for research efforts.

Followup at conventions with other researchers were planned. These meetings were to provide a critical mass of researchers interested in collaboration with PCS researchers.

The elegance and complexity of listed topics is obvious. However, the research efforts which have ultimately emerged were decidedly more modest. It appears by this time the project leadership had shifted its focus from project initiation to outside initiation. This would seem to be useful only if outside consultants were used on a continuing basis. Otherwise, the project staff might not have the same investment in their ideas and might not pursue them with the same intensity.

7. <u>May 1976</u>

According to this report, the project staff "devoted a lot of time solidifying research strategies and isolating specific areas for concentration."

Suggestions from panelists at AERA, and NARST were solicited. Similar to other suggestions made previously, these experts suggested a focus on describing how rapport was gained in the cooperating districts, descriptions of methods used in instruction, and formal evaluation of hands-on science learning. Thus, during the first two years, PCS rigorously sought out suggestions and ideas about its research program.

8. <u>August 31, 1976</u>

The eighth <u>Quarterly Report</u> presented the most ambitious statement to date of research goals and proposed activities. Seven lines of research were suggested:

a) Science knowledge of inner-city adolescents;

b) Science attitudes of inner-city adolescents;

c) Science learning among inner-city adolescents;

d) Science teacher-science student interaction;

e) Non-teacher influences on the quality of science learning and attitudes;

f) Evaluation of preservice program

g) Evaluation of model districts program

As of the summer of 1978, although some work has been conducted on these lines of research, there has been no comprehensive attack on any of these lines of research.

The purposes of the research program were outlined. At this time the project viewed research as helping to improve the practice of teaching science to adolescents in the inner-city. Vehicles for this include "technical" studies that would focus on measurements of attitudes and learning.

A research approach was proposed providing for "paired complimentary studies." Such an approach would entail two separate methodological analyses of a particular issue. Case studies would be paired with a survey, or a psychometric with a clinical or observational study etc.

After some discussion of cautions that must be exercised in conducting studies, the Report listed tasks to be completed for the preservice program, the model districts program, and for the other areas of the research domain.

This quarterly report is the most complete and detailed description of the research program. For the most part it remains however far removed from the nuts and bolts of designing and conducting research. No designs were presented, no analyses proposed, none of the usual paraphernalia of research proposals were used. It seemed to skirt or delay deciding exactly what could be done in PCS. The forty pages used to discuss the research program did not contain the explicit information needed to decide whether PCS can in fact improve the "practice" of teaching science to inner-city students.

9. January 31, 1977

By this period the project began to stress preservice intern evaluation. They were tested with two high-school level tests: the Cooperative Science Tests and the New York State Regents Examinations. It is difficult to understand the place of this testing and evaluation in the preservice program, because of the test level. The unique features of PCS would not seem related to these achievement examinations. The Solving Situational Problems tests, which were also administered to the preservice interns also seem similarly unrelated. Developing intellectual skills or aptitudes in the preservice interns, though perhaps desirable, does not appear to be a major objective of this project. If improving practice in teaching science is the goal, then more construct related testing would be in order.

The attitude Q-sorts and climate questionnaires appear to be much closer to the line of research articulated in earlier reports. How they relate to the major research focus is, however, somewhat unclear, since no hypotheses or research questions were presented to which this testing was pertinent.

A confusing discussion of district selection analysis was also presented. Although districts must have already been selected, since this report covers September 1976 to January 1977, the headings suggested that the questionnaires were part of the basis on which the districts would be selected.

10. June 30, 1977

During this period the research was concentrated on testing of inservice teachers and preservice interns along, with interviewing of field personnel. The testing is amply described along with many of the practical problems in organizing a testing program.

There was, however, very little discussion of how this testing fits into the overall research and evaluation plan, and the practical results of this information were not presented.

11. September 30, 1977

In this period the seven lines of research were restated and several questions were posed in the preservice and model districts evaluation. These questions are subsets of the questions posed in an earlier document (Quarterly Report #8).

The paired complementary approach was presented using the preservice and model districts program as examples of areas in which this approach would be used. It is difficult to see how the testing of knowledge and attitudes and the descriptive and clinical studies are complementary approaches to the same question.

The focus for the 1977-1978 year were presented. Emphasis during this academic year was to be placed on the student population rather than on teachers and coordinators. As an example, student attitudes toward science was one topic for investigation. Other proposed areas for investigation were:

1) Relationship between teacher, teaching methodology and student learning.
2) Nonteacher influences on student learning, such as curricular adaptation, student needs and interests, and adequacy of science materials. What has been accomplished this far in these areas is not clear.
3) Continuations of evaluations of preservice and model districts program.

4) Longitudinal studies of preservice teachers and students to detect long-range changes in attitudes and scientific career choice.

C. Products of the Research Effort

There were no published or completed research documents for the evaluation staff to examine. According to the Project City Science staff, several studies were in progress and several statistical comparisons, such as changes in test scores are measured over a period of time, have been made.

According to the Project staff, the studies in process include:

a. An antropological analysis of the community by a staff member.

b. Analyses of self-concepts and how they relate to school achievement.

c. Evaluation of preservice program focussing on participants' changes in levels of knowledge, skills, and attitudes.

d. Q-sort analyses of change in preservice intern perceptions of inner-city science teaching problems.

e. Interviews with on-site coordinators and cooperating teachers.

f. Changes in on-site coordinators' skills in perception of teaching problems using filmed vignettes.

g. Development of a proposal for funding a research project that would investigate why women and minorities do not pursue careers in science.

Since the documentation of these studies in progress is not presently available, the overall quality of these efforts cannot be ascertained. The evaluation staff will examine these studies in some detail when they are made available.

The topics as presented lead to the following tentative judgments:

1. The studies are not evaluative, but are descriptive.
2. There are no overriding hypotheses or research questions guiding these efforts.
3. The topics have little to do with the hands-on approaches espoused by the Project.

The studies could eventually lead to evaluations of the components of the program, but that would require that expectations, goals, or objectives for the components of the Project be clearly stated. No such expectations appear in the progress reports, nor in other documents submitted to the evaluation staff from the research staff.

D. Overview of Evaluation Findings

The research program clearly intended its scope to be influential in the field of science education. This is evident from statements made in both the original and the refunding proposal. Several early activities of the Project, such as the hiring of a highly competent research advisor, the appointment of a research director, and the acquisition of several advanced graduate students, attest to Project's commitment to a sophisticated research program. In this vein, a rather expensive minicomputer was purchased so that staff would have in-house capability for data analysis.

In addition, the program had an extensive advisory panel, many of whom gave advice on research and evaluation activities. The staff attended several conventions at which further information was gathered. The budget allocations for research activities, including hardware, travel, and staff represent a substantial portion of the overall Project City Science budget.

Why, then, are the results achieved thus far appear so disappointing, both to the evaluation staff and the Project staff itself? There are perhaps several crucial decisions that have shaped and determined the quality of the research effort.

1. Specialization Areas of Research Personnel

The areas of specialization of the Research Director and research assistants. The Director and the staff of research assistants were not science educators. It may have been difficult for them to apply their methodological skills to the rather intractable research possibilities posed by the total Project. It appears to the evaluation staff that their interests in methodology and topical subject matter in psychology may have directed their efforts to a rather limited analysis of all the issues inherent in this Project.

2. Choice of Field Personnel

It was the intent of the Project to employ doctoral students in science education as on-site in the schools and have these persons generate research ideas and be of assistance in collecting school related data. Apparently, these supervisors did not make these commitments prior to being appointed and they did not assist the Project in a substantial way either in supplying research ideas or in providing data. They kept diaries of their daily experiences but how these diaries will be analyzed has not yet been specified.

3. Background Activities in the Model Districts

In a Project with goals as broad as this one it seems inexplicable that agreements with the New York City Board of Education and the local school boards or superintendents did not include plans for acquiring information. The Project reports stated that there was a reluctance on the part of teachers and other staff to allow necessary testing and survey activities to be conducted. Thus, many comparisons that might have isolated the effects of Project City Science on the learning, motivation, and attitudes of students could not be made. Had these understandings been clearly in place before the Project was instituted in the two districts, such difficulties could have been ameliorated.

4. Organization and Planning of Research Activities

The research planning and review meetings attended by the evaluation staff may not have been representative of the the total planning activities of the research unit. However, two elements were conspicuous about the observed planning.

A. There was no participation by the on-site coordinators, nor by other members of the central staff in the posing of questions.

B. The research projects did not emanate directly from questions posed in prior proposals.

Although there is no guarantee that including on-site coordinators or staff members who work directly with on-site coordinators and interns would have made the research effort more successful, the variety and scope of the questions might have been broadened by their participation. The on-site coordinators' role is particularly crucial. Not only were they the doctoral students who were to help the Project develop, but they were the only persons daily observing the activities in the field. Their omission from the planning of research appears to the evaluation staff to be particulary important.

In regard to B above it appears to the evaluation staff that much of the research activity was generated on the basis of available subjects, available data, and available skills of the research staff, and not because of the relevance of the research questions. One staff member has, for example, been developing anthropological profiles of two model districts. What questions or hypotheses are being investigated is not clear.

This seems to be a major problem. Although several areas of research ("lines of research") were stated in Project Report #8, the present research activities do no seem to be generated by a well-developed overall research plan, which should have been prepared following these proposals.

It is clear that the Project intended to generate broad outlines. Both the so called Basic Investigations Program and the Research Applications Program[35] indicated that a research model was to be developed, and key questions identified. Had this been done, perhaps the research program could have proceeded on a more planned basis.

5. The 1978-1979 Prospects for the Research Program

A. The Project will be able to carry out several small-scale analyses of their teachers and students, but these studies will only be peripherally relevant to the field of science education.

B. More emphasis on the case study or clinical approach as outlined by the Project staff may uncover some crucial elements that allowed the program to achieve the success it did have in participation.

C. With more contibution from other NYU departments as well as coordinators and other staff, the Project can expand both the number and the depth of the research studies conducted.

SUMMARY

A responsive evaluation model when applied to the research activities of Project City Science puts the evaluators in somewhat of a quandry. An evaluation that focuses on the extent to which clearly articulated goals (summative?) are met would be decidedly easier in this case. Clearly, few if any, of the rather lofty goal statements made in the proposals and quarterly reports have come to fruition, and probable no one either on the staff or on the evaluation team would disagree with the conclusion that the project has not carried out its research function in a satisfactory manner.

A responsive evaluation, however, must shunt aside the idealistic rhetoric of the proposals and concentrate on actual activities and accomplishments in the research area. Thus, after four years of the entire project, or two years of the renewed funding, the contents of the effort that can be evaluated are:

1) Several reviews of the literature (self-concept, etc.)
2) Several statements of research directions (project reports, etc.)
3) A completed proposal to NSF for a planning grant.
4) Partially completed doctoral dissertations by several staff members.
5) Partially completed studies by Ted Brush on certain anthropological issues.

Whether these outputs are "sufficient" for the amount of money and time expended on them is debatable. Understandably, given the nature of recruitment of on-site coordinators who were to play a significant role in generating and carrying out many aspects of the research function, this level of output could have been predicted. These coordinators were not uniformly interested nor sophisticated in many of the relevant research projects and, therefore, much of the impetus of in-school research was blunted.

Futhermore, there were many fits and starts in data gathering at the local level, due primarily to the fact the research staff detected a negative attitude on the part of the local district personnel toward research. What is not clear to the evaluators is why such research commitments with all personnel were not signed and sealed before NYU organized its inservice and preservice programs.

There were, in addition, other factors that could account for the slow pace of research activity. For one, the present Director may not have given sufficient direction to the day to day needs of the research program. There is a long distance between the "Lines of Research" articulated in Quarterly Report #8, and the actual carrying out of the study. Although such lines of research may have adequately captured the flavor of significant issues in the field of science education, these "lines of research" are sufficiently complex that easily laid-out research designs were practically impossible.

In the judgement of the evaluators, there were simply too many ideas, too much optimism, too intractable a social system for the original intentions in the research area to be realized. This, however, must have become obvious to almost everyone in the project by the end of the second year. Why then did the rhetoric about sophisticated research designs continue until recently? If it were known that more modest approaches to these issues were in order, then frank admissions that the original course was not feasible should have emerged and a more modest course been charted.

Granted, under the present leadership new directions have emerged. The evaluators still have significant reservations about the content of the present strategies, however. This is a project about science education in the inner-city, yet few of the proposed studies seem to be clearly related to the overall issues embraced by this project, such as: How well is this project working for its target population? Which elements of the project are successful and which elements should be abandoned? Why is the "hands on" approach superior to other modalities in teaching science to inner-city students? It is such questions that form the basis for proposed extensions and replications of the PCS efforts.

In a section of the last published Progress Report, the staff summarized efforts made in the research area through 1977.

> During the first year of Project City Science's existence, our initial task was to establish our credibility as a university based enterprise capable of working cooperatively with school and district personnel. The second year signaled the beginning of research interests with increasing numbers of staff-conducted studies. In the third year, the research team ... undertook the task of defining and building the research program.[36]

Thus, the first year was to "establish credibility," the second year lead to the "beginning of research interests" and the third year, the "defining and building" of the program. As an overview of what was attempted, this is not entirely clear. One might ask, for example, how credibility would have been harmed by the completion of some good research. In any event, the result is that in three years little research has been produced. The staff has not yet characterized the fourth year. What is evident is that the research effort thus far conducted appears weak and ineffective. The staff has a great deal to do if they are to accomplish the goal of building an institute in the single year of funding that remains. Perhaps a reappraisal of what remains within reach would lead to the selection of more modest but perhaps more attainable objectives for this phase of the Project.

VI. The Preservice Program

A. Introduction

In its initial refunding proposal in December 1, 1975, Project City Science described an extensive list of goals and tasks to be accomplished during its third, fourth, and fifth year of operation (September 1, 1976 through August 31, 1979). The budget of the refunding proposal was revised downward on May 5, 1976 and, as a result, the specific goals were apparently refocused and redefined. This reformulation of goals did not change the main purpose of Project City Science, which was basically to improve intermediate and junior high school science teaching in the immediate New York City schools and to learn something in the process that would be useful to the broader community of science educators.[37] In particular, it was hoped that a deeper understanding of how to teach science to adolescents in the inner city would be a major outcome. An important part of this effort would be the knowledge that the Project hoped would result from an experimental program designed for training teachers to meet the demands of teaching science in the urban environment.

B. Goals of the Preservice Program

One of the four main products that were to be developed during the second phase o. Project City Science's existence was a model preservice training program. The Project staff felt that such a program was urgent from several standpoints:

> ... as an institutionalized embodiment of the Project's philosophy, its standards and its approaches to inner-city intermediate school science teaching; as an ongoing link to the model districts' and as part of a stabilized financial base for continuing Project activities.
>
> In order that other universities may adopt a similar approach to the preparation of inner-city junior high school science teachers, the Project will have its system tested and in operation by 1980. Explicit descriptions will be made available in the literature concerning all aspects of the program, including selection processes, field aspects, the content and structure of special courses developed for the program, assessment procedures and results, and placement outcomes.[38]

The preservice training model that was ultimately developed included a master's degree program. The Project sought to recruit individuals who had completed their baccalaureate degree with a major in science. Rather than recruiting individuals who had a broad background in education and needed science instruction, the PCS approach was to seek out individuals well versed in science who would then be given a variety of planned experiences in education. The training of interns would emphasize the need to understand the structure of the schools, the sociology of the inner-city, and a process approach to the instruction of students. Trainees were not given a stipend, but twenty-four of the thirty-two credits they needed to complete the M.A. would be offered free.

The coursework, as contemplated, is conducted at the university. During the early part of the school year (September and October), the interns are provided with a variety of orientation experiences including workshops on various topics and visits to field sites. They also visit, on a rotating basis, each of the eight schools participating in the project. Under the guidance of the staff, interns select the schools they would prefer to work in and are ultimately assigned. Their time spent in the school increases until the interns are eventually spending four days a week there. The fifth day is reserved for course work at the university.

It is clear that the Project intended to develop a preservice program that could be disseminated and used elsewhere. The structure and content of the Project's approach to training teachers is one that had apparently been in the process of formulation during the first two years of operation. In the revised proposal, the staff noted its intention of continuing earlier efforts. The staff indicated that at that point (1976), little had been developed that was completely new.

> As science teacher preparation programs go, the Project City Science Preservice Program can boast few if any altogether novel features. What is unique about it is its focus: the preparation of <u>inner-city</u> science teachers for the <u>intermediate</u> grades.*

<u>Quarterly Report #8</u> (written in 1976) further noted that what the Project had been doing could not as yet be considered a program of teacher training. It remained at juncture a comilation of experimental procedures and attempts that needed to be refined. The status of the preservice phase at that time and the staff's hopes for its future development were described in that report in the following manner:

> The Project City Science Preservice Program is not a program yet. It is a collection of many ideas and some experience. Still, it is taking form, acquiring character, and before long should have established itself as something special. As it is now developing, the Program intends to have these features:

*New York University, <u>Project City Science</u>, Quarterly Report #8, p. 65.

1) selection procedures that identify those candidates most likely to become outstanding teachers of science to inner-city adolescents

2) an orientation experience that prepares participants to benefit maximally from the year's field and academic work

3) heavy emphasis on field work that lasts an entire year and includes citywide, neighborhood, school and classroom activities, as well as work with individual students in many different contexts

4) a progressive introduction to teaching, starting with tutoring single students and culminating with the simultaneous instruction of several science classes for an extended time period

5) a high premium on developing skills of self-analysis, including the frequent use of videotaping and audiotaping

6) supervision of practice teaching by a team composed of a master teacher who has been specifically trained as a teaching supervisor and who is also personally involved in some creative aspect of improving intermediate school sciences; a university science education professor who is investing his or her research and development energies in the same schools in which the student teachers are placed; and a science education doctoral student who is preparing to become a professor of science education

7) a science learning experience that is the university equivalent, philosophically and pedagogically, of what science teaching at the junior high school level should be like

8) special attention, including substantial field work, to the psychology of the early adolescent, to the sociology of the inner city, and to their interaction

9) independent study opportunities provided to assist candidates in teaching a criterion-referenced knowledge of the physical, biological and earth sciences

10) a methods course that focuses exclusively on teaching science in grades six through nine and that faces up to the realities, both positive and negative, of inner-city schools

11) a set of intensive workshops on topics such as group dynamics, bilingualism, the reading problem, classroom research, and the like, that fill lacunae among, reinforce, or cut across topics dealt with in the scheduled classes and field work

12) a culminating group experience that helps each candidate reflect on his total year's experience in view of his or her own personal needs for self-actualization and approaching professional responsibilities

13) a built-in monitoring system for signaling the need to revise one or more aspects of the program

14) linkage to continuing research and development activities that are also concentrated on inner-city intermediate school science teaching

15) follow-up support for participants (job placement service; visits during first two years of inner-city teaching, if within range; newsletter)

16) master's degree program in science education specifically designed to build on and implement the preservice experience

Our aim is to develop a unified program incorporating the above features. Eventually an overall design should emerge that is distinctive, coherent and more durable than the individual parts making it up.[39]

As is clear from the extensive list of program features cited in this report, the Project staff had set very demanding objectives for the preservice phase of the Project. Though the features appear complex in nature and difficult to attain, the PCS staff apparently felt that reasonable progress had been made in reaching them during the 1976-77 school year. In Progress Report #11, written in summer of 1977, the following conclusion is offered:

The Project-City Science Preservice Program continues to take form as a unified, cohesive package. Individual components of the program (orientation, coursework, field experiences) have been defined and ways of integrating and coordinating these parts have continued to be explored. During 1976-77 the Project has taken significant steps to develop the program features described in Progress Report #8 [sic][40]

The course work mentioned in this report had by now taken shape and been generally formalized as part of the program. The actual instructional part of training program, which was to be conducted at the college, consisted of five basic courses: the psychology of the early adolescent, the sociology of the inner-city, methods of science teaching, curriculum, and science. The program for interns was to be as follows:

FALL		SPRING	
Integrated Science I	(3)	Integrated Science II	(3)
Psychology of the Early Adolescent	(3)	Sociology of the Inner City	(3)
Methods of Teaching Science to Inner-City Adolescents	(3)	Supervised Student Teaching	(6)
Science Curriculum	(3)		
	12		12

In recruiting interns for the program, the Project staff had established what appears to be a relatively demanding set of criteria. Attempts to apply those criteria are discussed more fully in a following section. The criteria included the expectation that candidates for admittance would be prepared to spend several days at a Project site, after which they would be interviewed to determine their suitability for the program. The full selection procedure was to be formalized and ready by the spring of 1977. The staff planned to have "the 1977-78 class identified, screened and accepted by May 1, 1977."[41] Three aspects of this selection process were identified:

> (a) how to attract students to the program on a continuing, nonsubsidized basis; (b) what screening procedures to use; and (c) how to evaluate both systematically.[42]

The training program, apart from providing specific instruction and a variety of important field experiences, was also to offer interns an example of the quality of teaching that would be expected of them. After explaining that the Integrated Science course would organize the New York City science syllabus for grades seven through nine into four large units, one of the progress reports went on and explained how the units were to be presented.

> Each unit will be designed using a different organizing principle: contemporary social-political issues (Energy); the power of science-based technology to change life radically (Science and Revolutions); universal themes (Movement); and scientific methodology (The Search for Simplicity). Each of the four units will include material from all of the natural sciences.
>
> Furthermore, it is anticipated that the point will be reached in which each of the four units will employ a distinctly different teaching approach. In any case, in every pedagogical aspect (presentation, use of materials, testing, etc.) the teaching must be exemplary. As a result: our program participants will come to know what good science teaching is by experiencing it; we will be continually establishing our credentials as their teaching mentors.[43]

For their field experience, interns were assigned to work with one, or sometimes two, cooperating teachers in the Project's school sites. Their initial responsibilities included observing and tutoring individual students or small groups. Eventually they would be expected to take over two teaching periods a day.

Each of the eight junior high schools had an on-site coordinator, assigned by the Project, available to aid the preservice interns in their efforts. The function of the coordinator was to help improve the quality of science instruction of not only the intern but the regularly assigned teachers in the building. By thus helping to create a model teaching atmosphere in the schools, the coordinators were to serve a vital and important purpose in the training program. Their presences as observers and their support of good teaching is considered a key element in the model the Project is seeking to develop.

Overall then, the intent of the preservice component of the Project was to develop a unique model for training junior high school science teachers. By applying and testing the model, the PCS staff hoped to shape and develop a final product that could be used by other colleges or universities who were preparing teachers for the inner-city. The training provided constituted not solely a series of courses but a sequence of planned experiences calculated to develop a depth of perspective about the role and function of the teacher in the urban culture. An important part of the perspective the staff was seeking to develop was a view of instruction that went beyond the traditional lecture approach.

> In 1977-78 we hope to present a total course package that will be coherent as well as useful as a theoretical basis for doing the kinds of "hands-on" activities in the schools that will serve as exemplary models of science teaching. This goal can be achieved by careful and recurrent planning....[44]

C. <u>Overview of Program Progress</u>

This section describes: a) aspects of the preservice phase that have been accomplished, b) aspects of the preservice phase that have not been accomplished, and c) the outcomes that were accomplished but that had not been specified in the revised proposal.

Evaluation judgments are based on observations and interviews with Project staff, preservice interns, and cooperating teachers and their administrators. Additionally, some written data were collected from preservice participants, on-site coordinators, and cooperating teachers. Visiting observers, i.e. science educators, science supervisors, and teachers also contributed their judgments of the Project. All observations, discussions, and interviews were conducted between January and June 1978.

In its revised proposal Project City Science promised that "explicit descriptions will be made available in the literature concerning all aspects of the program, including selection processes, field aspects, the content and structure of special courses developed for the program, assessment procedures and results, and placement outcome."[45]

These individual aspects are examined here in the same order.

Selection Processes

Quarterly Report #8 stated the Project intends to have "selection procedures that [would] identify those candidates most likely to become outstanding teachers of science to inner-city adolescents."[46] Selection, however, begins with recruitment. Recruitment efforts were based essentially on posters, brochures and occasional advertisements in such papers as The New York Times; The Village Voice; The Army, Navy, and Air Force Times; the Peace Corps Hotline; and the Daily Challenge. These efforts did not appear to produce large numbers of applicants, leaving the Project in the awkward position of selecting from a very narrow pool of applicants.

Admission Requirements

Applicants for admission to the program were expected to have a Bachelors Degree with at least 24 crdits in science distributed across several disciplines.

A minimum grade point average of 2.5 was required. In addition, candidates to the preservice program were expected to provide evidence of their desire to work with inner-city adolescents. "Evidence" was to be in the form of "Prior volunteer or paid experience in at least one of the following settings: school, social agency (such as drug treatment center or hospital), settlement house, camp, after-school center or other comparable organizations."[47]

Finally, candidates were expected to spend several days visiting the classrooms of the cooperating schools and subsequently discussing their "feelings about that experience and the prospect of working in an inner-city classroom...."[48]

In this way the PCS staff hoped to gauge the prospective interns' academic qualifications and their attitudes and other personal qualities.

In spite of these criteria, of the fifteen students accepted into the 1976-77 preservice program, only 10 completed the sequence.

Quarterly Report #8 suggested that the "selection procedure has to be formalized and readied to be tried in early spring" and that "We should aim to have the 1977-78 class identified, screened and accepted by May 1, 1977."[49]

The Project had recruited only four students by July, and in August 1977, students were being admitted "without transcripts, recommendation, etc." The Project ended up with nineteen candidates for September, 1977. Obviously, under such conditions Project City Science did not always get the type of participant they were looking for. With an inadequate number of applicants, the selection process broke down. These results highlighted a serious deficiency in the model, i.e., how well does it attract desirable candidates? The problem will become particularly acute when participants will have to be recruited without the incentive of 24 tuition-free credits. It may be that there are relatively few students with an undergraduate degree in science who aspire to become intermediatediate school teachers in the inner-city at a time when there appear to be many difficulties. It is also possible that there are even fewer of that population who can afford to attend graduate school full time for a year, inasmuch as tuition assistance is received for only a portion of the master's degree program. If the preservice program is to be disseminable, it would seem the Project must address itself to the recruitment issue.

Recruitment appears to have improved somewhat for the current year (1978-79), since the Executive Director of Personnel (Board of Education of the City of New York) circulated an information sheet about Project City Science.* In June 1978, the Project sent acceptance letters to sixteen applicants. By mid-July, ten candidates had accepted invitations to become preservice interns. That is clearly better than last year, but still does not inspire excessive confidence in the drawing power of the program.

In spite of the admissions criteria that appear above, the only selection procedure the project has developed to date is a written six-question addendum (see Appendix T) to be answered in lieu of an item on the standard New York University application for admission. In addition to this written material, the Associate Director conducts interviews with all applicants. A guideline for such interviews was discussed and some suggestions were made in June 1977. This material is used by the Associate Director, but "has not been printed," an unusual and disconcerting oversight.

When asked whether any relationship existed between admission "scores" of preservice interns and identification of drop-outs and force-outs over the past few years, and whether admission scores were related to "successful" performance, the Associate Director said that this had "not yet been researched," but indicated his hope that it would be. In response to the same questions, the Project Director indicated that raw data on admissions is available, but that he was uncertain as to who would do the research. There is a seeming lack of

*Letters were sent to some 3000 interested candidates.

smooth coordination between the separate components of the PCS effort implied in such statements.

Field Aspects

Another feature of the preservice program is the extensive orientation given the students. In the 1976-77 school year, it was held from September 13 through November 12.

> ...the orientation consisted of an introduction to the Project City Science staff, numerous workshops and field trips. These activities were designed to introduce students to many aspects of teaching science in New York's intermediate schools. Many of the topics included in the workshops and field trips were specifically related to subsequent course work. Others, which did not fit as conveniently into the required course structure, were included because of their relevance to teaching science in an urban setting. In addition, during the orientation, preservice students visited each of the schools in which the Project anticipated working.[50]

A major criticism of this orientation, as reported in Progress Report #11, was that it appeared to extend too long into the school year. A shorter orientation was planned for the 1977-78 group. This was apparently implemented successfully.

This attempt at monitoring and solving Project problems is seen as a positive accomplishment. It is uncertain whether the orientation process was significantly shorter for the next cycle of preservice interns. It is the Associate Project Director's recollection that the fall 1977 orientation program ended in late October.

Each course has a field component in which students are expected to relate their academic instructions to the reality of the inner-city situation. The specific value of the field experience should be rationalized and examined within the context of each course. This evaluation of course content and structure will be given in a future evaluation report.

The Project regards student teaching as "the paramount field activity" and the evaluators concur in that assessment. In theory, student teacher placement is an outgrowth of the orientation process. Students visit each cooperating school in each district and self-select the cooperating teacher with whom they would like to work. Three points should be made: 1) Although students visit all the cooperating schools in both districts, their final selection tends to be the school that is most convenient with regard to travel from their homes. 2) Not all the participating schools can be described as "inner-city" situations. 3) Although the choice of the cooperating teachers is of crucial importance, the Project is not always able to make its own selection. In most cases the building administrator suggests candidates who are then interviewed. It was the Project Director's impression that these candidates were volunteers. Interviews with cooperating teachers suggests that some felt administrative pressure to participate in the program. One cooperating teacher commented, "I did not have a choice of intern, or receive any warning. One day they were here." This is certainly not the model that Project City Science desires. It is, however, the day-to-day reality that results from poor communication with cooperating administrators and teachers.

Data was collected in two ways with regard to the preservice students' perception of their cooperating teachers. In one case, the students responded to a questionnaire and in the other instance, participated in an in-depth interview. Both techniques were administered at the conclusion of student teaching. The results of the first method are described here. The interview results appear in Appendix Q of this report.

To maximize the impact of the "hands-on laboratory" model of teaching espoused by the Project, it might be assumed that student teachers would be placed with cooperating teachers who employed a similar teaching technique. Yet, in response to the question: "Did your cooperating teacher use an instructional model that was consistent with what you were being taught in Project City Science?", the answers reflect great divergence. Only two preservice interns gave a positive reaction.[51]

The students apparently perceived their cooperating teachers as using a different model. In spite of this inconsistency, the cooperating teachers evidently had great impact on the professional growth of the preservice interns as may be inferred from the following question: "Did your cooperating teacher(s) make an effective contribution to your growth as a classroom teacher?" Nine students responded positively, suggesting the importance of the cooperating teacher in this field experience.[52] What teaching approach the interns are learning from the teachers obviously remains a major question, however.

As a result of observations made during visits to the schools, direct interviews, and data from questionnaires, the cooperating teachers appeared to differ greatly in their ability to assist the student teachers with regard to planning, classroom management, and evaluation. Part of the problem was that some cooperating teachers were not aware of the Project's expectations of them or the role they were to play. They were personally uncertain of the Project's goals. This uncertainty contributed to a general feeling that the Project is vague about its own goals. Some sample suggestions made by the cooperating teachers about their roles and Project expectation include:

> Give written and specific guidelines to cooperating teachers so they know exactly what is required of them and when.
>
> -
>
> Give cooperating teachers definite guidelines as to expectations; innovative lessons that are available; supplies available; student teachers' special capabilities or field of expertise. This way the cooperating teacher could guide better as well as benefit more.[53]

One cooperating teacher, noting uncertainty about her role, said, "I was told to sit back and watch and learn the new methodology (the intern would) introduce to me and the class .... there was little I was expected to do."

These comments suggest Project City Science must spend more time orienting the cooperating teachers if the Project wants to make use of the potential power of the field experience for its own purposes. All evidence indicates that the influence of the schools is great. It remains to be seen whether the Project is using that influence to work for or against itself.

There is some question about the preservice intern's role as a change agent. In some cases it is being overstated to some cooperating teachers, resulting in feelings of resentment, i.e., "I'm an experienced teacher and I am successful. It's my job to show him what will work."[54]

There is some uncertainty about whether the Project's goal is to introduce a "new methodology" to experienced classroom teachers (the change-agent role) or whether it is to provide a student teaching field experience in which preservice interns can try their hand at a specific Project City Science teaching approach. It may be unreasonable to expect preservice students to modify the teaching behavior of "successful" teachers. Most cooperating teachers denied that their own teaching had been affected as a result of the preservice intern's presence. Some admitted they had picked up some new lab experience that they would use in the future. One teacher, already committed to a laboratory hands-on philosophy was entusiastic about the help and the labs the student teacher provided. It would be difficult to estimate the degree of change in his teaching as a result of serving as a cooperative teacher. More likely the model was reinforced in that situation. If cooperating teachers deny any change in their own teaching strategies as a result of working with a preservice intern, it suggests the "change agent" concept may not be working, though one must admit the possible tendency of teachers to minimize the influence of another teacher, particularly an inexperienced one.

Among the features the program intends to develop are the:

> Supervision of practice teaching by a team composed of a master teacher who has been specifically trained as a teaching supervisor

> and who is also personally involved in some creative aspect of improving intermediate school sciences; a university science education professor who is investing his or her research and development energies in the same schools in which the student teachers are placed; and a science education doctoral student who is preparing to become a professor of science education.[55]

Presumably, the master teacher described in the above passage is the co-operating teacher we have already described. The third member of the supervision team is the doctoral student preparing to become a science education professor--this member is the on-site coordinator.

During interviews conducted in June of 1978, five of the on-site coordinators offered their view of the tasks inherent in that role:

evaluating preservice interns
resource link
lesson planning
arranging and organizing field trips
change agent
workshop giver
diagnostician
coordinate preservice training program
help preservice and cooperating teachers to achieve a hands-on experimental mode

In thus describing themselves, they appeared to confirm the Project's perception of them.

> Our field status was further stabilized by the increased maturity of the on-site coordiantors. The diversity of their experience in the schools with Project Preservice students, with teachers inservice, and with school administrators is rich, perhaps unique. This experience allows and often requires them to perform a variety of tasks in many different contexts. Furthermore, in many ways, they are the yardstick by which the Project's credibility is measured in the schools. Therefore, the on-site coordinators, by their ability to engage with teachers in curriculum adaptation, to work with students and teachers in coordinating science fairs, to supervise preservice students, lend continuity and stability to the Preservice Program.[56]

It is clear, both from the Progress Reports and their own perceptions, that the on-site coordinators have a major responsibility in supervising the preservice student teaching field experience. Yet the Project requires no formal supervision course work at NYU. The coordinators receive six graduate credits for the experience they get from supervising the preservice students. In addition, only three of six on-site coordinators are themselves experienced junior high school teachers. The concern expressed here is related to their effectiveness as supervisors of interns in the program.

Preservice interns expressed mixed reactions to the supervisory efforts of the on-site coordinators. In general, they expressed dissatisfaction with the amount of healp they received in prelesson planning and postlesson evaluation. It is important to note that the on-site coordinators were only required to be in the schools three days a week, with the other days devoted to their own doctoral program responsibilities.

It may be that the on-site coordinators were too burdened to provide the supervisory support the student teachers felt they needed. As a result of interviews with the preservice interns it also became obvious there are strong personality clashes between some of them and their on-site coordinators. Whether supervision is a problem due to constraints on time or personality differences, it is suggested that the Project City Science staff needs to develop a formal mechanism to ameliorate or solve this problem. Some well-organized training in supervision would be one useful step in that direction.

Lack of clarity appears to be a constant problem. On-site coordinators did not appear to understand their roles until late in the year. One on-site coordinator indicated his greatest frustration was due to a "loose sense at first of what the role was all about--in some ways the nonjudgmental attitude of the [PCS] staff made it difficult to know if a job in the school was indeed being done. [There was] vagueness regarding the ultimate goals [sic]."

Others commented: "The project is a little arbitrary in its expectation of what is to be done or accomplished by different coordinators--this has a good point to it, but I was a little confused in my first two or three months on the job." "Lack of prior training in supervision and management made it difficult for me to realize what was expected of me by my preservice interns." "The lack of any sense of direction seemed to be the greatest problem."

Other areas of concern to on-site coordinators were "the negative attitude of the teaching staff toward change." Working with administrators, getting noncooperative teachers to see and use the methods propounded by Project City Science by which the Project's credibility is measured in the schools."

It is unreasonable to expect relatively untrained and inexperienced personnel to provide strong supervisory services to student teachers. If the on-site coordinators are so uncertain about their own roles, the problems are greatly compounded. For the same reasons it may be unreasonable to expect these on-site coordinators to become effective change agents within the school. On-site coordinators need formal training if they are to be effective. As the most visible representatives of the Project, their roles may simply be too important to be lef to on-the-job training.

Finally, the preservice student interns' own performance in this "paramount field activity" must be addressed. In this regard it will be useful to examine their performance from three perspectives:

a) How does the preservice intern regard the Project City Science approach, its effectiveness, and its influence in the schools?

b) How do the preservice interns feel about their own professional development?

c) How do outside observers perceive their attempts to implement the teaching approaches taught by Project staff?

1. Preservice interns were asked whether they had been given a clear model for science instruction, whether the instructional methods they had learned were effective with inner-city adolescents and whether they believed the hands-on model was effective in the junior high school.

The overwhelming response was "yes." In that sense, their Project City Science training was successful. Most of the interns completed their student teaching experience convinced of the general efficacy of the teaching approach espoused by Project City Science, though they expressed a number of important reservations (see Appendices C-D)

It is clear that a majority of the preservice interns felt they had an understanding of and reasonable confidence in a "hands-on" laboratory approach to teaching science. The Project has apparently achieved positive results in terms of convincing students of the overall usefulness of this type of instruction. Although there is a verbal commitment to the use of this teaching approach, there was a persistent gap noted by observers between the view expressed and actual teaching behavior (see Appendices F-G). That difference will be discussed further in a later section of this report.

In terms of Project City Science exerting influence within their schools, the interns appear to be evenly divided. There is some question about achieving a "visible, visitable" entity in their cooperating schools.

2. How does the preservice intern feel about his own professional development? We asked the preservice student teachers questions about effectiveness in the classroom and about their own satisfaction in terms of learning to be a good teacher. Here again the results appeared positive. Additionally, they felt this growth was based on a sufficiently extensive teaching experience, a view that will be examined at greater length.

3. How did outside observers perceive the preservice interns as the product of an innovative new program? During the last few months of the spring semester 1978, the evaluators invited a series of experienced educators to make observations of the preservice interns in a teaching situation. The visitors included three professors of science education from major universities, two science supervisors from the New York City public schools, and three experienced

junior high school science teachers from the Hempstead, Long Island, schools.

The observers were asked to rate the science instruction they had seen, its content, rigor, and significance. In general, the level of instruction was seen as average or somewhat below average. The rating on content, rigor and significance were generally considered average to somewhat above average. When asked to describe the type of instruction they saw, the observers offered comments such as these:

typically teacher-dominated
product oriented
teacher oriented
incomplete, unstructured, inadequate
unmotivated
traditional

Aside from the personal style, the observers were asked whether they could identify a discernible model of science instruction. Some sample responses are given below:

"I don't feel there is a model being used that has any real value."

"Generally, there was no discernible model...there was the usual emphasis on teacher lecturing, teacher structure, teacher questioning, student responding.... The model may be described as teacher-centered, traditional, developmental type....A question and answer review lesson. The science being taught is, in general, unimaginatively presented and of dubious accuracy or relevance."

In one case, two observers in the same class saw a lesson (described as "a hands-on" approach) where students were asked to do an experiment and use answers based on a past experiment.

Most of the observers failed to see anything that could be described as above average. Many expressed disappointment. What is most surprising is that these visits were all announced ahead of time so that the preservice interns could be adequately prepared. On a number of occasions, schedules were changed or students failed to show up, so that visitors and evaluation staff were unable to observe any teaching. Further, the observers were struck by the generally light teaching loads the preservice interns were carrying by the end of their student teaching experience. For the most part, preservice interns were teaching no more than one or two classes a day. Under these circumstances, one might have expected more observable evidence of the Project's training influence, the availability of university staff to help in planning lessons, and the free time to organize and prepare materials. Most teaching observed did not reflect the advantages of these additional resources.

One drawback in the training program appears to be the lack of a regular observation schedule. The interns appeared to receive little guidance in this regard and were free to observe classes as they pleased. Most chose to do it too seldom. It would seem reasonable, at a minimum, to encourage the preservice interns to observe each other on a regular basis. This was not done. There was also little evidence of a regularly scheduled series of observations of the interns by the on-site coordinator--either alone or with the cooperating teacher. The field experience appeared to be conducted on a much too casual basis. Finally, relationships and a rigorous observation schedule are not mutually exclusive. Such scheduling could benefit the intern, the on-site coordinator and the cooperating teacher.

The interns' light teaching loads should also provide time for them to plan lessons more thoroughly. As suggested in Quarterly Report #8,

> Every single kind of activity must be rationalized, described operationally so that students know exactly what is expected of them, and placed in time. For example, if tutoring is called for, then the description should make clear what constitutes minimum number of sessions, what kinds of students are to be tutored (e.g., "normal" students who are merely behind, poor readers, non-English speaking students, the physically handicapped, those with behavior problems, etc.), what is to be recorded about each session, and how and when the tutoring experience will be analyzed.[57]

Finally, it should also be mentioned that the preservice student teachers reported to NYU each Thursday for their own course work. This appeared to effectively interrupt their teaching, requiring the cooperating teacher to carry on any planned unit. It would appear that course work at NYU might be less disruptive if conducted on a Monday or Friday.

Content and Structure of Special Courses

The course structure has remained basically the same the last two years, though specific content is still being modified as the last year of funding approaches. The evaluation team has not had the opportunity to examine all the course outlines and documents, but it is anticipated that an evaluation of these courses will be made and reported on in a future report. Some comments can be made, however. It appears that all of the course work in the preservice sequence is taught by three Project staff members, which may be somewhat limiting in a University setting. In addition, these staff members have limited experience in terms of college teaching or junior high school experience. This was not accidental but part of a planned approach.

> One aspect of staffing does merit attention. It is the deliberate decision of the project to rely heavily on relatively inexperienced personnel on its professional staff.... The reasons for this are that teachers in the respond more positively to interested, informed and energetic colleagues than to university professors. The former are perceived to be there on a more-or less equal footing to work with them on solving problems.[58]

No evidence is offered to support this view. Further, the proposal stated that "Experience outside the city is not given much credence by those teaching in it."[59] This is offered to support the use of inexperienced personnel. The statement, while probably an accurate reflection of the views of the city's teachers, in no way seems to imply that the lack of such experience will increase an outsider's acceptance. It would seem far more likely to compound the problem than minimize it.

There is no question that the staff is dedicated and hard working. The problem is that they are not able to put their full energies into the Project. As noted earlier, they have other university responsibilities. They do not spend much time in the field and as a result do not experience the day-to-day realities faced by the preservice interns. It would be useful if all staff members visited schools regularly. That would be not only an aid to interns but would improve their own perspective about the needs of the Project.

Although the evaluators have not been able to observe all the courses in the sequence, little has been seen resembling "a distinctly different teaching approach. Course instruction by the coordinator and reports by preservice interns appears ordinary and commonplace. It reflects neither special training, additional planning time, nor the resources available to them with regard to the university's staff, materials, or facilities. Seminars and discussions appear similarly mundane and uninspiring. College observers of the preservice course work (Integrated Science, Psychology, Sociology) were, in general, unimpressed with the student reports and presentations in terms of apparent preparation, enthusiasm, student interest, or accuracy of content.

The preservice teachers were asked to rank order the courses they took in terms of their usefulness to the student teaching experience. The ranks ranged from 1 (most useful) to 6 (least useful). The totals are incomplete because some students only listed three courses while others couldn't remember all course titles.

	Choice					
Course	1	2	3	4	5	6
Curriculum	3	4	2	1	1	0
Methods	5	3	3	0	0	0
Integrated Science	2	3	1	6	0	0
Psychology	2	2	4	4	0	0
Sociology	0	0	0	0	4	0
Workshops	2	0	2	0	0	0

Ten of the preservice interns were not sure the course work was applicable to their classroom situation, and none of them rated any of the Project courses as excellent.

Placement Outcomes

A major goal of the Project is to prepare junior high School teachers who can work effectively with inner-city adolescents. After four years of operation there are forty graduates of Project City Science. Fifteen of these are the 1978 graduates, three of whom have teaching positions, on of which may be in a junior high school. Of the twenty-five previous graduates, the whereabouts of ten are unknown; one has no position; one has changed his field; one is in the U.S. Marines; one is employed by Project City Science and eleven are teaching in the high schools (mostly in New Jersey and suburban New York).

To date the Project can claim only one "possible" intern hired as a junior high school science teacher for the inner-city. It is true that regular teaching positions are difficult to find; however, openings for mathematics and science teachers are not unheard of, particularly in New York City. Project City Science graduates appear to be unexpectedly underemployed, given the conditions and four years of program operation. Additionally the staff appears curiously unconcerned about this condition and little follow-up of program graduates has been done.

A related issue concerns the seven students who have dropped out of the program since 1976. The project has made no attempt at a follow-up.

In a description in one of the quarterly reports,[60] the staff suggested it would provide "...follow-up support for participants (job placement service; visits during the first two years of inner-city teaching if within range; newsletter)." There is no evidence this has been done. Since the Project is mainly interested in developing teachers for the middle schools, it would seem that PCS should address itself to ways of encouraging graduates to remain in a junior high setting rather than seeking employment in senior high schools, which the majority of graduates appear to have done.

D. Overall Assessment

Project City Science is producing graduates trained to teach at the junior and senior high school levels. The teaching staff, which operates the preservice program, is small and obviously hard-working. The staff is dedicated to the concept of developing a special program that will prepare teachers to work with adolescent children in an inner-city situation.

There is no special certification for teaching at the junior high school level in New York City. Candidates willing to teach at that level must acquire a secondary school license. Given such credentials, it is not clear why teachers choose to teach at the junior high school level. There would appear to be more prestige, and in the view of many, more "science" to be taught in the senior high school. The idea of more "science" may be particularly appealing to a prospective teacher who has demonstrated an interest and ability in the subject by completing an undergraduate major or minor in a particular discipline.

Further, junior high school students are at an especially challenging age and may not be as easy to work with as more academically oriented high school students.

Given this certification situation, and the special allure of the high schools, what unique program can be developed that will motivate teachers to opt for an adolescent-aged, inner-city teaching situation? Further, what specific training can be devised which will adequately prepare them for this task?

The preservice program of Project City Science has wrestled with these issues. The results, so far, have not been encouraging. Much of the disappointment stems from the grace and eloquence of its own literature which continually promises a program of greater elegance and accomplishment than has actually been achieved.

The Project is operating at an intuitive level and has not produced an operational philosophical or theoretical framework. In the words of the Project Director, "there is no time to reflect ... everyone is far too busy. Central questions are not being asked or answered."

Under these circumstances the Project must operate at an intuitive level, and sometimes it has been remarkable effective. For example, the selection process is not at all as it appears in the literature, and yet some of the participants have been impressive, bright, dedicated, and competent.

There is also evidence that the Project has influenced the views of its preservice interns with regard to a hands-on model of teaching. Although the approach has not been much observed in the field, it is worth noting that students express feelings of competency. Perhaps such feelings will eventually be translated into action. This level of accomplishment may not be great enough, however, to warrant the effort being expended.

The evaluators have observed some poor lessons, weak supervision and some uncooperative, cooperating teachers. None of it has been extraordinary or beyond the range of our prior experience. It is simply that more was expected as a result of the literature and the length of time the Project has been in operation. This time period is deceptive, for the experience centers on a very small number of students. After all, the Project has only graduated forth students in four years, though expectations were that the staff would have trained 100 preservice teachers, 372 in-service teachers, and "will have taught a total of more than 206,000 student-years, of an average of approximately 69,000 students/year" by 1979. This appears to have been an unrealistic assessment of what PCS could accomplish. In spite of these small umbers, the preservice phase is probably the most fully developed component of the Project. It is evident that it represents a great deal of effort.

In working with the evaluation team, the PCS staff has been remarkably open and candid. They have been cooperative and helpful in sharing their thoughts and perceptions. It is possible that the presence of the evaluation team in the next year will stimulate the Project to redirect its efforts and analyze more closely those aspects of the preservice program that offer the greatest promise of contributing to our knowledge of science education.

VII. Dissemination Program

A. Introduction

Through the brief history of Project City Science, dissemination has been considered a separate program, an aspect of the research program, a part of the effort to institutionalize change, or even an unnamed part of the Project's efforts. However, at all times the Project City Science staff has recognized the major role that the sharing of ideas through a variety of media must play in a project of this magnitude.

The evaluation that follows is an incomplete document. It was designed that way, recognizing that the evaluation team will continue to raise questions and offer its observations throughout the 1978-79 academic year.

This section consists of three related parts. In the first, the evaluation staff has traced the dissemination phase of PCS chronologically beginning with NYU's revised proposal (1975) to the NSF. This part of the evaluation report will provide the reader with those expectations and accomplishments of PCS as recorded in the eleven Quarterly/Progress Reports. The second part of this section attempts to describe the dissemination program of PCS as it currently exists. And finally, the last part offers a set of questions and concerns raised by the evaluation team as its foci for the 1978-79 academic year.

B. Goals of the Dissemination Program

The goals of the dissemination component of PCS remained unchanged when the project made its first request for additional support. These goals were broadly stated as follows: "... to generate and disseminate knowledge about adolescents, the learning of science in the inner-city situation, and the process of improving science education."[62]

The 1975 proposal to NSF offered an adjusted dissemination plan with the following new features:

> a) The revised plan relies even more than before on engaging other universities in New York City in the enterprise ... efforts will be accelerated during Project Year #2 (1975-76) to inform the universities in the city having education departments of the project's work .... Initial inquiries indicate that ... at least three or four teacher training institutions and to six to eight community colleges are ready informally to explore various possible ways to become associated with Project City Science.
>
> b) A higher premium is placed on the project's being able to demonstrate substantive and unambiguous "success" in the district in which it works. Only then will other universities and districts be likely to make long-term commitments that are eventually needed to achieve city-wide dissemination.
>
> c) ... this information-sharing responsibility will have to be tailored to contribute maximally to dissemination within New York City itself. <u>To the extent that the project gets positive, tangible results and makes them known</u>, teachers, administrators and parents will seek to emulate its approach. (emphasis added)
>
> d) ... To the extent possible, the overflow [of teachers trained by PCS preservice program] will be deployed in other districts in such a way that they eventually will be in a position to help in continuing dissemination activities.
>
> e) Intermediate and junior high school teachers and administrators throughout the city need to be informed continuously of ways to improve science instruction in their schools.
>
> As the Project learns of useful actions that any district or school can take to improve instruction with or without project interaction--it intends immediately to spread the word. It also wants to let teachers and administrators outside the formally participating districts know of help available to them via Project City Science. Some of these might be: documents and reports; visits to project schools with special science programs; teacher exchanges; "loan" of trained resource teachers to serve as special consultants; project help in conducting their own self-studies

and in planning science activities; copies of New York City Field Trip and Resource Guide (to be prepared by the project); names of individuals in other universities who might be interested in cooperating with them in a PCS-like relationship; and attendance at PCS symposia....

One method selected for disseminating information is the publication of an inexpensive monthly, called citiscience notes ... [which] will be sent by the project to all New York administrators and science teachers in the middle grades

.... (The participating districts will do an additional distribution within their boundaries, including to community groups. The Junior High School Principals' Association has agreed to send copies to all its members.) Another method of dissemination (for a different audience) will come from modifying the Quarterly Report* to include "signed articles" by staff members. The intent of these essays will be to present thoughtful reflections on staff experience, and they are to be written so as to be useful to colleagues having similar interests. Articles will also be solicited from teachers and administrators in the participating districts.[63]

In subsequent discussion of "The Status of Science Education in the Middle Grades," the PCS staff raised a series of dissemination-related questions such as "How can such a voice [like PCS] cut through the cacophony of message-laden New York? What are the communication channels that are most likely to reach the desired audiences?"[64] In an attempt to develop answers to these and other questions, the Project scheduled a March 1976 conference for faculty and graduate students from a variety of relvant NYU departments.

In the Goals, Tasks, and Activities section of this proposal, the following clarification of the dissemination phase of PCS was presented:

> Goal VI: To extend the influence of the project beyond the boundaries of New York University and the participating districts. This goal (dissemination) can be achieved only if the project is reasonably successful in reaching its first five goals, and in addition is able to communicate information effectively to other districts in New York City to other cities, to other universities, and to all interested individuals.[65]

Relevant to the above-stated goal was the following "goal-related task":

*As noted earlier, the Quarterly Reports (now referred to as Progress Reports) are a triannually produced document reporting on Project activities.

. Disseminate information about the goals and activities of Project City Science to individuals within each of the main elements listed above (school, community, etc.) Pay special attention to meetings with administrators and university science educators.[66]

In an attempt to demonstrate the relationship between tasks and activities, the proposal writers presented the following example:

Example 1:

Activity	Goal	Tasks
Publishing citi-science notes every month*	I	Coordinate PCS and community goals. Cooperate with social and educational organizations.
	II	Emphasize new developments. Coordinate science-related resources in school.
	III	Study the resources of the community. Locate available institutions, programs, and fundings.
	IV	Locate basic information in our schools.
	V	Show feasibility of adopting PCS activities.
	VI	Disseminate information about the goals and activities of PCS to administrators, teachers, etc.[67]

*See Appendix S for sample editions of Citiscience Notes.

Finally, this proposal listed the following activities as relevant to dissemination:

#17 - Inform parents and other community members of PCS goals and activities by meeting with District Steering Committee biannually.

18 - Meet to explain PCS goals and activities to various parent organizations, including Parents for Educational Action; Harlem Interfaith Community Service; Lectorium Publications, and others.

21 - Meet to inform UFT leaders of PCS goals and activities.

25 - Contribute PCS press releases and articles to UFT publications.

31 - Aid other universities to adopt and adapt PCS programs for their own.

32 - Advertise PCS to recruit qualified students from other universities and community colleges.

33 - Inform the New York City Central Board science leader's bimonthly publication of PCS activities.

36 - Arrange the Symposia Series.

38 - Articulate the project change model more fully and show its position relative to contemporary theoretical models.

53 - Publish the Quarterly Reports, citiscience notes, press releases, New York City Science Field Trip and Resource Guide and District Supplements.

54 - Arrange regular meetings for the PCS staff with the teachers, administrators, and community.

55 - Meet with and make presentations to science educators: Nationally - NSTA, AAAS, NAASP: Locally - NSTA, AETS, Academy of Science, and other university science education departments.[68]

As noted, a revised proposal was subsequently submitted by NYU to NSF in response to reductions in the budget initially sought. This revision reported the planned continuation of citiscience notes among other aspects of the original program. The Quarterly Reports were obviously retained as an NSF requirement rather than an optional part of the Project, as was the case with citiscience notes.

In describing the preservice program, the proposal made clear that the dissemination effort was not to be limited to that component alone, but was intended to communicate the results of all Project's activities:

> In order that other universities may adopt a similar approach .... Explicit descriptions will be made available in the literature concerning all aspects of the program ....[69]

It would appear that the dissemination component, while technically viewed as one of the four major thrusts of the Project, can be more practically viewed as an assumed subfunction of the research, model districts, and preservice phases of the program. The results in each of these areas were intended to be shared with the broader community of educators. This intention is made clear in much of the Project's written material:

> ... it becomes more important than before to plan for the dissemination of knowledge.
>
> ... to this end, we now plan to have in operation by the end of academic year 1978-79 ... the Institution for the Study of Inner-City Science Instruction .... The functions will include: serving as a clearing house for research on inner-city intermediate school science teaching ... disseminating information on a continuous basis....
>
> The preservice teacher preparation program will receive somewhat more emphasis than described in the refunding proposal. This is because ... it can serve as a focus for dissemination.[70]
>
> The project expects not only to provide summative evaluations of individual components of the project, but also to describe its evaluation techniques in the literature so that they can be used by others....we propose to leave it [project evaluation] to an outside group. This will allow the project to concentrate on the analysis and assessment of various aspects of its work (i.e. project evaluation) and for the dissemination of results to other groups wishing to undertake a similar effort.[71]
>
> The Dissemination Program will match the intended outcomes as outlined above. The model districts will serve as places of observation and as examples of attainable standards in the city setting. The preservice program will have been fully described, including all of its field and academic components and publication of follow-up studies on its effectiveness will have been started. Finally, the ongoing research institute will disseminate research findings and information about the continuing impact of the project and other cities will have been made aware of possible educational change models that might be applicable to their particular situations.[72]

In brief, it is evident from reading various documents produced by the PCS staff that the dissemination of Project activities and outcomes was an important objective of the program. The staff appeared to see this as one of the major contributions the Project would make. It represented an effort on the staff's part to share in a systematic, organized fashion, the results of an effort to deal with a persistent set of problems in an important area of education.

On May 25, 1978, at the request of the evaluation team, the PCS staff prepared a status report entitled, "Notes on Dissemination, Project City Science." The major purpose of the status report, in the absence of the scheduled Progress Report #12, was to describe those dissemination activities in progress and plans for the immediate future, as well as to clarify the dissemination goals for the Project at this point in its history.

The opening paragraph of the status report appeared to confirm a position most recently stated in Progress Report #11, "... empirical testing of our programs, practices, and presuppositions must precede an effort to broaden our base."[73] This statement, however, was expanded in the status report: "During the first three years of the Project the efforts were formative and explorative. During that time no efforts of dissemination seemed proper, or were made other than the monthly production of citiscience notes sent to all middle and junior high schools, and the triannual reports to NSF."[74] (emphasis added)

Apparently the Project staff believed that these criteria had been met when they wrote, "However, the program was sufficiently stabilized by 1977-78 for the first efforts at dissemination to be made."[75]

The status report continued with an apparent clarification or redefinition of the dissemination component of PCS: "The dissemination obligations of the Project include two target groups--expansion of the Project activities through New York City schools during an interval of some years, and creation of parallel operations in other cities." The New York City expansion goal of the Project is currently being approached by the PCS staff through the offices of the executive director of the New York City Board of Education's Bureau of Personnel. As a result of activities, PCS was able to invite fifteen community district superintendents to a meeting on May 17, 1978, to explore the possibility of their volunteering their districts for participation in a PCS type program in 1978-1979.

The second dissemination obligation listed in the status report--"[the] creation of parallel operations in other cities" is reported to have been approached in several ways. First, the project staff met in the fall of 1977 with a New York City union leader who counseled the group on " ... whom to contact in which cities." At the same time the PCS staff approached this extra New York City expansion goal by using the vehicle of the various science education professional meetings. The most recent of these activities took place at the annual convention of the National Science Teachers Association, held in Washington, D.C. between April 7 and 10, 1978. The "Notes on Dissemination" reported that " ... four small meetings were held with invited people from school departments of major cities, university people from the same cities, significant school people from elsewhere throughout the country, and significant university people from around the states."

The status report further reported that additional and different contacts were made by a union leader on behalf of the PCS at the ASCD meeting held in San Francisco during February 1978. The "Notes on Dissemination" concluded with a statement that further dissemination efforts, including follow-ups on those made to date, are being planned for 1978-1979. Appended to the status report was a copy of a correspondence from the Department of Education of the Commonwealth of Puerto Rico requesting " ... the assistance of New York University for a program aimed at thirty science teachers and administrators, currently in service." The letter reported that discussions of such a cooperative effort were held between a representative of the Commonwealth and the Director of PCS during the NSTA annual meeting..

Citiscience notes and the Progress Reports continue to be major dissemination efforts of PCS, but the regularity of these publications appears to have suffered this year. Only a March/April edition of the notes was published this spring, rather than the monthly issues of the past. Similarly, the most recent Progress Report to be published was #11, July 1, 1977 to September 30, 1977. No additional reports were issued at all this year, though one was in press and its completion was expected by mid-July.

Although concern persists about how effectively the Project has organized its dissemination effort, there is evidence that PCS has produced:

a) a series of eleven Progress Reports;

b) a set of citiscience notes;

c) a descriptive brochure; and

d) several presentations at various professional meetings.

It is clear from the literature provided by the Project, as well as through personal interviews conducted by various members of the evaluation team, that PCS has elicited some interest on the part of New York City public school administrators and received some inquiries from non-New York City educators.

Although these latter dissemination efforts seem a long way from bearing fruit, nevertheless that which has been completed is consistent with the revised goals enumerated in the "Notes on Dissemination." As PCS approaches its last year of NSF funding, several questions and concerns related to the dissemination activity require clarification.

C. Implementation Efforts

In the view of the evaluators, a major flaw in the dissemination effort has been the lack of a well-designed strategy. The staff appears to be dependent upon three major dissemination vehicles: citiscience notes, the Progress Reports, and presentations at major conferences. As a complete plan for reaching the large and diverse audience the Project is intended to serve, this seems unimaginative and unnecessarily limited. What seems to be missing is a recognition of the differing needs, interests, and levels of the audience served. The scope of these activities appear too narrow and their form too limited to attain the ends sought.

Three years ago, an earlier evaluation team raised the question of whether a plan for dissemination existed; they concluded it did not. Since that time, the original objectives or goals of the dissemination component, though modified, have remained essentially the same. Progress Reports and a number of citiscience notes have been issued; presentations have been made at professional conferences; contact has been made with representatives from cities other than New York and with superintendents from New York City districts (in addition to the two districts presently involved) for possible replication of the Project. Yet the same question can still be asked, "Is there a dissemination plan?"

It is the opinion of the evaluation team that such a plan has still not been developed. During the earlier evaluation, the following conclusion was drawn:

> No formal dissemination plan exists. The directorate speaks clearly about how dissemination is expected to occur--so it can be said that an informal plan exists. There appears to be no reason to make this plan more explicit.[76]

In contrast to this conclusion, the present evaluation team raises the question of how the objective of disseminating Project results can be accomplished effectively without a formal plan? It would appear that the Project needs to specify its intended audience and determine the best available means of reaching them. Since choices made can be wrong, or at least less effective than other alternatives available, the Project staff should also consider ways of determining how effective the means they have selected are. Project City Science engages in several activities calculated to disseminate its efforts, but there does not appear to be an overall design that guides the activities, assesses their impact and makes necessary corrections. The adequacy of the Project's three major means of dissemination need to be examined in greater detail.

Citiscience notes

The material in this publication appears, in general, to be classifiable into four major categories:

a) Information about PCS, encouraging participation;

b) Examples of the PCS science activities;

c) Surveys and responses to them; and

d) Science-related experience possible in the five boroughs of New York City

Inasmuch as a primary goal of PCS is to improve the quality of science education in the middle schools of an urban setting (New York City), there is no question that "things to do--places to see" (the sub-heading of citiscience notes) can provide a necessary element in this change process. Unfortunately, in the opinion of the evaluation team, such information is not sufficient for the realization of this goal. It has long been recognized that the classroom teacher is but one, though an admittedly essential, member of the team necessary to bring about change. Other groups must include the science supervisors, building and district administrators, board of education members, and othe lay leaders of the district representing the parents. If this assumption is correct, then the Project staff needs to redirect some of its efforts.

To what extent would or do other relevant groups find citiscience notes valuable in achieving the stated goal of improving the quality of science education in New York City? The potential influence of such a newsletter needs to be examined. Specifically, answers should be sought as to whether this publication represents an effective or efficient way of improving the quality of science education. Who reads it and how do they react to it? In one edition, recipients were asked to respond to some questions asked. Of the 1800 individuals receiving the publication, there were some 120 responses. While it is difficult to form any firm conclusions, such a level of response is not highly encouraging. It seems reasonable to question the sustained effect of such a publication as a major vehicle for disseminating Project results or influencing classroom behavior. The evaluation team will, as we believe the Project staff should, attempt to examine how widely read the notes (and the Progress Reports) are and how useful they are considered by those receiving them.

Progress Reports

The triannual (previously quarterly) Progress Reports constitute the major effort in reporting the experiences, concerns, and future plans of PCS. In the case of these reports the intended audience includes the NSF, educational administrators, university based science educators and other interested parties. The expansion of the Progress Report mailing list from 180 to 500 individuals is now intended to include superintendents and university professors who appear on major mailing lists. These additions appear to be in keeping with the Project's expansion goals.

In the absence of Progress Report #12 covering the 1977-1978 school year, it is impossible to determine the extent to which the report will be consistent with the evaluation team's findings for the same time period. This document is especially necessary to determine programmatic consistency in light of the change in directorship during the 1977-1978 year.

Irrespective of the nature of Progress Report #12, the evaluation team has raised questions concerning this aspect of the dissemination program. Most notable among these is our concern for the diverse audience for whom the Progress Reports are written. Specifically, can the unique needs of each group who receives this Report be met optimally by a single document? Have school administrators, both within and outside of New York City received enough clear data in the Progress Reports to determine whether or not the PCS model should be implemented in their schools? Have science education departments at universities been offered sufficient information to determine whether it is a viable alternative or addition to their existing programs?

Beyond the adequacy of the information offered, the evaluators question whether the "findings" are sufficiently rigorous for a project of the magnitude and importance of PCS. The absence of any "analyzable" data is a cause for concern. Activities are reported but evidence of careful examination, analysis, and presentation of results is seldom offered. Denied the advantage of a broader focus, the content of the reports borders on becoming insular and parochial, centering on events of limited interest to those outside of the Project itself. The value of what is being reported needs to be assessed with a view to the audience served. It is possible that changes in format (or additional means) need to be considered to reach recipient groups with such diversified needs.

Conference Presentations

Progress Reports #7, 10, and 11 indicated that PCS staff members have made both formal and informal presentations at such prestigious conferences as AERA, NSTA, and AETS. In addition, presentation on behalf of PCS was made by a representative of the AFT at the 1978 ASCD conference. Clearly, these activities could be appropriate as one means of disseminating Project information and are consistent with the Project's stated purpose " ... of having its model for educational reform adopted by other major universities and neighboring school systems throughout the nation."[77]

In Progress Report #11, it was pointed out that " ... Project staff have increasingly participated in local and national conventions that provide an opportunity to establish a forum of discussion among individuals who share Project interest and goals." Referring to the 1978 NSTA Convention, the report continues, " ... PCS hopes not only to encourage researchers to conduct parallel studies on urban science teaching, but also to interest individuals in establishing a Washington edition of Project City Science." The Report continues, stating:

> .... Discussion of establishing a parallel program in Washington presupposes that the Project is firmly established in New York and is at the point that it can document activities in the schools, suggest profitable models for intervention, and present formal evaluation of its programs. Such documentation is the domain of the Project research team who will make presentations at research conventions in the spring of 1978 such as AERA and NARST. Research presentations are crucial in the Project's effort to attract a critical mass of researchers to insure a large volume of related studies.[78]

This statement is consistent with earlier ones, and is the basis for a concern expressed by members of the evaluation team who were in attendance at one of the NSTA meetings. Specifically, what are the results of the empirical testing of the programs, practices, and presuppositions? What is the "systematic knowledge and substantionated claim(s) ... that have been gathered to date and that the PCS staff had indicated are necessary before full dissemination should begin?

While little in the way of evaluative or research data appears to be available, nevertheless the PCS staff seems prepared to share their "experiences" with other universities and school districts. Contrary to earlier statements that sought to base dissemination efforts upon empirical testing of program results, the sharing appears to proceed on a descriptive rather than an analytical basis.

Such presentations seem to be informal in nature, centering more on Project efforts rather than reporting information about results. Participants at such meetings seemed to be aware of the "soft" nature of what was being shared. At a PCS staff meeting following the NSTA conference presentation, two of the questions frequently raised by people in attendance were:

> "How is the Project documenting its progress?"
>
> "How is your preservice program different from other such programs and how do you know it works?

Discussion on these questions was postponed, but the answers are crucial to the Project for they reflect the demands the community of educators will make before any serious interest will be aroused.

To this end the evaluators are anxious to learn about any "final" presentations planned for 1978-79 annual meetings of AERA, NARST, NSTA, and AETS. Deadlines for these proposals are now due and should serve as an indicator for at least this aspect of the 1978-79 dissemination plan. It is expected that such presentation might include some of the results of the analysis of the "hard" data now being collected, together with the answers to a full gamut of research questions which, taken as a whole, will answer the questions raised at that recent conference.

C. Overview of Dissemination Efforts

In the evaluator's review of the PCS dissemination efforts there was found a continuing attempt to include New York City teachers within the program as dispensers of information presumably of interest to other science teachers in similar situations. At the same time it is curious that the involvement of building administrators as well as building and city-wide science supervisors was not as vigorously pursued as might be expected. As noted earlier, the partnership aspect of PCS, like so many other projects, can either be a positive force or or simply another example of the drawbacks of a limited relationship. The absence of input and the lack of a greater role for leaders of the school system in which PCS exists is distressing. The evaluation team cannot make an accurate assessment of the root causes for this omission. It is noted, however, that the lack has been a continuing problem.

In the earlier report on Project progress, the evaluators made the following observation:

> Still, it is a bit puzzling that Project City Science has not marked the administrators as an important group to win over--if for no other reason than that most of the work with teachers drags along if there is no sustained acknowledgement of it from the principal's office[79]

The response of the Project staff was that this ... "does not indicate so much an ignorance of the importance of administrators to the Project's potential success as it does a choice of tactics and approaches." They noted at that time, their intent to increase administrator involvement. This intent has not been effectively implemented and the evaluators are left to ponder whether the Project staff does not consider such personnel a major force or whether they simply have not carefully considered the entire issue. It would surely appear that the skillful inclusion of administrative and supervisory personnel would be an important part of an effective, long-range dissemination plan. The teaching staff would seem far more mobile. The best often leave and move on to other goals or to the high school. Would not administrators provide the best source of continuity, the most stable long-range focus?

This group would also appear to be potentially more effective as supporters of Project activities. They have a broader range of professional acquaintances, more power to influence others, greater freedom to travel and share experiences, and more immediate access to parents, teachers, and other educators. If such administrative personnel were to take great pride in their science program, it would seem the entire concept of dissemination would be better served. They might then be prepared to invite visitors to their buildings, explain the power of the program, and even be drawn thereby to greater efforts at improvement and further dissemination. There seems to be a built-in reward system here that can work. It is unfortunate that it has not been more deeply explored.

Another troublesome aspect of the Project is the absence of any rigorous examination of what the staff feels PCS has to offer. As noted, the sharing at conferences lacks rigor and must, of necessity, be more informal in nature. The staff needs to ask what specific aspects of their program it believes to be disseminable. The intent had been to have the Project "demonstrate substantive and unambiguous success in the districts(s) in which it works."[81] It does not appear the staff has closely defined what it believes these successes are. An attempt at disseminating program information that is not clearly informed by a detailed knowledge of a project's strengths, can easily deteriorate into a public relations effort. This may be a danger for PCS. A clear picture of what the Project has achieved needs to be articulated. What is it that the staff is seeking to disseminate? If the lure of funding is removed, what would attract colleges or public school systems to adopt the program they are developing? What is the power of the preservice program? What is the thrust of the research effort and what overall model is guiding it? The first priority would appear to be that the staff determine clearly what it is seeking to disseminate. Then the Project's knowledge relative to those aspects can be shared in a more organized and informative manner.

Another problem that PCS needs to consider is the extent to which programmatic ideas can be disseminated, apart from the personalities and strengths of those who created them. The implications of this question need to be examined in greater depth. It cannot be assumed that the major ingredients of the program are usable elsewhere in their current form. The staff will need to consider not only what part of the Project is exportable, but in what form. What aspects seem with slight modifications (and they need to be identified) to be workable elsewhere? What parts seem least likely to be usable elsewhere, seem to be in need of the greatest change and adaptation or appear most subject to local constraints and contingencies? The Project does not appear to have given serious attention to such questions, and yet they appear to be among the ways the science education community could most profit from this effort. The fact that such questions have not been addressed as an important part of the dissemination effort leads the evaluators to believe the PCS staff may assume that what it is attempting is essentially transferable in its present form. That is a view which current research, such as the Ford Foundation study of its innovative efforts, does not support.

On the basis of its evaluation to date the Queens College team has expressed its concern about several aspects of the PCS dissemination program. Of primary importance is the absence of a dissemination plan, which in the opinion of the evaluation team is essential if PCS is to optimally reach its goals in this area. Similarly, the reluctance of the PCS staff to disseminate its findings during the first four years of operations is a major weakness that needs to be addressed immediately. While the evaluation team can appreciate the reluctance of the PCS staff to "disseminate before they are ready," we are concerned in that the time has always been right for the dissemination of formative data.

As PCS enters its last year of funding the evaluation team expects to conduct an analysis of the existing dissemination efforts in an attempt to determine their usefulness in meeting the ultimate goal of improving science education at the intermediate school level. This analysis will also be concerned with how appropriate the published and unpublished efforts (<u>Progress Reports</u>, <u>citiscience notes</u>, and professional meeting presentations) are for the various recipient groups.

Finally, the evaluation team has expressed its concern over the absence of dissemination efforts on the part of key "partners" in the project--those administrators and supervisors in the districts who are in an ideal position to comment about the strengths and weaknesses of PCS as a project to be replicated.

In summary, while the presence of the Progress Reports, citiscience notes, professional conference presentations, and other dissemination means are evident, nevertheless, the evaluators must express some concern about the extent of their effectiveness in meeting the Project's objectives.

VII. Conclusion

In assessing the progress of this Project, the evaluators need to make clear their belief that what is being attempted is important. PCS is in many ways a necessary project doing work that is important. Questions raised deal with the efficiency and effectiveness of that effort, not its intent. It seems fair to state that the Project has faced many difficulties. Not the least of these was the serious fiscal crisis that affected New York City just as the Project was beginning, causing massive dislocations in the educational system as a result of cutbacks in staff. Additionally, PCS has experienced numerous changes in its own personnel, including that of the position of Project Director. The lack of continuity represented yet another difficulty. Lastly, the Project staff has been badly overburdened. There are too few people to do the work that needs to be done. The university staff of six, all of whom have additional responsibilities, is too small to meet the demands placed upon them.

It is quite possible that because it attempted too much, the Project is ending up accomplishing not only less than it hoped, but less than it was actually capable of doing. In overestimating its potential, the Project may have spread its effort so thin it could not achieve that which was actually within reach. It would seem useful to reassess what the Project has available in terms of human and material resources. What are the skills and talents of the PCS staff, and how can they best be utilized to achieve some of the specific goals of the Project? What resources are available in school, community and the university, and how can they be organized to attain certain specific ends that are related to the intent of the Project?

It would seem that a better match needs to be made between what is available and what the staff hopes to achieve. This may mean the pursuit of less global outcomes, but the staff needs to learn to focus its efforts, to apply the greatest effort where it seems most likely to produce the best results. Accepting the risk and recognizing the unpopularity of the view, the evaluators again suggest that the task the Project assumed was beyond its reach. An earlier evaluation of the Project made precisely this point. The PCS staff, in its response to that report, appeared to reject that suggestion.

> It is . . . very encouraging to read that "the staff is good, it has good ideas, it has gotten off to a good start . . . ." All the more depressing, then, to be told that "the job is too big, the manpower needs are overwhelming, the resistance of the city too great." If either the Project staff or the National Science Foundation had been that pessimistic, the Project would not have been attempted in the first place.[82]

Here and in the refunding proposal, a similar attitude is expressed, generally followed by comments that attempted to make a very large task appear smaller.[83] The impression is left that the Project staff may have been so busy arguing the point, that they paid insufficient attention to its potential accuracy. The evaluators had not concluded the job was impossible for anyone to do. They were suggesting it was too big for this project, this staff, this level of effort. The Project's conclusion that "Such pessimism can in fact only generate apathy and thereby become self-fulfilling,"[84] seems unwarranted. It could also cause a reflective and open staff to reexamine whether it can do all it is attempting. It could result in a change in direction, a redefinition of purpose, goals and activities. Such is the intent of the present evaluators, who have reached a roughly similar conclusion.

Finally, the evaluators feel one additional caution needs to be added. It is tempting to reach for the easy conclusion that making the attempt Project City Science has in a large urban area is wasteful, "a drop in the bucket," never enough to make an impact in a city so large and diverse. The evaluation team does not concur with such a judgement and hastens to add that it does not necessarily follow from the conclusions reached. At the risk of being redundant we repeat our belief that such efforts are badly needed. We know far too little about urban schools and far too much about their increasing importance for the nation to continue ignoring them. It is precisely because the target area for this Project is so large and diverse, so difficult to influence, that there is an absolute necessity to define precisely what will be attempted and record the results with rigor. The larger the potential target, the more critical the demand to focus on specific objectives. Misdirected efforts are easy in environments that afford a multitude of choices. Clarity of purpose would seem a necessity in such circumstances.

What can the Project, moving into its final year of funding, now accomplish? Where should it focus its efforts? It would seem necessary that the staff establish priorities. The staff members need to state candidly what they should abandon and what they feel can be accomplished. Such decisions should be based on an assessment of staff talents and those objectives that are within reach. They may not necessarily be the more ambitious goals to which the Project had previously committed itself. In this effort at reassessment, the staff could be well served by a fresh examination of its own list of seven questions, generated when the Project was seeking refunding.

FOOTNOTES

1. New York University, Department of Science Education, The continuation of Project City Science: A Cooperative Multifunctional Approach to the Improvement of Intermediate School Science Teaching in the Inner City, proposal submitted to the National Science Foundation seeking funding for Phase II (1976-77) of Project City Science, December, 1975, p. 3. This proposal is referred to in the text and in subsequent footnotes as the second proposal.

2. Ibid.

3. Ibid., p. i.

4. Ibid., p. 7.

5. Ibid.

6. Ibid.

7. Ibid., p. 8.

8. Mosaic, "Science for Urban Junior Highs," Vol 8, #5, Sept-Oct 1977, pp. 31,33.

9. New York University, Department of Science Education, Project City Science: revised proposal, submitted to the National Science Foundation, January, 1976, p.1. This proposal contains modifications of the second proposal (see footnote 1) due to reduction of funds. This proposal is referred to in the text and in subsequent footnotes as the revised proposal.

10. Ibid., pp. 1-2.

11. Ibid., p. 2.

12. New York University, second proposal, op.cit., pp. 9-10.

13. New York University, Department of Science Education, New York University Preservice Program for Intermediate School Science Teaching, competency based teacher education document mandated by New York State Department of Education, Albany, N.Y., January, 1977, p. 8. This document is referred to in subsequent footnotes as Competency based teacher Education document.

14. Mosaic, p. 31.

15. New York University, revised proposal, op.cit., p. 3.

16. Barbara Sayers, "Changing Science Instruction: Project City Science," NSTA News-Bulletin, May 1978, p. 9.

17. New York University, revised proposal, op.cit., p. 4.

18. Ibid., p. 9.

19. New York University, Department of Science Education, Project City Science, (funded by the National Science Foundation), Quarterly Report #8, June-August, 1976, p. 85.

20. Ibid., pp. 86-88.

21. Ibid., pp. 90-92.

22. Ibid., pp. 94-96.

23. New York University, Department of Science Education, Project City Science, (funded by National Science Foundation), Progress Report #11, July-September, 1977, pp. 18-19.

24. Ibid., pp. 20-21.

25. New York University, Project City Science, Quarterly Report # 8, op.cit., p. 90.

26. Ibid., p. 91.

27. Ibid.

28. Ibid., pp. 91-92.

29. Ibid., p. 92.

30. Ibid., p. 90.

31. Ibid., p. 96.

32. New York University, Project City Science, Progress Report #11, op.cit., p. 19.

33. Ibid., p. 20.

34. New York University, revised proposal, op. cit., pp. 4, 8, 9.

35. Ibid., p. 8.

36. New York University, Project City Science, Progress Report #11, op. cit., p. 32.

37. New York University, revised proposal, op. cit., p. 1.

38. Ibid., p. 3.

39. New York University, PCS, Quarterly Report #8, op. cit., pp. 68-71.

40. New York University, PCS, Progress Report # 11, op. cit., p. 2.

41. New York University, PCS, Quarterly Report #8, op. cit., p. 80.

42. Ibid.

43. Ibid., p. 75.

44. New York University, PCS, Progress Report #11, op. cit., p. 4.

45. New York University, revised proposal, op. cit., p. 3.

46. New York University, PCS, Quarterly Report #8, op. cit., p. 68.

47. New York University, competency based teacher education document, op. cit., p. 11.

48. Ibid.

49. New York University, PCS, Quarterly Report #8, op. cit., p. 80.

50. New York University, Department of Science Education, Project City Science, funded by National Science Foundation, Progress Report #9, September 1976-January 1977, p. 2.

51. Structured interviews conducted by Penelope Haile for the Queens College evaluation with Project City Science interns, April, 1978. See appendix C of this report for complete interview schedule.

52. Ibid.

53. The data reported have been drawn from questionnaires distributed by the Queens College evaluators to Project City Science cooperating teachers, May, 1978. The questionnaire is available from Queens College, Department of Elementary and Early Childhood Education.

54. Project City Science cooperating teacher, intervied, April, 1978.

55. NYU, PCS, Quarterly Report #8, op. cit., p. 69.

56. NYU, PCS, Progress Report #11, op. cit., pp. 6-7.

57. NYU, PCS, Quarterly Report #8, op. cit., p. 81.

58. New York University, second proposal, op. cit., p. 18.

59. Ibid., p. 19.

60. Ibid., p. 70.

61. Ibid., p. 66.

62. Ibid., p. i.

63. Ibid., pp. 44-49.

64. Ibid., p. 52.

65. Ibid, pp. 73-74.

66. Ibid., p. 76.

67. _Ibid._, pp. 77-78.

68. _Ibid._, pp. 80-85.

69. New York University, revised proposal, _op. cit._, p. 3.

70. _Ibid._, pp. 4-6.

71. _Ibid._, p. 9.

72. _Ibid._, p. 10.

73. NYU, _PCS_, Progress Report #11, _op. cit._, p. 41.

74. New York University, Department of Science Education, _Notes on dissemination of Project City Science_, May, 1978, p. 3.

75. _Ibid._, p. 1.

76. NYU, Department of Science Education, _Project City Science_, funded by National Science Foundation, Quarterly Report #4, July-August, 1975, p. 17.

77. NYU, _PCS_, Progress Report #11, _op. cit._, p. 41.

78. _Ibid._, p. 44.

79. _Ibid._, p. 5.

80 _Ibid._, p. 29.

81. NYU, _PCS_, Quarterly Report #4, _op. cit._, p. 45.

82. _Ibid._, pp. 30-31.

83. New York University, second proposal, _op. cit._, p. 28-29.

84. NYU, _PCS_, Quarterly Report #4, _op. cit._, p. 31.

85. New York University, second proposal, _op. cit._, pp. 28-29.

86. NYU, _PCS_, Quarterly Report #4, _op. cit._, p. 31.

APPENDIX B

Second Queens College

Evaluation Report: Project

City Science

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OVERVIEW AND UPDATE

The first section of the evaluation report (Appendix A) dealt specifically with the academic year beginning in September of 1977 and concluding in June of 1978. In compiling information for that report, the evaluators read documents produced by the Project staff and assessed activities in which PCS had engaged, covering the first four years of its existence. The major intent of that phase of the evaluation was to present the goals of the Project as they were stated in official documents produced by the PCS staff. Additionally, interview data were collected to help clarify these goals and to allow PCS staff to offer a working interpretation of what was being attempted. Thus, the initial evaluation effort concerned itself with a statement of project purposes and an analysis of the extent to which they were being implemented. It was consciously intended as a goal comparison, beginning with statements of objectives and comparing them to actual project activities. It covered a lengthy time period (in the case of PCS documents, a four-year span) and was of necessity extensive and detailed.

This section of the report is more limited in scope. It reflects Project activities spanning barely a four-month period, from September 1978 through early January 1979. The PCS staff spent much of this time preparing and initiating the activities in which they intended to engage during the remainder of the year. To make the best use of this short-term period for reporting purposes, the evaluation team determined to shift its focus from goal comparison to operational activities. Thus, this interim report concentrates on staff efforts as they relate to long-term objectives. The evaluators attempted to study what the PCS staff was doing and determine what links existed between these behaviors and the overall project intent. This report also attempts to update what the PCS staff has shared about it own activities in Progress Reports 12 and 13, which were issued after the completion of the initial evaluation effort. Through the examination of Project activities and its own system of reporting, it was hoped the evaluators could develop a better understanding of the relationship between specific events and long-range program purpose. This should help to establish a clear direction for the final report and identify the activities or areas of concern requiring further attention.

As with the prior evaluation report, an assessment of each of the four components of the Project is offered. The section on the Preservice Program is somewhat more detailed in nature, since a number of important events relating to that component occur in the fall and occupy a considerable portion of the staff's energies. Conversely, the Research and Dissemination sections are, in our view, less substantive, since the fall semester is a time of preparation, while actual outcomes or activities occur largely in the spring semester. Even where specific activities were sparse, however, the evaluation team attempted to assess the quality of the planning that took place in preparing for future events. In particular, the evaluators sought to determine how well the Project staff was establishing the foundation for the continuation of activities into what the original proposal called Phase III, the unfunded period of the Project's existence.

As was true in writing the initial report, the PGS staff has continued to demonstrate a refreshing level of candor and openness in its relationship with the evaluation staff. They are faced with a very difficult job. New York City is a vast and complex arena. The educational bureaucracy is not easily understood. Important levels of administration are not always accessible, though this staff has managed extremely well.* In addition, the junior high school

*The evaluators again express their belief that if this process of establishing and maintinaing contacts within the educational bureaucracy could be offered in the form of written reflections with accompanying analysis, it might represent one of the Project's major contributions.

may well represent the most challenging and demanding part of the educational structure. Thus, the task facing the Project is a formidable one, which has not been made easier by the serious financial problems the City recently experienced and continues to face. Meeting these demands with the limited staff resources available continues to require extremely high levels of effort.

This set of circumstances creates a major area of concern. The amount of work required to manage the daily activities of the Project continues to leave little or no time for the planning and reflection that should guide those activities. The evaluators continue to be struck by the discrepancy between the Project's ambitions and its resources. Though a difficult workload is willingly assumed, the demands still outpace the efforts of the staff to meet them. The Project has lagged two or three progress reports behind. This has often left the staff commenting on events long since past, some of which have been stripped of their meaning by subsequent events. In any case, writing under time pressure does little to contribute to the reflective thinking that such reports require.

Following the initial evaluation report submitted in July 1978, the evaluators offered an invitation to reply to the analysis, which the PCS staff accepted. It was hoped the response might constitute a part of this report. Though the response was solicited on a number of occasions, the PCS staff was unable to find time to complete it. We believe this represents a loss for both groups. It also underscores the compelling demands the day-to-day operation of the program makes on Project personnel. The lack of time to meet the varying requirements of the Project is a continuing source of concern, for the ultimate success of the PCS effort requires the staff to plan its activities more carefully and reflect thoughtfully about the outcomes they choose to report. As necessary as this may be, it is increasingly difficult to see how a reasonable accommodation can be made between the work that has been initiated and the limited amount of time remaining in which to accomplish it. As was suggested in the earlier report, the staff must determine which of its activities offer the greatest promise of success and concentrate its efforts in these areas. The refusal to set priorities threatens to make the continued existence of the Project the single, overriding concern, diminishing prospects of meeting other goals.

I. THE PRESERVICE PROGRAM

A. Orientation

The preservice component of the Project City Science program assumes a great deal of the staff's energies in the early fall. The orientation of students and the need to integrate them (and the on-site coordinators) smoothly into the school structure requires a considerable amount of effort and planning. This phase of the evaluation report deals with that effort and also attempts to offer an update of preservice activities as presented by the PCS staff in Progress Reports 12 and 13.

Recruitment procedures were apparently enhanced this year by having a description of the Project included in a mailing promulgated by the New York City Board of Education describing teacher education programs in the City. While the response was not overwhelming, the Project staff felt it provided the best single source of publicity for recruitment purposes. It suggests that future recruitment efforts might best be publicized by one of the major intended employers--the Board of Education of the City of New York.

The task of orienting the 1978-79 interns to PCS and the City's schools appears to have been handled very capably. This year's orientation process was shorter and apparently more effective in terms of student reaction. The length of time was shortened in response to suggestions made by last year's interns. The Project staff made a calulated effort to solicit the views of their former interns about how orientation procedures could be improved. Once such information had been collected, the staff response was both forthright and deliberate. The change in the operation of this parti ular aspect of the program this year was the direct result of the faculty's willingness to act on information they had collected for precisely this purpose. The PCS staff felt it represented an improvement over past procedures.

The workshops and videotaping experiences also appeared to be useful and were well received by the interns. In addition, the process of rotating participants through each of the cooperating schools was made shorter by limiting the rotation to schools within one borough. This seemed more realistic for most students. Those who wished to visit schools in both districts were not precluded from doing so. By the same token, interns for whom such trips would have proven prohibitive in terms of commuting time were not forced to expend energies visiting schools they had no intention of selecting.

A weekend spent by the PSC staff and the interns at the Pocono Environmental Education Center (PEEC) also appeared to have proven highly successful. The weekend was intended to serve a number of purposes, one of the more important of which was to develop a closer rapport and enhance working relationships between staff and students. It seemed to serve this purpose quite well. PCS staff and program interns both commented on its usefulness. The interns were enthusiastic about the experience, and it did appear to contribute to a closeness within their group and between them and the Project staff. The overall concept of the weekend, that of enhancing and deepening relationships, is sound. The specific planning for it seemed to be handled with sensitivity and skill. There is every indication that the outcome was highly positive on a personal as well as a programmatic level.

Other adjustments in the orientation procedures from previous years included getting the interns into the schools earlier and attempting to have them participate more regularly. These adjustments were also based on prior student and staff feedback and represent yet another attempt to respond to suggestions for improvement.

Overall, the orientation program seems to be well-designed and effectively implemented. Interview and observation data offer relatively consistent evidence of thoughtful planning, attention to detail, and the willingness to seek ways to improve current procedures. It should be noted that both the interns and the school staff members generally confirmed the effectiveness of the orientation procedure, although some teachers and administrators objected, suggesting that parts of the orientation cause students to miss important aspects of the beginning of school. These efforts allow the program to begin with a minimum of confusion and make an important contribution in clarifying its goals for participants. It also contributes to a positive attitude on the part of interns, enabling them to establish relationships in the schools that can contribute to success. In brief, the orientation phase of the preservice program seems to have been managed capably and has had a positive effect on the operation of the Project.

B. Program Assignments and Coursework

While PCS is specifically enjoined from writing a new science curriculum for the City's junior high schools, it has attempted to modify existing programs to make them more relevant for inner city schools. This "modification" is in the form of trying to introduce more "hands-on" laboratory activities to enhance the existing science curriculum. One specific attempt to develop such activities is reported in Progress Report 12 and describes the final assignment for the Curriculum and Methods courses (E14.1039 Teaching Science in Intermediate and Secondary School; E14.2091 Science Curriculum Elementary and Intermediate Schools) for the fall semester 1977.

> These assignments do require preservice students to develop for the Curriculum course a sequence of lessons or activities based on the curriculum of the Board of Education, but reflecting contemporary methodology; and for the Methods course, the parallel development of a thirty-student kit of inexpensive materials needed to carry out those activities. At present, these assignments are being submitted and evaluated, and in many cases are available for immediate implementation in the schools. Once materials have been field tested, they

> will become part of the resources of instructional materials available to all preservice students. In this way, each preservice student will have access to a much wider range of curriculum adaptations for classroom usage than any one of them working alone could either plan or use in an entire school year.[1]

These assignments seem appropriate and consistent with the Project's philosophy with regard to preservice training and Project goals as recommended.[2] It appears that while the PCS staff felt the assignment was a beneficial one for students, it was not entirely successful from the point of view of the total program.

Progress Report #13 indicates:

> . . . these coordinated projects (a week's sequence of learning activities and a thirty-student kit of inexpensive materials to implement the activities; though beneficial to each preservice intern, did not result in the anticipated pool of field-tested and revised curriculum kits available to all. This pooling did not occur because: 1) many students retained their kits of materials in their schools, and returned them only after most of the expendables had been exhausted, and 2) students did not appreciate the time and energy they could have saved each other by keeping the kits well-organized and stocked.
>
> However, though the kits were not retained, the teaching units were and are not available for future preservice. Examples of these units include: Optics and Photography; Making and Using Simple Optical Instruments; The Heart and Circulatory System; Food and Nutrition; and Sound. In general, the coordinated projects and the plan to implement them in the Spring were assessed positively. In 1978-79, we will explore additional ways to promote more active swapping of curriculum materials among members of the preservice group.[3]

It seems reasonable to ask why the assignments did not accomplish the initial intent. They would appear to have value and, if repeated, the Project might well have accumulated an important collection of field-tested science activities appropriate for specific use in New York's junior high schools. This is especially true if "the coordinated projects and the plan to implement them . . . were assessed positively," as stated above. It seems unfortunate that the interns either did not understand or did not comply with what appears to be an important course assignment, one that would have benefited all concerned.

A related question involves the use of expendable materials. During the four years of its funding, the Project has apparently not accumulated any sizable quantity of commonly used supplies and materials. It appears that on-site coordinators have frequently been forced to spend considerable time, effort, and even personal funds, purchasing supplies such as dry cells and bulbs in local hardware stores.. Such expendables might easily be provided in quantity more cheaply and efficiently by the Project. Indeed, ready access to such materials might greatly facilitate the extent to which preservice students employ "hands-on" activities in the classroom. It could even avoid serious duplication of effort.

Progress Report #8, written in 1976 and quoted in the July 1978 Report (pp.76-77) identifies a list of features that would ultimately be included in the Preservice Program. Item one on that list suggests the development of selection procedures that identify candidates most likely to become outstanding teachers of science to inner-city adolescents. Formal copies of the selection procedure were not available at the time of the previous evaluation report (July 1978). Final revisions were apparently made during the recruitment and selection process for the last cycle of participants in the NSF-funded phase of PCS. It represents the finished product describing that phase of the Project. The apparent effectiveness of the Guidelines will be discussed in the Final Report, since they were received too late for the evaluators to comment on them in this report. This section deals solely with the specific activities involved in the recruitment process.

Basic recruitment for the cycle is described in Progress Report #13.

The Project was advertised in The New York Times' spring education survey (April 30, 1978) and given publicity in ACTION, the newspaper for Peace Corps and Vista volunteers. Flyers were also sent to all deans of education in metropolitan New York area colleges that do not offer degrees in science education. In May, the Board of Education sent out a large mailing describing New York City sponsored programs in teacher preparation. The Project leadership arranged to have a brochure from PCS included in that mailing. A number of this year's participants learned of the Project's existence through friends, announcement in the Daily News, and other less formal ways. All of these sources led to a total of 82 inquiries. While the recruitment efforts took on a new form, some of the problems in attracting a large pool of interested participants seemed to remain.

The selection process itself followed the guidelines established by the associate director, and eighteen students were admitted to the program for 1978-79. It should be noted that not all the participants this year have an undergraduate major in science, a requirement suggested in PSC Quarterly Report 8 (pp. 73-74).

For the first time in the Project's history, each participant was given a $1000 stipend in addition to the 24-credit tuition waiver. Interestingly, none of the interviewed participants felt the stipend was a critical factor in the decision to participate.

One part of the success or effectiveness of the selection process may be measured by the number of participants who complete the sequence and seek employment in an inner-city junior high school situation. The final report will address itself to this issue in greater detail. In regard to the Project's own follow-up of previous participants and their success in finding teaching positions, little appears to have been done formally. Previous participants were invited to a Christmas party this semester, but as yet no one has followed up on those who did not attend, nor does there appear to be any definitive record in regard to the employment situation of these former interns. This information may have been shared informally at such a gathering, but there appears to have been no formal attempt to either record or follow up on results.

Overall, it would appear the Project continues to experience difficulty attracting prospects in suitable numbers. Adjustments have been made, but the problem remains that some elements of the program--its structure, time demands, or what it offers--do not seem to compel the interest one would like. The need for science teachers in the urban junior high schools was well stated by the Project Staff in its original proposal to NSF five years ago. That need, if anything, has increased. The Project's efforts for the first four years have resulted in forty prospective junior high school science teachers being trained and completing the program. Of these, the staff seems certain that eight graduates, all from the Class of 1978, are employed as science teachers in junior high schools (three in private schools).

For a Project as well funded as this one, that is not an impressive number. (It should be noted that positions for science teachers in the New York City schools have been available.) Of greater importance is the implication that this program, which is meant to serve as a potential <u>model</u> for developing urban, middle school science teachers, simply does not have the power to attract participants. It will be difficult for PCS to disseminate a preservice "model program" about which such questions can be raised.

Course Sequence:

Integrated Science I and II, which was to be a major portion of the Preservice Program and which had been described in the original proposal, is not

not being offered to this year's interns. An alternate course, E14.2071 Dynamics of Urban Ecology, is being given.

The following reasons for this change in program were offered by the associate director: 1) preservice interns must take an additional 10 credits beyond the 24 credits offered in the program. Alternating Urban Ecology with Integrated Science allows the interns an opportunity to take some additional courses in the department; 2) Urban Ecology fits the NYU cycle in Environmental Science. This allows the preservice interns the opportunity to take Environmental Science outside the Science Education Department; and 3) the course content should prove useful to students.

While such justifications are reasonable, they are not compelling. Certainly item one above appears to be more advantageous to the department than it is to the program. (Varying courses yearly accommodates non-Project students who may be seeking different offerings.) Such a course change at this point in the Project's history appears to preclude the possibility of PCS generating a finished, transportable "product" in the form of an unique series of classroom experiences, including the course in Integrated Science that was so enthusiastically described in Progress Report #8.[4]

It should be noted that a course in Urban Ecology is not inappropriate. It could very well fit the needs of the preservice interns and provide them with considerable insight into the problems of energy in the urban inner-city environment in which they are preparing to teach. Indeed, a number of the present preservice students, though unhappy with the direction the course actually took, noted that a study of urban ecology would be of great use to them in their teaching.

Thus, the concept of the course itself is not a poor one. Its inclusion at this juncture in the program does pose some difficult , however, and gives rise to some questions that the Project staff needs to consider. If the Project, as all the early literature indicates, is attempting to develop a model preservice program, what are the basic and vital elements of that model? Are the unique features that PCS was seeking to develop contained <u>within</u> its course structure at the college as well as in the set of field experiences that have been developed? If the answer is yes, the decision to change the single most permanent course in the program (6 of the 24 credits, 25% of the course credit, or one-third of the actual time spent in study) is inexplicable. The change is nowhere explained or even hinted at in the literature. From conversations with staff, it was learned that the change was announced but not formally reviewed, evaluated, or discussed by the faculty. In our view, the change is major, yet there is considerable indication that the decision was casual rather than deliberate in nature. Interviews with the course instructor and other staff members gave no indication of faculty planning or extensive discussion. The evaluators challenge neither the right of the Project staff to make such changes nor even their possible virtue although we do maintain that such changes raise serious questions about what the preservice model is. The question raised is the seeming lack of formal decision-making procedures that would encourage a full consideration of the implications of such major shifts in direction. The creation of these procedures would lead to a systematic means of approaching such changes, including a formal evaluation of the causes for the change and a plan to measure the results of the new direction taken. In the case of this course change, there is very little evidence that this has been done or that it has even been considered. Several of the staff members could state no reasons for the shift and knew almost nothing about the new course, including how or when it had been developed.

As was suggested in the first report, where the evaluators noted the undocumented shift in program objectives that resulted in the apparently unplanned phasing out of the innovative strategy, changes such as these should be the result of a formative assessment. When they are not, it raises grave concern about the Project's capacity to plan and program important shifts in direction and base them on a formalized system of inputs, regularly collected. It makes the Project appear the unknowing victim of change rather than its organized master, consciously seeking ways to improve and grow. As noted earlier, the verbal reasons offered for this change did not appear to address the deeper issues. Perhaps the interviews could not tap the working rationale. The absence of any reference to it in Project documents, however, would seem to make the problem more than mere oversight, but rather a serious gap in the staff's conception of its role in the formation of a training model.

A second point should be made. If some unique features of the PCS preservice model were not contained within the course structure as well as the set of field experiences, then it would appear that one of the most basic elements of the training program has been viewed only in broad and not specific ways. The university training must provide trainees with all the skills they need to combat the lure of the traditional teaching approach this Project was set up to combat. If the adequacy of that training has not been conceived of in specific terms, but has only been viewed as some vague, interchangeable program of instruction conducted by the university, then something extremely valuable has been lost.

A second course change has also been made. This one does appear to have been based on student input and did involve some general staff discussion. The process here seemed somewhat more orderly and systematic. This change involved dropping "Sociology of the Inner City" from the second semester sequence and substituting "Implementing Intermediate School Science Programs."

The evaluators have not thus far been given a course outline, nor has the course been taught previously within the confines of the Project. Its title suggests its appropriateness in preparing teachers to work with junior high school-aged children. Still, the same questions remain about both the evaluative procedures followed and the impact of such a shift on the overall preservice program. This particular change gives rise to two questions:

1) Will the in-depth community activities,[5] which were in part associated with last spring's "Sociology of Education," be included in an implementation of science course?

2) Is it advisable for the Project to continue to stretch its teaching resources this way in spite of post-criticism from two different evaluative groups that Project perspective is overly limited by course offerings from within the science education department?

PCS has consistently made little use of the University's resources outside its own department. The elimination of the sociology course, while it may have been necessary, is unfortunate in that it was one of the few times the Project had managed to incorporate resources from elsewhere in the university.

The Project continues to offer all but one of its courses on a single day each week. Students are required to be present from 9:30 a.m. until 6:00 p.m., attending three courses and a one-hour seminar. It is a long day with all sessions conducted in an extremely unappealing, basement room. Little attention is paid to the physical environment or the comfort of the students. Although it has been suggested by Project staff that such a room should resemble an actual junior high school classroom, intern reactions indicate that the realism may have been carried too far and the result obtained at the cost of sustained student interest and enthusiasm.

C. Observer Comments

A number of outside observers have visited the PCS courses as part of the evaluation effort. As has been noted previously, while the staff is limited in number, they are extremely hard working and sincere. The nature of the comments offered were rarely directed at either the energy or ability of instructors, but at the type of classroom activities observed. Most of these have been viewed as unique to neither the field of science education nor the needs of the inner-city teacher, no matter how well taught. (See Appendices F-H.) One observer summed it up as follows:

> The expected urban thrust was not in strong evidence in the classes, although admittedly one day is too small a sample upon which to base a conclusion. It does raise a question, however, about the real uniqueness of the program.[6]

Granted each observer's sample is "small." It must be noted, however, that the Project staff was notified in advance of consultant visits. It is to be expected, under the circumstances, that the lessons offered would generally be representative of the overall intent of the program and the purpose of the particular course.

What observers have seen are lessons that are neither dynamic in approach nor unusual in their conception. Some of the material seems totally unrelated to the needs of preservice students preparing to teach in the City's junior high schools. An observer noted that one class in Urban Ecology ". . . had little or no relevance for either the interns or for the students they are preparing to teach!"

In a lesson on the electromagnetic spectrum, one observer felt there were:

> . . . notable and gross errors in the chalkboard drawing, and in the description by the instructor. But the class either did not have enough background in physical science

to know when errors were made, or simply felt it unethical or unimportant to comment or correct mistakes.[7]

The same observer spoke with a sample of students in the class and drew the conclusion that the course "seems ill-fitted to both the scientific and professional needs of these interns. They are not at all happy with it, and get almost nothing out of it."[8] It was the observer's impression that "the instructor seems genuinely eager to provide something of value, but also seems singularly unaware of what is needed for science instruction in the inner-city junior high schools." Another observer, commenting on another session of this same course, voiced similar sentiments, indicating that nothing was observed which would distinguish the course as being specially designated to train teachers for the junior high school or inner city.

The evaluators are aware that some topics in a new course might be beyond the previous experience of the instructor. Such excursions into new areas by the staff can be useful for growth and should be encouraged. There are, however, other sources of help available. The Project appears to have made extremely limited use of consultants or experts outside of its own department. In a city as rich and diverse as New York, it is unfortunate that so little use appears to have been made of its human resources. In its four years of operation, the Project must surely have encountered a number of knowledgeable, talented, and capable professionals who could provide an added dimension to each of the course offerings. It seems unfortunate that the attitude which sees the material elements of the City as a teaching resource does not prevail when it comes to instructional talent.

D. Conclusion

As the Project approaches the conclusion of its final year of funding, a number of concrete things have been accomplished in the preservice program. The Project staff has worked out a well-conceived plan for orienting students to the program and gradually increasing their involvement in the schools. The orientation program includes familiarizing students with the NYU campus and its facilities, demonstrating how the city can be used as a resource for science instruction, and conducting a number of one- or two-session workshops on various topics that have been well received by the preservice students.

Additionally, an intelligent and well-organized program has been developed for introducing students to the available schools, having them meet potential cooperating teachers and PCS coordinators, and observing in various classrooms. The students are placed on a rotation cycle that allows them to see all the schools prior to deciding which school and teacher they wish to work with. The choice is made at an environmental center, where the preservice students and the Project staff spend a weekend together. The weekend gives every indication of being a well-designed vehicle for developing a closer working relationship between staff and students. The benefits were apparent following the weekend, and it appears to be a sound idea, successfully implemented.

In regard to the orientation activities noted above, it is important to note that the Project staff has been open to making changes in its approach, based on student and staff feedback. The efforts have been open to criticism, and some successful adjustments have been made as a result. Some of the workshops have been changed, the rotation time for students decreased, and the structure of the weekend modified. The willingness to not only accept but seek ways to improve program functioning in this component of the program speaks well of the staff. It has resulted in areas of real strength and improvements of considerable importance, since they come at the very beginning of the program when the initial attitude of interns is critical to the future conduct of the program. The PCS staff has developed a structure and techniques here that have been successful and of real use, enabling the interns to be introduced into the public school system in carefully planned stages, expanding their views of the City, and getting them off to an enthusiastic beginning.

In terms of the recruitment process, it is difficult at this point to determine its strength. There are few data regarding the size of the potential recruitment pool. While the number of inquiries and applications is relatively small, it is impossible to know whether this is a result of inadequate publicity or of a general disinterest on the part of the graduate population who have prior science training. Whatever the cause, it seems clear the program has not attracted applicants in numbers that would encourage other teacher training institutions to adopt the model. This has remained so in spite of the availability of science positions in the inner city and the desperate need of the schools to fill them.

In regard to its organization, the Project does not appear at this time to have developed any specific course or sequence of courses, assignments, or activities that make up a unique program for preparing teachers for the City's junior high schools. It is difficult to see how any firm model of teacher preparation or teaching style is likely to emerge in the final months. The staff is competent but it has not developed a solid theoretical framework upon which to build a different program. The staff has yet to establish effective techniques for evaluating its own efforts and using such feedback to continuously modify the courses. The result is that courses seem to be essentially individual efforts rather than a program. It is, perhaps, because a cohesive model has not been developed that the Project staff is found adding and dropping courses in an almost casual manner in the final year of funding. What remains is a series of activities that begins to parallel all too closely those of other departments of science education in urban settings. There are differences, but they are fewer and less systematic than one would hope. (The year of teaching experience and the presence of an on-site coordinator are two of the more important ones.) The individual courses range, in their rating by observers, from fair to good. None of the observers characterized any of the courses as excellent or particularly unusual in intent or execution.

The PCS staff appear personally able and politically astute. They have built solid relationships in the educational hierarchy of New York and yet at the same time have apparently been unable to utilize ordinary professional relationships within the NYU community to take advantage of the wealth of talent within the University. Over the period of this evaluation not a single course session has involved visiting lecturers or individuals with expertise who have been recruited from other departments within the University or from surrounding institutions. Similarly, the research group has been unable to attract either doctoral candidates or interested professors from other departments to invest their time in what would surely seem like a rich set of possibilities.

The staff members have taken a great deal upon themselves. A small faculty of five teaches elementary, intermediate, and senior high school science methods, curriculum, integrated science (content), psychology, sociology, seminars, workshops, education administration, supervision, community activity, urban ecology, and a weekend course in Puerto Rico. When not teaching they supervise student teachers, prepare progress reports, attend staff and professional meetings, and maintain the science education department. That is an exceptionally burdensome set of professional responsibilities for so small a staff. The performance of some of these responsibilities must suffer from overextension. The area that seems to be most easily put aside without fear of immediate consequence is that of planning. Yet the guidance that planning alone can provide remains one of the most significant needs of the Project.

Suggestions for the Project:

a) The senior staff apparently has great confidence in one another, and this is as it should be. However, it would still seem useful for the Project's leadership to develop a program of systematic visits to instructional sessions to monitor, evaluate, and coordinate the efforts of the teaching staff. Such visits could provide the leadership with a better grasp of the reactions of students, the performance of staff, and the needs of the program. It is suggested that each course might thus be more representative of a total project effort. It would also seem important to reschedule faculty meetings not to conflict with classes, so the full staff can attend and contribute.

b) A number of participants have strong backgrounds in the sciences. Some attempt might be made to individualize their training to enable them to take advantage of the University's strengths. Currently, students are told they need not take all the Project's courses, but they must complete all the course assignments. With only 18 participants it may be possible to achieve a greater individualization than such a policy implies.

c) With all the effort to develop a closer rapport and build a special relationship between staff and students (i.e., PEEC weekend), is it in the Project's best interest to mix students from outside the program with the pre-service students? It would seem to erode the camaraderie PCS is trying to develop in its interns. In one course there appear to be as many as 10 non-Project students in the class. This may not be in the best interests of the non-Project student either. Many discussions center on specific PCS concerns and other students are rarely involved. Such an arrangement may serve to limit opportunities for both populations.

d) The instructional day may be too long to be effective. Classwork begins at 9 a.m. and concludes at 6 p.m. Interns frequently note how difficult it is to sustain interest over such a period of time. Inasmuch as students have courses on a second evening, could the fall sequence be carried on over a two afternoon/evening sequence? The change to a Monday format for the spring semester is viewed as an improvement, since it allows the interns to spend four successive days in the school each week. The Thursday schedule prevented this.

e) The Project should consider making greater use of outside consultants and specialists. While the staff recognizes the value of the City as a learning resource, it is not making sufficient use of the City's human resources. Efforts should be made to avoid creating too great a demand on the staff's own talents and resources.

f) The Project should undertake a formal search of the employment situation of all its previous graduates. The current record is skimpy and contains numerous gaps. While the Project has done very well in stating the need for science teachers in the City's junior high schools, it has expended little effort in providing employment information and assistance. In a project that initially saw its graduates as being the vehicle for making significant changes in the way science would be taught in the New York City intermediate schools, such a lack is incongruous. One would expect an organized follow-up program that would both encourage graduates and use them as an irreplaceable source of data about how the Project could be improved. The potential value of such a resource should be continuously exploited. To maintain an updated record of their current professional status would seem to be a minimum requirement in such an effort.

II. PROJECT CITY SCIENCE: MODEL DISTRICTS PROGRAM

A. Introduction

In the initial evaluation report of the model district program six months ago (July 31, 1978), four sections of commentary explored each of the following questions:

(1) How did PCS define a model district program and how did PCS define the goals for a model district program?

(2) Which goals for the model district component of the project have been completed and which remained to be completed?

(3) What possible courses of action for the fifth and last funded year (1978-79) of the project could be proposed if the project hoped to reach its five original goals?

(4) What activities, mechanisms, procedures, etc. were carried out by PCS but not necessarily related to the goals or definitions of a model district as originally proposed?

Two main conclusions of that initial report can be summarized as follows:

(1) There had been limited progress toward meeting the goals of a model district as originally detailed by PCS staff.

(2) Activities were undertaken by the Project toward the creation of "model schools," i.e., places where an administrative arrangement of support exists between schools and the project.

This interim report, in two parts, continues to document the progress PCS is making toward the implementation of a "Model District/School Program."

B. Summary of Prior Program Activity

In the evaluation report of July, 1978, the "history" of the model district phase of the Project as revealed in PCS written communication ended with Progress Report #11 (thru September, 1977). To provide continuity with that initial evaluation report, Progress Report #12 (thru January, 1978) and Progress Report #13 (thru May, 1978) are here reviewed.

Progress Reports #12 and #13

The tasks related to model districts for 1977-78 academic year were noted in Progress Report #11:

> The task for the coming academic year (1977-78) is to draw on last year's data collection and to begin early in the fall with an expanded list of questions about how science is actually taught in the district, i.e., the proportion of time spent in lecturing, demonstrating, experimenting or discussing; large or small group work; connections with other programs in the school and/or with community activities, etc. This will be especially important regarding the new schools chosen for involvement. In future years, this information will provide one definite estimate of change in science programs because of Project involvement.9

It was hoped that Progress Reports #12 and #13, reporting on the model district activities for 1977-78, would indicate whether such tasks had been completed. Specifically, was there evidence that Project activities had been directed to finding answers to (1) how science is actually taught in the district, (2) how science connects with other programs in the school, and (3) how science connects with community activities? Progress Report #12, covering the period of October 1, 1977 to January 31, 1978, does not report on activities related to these tasks. Nor are these tasks the focus of an advisory meeting held in October in which

> Emphasis was placed on (1) ways to disperse Project teaching style to schools which are not involved with Project yet, as well as (2) the analysis of the on-site coordinator's role, and (3) the central staff's role in implementing an all-school involvement.10

These tasks were not part of the discussion conducted by subgroups of that same advisory board meeting where two major questions were considered:

> First, have any significant areas been overlooked in the criteria established for the selection and evaluation of model districts for the teaching of science? (See Progress Reports #9, pp. 12 ff and #11, pp. 14 ff.) The group agreed that the essentials had all been defined but that additional specifics should be cited and priorities set among the various criteria.
>
> The second question concerned the best methods to disseminate the Project model to other metropolitan centers throughout the country. The subgroup has recommended that the Project hold a meeting to discuss inviting individual New York City districts to become involved with Project City Science at New York University, utilizing their own funds in lieu of government funding. If this proved successful, the program could be expanded to include other universities in New York to work in conjunction with additional districts. Moreover, the group urged the Project to make presentations at various local and national meetings held for science teachers, supervisors, and curriculum specialists to encourage urban areas to consider adaptations of part or all of the Model Districts Program.11

Finally, these tasks do not form a part of the narrative of activities of the Model Districts Program reported on pp. 13-39 of that same Progress Report. For readers who consult the progress reports seeking an understanding of the way the Model Districts Program has been developed by the Project staff, such gaps in reporting represent a serious obstacle. In regard to both informing an audience and maintaining a record of Project achievement, the reports lack a necessary continuity.

Progress Report #12 suggests that

> This spring (February - June 1978) the focus of the observations will shift to the communities around the schools. Last year's project (see Progress Report #10) has been expanded and formalized. Observation skills learned in the schools will help Project City Science become better informed about and more involved in neighborhoods surrounding junior high schools.
>
> Ten community observations have been assigned. These include descriptions of student "hang-outs," home environments, community resource organizations, the Community School Board, the Parents' Association, local merchants, and local newspapers.12

When one consults the following Progress Report (#13) to determine the results of these efforts, one does so in vain. In the twenty-seven pages devoted to the Model Districts Program, no reference is made either to these community activities or to the tasks of finding answers to how science is actually taught in the district or how science connects with the programs in the schools.

Such discontinuity in reporting makes it difficult for observers and potential supporters of the Project's activities to understand or appreciate its merits. If staff efforts at improving science teaching in urban junior high schools are to attract and hold the interest of a professional audience, the results of such activities must be reported in a clear and straight-forward manner. It is simply not sufficient to record intentions and omit outcomes, for it is the analysis of results that would seem most likely to sustain the continued interest of readers.

1. Project Activities October 1977-May 1978

An essential component in the evaluation of the model district component of Project City Science must be the continuous examination of this critical question: To what extent is there a correspondence between goals and the procedures, tasks, or activities that relate to these goals? To restate this question in a manner more consistent with the style of the two most recent Progress Reports, one might ask what objectives might be inferred from a listing of tasks, procedures, and activities carried out by the Project?

The isolation of certain portions of the narratives contained in Progress Reports 12 and 13 make it possible to identify:

(1) What the Project reports that it did (activity reported) and

(2) What were the implied objectives for this activity.

By interpreting the meaning of the original goals, the evaluators believe it is possible to postulate reasonable implied goals based on the reported activities and the projected objectives. The evaluators feel it will thus be possible to include in the final report an assessment of the effectiveness of Project activities.

The following section represents an attempt to extract the implied objectives of the model districts component of the Project by examining its most recent operational aspects. Thus, the activities in which the Project reports it has been engaged are presented, along with language that implies the purpose or objectives of these activities. Some inferences are then drawn from these operational endeavors as to what the staff is intent on accomplishing. The extent to which these are completed can be used to evaluate progress.

What follows is a series of reported activities and implied objectives drawn from the two most recent Progress Reports. These are then compared with the original goals of the Project, and inferences will be drawn about how the intended outcomes relate to these goals.

1. Activities and Objectives:

Progress Report #12, p. 14

Reported Activity 1: Have the Project team volunteer to inventory, then organize, the science materials and equipment.

Implied Objective 1: "To get a school's inservice staff to become aware of the Project's presence and to have confidence in us as resources for science education."

Progress Report #12, p. 14

Reported Activity 2: Have the Project serve in a leadership role in school science fairs.

Implied Objective 2: "To help teachers and students in the school on an individual basis and to set up a resource center for Project activities."

Progress Report #12, p. 15

Reported Activity 3: Have the Project assist students in the preparation of newspapers.

Implied Objective 3: To generate "enthusiasm among the administrators, faculty, and staff about science and the Project."

Progress Report #12, p. 17

Reported Activity 4: Project should sponsor an anthropological research effort.

Implied Objective 4: "To increase understanding of the relationships between the schools and neighborhoods."

Progress Report #12, p. 18

Reported Activity 5: Involve Project preservice teachers in anthropological research efforts as a training device.

Implied Objective 5: "To foster better understanding and communication between schools and communities."

Progress Report #12, p. 19

Reported Activity 6: Have preservice teachers record their observations and impressions in a prescribed format and discuss such directions and impressions.

Implied Objective 6: To sensitize preservice teachers to "schools that were being entered for the first time."

Progress Report #12, p. 19

Reported Activity 7: Involve the preservice students with observation tasks within their respective schools and discussions of this collected and compiled data.

Implied Objective 7: "To encourage the preservice students to increase their contacts with school personnel and students, and to understand the complexity of the institutions in which they worked."

Progress Report #13, p. 13

Reported Activity 8. Hold weekly coordinators meetings, each meeting focusing on 1) supervision of preservice interns, 2) work with inservice teachers and administrators, 3) review of progress during the month, 4) plan for the month ahead.

Implied Objective 8: "To increase understanding of various situations in the schools in order to aid the coordinators in solving problems arising there."

Progress Report #13, p. 13

Reported Activity 9: Project staff prepares and distributes a list of science objectives for the semester for the participating teachers and distributes such lists.

Implied Objective 9: "To encourage non-Project teachers to use new curricular materials."

Progress Report #13, p. 15

Reported Activity 10: Provide coordinators with a series of practical tasks to be completed in the summer prior to the academic year.

Implied Objective 10: To have "each coordinator ... develop skills for the coming year."

2. Inferences

In its original proposal for refunding, six goals are listed for Project City Science (See Appendix P). Each goal is assigned a set of tasks that must be accomplished.

Project Goals*

Goal I: To develop a cooperative working relationship among those key institutions and individuals having an interest in improved science teaching in New York City. This goal (Cooperative Interaction) includes two components:
1) establishing a functionally sound and enduring relationship between the Project and students, teachers, and administrators in the participating schools, the neighborhoods in which those schools are located, various departments and bureaus of the central Board of Education, the United Federation of Teachers, New York University, other universities, and state and federal education agencies;
2) gaining an ability to catalyze cooperation among these as necessary to achieve sound science education ends.

Goal II: To improve the ability of teachers to help children in grades six through nine gain a better and more rewarding understanding of science. Associated with this goal (Staff Development and Support) are three subgoals. These are 1) improving the skills and insights with which intermediate school science teachers do their job; 2) updating the science curriculum they utilize; and, 3) developing a feasible support system for them.

Goal III: To find out and continually reassess the state of science instruction and learning in each participating district. This goal (Needs and Resources Assessment) encompasses: 1) learning what the major science teaching/learning problems are as variously perceived by different groups in each district, discerning what factors impede the solution of those problems, discovering what human and material resources exist to help ameliorate them, and determine what the implementation cost is likely to be for any particular reform measure in terms of money, time and education side effects; and 2) achieving this in such a way as to help district personnel (teachers, administrators, and parents) learn how to make such analyses themselves with a minimum of external help.

Goal IV: To gain generalizable knowledge. This goal (Research and Evaluation) is taken to include gaining knowledge of and in-

*This is a representative rather than a complete list of such goals.

sights about: 1) early adolescence as a unique period (psychologically, physiologically and culturally) in the lives of young people; 2) attributes of the inner-city situation that affect the science learning of early adolescents; and 3) the effectiveness of the Project City Science model in promoting desired changes.

Goal V: To building Project City Science into "the system":
This goal (Institutionalization) will be achieved to the extent that the various programs and activities of the Project become adopted as part of and integrated into the standard operations of the appropriate participating institution, including District Administration and schools, the Board of Education, United Federation of Teachers, New York University, and the State Department of Education.

Goal VI: To extend the influence of the Project beyond the boundaries of New York University and the participating districts. This goal (Dissemination) can be achieved only if the Project is reasonably successful in reaching its first five goals, and in addition is able to communicate information effectively to other districts in New York City, to other cities, to other universities, and to all interested individuals.[13]

Further, each goal is assigned a set of tasks to be accomplished:

I. Cooperative Interaction:

Meet regularly with administrators of each of the key elements to inform them of Project City Science goals and activities.

Coordinate Project City Science and community goals by working through local school board coordinators of community services, health services, special services, etc.

Cooperate with social and educational organizations of the city in training staff and working in schools.

II. Staff Development and Support:

Implement the teacher training programs.

Develop professionalism, peer support, supervisory techniques, etc.

Emphasize new developments in science-related materials, methods, and concepts.

Coordinate science-related resources in the schools.

III. Needs and Resource Assessment:

Gather and assess basic information about the needs of schools and teachers.

Analyze the attitudes, interests, and perceptions of students about science, their school, and their lives.

Study the needs and expectations of parents.

Ascertain the resources of the school in terms of finances, available materials, and personnel.

Study the resources of the community in terms of cultural ethnic richness, park and museum facilities, health and industrial services.

Locate available city, state, and national institutions, programs, and funding.

IV. Research and Evaluation

Gain an overview of the knowledge available.

Search for new ideas for finding and using this knowledge.

Locate the basic information available in our schools.

Begin psychological and sociological studies in connection with university courses and related field work.

V. Institutionalization

Show the feasibility of adopting and adapting various programs of Project City Science for other institutions.

Continually check that avenues of communication and cooperation are kept open.

VI. Dissemination

Disseminate information about the goals and activities of Project City Science to individuals within each of the main elements listed below (school, community, etc.)

Pay special attention to meetings with administrators and university science educators. 14

The reader will note that the term "model district" is not mentioned in either the goals or the goal-related tasks.* However, the present Project Director's operating definition of model district as being "an administrative arrangement of support between a sympathetic principal, classroom teachers, and the Project," suggests that the goal of "Cooperative Interaction" is the same as that which has been set for Model Districts.

*In its revised proposal, the Project reformulated its original six goals and the "model district" appears as one of the four reformulated objectives.

Three mechanisms or programs are suggested in the proposal as a means of moving toward the development of a model district: (1) inservice staff development, (2) the publication of citiscience notes, and (3) the design of resource materials. Since the publication of citiscience notes is discussed in a separate section of this evaluation (see Dissemination), it is in the programs of Inservice Staff Developmentand Design of Resource Material that goals can be implied and the relationship of the previously listed activities and implied objectives compared.

The reader will note that objectives one, two, three, and nine describe behaviors that relate Project activities to the administration and faculty within a Project school. To create an awareness among these persons, to help them on an individual basis, to generate enthusiasm, and to encourage non-Project teachers to use Project materials, are all tasks addressed by the Project with concrete actions. There is some evidence that the Project was successful in accomplishing these tasks (see "A Redefined Model District" in a later section of this report). Obviously, all four objectives relate to the program of inservice staff development.

Objective four, the sponsoring of an anthropological research effort, can easily be recognized as part of the attempt to design unique resource materials, which is noted as a major goal.

Objectives five, six, and seven, (preservice concerns) and Objectives eight and ten (Coordinator's role) are tasks not specifically related to the program or mechanisms that are part of the Model District component.

C. General Assessment

In September 1977 and again in June 1978 the present Project Director indicated that the development of model schools rather than model districts might be a more useful project goal. As noted earlier, a model school was described as "an administrative arrangement of support between a sympathetic principal and assistant principal, classroom teachers, and the Project."

A series of interviews, school visits, and classroom observations with Project staff, school administrators, on-site coordinators, cooperating teachers, and interns between October 1978 and December 1978 supports the notion that an administrative arrangement of support exists. Comments such as these were common:

a) "The program is working; I support it."

b) "The project supplies extra pairs of hands for the science effort."

c) "Project personnel might influence positive changes in the mostly tenured faculty."

d) "The interns seem to be more dedicated than ordinary student teachers who come into the school."

e) "The on-site coordinator relieves the Project personnel from managing and supervising the interns."

f) "Certain projects--like the science fair, a newspaper, and a special science club were started by PCS--they're all very good. I think they'll continue even when PCS leaves."

g) "A useful service in the schools. Their presence is welcomed and they are making a positive contribution."

Internal Participant Commentary

Such comments suggest that the structure of PCS offers the school some unique features that are indeed valued. As one school administrator expressed it, "Project City Science contributes to school services rather than drains them." This individual was pointing out that the typical preservice teacher arrangements requires a great deal of administrative support and effort to work successfully, since the university provides so little on-site guidance for trainees. The presence of an on-site coordinator not only alleviates this burden but provides yet additional help for inservice teachers in the way of ideas, materials and support for experimental ventures.

The same administrator noted that without PCS, a number of classes conducted for students who exhibited science talent or ability would have to be dropped. It was also pointed out that the Project's very presence has contributed greatly to the morale of the science department. It has provided a lift for teachers, helping combat feelings of resignation, offering an alternative to the rut teachers feel they are in, and countering the depressing effect of the lack of upward mobility and promotion available to teachers in the schools. These are positive contributions and have helped make PCS a welcome addition to the school's regular program of instruction.

External Observer Commentary

How do the views of "outside observers" compare with the views expressed by school officials? With a focus on those activities that bear directly on the improvement of science education, these "summary" observations have been made:

1. I do not believe that the knowledge base, the skills, or the affective directions of the children is being materially improved by PCS. If the students, themselves, do not show a measurable increase in cognitive, affective, and psychomotor capabilities, then the project itself becomes questionable.

2. School administrators tend to view the Project primarily in terms of providing additional hands for the classroom.

3. Cooperating teachers view the interns as little more than student teachers in spite of their Project status.

4. There is a wide range of competencies, enthusiasms, points of view, and support among the participating schools and the Project participants.

5. The instruction within the class is not reflective of any particular teaching model or strategy. There is too little attention paid to the content of the real life, the environment, and the socioeconomic status of the student. The Project staff would do well to orient itself and its interns to deeper reflections about the learning styles of students in inner-city environments.

With respect to observations by <u>outside observers</u>, it is clear that PCS has not become a partner in the way schools offer their science instruction. The Project has remained an outside addition, welcomed but not influential to the extent that their counsel is either accepted or sought after in regard to basic instructional decisions. Their instructional influence appears highly restricted.

D. Conclusion

PCS has won a certain acceptance by the schools. It has done so because the PCS staff has been patient and has shown good judgment in its interaction with school personnel. Nonetheless, a portion of that acceptance has been won at the cost of an adjustment of Project direction and Project activities. The situation poses an interesting dilemma. To have any effect at all, it appears that projects such as PCS must choose to work within certain limitations dictated by the structure of the schools as they exist. To work within those limitations, however, is to run the risk of being coopted, to have the thrust of the program blunted, and to become simply another contributing service to the school. Such help is welcomed and used, but by the very nature of the compromise that has been struck, its capacity to influence has been seriously diminished. Thus, it is possible to serve the short-term interests of the schools at the expense of the long-term goals of the Project. To avoid such compromises is perhaps the major obstacle to program success, and is extremely difficult.

The hard-won acceptance the PCS staff has obtained has seemingly come at a point when the Project has simply run out of time to capitalize upon it, assuming that it was ever possible to really use the leverage gained to influence the basic operation of the schools. Whatever may have been possible, it appears increasingly unlikely that the hypothesis of gradually gaining acceptance in order to be able to help the schools make necessary changes will be tested within the funded life of this Project.

A project such as PCS operates at many different levels and has the potential for servicing a number of different constituencies. In fairness to the Project, an effort should be made to consider which of these has been served and how effectively. It would appear that the outcomes for at least five different groups might be part of such a consideration:

1. How did the National Science Foundation profit through its funding of such a Project?
2. What did the broader community of science educators learn from PCS activities?
3. How did the New York City school system benefit from it?
4. How did the local districts profit from it?
5. What were the benefits for the individual schools that directly participated in the Project?

Generalizing from the comments previously offered, it seems that officials in the schools in which PCS has been working do feel there have been distinct advantages. Preliminary investigations suggest that as one moves outward to the larger educational communities the Project could serve, its impact seriously diminishes. The extent and the degree of that potential impact will be the subject of further reflection in the final report.

III. THE RESEARCH PROGRAM

A. Introduction

As noted in the opening section of this report, there is little in the way of specific research results to comment on at this time. The PCS staff has used the fall semester to initiate some of its research activities and to assess the implications of work begun last spring. Having begun recently, most of these efforts are in progress and cannot be reported on fully at this point. What is clear is that the Project staff has identified a line of research it intends to pursue* and has mounted its resources toward that end. Initial efforts appear to have been successfully implemented and the staff has indicated it is pleased with the direction that has been set. The staff members have made a major effort at redirecting their research efforts, which has required internal readjustments. They appear better organized than last year and seem to have a firmer sense of purpose.

While it is far too early to comment on the quality of the research being done, the staff is to be commended for the redefinition of purpose that has taken place. Under the rigors of a demanding schedule and the difficulty of collecting data in the schools, it has initiated a good effort. Some large-scale testing has taken place in the school without incident, and a broader integration of staff (in this and other research endeavors) appears to have been attempted. In brief, the new line of research, and particularly the effort to organize and direct staff energies within the framework of a calculated design, is hopeful and encouraging.

*The studies being conducted involve comparisons of adolescent students' academic and global self-concepts.

B. Summary of Prior Program Activity

In contrast to early periods of the research program, the 1977-1978 effort began a more intensive analysis of research related to adolescent students. Of particular importance in this effort were student data collected in May and June.

Up to this period, the research component of Project City Science had focused on evaluations of preservice interns, on whom a variety of information had been collected. Such data included attitudes toward science, perceptions of teaching problems, and science knowledge. Some of these studies produced surprising results, such as the level of science knowledge remaining unchanged from fall to spring. In most instances, the theoretical framework guiding the collection of such data seemed unclear.

In addition to the work cited above, the research staff prepared several papers for presentation at national conferences in science education, and also completed a research proposal requesting planning support for a study of career development in science. The proposal, however, was not funded.

In the area of intermediate school student research, the Project achieved access to several kinds of information. Most notable were the analyses of students' perceptions of science careers, and multivariate analyses of certain personality variables such as motivation and global and academic self-concept. Academic variables such as verbal fluency, achievement in science, mathematics, and English were also considered. The staff found several strong relationships between academic self-concepts and school achievement. The staff intends to report the full data at several national conferences later in the school year.

Research Goals for 1978-1979

Many of the directions begun in 1977-1978 will be continued during the last year of the program. In the student learning and attitude area, the projected studies will attempt to extend findings regarding the role of self-concept in science learning. In addition, the role of ethnic status, socioeconomic level, sex, and grade level as moderators of the effects of self-concepts will also be investigated. Types of classroom organization, (student-centered versus teacher-centered) will also be systematically studied regarding the role of the variables listed above.

Further work is anticipated on the use of a Project-developed instrument called the Progress Index. It is used as an assessment of the so-called "hands-on" approach to teaching science. The on-site coordinators were to be trained to use this observational checklist, which will apparently be employed to measure the extent to which preservice interns use the "hands-on" techniques.

The research staff had earlier discussed its intent to evaluate the skills of the on-site coordinators in the areas of observation and supervision. These skills would be measured by showing brief movie segments of classroom teaching and asking coordinators to reflect on what they observed and how they would have reacted in each situation. This study will apparently not be continued this year.

Research Activities

In regard to program research and evaluation, the unique features of the Project City Science program still appear to be relatively unsupported by research data developed within the Project. Specifically, the efforts to systematically improve science instruction in the intermediate schools in New York City have not been measured nor have the effectiveness of attempts to diffuse this information to members of the science education community. The relative success of these efforts has not been evaluated in a manner that would allow it to be reported.

The preservice evaluation emphasized the academic changes that resulted from participation in the PCS program. These data can be important in determining whether the instruction at NYU has been effective in raising overall scientific understanding. Far less attention has been paid to determining the particular skills needed to effectively teach science in inner-city schools, an issue equally important and central to the Project. In regard to the information that has been gathered, the small sample size presents a serious limitation because detection of changes and generalizability of results are made more difficult. Using samples of ten to fifteen is an inherent feature in this kind of training. The project has tried to develop useful information from the data, but sampling error becomes a crucial constraint when groups are so limited in size.

The larger-size studies currently being conducted with students will overcome the problems of sampling size and relevance. The studies of adolescents' science career orientations and perceptions can be related to the original goals of the Project. Further studies that focus on changes in orientations and perceptions over time in the Project would also be very useful in assessing program effects. Another way of detecting potential program effects would involve comparisons of participants and nonparticipants. This would require some collaboration and cooperation from the local school districts, which might be difficult to achieve, but would seem to be extremely important in examining the overall impact of the Project.

The studies that examine in detail the statistical relationship between science achievement and a set of academically related predictors such as self-concept, motivation, and verbal ability could prove interesting. They are useful first steps in developing information on the educational psychology of science learning. The next step could be to see which salient predictor variables are influenced in the hypothesized direction.

Some of the evolving research program activities appear to be helpful outgrowths of previous program activities. The development of a research file for coordinators and other students on perceived problems in the schools should give greater impetus to student research. This again, however, is a "future" activity in a project that needs to establish the results of its present efforts. The "Progress Index" could bring the research effort closer to the stated goals of the program, and might offer the Project staff a clearer understanding of what is actually happening to the preservice interns.

The Project staff has not, as yet, been very successful in enlisting resources outside the Project itself. Much effort must be expended in simply keeping the science education department viable, and participation by other NYU staff and students is very difficult to obtain in this kind of situation. Furthermore, the solicitation of outside funds and other school districts in the city of New York, while perhaps necessary for the expansion and maintenance of the project, has expended resources in staff time that has taken away from the research effort. This is surely true of attempts last year to seek external funding for continuation of Project activities. The most understanding view of these attempts is that the Project's research efforts are considered to be all that is possible in a difficult milieu. A significant part of the dilemma the Project faces is the result of not having successfully used the initial two components of the Project to lay the foundation for the period when it was to operate without external funding.

C. General Assessment

As noted in the introductory section, the research staff has initiated some efforts that are encouraging. It has identified a clear line of research in the area of self-concept and has mounted an attempt to investigate some questions relating to academic achievement that seem promising. The results of these investigations, currently in progress, should be completed prior to the conclusion of this school year and will be commented on in the final report. They represent a hopeful direction. The major weaknesses of the research phase of the Project at this time appear to be threefold:

1. The staff has not been sufficiently skilled or persistent in getting others to attempt to conduct research related to PCS activities. Thus the sole research outcomes in view appear to be those initiated by the small PCS staff, whose limitations in number and available time simply cannot allow them to exploit the rich set of possibilities that such a project affords.
2. The research program suffered from the absence of a detailed research plan that would have informed and guided staff efforts. The lack of such a plan has led to some floundering in defining a line of research and has resulted in a late start, minimizing what might have been a substantial opportunity to conduct some important inquiries in the field of science education.
3. There appears to be no firm foundation laid for the development of the "Institute for the Study of Inner-City Science Instruction," which was proposed as an outcome of the two funded components of the Project. The existence of such an institute was not originally predicated on continued government funding but on the development of resources and mounting interest within the city and the science education community. With limited time remaining, it seems increasingly unlikely that such an institute will be staffed and in place at the conclusion of the funded stage of this Project.

In regard to attracting additional researchers, the original proposal offered by Project staff to NSF contemplated a broad mobilization of staff in other departments at NYU (as well as attracting outside sources) to conduct research in areas relating to PCS interests. Even with the reduction of funds, much additional help was anticipated. Indeed, as one faculty member explained, the decrease in funds made the necessity of attracting outside research interest all the more crucial. The staff remained aware of this need, noting in an early Progress Report that one intent of making presentations at conferences was to attract a "critical mass" of researchers interested in collaborating with PCS personnel.

Midway through the final year of funding, it is apparent that such researchers have not been induced to participate. The reasons for this are not entirely clear. The absence of a clear research design on the part of Project staff would seem to be a contributing factor. To some extent, such a design creates limits to participation, possibly excluding those who have no interest in the areas being pursued. On the other hand, the clarity of purpose and the possibility of reporting some early findings might well have spurred interest or caused others to see possible outlets for their own efforts that would otherwise remain obscure. The evaluators believe the presence of a design that could have been clearly explained to others and the reporting of results early in the Project's history would have been of great aid in attracting outside interest.

The lack of a commitment from participating districts to allow the Project to conduct research in the schools would seem to be another factor limiting results and participation. We believe such commitments should have been sought and obtained early in the Project's existence. To do this would have necessitated the development of some clear guidelines (and limitations) to protect the schools. The contacts should have been initiated at the beginning, even if the

PCS staff felt it advisable not to begin the actual research activities until firm relationships had been established. The staff did appear to make such a decision to downplay research in the early stages of project activity and there is reason to believe the decision had merit. In one of the first districts in which the Project worked, some difficulty did arise over research efforts and proved costly. To that extent the staff was astute in its judgment and perceptive in its assessment of the organizational dangers involved. Still, one must begin sometime. Projects of a less threatening character might have been initiated. Further, the reseach staff need not have confined itself to conducting efforts solely in the two districts that PCS had chosen to work with. The evaluators can see no reason that some preliminary work could not have begun elsewhere if the two cooperating districts were closed to them.

It should be noted that it may have been easy to yield to the presumed dangers connected with such efforts when there was no clear research design to put into action. It was not that a carefully planned approach existed which the staff was patiently waiting to initiate. The research staff confirm that such a plan was not available and this was precisely the problem. It made waiting easier and resulted in postponing decisions about a direction for the research effort until much too late in the funded life of the Project. Thus the lack of a research plan, paucity of results to report, and the absence of a concerted effort to encourage participation all appeared to contribute to the inability to attract needed research help from outside the Project staff.

The relationship between planning and programmatic outcomes needs to be carried one step further. In Progress Report #13, mention is made of the breakthrough represented by the recent testing of students in the schools. The difficulty in winning such approval needs to be underscored. The accomplishment is a significant one, for the schools do resist this type of effort. The most recent Progress Report indicates why this is so:

> An assessment of Project City Science research output to date indicates that the areas of greatest weakness have been those dealing with science knowledge and attitudes of innercity adolescents.
>
> A major reason for this gap in Project research has been an inability to gain access to innercity adolescents. School administrators have tended to remain highly suspect of research long after they have learned to accept other Project efforts as a positive force in their schools. Stated reasons for this apprehension include a past history of negative experience with researchers from other institutions, a suspicion that students might be rendered "at risk" by possible studies, and a fear of retribution by the parents of students involved.
>
> During the spring semester of 1978, the research team began to gain entre to several Project schools for conducting research. The constant contact with school personnel which the Project has maintained throughout its history as well as the nonthreatening nature of the research tasks presented for approval combined to create a situation of mutual trust.[15]

The PCS staff needs to consider why access to the schools was gained at that time and not earlier. If the breakthrough that is noted represents, as is seemingly implied, some change in attitude on the part of the school officials, what that change is and how it has been brought about is itself an appropriate subject for study. What remains a point of contention is the length of time it takes to develop the mutual trust alluded to, and what factors contribute to it. It is possible that the schools were ready for such activities earlier than the Project was. The lack of access to students may indeed be, as indicated, "a major reason for this gap in . . . research," but there were other important factors that seem to have contributed to the lack of progress as well and that again is where planning comes in. The PCS staff did not appear to have a clear conception of its research purposes, a well-defined set of hypotheses it wanted to investigate and an explicit design for accomplishing its goals that could be shared with personnel in the schools. This lack also frustrated progress. It may not be a coincidence that access to the schools was obtained at the same time that the Project staff developed a line of research it wanted to pursue.

D. Conclusion

There appeared to be an absence of leadership in the area of research. Though a number of faculty were assigned to this effort, it seemed no single individual had a clearly assigned responsibility for seeing that research objectives were developed and guiding the staff to their accomplishment. In the absence of such leadership, the Project appeared to place a heavy burden of responsibility for the design and implementation of its research program on junior faculty members, who in the early stages were too inexperienced to have assumed such roles. The result seemed to be that the research effort has become heavily reliant on the personal skills and interests of faculty members to the exclusion of a number of possibilities that appeared better suited to the Project's purpose and intent.

The changes in Project staff and the directorship have further complicated this problem, as did circumstances in New York City. It would be difficult to overemphasize the dilemma the fiscal crisis in New York posed for this Project. In the early years of its existence, the morale of teachers and the focus of administrators on sheer operational survival made research a low priority for all concerned. Comments about progress must be weighed against the confusion such a dilemma posed for staff. Yet for all this, it is important for the staff to consider the flaws in their organizational procedures that contributed to rather than reduced the considerable limitations such obstacles presented.

Before closing, some comments should be offered about the present status of the proposed research institute. There continues to be ambiguity about how and when it will be formed. The staff originally anticipated its formation at the conclusion of this year, but there is little in place at this time to inspire confidence that this will indeed be the case. A recent Progress Report explained that funds are being sought for a five-year longitudinal study of career development and noted:

"If funded, this project would mark the beginning of the Research Institute envisioned by (the) former director of PCS. . . ."[16]

That seems to make the existence of the institute a condition of further governmental funding, rather than an outcome of this Project. This was not the stipulation stated in the original proposal. Further, the potential development of such an institute has not been aided by the University's decision this year to cease offering a doctoral degree in science education. This is a curious and distressing interpretation of its responsibility to the Project, the staff, and the outcomes originally supported. In any event, the goal of establishing the institute is in doubt.

In conclusion, if one is to measure ultimate success by the extent to which intended outcomes have been reached, this component of the Project poses a dilemma. Even the most charitable assessment cannot conclude that the original goals appear within reach. By itself, this need not constitute failure. The most well-planned projects often find that in actual operation they have to shift their goals to what is practical, accessible, and within reach. Such revisions can prove imaginative and lead to highly productive results. The problem with the PCS research effort is that while some of its original research objectives do not appear to be within reach, precisely what will replace them in terms of breadth and depth is equally unclear at this late date. The final report will attempt to deal with how productive the efforts recently initiated have been and the overall contribution of the research program to the intended outcomes of the Project.

IV. THE DISSEMINATION PROGRAM

A. Introduction

The introduction to the Dissemination Program section of the latest PCS Progress Report (#13) begins:

> As PCS ends its next-to-the-last year of funding by the NSF, one of the staff's major concerns is the continuation of the Project after funding has been withdrawn. Accordingly, interest in the content and direction of the Dissemination Program has become prominent! 17

The present evaluation report is designed to review the status of the "content and direction" of the Dissemination Program during the first half of the final Project year. It will examine the nature of any changes in the program reflective of this heightened interest.

The July 1978 evaluation report raised a series of questions concerning the Dissemination Program. These questions focused on the citiscience notes, the Progress Reports, and conference presentations, since they appeared to be conceived of as the major means of making the Project known. The report also commented on the apparent absence of a formal dissemination plan. The evaluation team has not received a response to the report from the PCS staff, nor has any Progress Report been written and published covering the period after the evaluation report was issued. Further, since little in the way of reporting at major conferences or new issues of citiscience notes have occurred during these initial four months, we will defer the bulk of any further comment on these issues until the final evaluation report. The present report will, therefore, be brief and will concentrate on those dissemination activities that are currently taking place or are planned for the immediate future.

B. Dissemination Activities

Citiscience notes:

Citiscience notes continues to serve as one major dissemination vehicle for

PCS. This monthly publication serves a variety of important functions, not the least of which is to keep the name of Project City Science before a large group on a regular basis. There is no doubt that the notes contain a variety of useful information, some of which teachers may collect and retain as resource material for future use. (Certainly a subject-organized index would aid in this use.) While it seems reasonable that citiscience notes should be published by the NYC Board of Education's Science Division, that is not the case and PCS has filled the void with a useful publication.

The evaluation staff continues to believe that the PCS staff should evaluate the perceived value of the notes to its readers as an integral part of the staff's responsibility to NSF. An organized effort to determine their potential effectiveness could aid the staff in determining how useful they have been to teachers as well as how they might be improved. The evaluation staff will conduct such a survey for our own use. The results of a survey will be included in the final evaluation report. There is a need to determine their power as a dissemination vehicle for the Project.

Progress Reports:

The first evaluation report (1976) was written without the benefit of Progress Reports 12 and 13 (October 1, 1977-January 31, 1978; & February 1, 1978-May 31, 1978, respectively). In the absence of these two reports, which covered the initial evaluative period, the evaluation team raised a series of questions based on Reports 1-11 concerning the efficacy of the Progress Reports as an instrument designed, in part, as a means of enticing new districts to replace the project elsewhere. After reviewing Progress Reports 12 and 13 the evaluation staff continues to feel these questions are pertinent:

Can the unique needs of each group (who receives the Reports) be optimally met by a single document?

Have school administrators both within and outside NYC received enough clear data in the Reports to determine whether or not the PCS model should be implemented in their schools?

Have science education departments at universities been offered sufficient information to determine whether it is a viable alternative or addition to their existing programs?

. . . Are the findings sufficiently rigorous for a project of the magnitude and importance of PCS? 18

These questions, as well as others, still need to be answered. The PCS staff reports that the focus of the Progress Reports has shifted to more of a business report. Nevertheless, one must question why it is necessary to expend such critically needed resources to report information of such limited use. Surely there are means available that are more direct and effective for disseminating information to districts who are considering replication of the Project. Even at this writing the PCS staff is still collecting data on the efficacy of the project as a model of science education for the target population. It seems likely that the Project has several populations that it can and should reach. What is questioned is how effective the Progress Reports are for reaching any of them.

As in the case of citiscience notes, no formal effort has been made to determine the effectiveness of the Progress Reports for the intended audience. The staff appears to be content with reporting on their progress in a manner that is best or most comfortable for them. While the Progress Reports meet the Project's obligation to maintain a record of its activities, there has been insufficient concern with their usefulness as a dissemination vehicle. As noted in an earlier report, the evaluators believe that the different audiences the Project serves require a more varied effort. The Progress Reports seem too limited a form for this purpose. Even within these limitations, however, there is a need for the staff to obtain feedback from those who receive the reports about how useful they are. Such an attempt would seek to find ways the reporting could be modified or changed, in order to better accomplish its purpose as a dissemination vehicle.

To do this, a more thorough effort at planning a system of reporting would have to be made. The Progress Reports could not be seen as vehicles that simply record, in a general way, the various activities in which the Project is engaged. They would instead be viewed as instruments for accomplishing specific purposes. These would include reporting formally and at periodic intervals the specific outcomes of various project efforts whose goals and procedures have been clearly described. This would encourage different parts of the science education community to look to these reports for data on successful classroom implementation, teacher training practices, or developments in current research. The present reports seem to offer data that are of greatest interest to those most closely involved in this particular project and decrease in influence or usefulness as one is further removed from it. Little hard data are offered, and information is presented with no apparent concern for a systematic, developmental build-up of results. That defeats the central purpose of a dissemination vehicle, for it limits interest and understanding to the initiated.

Replication Activities:

The first evaluation report (1978) briefly commented on PCS's attempt to expand its involvement in NYC by means of a cooperative effort with the Bureau of Personnel of the Board of Education. This involvement, which originally included the possibility of Central Board funds, did not materalize due to a variety of events beyond the control of PCS, not the least of which was a serious fiscal problem and a change in leadership at the central administration level.

While a significant number of school districts did initially express an interest in participating in some aspects of a "new" PCS, the loss of Central Board funds reduced that number to one. It is absolutely clear that such a situation has little to do with the efficacy of the Project. Nevertheless, so much staff energy was expended that a follow-up report beyond that given in Progress Report #13 would assist future NSF-supported projects in their replication efforts. Questions designed to determine what kind of information, support, or university/NSF involvement would be necessary for a school district to participate in an already existing project like PCS should be collected.

While it may be impossible for PCS to ascertain all of the variables that entered into the negative decision on the part of such a large number of school districts, an analysis of those elements that are reported, in relation to any unique characteristic of the district, would be helpful. Stated differently, the process PCS used in following up the Board initiative should be examined. Reactions of the districts when there existed the promise of Central Board funds should be compared to their reaction when the funds were not available. A thoughtful analysis would constitute an interesting and important part of the history of this Project. It is suggested that such an analysis be attempted and the results reported along with significant PCS experiences.

One major distinction between the PCS model currently being implemented in the participating districts and that which has been proposed for any new districts warrants comment at this time. When the characteristics of the PCS model that set it apart from scores of other school-university "partnerships" are examined, one clear distinction would be in the area of personnel.

The present plan supplies PCS staff involvement at three levels: The master's level intern, studying at NYU and providing direct supervised instruction to children; a doctoral level intern, serving as the on-site coordinator, studying at NYU and providing continuous feedback to the PCS staff;

and the NYU-based PCS staff who plan, execute, and evaluate PCS on a day-to-day basis.

This three-tiered organization is clearly a "unique" feature of PCS and, in the understanding of the evaluation team, one critical to the ultimate improvement of the quality of science education for the target population. The potential for immediate feedback and supervision of instruction that exists between the intern and the coordinator is undeniable. Equally obvious are the additional costs of the supervisory intern (field coordinator) to the funding agency--NSF presently and the community school districts (CSD) in the future. The proposal PCS has discussed with several CSD drastically changes the staff organization by having the field coordinator selected from district personnel, leaving only the classroom intern to be responsible to PCS--a model not unlike every student teacher program currently in existence. While the reduction in cost resulting from this change is obvious, so too is the potential reduction in PCS control. Where this approach has been used by the project, the results have not been totally satisfactory.

It is probably safe to hypothesize that this change may have an effect on the extent to which any unique aspect of the PCS instructional model will be realized. While it is obvious that only future observation and evaluation can determine such changes, it is equally clear that the proposed model differs from that currently being employed in one significant dimension. If the on-site coordinator becomes a district and not a University employee, it is quite possible that what will eventually be replicated is a student teaching structure very common to most colleges and universities. The project will assign its intern (student teacher), the building staff (in the form of the coordinator) will supervise the field activity, and the college faculty will again be relegated to a peripheral role lacking in both influence and impact. The PCS staff should consider how different or effective this model can remain.

Professional Conference Presentations:

The first evaluation report (1978) included a reference to the informal and formal PCS conference presentations described in Progress Reports 7, 10, and 11. It continues to be the position of the evaluation staff that these activities are appropriate as one method of disseminating Project information and, as such, are consistent with the Project's stated goal ". . . to have its model for educational reform adopted by other major universities and neighboring school systems throughout the nation." The PCS participation in the 1978 NSTA Conference is referred to further in Progress Report #12 and described in detail in #13. In addition to these references, the PCS staff reported participation in a State Education Department meeting, an AETS session, as well as a NSSA meeting held at the Pocono Environmental Center.

The first evaluation report referred to two questions raised by participants at the NSTA Conference that we believe should be considered for the 1979 conferences:

How was the Project documenting its progress?

How is your preservice program different from other such programs and how do you know it works?

It was the expressed hope of the evaluation team that 1978-79 conference presentations would be designed to provide answers to these and to similar questions. An August 1978 PCS publication listed conferences scheduled for the last year of the Project's funding. In addition to the items listed, it was reported that a research paper based on Dr. Jordan's dissertation has been accepted for presentation at the Annual Conference of the Eastern Educational Research Association. It will, of course, require an analysis of the planned presentations to determine whether they include any of the long-awaited answers to questions of the program's efficacy. Such an analysis will be included in the final evaluation report. Appendix B gives a full list of the conventions that the PCS staff will attend this year and the presentations they plan to offer.

C. General Assessment

This phase of the project is plagued by two problems: the absence of an overall approach and the lack of any clear results to disseminate. As was the case at the time of the first evaluation report, it is evident that PCS is complying with the broad intent of a program of dissemination. Citiscience notes and the Progress Reports continue to be published, contacts continue to be made with local school districts that might consider replication, and various staff members are making presentations at large professional gatherings of educators. In regard to what the staff has to offer such audiences, questions first raised six months ago continue to be relevant:

1. Do the intended audiences find that which is presented useful?
2. Are the data necessary to substantiate any claims of success available?

One might note that these questions echo the underlying sentiment of those raised by educators who attended the Project's presentation at last year's NSTA conference. It is hoped that answers to these and other questions will be forthcoming as the Project completes its funded existence at the conclusion of the current academic year.

One of the major issues posed in last year's evaluation of the PCS effort was whether a formal dissemination plan existed. The need for such a plan and its seeming absence must again be raised in this report. There does not appear to be any evidence of either a stated plan or one which could be logically derived from the separate dissemination activities beyond that of a simple frequency schedule. It seems clear that the major objective of Project replication is too important to be left to chance or a series of short-term efforts.

It is the belief of the evaluators that the "content and direction" the project staff alludes to must first be established by clearly stating objectives so that progress can be monitored and evaluated, both formatively and summatively. Such an approach requires a different set of operational standards than that of simply increasing interest in the Project and its activities. The mandate has always been broader than that. What is implied is the creation of specific procedures set up to achieve clear outcomes in regard to disseminating results, attracting visitors and encouraging replication. In a project whose third component has always assumed ten years of unfunded activity, the absence of such a plan of action represents a major deficiency.

This need not have been a solitary task. A better organization of the effort could have resulted in help. In this connection, for example, the question can be raised of how skillfully the PCS staff made use of its advisory board in helping <u>design</u> and <u>implement</u> a dissemination plan. It is clear that local members of that board have been employed in various ways, but less clear how well the full membership has been used? Have they been asked to comment on the usefulness of <u>citiscience notes</u> or the <u>Progress Reports</u>? Have their opinions ever been sought not only in regard to how dissemination should be conducted but on the effectiveness of the techniques currently employed? Beyond the last meeting held (September, 1977), no record of such consultation has been offered by the Project staff. In a similar vein, it appears that the advisory board has not been asked to participate in the development of a formal dissemination plan or offer their reactions to a written plan developed by PCS staff. Such a course of action is not the only one available and need not have been pursued. The evaluators simply suggest that there is a continuing need and that groups such as this one represent an available and unexploited resource that might have been used.

In regard to specific dissemination activities, a number of suggestions could be made. It would seem useful to have invited a selected list of educators to visit the Project on a regularly planned schedule developed by the staff. The schedule of visitors could have represented a calculated and coordinated effort to reach particular audiences within prescribed geographic areas in ways that mounted Project influence in thoughtfully planned stages. Depending on need and purpose, visitors could have been brought to the NYU campus or Project field sites. The audience considered might have included:

a) Teachers and building level supervisors or administrators from New York City who would be exposed to salient features of the Project and its potential for their district.

b) Teachers and supervisors from other urban areas. This could not only lead to replication but might have provided important data about the strengths and weakness of current parts of the PCS effort as viewed by other urban educators.

c) Science educators (possibly with some of their students) and school superintendents (with members of their staff) who might have been invited to spend a day at NYU in which workshops were conducted and the Project generally showed the best they had to offer. Conversely, the staff might have chosen to have them visit field sites to observe effective instruction, science fairs or other activities in which the Project took pride. The visitors could have been local or from surrounding geographical areas.

d) Researchers in science education, invited to attend a conference where the Project staff presented data they had collected, suggested opportunities for research within the Project, and elicited possible avenues of research from those in attendance.

At the simplest level, such an approach might have represented a means of disseminating information on specific aspects of the program. It also could have served as an effective means of collecting data from a variety of professional sources about how improvements could be made. Such outsiders represent not only a source of Project replication but a means of formative evaluation, collected from experienced sources. The evaluators have, for example, brought in a number of individuals from local school districts, other urban areas, and different universities for precisely this purpose. A similar procedure, established early by the Project, might have proven extremely useful.

It is not the purpose of the evaluators to suggest specific vehicles, only to point to the need and existing possibilities. Such efforts would represent a varied and necessary effort at promoting the program, sharing its results, and obtaining feedback about what parts seem ineffective or represent obstacles for others. It would require extensive and thoughtful planning, however, and this is precisely what the dissemination program has always lacked. There has not been a design, an overview, a plan to bring about the Project's objectives in this important area. We are speaking here of a long-term, written plan that could be modified or revised as data about its effectiveness was accumulated. No such plan appears to exist.

Equally important, no one seems to have been clearly assigned the responsibility to develop such a plan. There are staff in charge of the activities that currently represent individual parts of the dissemination program. The citiscience notes are put out, the Progress Reports eventually are produced, and arrangements are made to visit conferences. But these are seperate activities, some of which are mandated, and not a plan of action. What is lacking is 1) an integration of these activities aimed at well-defined objectives, 2) means of obtaining feedback that would inform and/or redirect present efforts, and 3) evidence that someone has been charged with sufficient responsibility and authority to set a clear direction.

D. Conclusion

The dissemination component would seem like the logical launching pad for the third part of PCS, which involves ten years of unfunded activity. It must be noted that little resembling a reasonable foundation for such continued activity is currently in place. No replication outside of New York City can be pointed to at this time. Within the City, there are hopeful signs that some of the local school districts may set aside funds that would enable the Project to continue. Neither the form nor the extent of that continuation is totally clear. Of considerable interest will be the decision made by the two districts in which the Project is currently working. If they are to be "model districts" or even dissemination models, it will be useful to see what plans have been made for them in Phase III by the PCS staff. The nature and extent of their participation is important the the Project needs to plan their role carefully.

On the final page of its most recent Progress Report, the following assessment is offered:

> In conclusion, during the spring semester, the Dissemination Program became more prominent in the minds of th. Project staff. This can be attributed to the staff's growing confidence that the Project has developed a successful and transferable program for educational reform, as well as the staff's feeling that others concerned with education should become persuaded of the Project's value and develop parallel programs nationwide. 19

It is good that the staff has confidence in what it has accomplished. It is encouraging to hear they believe a successful and transferable program for reform been developed. What remains is for them to marshal the evidence for this and present it in a form that can be disseminated. That alone will provide the impetus needed for the development of parallel programs on a national basis.

In the absence of this data, such expectations would seem unwarranted and unrealistic, as a number of visitors at earlier conference presentations have made clear.

FOOTNOTES

1. New York University, Project City Science, Progress Report 12, pp. 42-43.

2. New York University, Second proposal:Goals, Tasks, Activities section (See Appendix P).

3. New York University, Project City Science, Progress Report 13, pp. 2-3

4. New York University Project City Science, Quarterly Report 8, pp. 73-75

5. Progress Report 12, pp. 19-22.

6. Quoted from reports submitted to the evaluation staff by outside consultants employed to observe Project activities during the 1977-78 school year.

7. Ibid.

8. Ibid.

9. New York University, Project City Science, Progress Report 11, pp. 20-21.

10. Quoted from the minutes of a Project City Science Advisory Board and reported in Progress Report 13, p. 3.

11. Ibid. pp. 6-7.

12. Progress Report 12, pp. 20-21.

13. New York University, Second proposal:Goals, Tasks, Activities section (See Appendix P, pp. 353-376).

14. Ibid. pp. 354-368.

15. New York University, Project City Science, Progress Report 14, p. 18.

16. Progress Report 13, p. 36.

17. Ibid. p. 41.

18. These questions were raised in the First Queens College Evaluation Report of Project City Science Activities, see Appendix A, pp. 95-107.

19. Progress Report 13, p. 49.

APPENDIX C

SUMMARY REPORT OF INTERVIEWS CONDUCTED

WITH

PROJECT CITY SCIENCE PRE-SERVICE TEACHERS

AND

ON-SITE COORDINATORS

1977-1978

By: Penelope Haile

Penelope J. Haile

REPORT ON INTERVIEWS WITH PRE-SERVICE TEACHERS AND ON-SITE COORDINATORS IN PROJECT CITY SCIENCE

INTRODUCTION

On May 9, 12, 16, 22, and 23, 1978, I interviewed fifteen preservice teachers and six on-site coordinators involved in Project City Science. These interviews were conducted as part of a total evaluation of Project City Science. Each person interviewed was seen individually by me for 30 to 45 minutes within the school in which he or she worked for the past year. A guided or focused interview format was used. The interview protocol for the preservice teachers appears in Appendix A and the interview protocol for the on-site coordinators is in Appendix B.

The following is a two-part report of these interviews. The first part analyzes the responses of the fifteen preservice teachers. The second part analyzes the responses of the six on-site coordinators whom I interviewed.

PRESERVICE TEACHERS ("INTERNS")

Overview

Although all of the preservice teachers (interns) had specific complaints about the details of Project City Science (PCS), no one considered his or her year a waste--not even the three interns who do not plan to teach next year. This is not surprising since these fifteen interns are the ones who have successfully completed the training. Others who started in PCS as interns in the fall of 1977 have since dropped out.

Most of the interns felt that the basic structure of the project--the integration of coursework at New York University with a good deal of fieldwork in the public schools and the use of a Hands-On approach to the teaching of science--is excellent. Only three of the fifteen interns felt that the balance between time spent in the public school and time spent at New York University was not ideal. Two felt that the one day a week (second semester), when the interns were at New York University and not with their public school classes, was disruptive to the classes. Another intern suggested that the coursework at New York University could be intensified in the beginning of the semester and lessened as the interns' duties in the schools increased. And of the fifteen interns, eleven said they would use the Hands-On approach if they teach science in the future. It would seem that most interns would agree with one of their colleagues who said: "I think the idea of the project is excellent: the concept, the Hands On, the learning. A lot of the coursework is excellent."

Not all specific aspects of PCS, however, worked equally well for all the interns. Questions about particular elements of the project served to point out a number of areas of concern: The Hands-On approach, the instruction at New York University, the On-Site Coordinators, and the Cooperating Teachers. These four general areas of concern are analyzed below.

The Model for Science Teaching

The model for teaching science in the Junior High School, as promoted by PCS, was variously defined by the interns as follows:

a)	Hands-On	(13)*
b)	Discovery Learning	(3)
c)	Inquiry Method	(1)
d)	Scientific Method	(1)
e)	Exploratory Method	(1)

The model was characterized as "child-centered" and involving:

a)	experiments or "lab work" (as opposed to "demonstrations")	(11)
b)	quantities of equipment and materials	(11)
c)	asking and answering questions	(9)
d)	worksheets	(7)
e)	group work	(7)
f)	more student participation	(4)
g)	the teacher "not in front"	(3)
h)	higher noise level	(2)

Three interns stated that PCS introduced them to an approach or an attitude toward science education rather than a strict model for teaching science.

One intern said:

> They didn't give us a model. They didn't say "This is the way we expect you to teach." They just gave us a lot of little things. And, I think, we put it together ourselves.

---

* Indicates number of interns who made the response--some interns made more than one response per category.

Another intern said:

> Basically the project set out roles--goals to be that type of teacher who is flexible enough to realize that if the classroom has a stagnated appearance (a stagnated feeling, we're not going anywhere, they're not picking up fast enough, I'm not getting the attention of the students in the back, someone's sleeping on me) to be able to realize it without having self-destruction; without saying, "Well, I'm a loss at being a teacher." And to correct that error by using different motivations--maybe field trips, maybe using cultural differences, bringing in other languages, other cultural attitudes about science, incorporating what goes on in your background.

There seemed to be times, however, when it was not clear in the minds of the interns whether the model advocated by PCS was strictly a "learning-by-experience-only" model or was a broader approach including "concrete experiences." For those interns who saw the model as limited to the basic Hands-On experiments, there was dissatisfaction and confusion. This confusion and a desire to utilize a wider range of presentation formats is illustrated by the following comments by one intern:

> We were never told not to (talk through a topic). In fact, in some of the discussions that we had had in our curriculum and methods classes, our professor did mention that it wasn't really necessary to do this (Hands-On experiences all the time. And that not everyone was really convinced that Hands-On all the time was really that much better than lecturing. But what they wanted to do, I suppose, was to give us the option to do it either way that we wanted. And I do feel that I do have this option. I'm not required to do Hands-On. I'm not really required to do anything, although I'm encouraged to. I've found that by doing the Hands-On, I haven't so much become a better teacher for it, but I am developing an attitude which is probably different than the attitude a normal teacher has.... Lecture, that's the usual thing. You sit down and write your developmental lesson and I suppose I can do that as well as most teachers by now. But once in a while as I'm sitting there, what comes to mind is whether or not what I'm reading is adaptable to a Hands-On experience for them. And if it is then I take off a couple of hours and I write up some worksheets, go out to the store, buy what I need.

Another intern said:

> I think there should be a marriage between the two (discovery learning and traditional/ lecture). I don't think you can have one without the other. They haven't emphasized that. There are some concepts in the eighth grade that just cannot be handled by discovery alone.

From the point of view of four interns, the advantage gained from including Hands-On experiences in one's teaching is the increase in student participation. Another intern noted:

> An important thing, I think, is that kids participate more. More kids participate more. Both in quality and quantity. After you've gone through something like that. Of course, there's always other stragglers. They haven't done anything. But all of a sudden you have faces popping out of the class that were never there when you were just lecturing.

The fifteen interns were asked about their career plans for next year. They responded as follows:

a) Hope to teach in Junior High School (6)
b) Hope to teach in Senior High School (6)
c) Do not plan to teach next year (3)

When asked if they would use the Hands-On model of teaching science if they were to teach in the future, eleven said they would use the model, four said they would not. One intern qualified his response by saying:

> Once I get more relaxed in the situation; I got used to the school, I'd go to more Hands-On. But I'll probably be more traditional the first year....I think I'd have more control, be able to develop rapport more easily. I'd start off more traditional than liberal. I think it presents problems in control.

All of the interns acknowledged some difficulties or limitations in implementing the Hands-On experiences. These difficulties included:

a) student behavior and safety considerations (12)
b) time available (teacher preparation time and student classroom time) (9)
c) content required to be covered (kind and quantity) (9)
d) level of student achievement/intelligence (4)
e) equipment availability (4)
f) student boredom/apathy (2)
g) method opposes students' previous science training/ does not fit the system (2)

The greatest difficulty that the interns experienced in implementing the model was classroom management (student behavior and safety considerations). One intern stated:

> They're a very rough class and its very hard to keep them going. You really just can't trust them with microscopes. I fall back on a lecture sometimes to have them sit and write and learn how to behave.

The content area (e.g., "living things" and "chemical reactions"), the amount of time available (to "cover the curriculum" and the time available for the teacher to plan and set up the experience), and the availability of equipment were also important considerations in implementing the method. When asked how he decides to use a Hands-On approach, one intern reported:

> It depends on the subject matter, for me, more than anything. And sometimes it depends on my time. If I see that I can't arrange to do something with cheap materials or else I'd be straining the topic by doing it, I just don't do it. I just talk my way through it or else I show a filmstrip or something like that.

The interns reported that they had used the following alternatives to the Hands-On experiences:

a) "developmental lessons" (6)
b) lectures (5)
c) a mixture of lectures and lab (3)
d) filmstrips (2)
e) discussions/colloquia (2)
f) 3-week unit projects (1)
g) "Learn Ball" (use of competitive teams) (1)

Two interns had serious objections to the model. One felt that the model was "too time-consuming," that "students could absorb more (content) verbally." Another stated:

> It (the model of discovery learning) sounds great, but it does not always work. It's a really hard thing to apply. It's terrific in theory, but, as I've done some more reading of my own, perhaps it's not even so good in theory. It's just not the way science really is. What that kind of model emphasizes is a theoretical-inductive model, where you work from the specific and you work up to a model. It's very logical, very rational. And if you have a very logical mind, you might be able to come up with some very interesting things. However, in my understanding of a philosophy of science and historical approach to most of the great discoveries, it wasn't that way at all. Things were more intuitive, more hit-and-miss.

A need for more evidence of the benefits gained by using the model was clearly expressed by another intern:

> The Project philosophy is to develop a lot of Hands-On methods because they believe that it works better; that it can help the student learn better. I was interested in really testing it out....If New York University can really look over all the Hands-On experiments (as designed by the interns), make sure they're perfectly set up, then we can test to see if it really does work out. I'm just wondering on a bigger scale how it affects the students. Are they really learning better with it? If not, why not? I'd like to see if it (the Hands-On teaching) could be perfected, a little bit more organized.

<u>Instruction at New York University</u>

When asked to mention courses that were particularly helpful, the interns noted the following courses:

a)	Curriculum and Methods courses	(7)
b)	Psychology/ Behavior Modifications	(3)
c)	Integrated Science	(2)
d)	Workshops	(1)

One intern reported that

> Both (the Curriculum and Methods courses) that were offered were very, very good. I don't think there's a class there that I didn't enjoy or that I didn't learn something.

The following courses were reported by the interns to be of little or no help in preparing them for teaching:

a) Integrated Science (7)
b) Sociology (4)
c) Some Workshops (2)
d) Community Work (1)
e) Methods (1)

The Integrated Science course was viewed as particularly unsuccessful for these reasons:

a)	content was a repeat of previous science training	(4)
b)	a "waste of time"	(4)
c)	the instructor did not have a strong enough science background	(3)
d)	the book used was not good	(3)
e)	some content levels too elementary, some too advanced	(2)
f)	no depth	(2)
g)	boring	(2)

One intern stated:

> One of the parts (of Integrated Science) involved going through some book called <u>Science Inquiry</u> by Laughery. This had a set of experiments, so called inquiries, which were supposed to provide us with experiences....I found that really boring. The experiences were high school, junior high school experiments. You know, I have a BA in physics. That stuff to me was so boring. So that eight weeks was a total waste for me. I could have read that book and gotten the same thing out of it in about three hours of reading.

Another intern was critical of the Sociology course. He said:

> Now there's a sociology course where the professor just gets up and does his "thing."...Some of the courses that they taught us at New York University were Hands-On methods. Some of them were complete lecture, complete everything that they're trying to keep us away from.

All of the interns were asked if they were able to bring problems they encountered in their fieldwork to their New York University instructors and receive help. The interns reported that they found the instructors:

a) knowledgeable (7)
b) helpful (6)
c) available (5)
d) not helpful (2)

Two interns indicated that they did not bring their problems back to New York University because they were fearful of evaluation by the instructors. One intern commented:

> Their "rap-sessions" were not run very well. They turned into a "Look-how-great-I-am" kind of thing. I think they were overly-critical of anyone who had a problem. So I didn't discuss any problems that I had. The "rap-sessions" were very destructive. I think that probably came down to the individual person who was running the "rap-sessions." She probably felt she was emphasizing the positive things about what we were doing, but I think it turned out to be negative. I think they've tried to emphasize the positive throughout the program. It was very good in the beginning when we were all afraid of entering the classroom and that kind of thing. But in the end, they should have made some concessions that "Yes, there are some problems which you're going to encounter. You're not the only one." This type of thing.

Another intern reported that he had not received the help he sought from the instructors because of a dispute over "jurisdiction"--which staff member was the correct person to give the assistance.

One intern complained about the use of graduate students to teach graduate level courses. She stated:

> I would like to see, in the psychology field, doctors of philosophy teaching these subjects. The instructor for our psychology course did not have a doctorate. They should come in experienced.

Another intern noted the drawbacks inherent in a small, self-contained graduate program. He commented:

> I would have preferred a more varied staff....You get different opinions from different people. And just by a person looking different and talking different, in a different voice, helps....We've had pretty much two people....Not only is it the same instructor at times, it's the same students in the classroom also.

Of the fifteen interns, three felt that there were problems running the coursework at New York University concurrently with the extensive fieldwork experience. Two interns mentioned that their classes in the public schools were disrupted by their absences once a week (second semester). In both cases, the cooperating teachers, who conducted the classes while the interns were at New York University, were seen by the interns as not following through with the lessons as planned. When the interns returned to their classrooms, they could not count on content having been covered, groundwork having been laid, or instructions having been given by the cooperating teacher the previous day. One intern felt that the work got piled up at the end of the semester. Typically in school courses, requirements such as papers, reports and projects are assigned toward the end of the semester. In PCS the interns also began to take on more responsibility within their field placement toward the end of the semester. This intern suggested that PCS alter this arrangement by intensifying the New York University coursework at the beginning of the semester and easing off on assignments at the end of the semester so that the interns can devote additional time to their field placements.

All of the fifteen interns felt that the fieldwork was vital in their training as science teachers. The value placed on the fieldwork can be seen in the following comments by three interns:

> The student teaching--being in the field--was the most important (aspect of my training) because I learned a lot. I learned the New York City school system. Also I had the opportunity to learn from many teachers--to listen to them talking.
>
> But maybe the best thing about it was that because I started those curriculum and methods courses at the same time that I was already inside the schools every time there was a reference to a classroom situation, it was so much closer to a real experience that I had had somewhere.
>
> The fieldwork is probably a million times more valuable than the coursework.

The following general comments and suggestions were made about the interns' relationship with New York University:

a) too much work required (3)
b) work involved not difficult (3)
c) need a more systematic approach to reviewing science curricula; more specific to New York City (3)
d) no time scheduled to prepare lessons, to "scrounge" for equipment (2)
e) need a specific "library" of Hands-On experiences/ materials available (1)
f) give more credits for "Student Teaching" (1)

On-Site Coordinator

Each intern was asked to describe the role of the On-Site Coordinator. The following functions of the On-Site Coordinator were reported:

a) supervise lesson plans (10)
b) liaison between interns and cooperating teachers and administration (9)
c) resource person (7)
d) work with other science teachers in the school/ promote Hands-On experiences (7)
e) observe interns teaching (6)

The following characteristics were viewed by the interns as most important in order for the on-site coordinator to function adequately:

a) science teaching experience (5)
b) availability (5)
c) good at interpersonal relations (5)
d) knows what to do to solve classroom problems (4)
e) responsible/dependable (1)
f) efficient (1)

Three general problems were reported with respect to the on-site coordinators:

a) not available (5)
b) not "professional"/objective (2)
c) not dependable (1)

Lack of availability was attributed to two different things. In some cases, the on-site coordinators were doctoral candidates intensively involved in their own work. In one other case, the on-site coordinator was also the cooperating teacher. This situation caused a unique problem. The intern involved concluded that:

> I would say now that the on-site coordinator and the cooperating teacher should be separate individuals. Sometimes you want to say something to one about the other. What do you do when it's all in one?

The intern solved this problem by using the district science coordinator (not involved with PCS) to fulfill some of the functions of the on-site coordinator. The district science coordinator observed her lessons, offered criticisms, and made suggestions and corrections.

A lack of responsibility and dependability was attributed to one on-site coordinator. The ramifications of this situation were spelled out by an intern:

> Basic little things like being in on time can upset the whole system. When you tell twelve kids you're going to be in to work on a science project, then they're knocking on the door all morning and you're not here. That is upsetting to me who's trying to get my work done, to the kids. It lets them down. They haven't had anything. They've been let down by society and especially in this school. And if you're going to let them down too... they're not going to trust. They can't even trust a black person or a Puerto Rican. I mean, really. And that, to me, was very important.

Three interns suggested that the on-site coordinator could have helped them more if they would have been able to make more observations of the interns while they were teaching. One intern felt that it would have been more helpful if the on-site coordinator had had science teaching experience.

Cooperating Teachers

The interns were asked if they used their cooperating teachers as a role model in their own teaching. Nine interns reported that they did use the cooperating teacher as a model; six said they did not. An intern commented:

> It was inevitable that I used (the cooperating teacher) as a model. I just went to the classroom and found myself doing things that he would do. I didn't have an alternative model. What was I supposed to do.

Nine interns reported that the cooperating teacher used them as models for teaching science, to a certain extent. The cooperating teachers would use the Hands-On lessons developed by the interns. An intern said:

> I don't think I have changed (my cooperating teacher's) style at all. But I have changed, maybe, the things that he does do. I think, in the future, if he does come across something he may decide to do a Hands-On unit.

> But I'm not sure he'd bother to do his own. I know that now what I've done to the mealworms with him and I've done the air and gas...he has copies of all of these and he can use them if he wants.

There seemed to be quite a problem in that not all cooperating teachers used the Hands-On approach. The interns reported that the cooperating teachers used Hands-On:

a) frequently (2)
b) a little (5)
c) not at all (8)

Other methods used by the cooperating teachers included:

a) lectures (6)
b) demonstrations (4)
c) highly programmed "labs" (1)

Not only did this make it difficult for the interns to learn the Hands-On approach, it made it difficult for them to fulfill one of their obligations to PCS, as they saw it. One intern described the "Catch-22":

> To a certain extent, I'm caught in the middle because one person's pushing you to do Hands-On and one person doesn't want to do Hands-On anyway. And you're being evaluated, partially, on the implementation of their program. And there's somebody standing there saying, "I'm not going to let you do what you're supposed to do."

Another intern concluded:

> Our positions in the school are strange, in a way. We're supposed to be in there helping the staff, but I'm supposed to be learning at the same time. Sometimes I question whether or not the cooperating teachers I've been given are the best models.

Three other interns also mentioned the difficulty they had experienced in trying to be emissaries of an innovative teaching method while being neophytes in the teaching profession.

Seven interns mentioned that their cooperating teachers were quite helpful, both with methods for handling children (classroom management techniques) and with content suggestions ("curriculum"). Seven interns reported that other science teachers in the schools were helpful to them.

Five interns stated that, by the end of the year, there still were unresolved problems involving the cooperating teachers. Three interns characterized their cooperating teachers as restricting and dogmatic. One intern suggested that the cooperating teachers were less than cooperative because of internal problems within PCS. She stated:

> We had so much disorganization within the project that it discourages the cooperating teachers.

Suggestions for Further Evaluation

At the conclusion of the interview, each intern was asked to suggest thus far unexplored areas or aspects of PCS which he or she felt should be subjected to evaluative study. The most frequently mentioned aspect was selections procedures. Review of the selection criteria for these positions was suggested:

a) the public schools in the project (3)
b) the interns (2)
c) the cooperating teachers (1)
d) the on-site coordinators (1)

One intern noted that an error in selections can serve to cancel out positive aspects of the project. She said:

> There are some problems with the program in this school which outweighed the Hands-O... The project was not accepted in this school (by most of the staff members). The way it was presented was we were going to change curriculums. And they didn't want that. There has been a lot of resistance.

One intern suggested studying the relationship between the proposed goals of the project and the budget. He suspected that the allocation of funds does not accurately reflect the stated purposes of the program. He said:

> As individuals working in the school, we should have money to spend (for equipment). We were allotted $25 and they did even that in a begrudging manner. Money to spend on things that the kids use up, to throw away. Money to spend on things to be kept in the school and things that can be hoarded by New York University that can be used when the need arises. For something that's supposed to be some really big educational project--I guess it's like being in the infantry with an M-1 but no artillary.

A closely allied question was proposed to study by another intern. He asked:

> How do student teachers manage in the program? How do we survive since we don't get paid? Would we be better if we had some compensation? Has financial stress been a factor in others' decisions to drop out of the program? If I had gotten only $40 a week, I would have had less worry. My mind would have been clearer.

Another intern suggested that an evaluation include a review of the research being done by PCS and the extent to which that research has been disseminated to project members. The intern did not think any research was being done and believed that research was necessary. Similarly, an intern suggested that any evaluation effort should include a close look at the students who have received the Hands-On instruction. She suggested looking at:

> How the teacher has gotten the concept of Hands-On across to the kids. If this program has been effective, there should be a difference in the teaching styles. The students should be able to say, "Well, since this person's been here, we've been able to do this."

One intern proposed that the evaluation study include questions directed to "interns" who dropped out of the program before completing the training, in order to find out why they resigned.

Two interns suggested seeing whether the Project has specific goals. One intern noted:

> It's not the work (that is a problem), it's the vagueness of it all.

Another intern stated:

> I think they should be more structured. I think they should find out really what their goals are. You can't take on too many. If you want to be good in these things, you can't spread yourself too thin. Find out what your goals are. Find out what you really want out of the student teacher. If they want us to do well in the schools, make sure there's enough time to go out and buy the materials; to go out and get extra resources; to look for something else.

ON-SITE COORDINATORS

Overview

All of the six on-site coordinators felt that their job was quite extensive and multi-faceted. Each on-site coordinator emphasized and perfected different aspects of the job, based both on their own strengths and weaknesses as individuals, as well as the opportunities and limitations presented by the particular schools in which they were situated.

The six on-site coordinators felt strongly that the Hands-On model for teaching science had great merit. They also felt comfortable with the basic structure of placing preservice teachers in the schools while taking courses at New York University, within a project context. Three of the on-site coordinators have had previous experience within the project as cooperating teachers. Two others had been with the project as on-site coordinator for three years.

Again, as with the preservice teachers, each individual on-site coordinator had different opinions and responses to various aspects of PCS. The general areas of concern were: The role of the on-site coordinator, The Hands-On model, The interns and cooperating Teachers, and Research. These four general areas of concern are analyzed below.

The Role of the On-Site Coordinator

All of the on-site coordinators pointed out that their role involved a number of different relationships, all on different levels. The coordinators mentioned that the general areas of their duties included:

a)	Supervise interns	(6)
b)	Work with inservice teachers	(6)
c)	Work with administration	(4)
d)	Chose cooperating teachers and pair with interns	(4)
e)	Mediate between intern and cooperating teacher	(4)
f)	Public relations/Promote the project and Hands-On	(4)
g)	Set up a "lab" or resource room	(2)
h)	Initiate departmental meetings	(2)
i)	Initiate a Science Fair	(2)
j)	Mediate between the interns	(1)

One Coordinator said that he worked

> ...with the inservice teachers who are actually working here. To try to get them to improve their science instruction. To bring them new ideas, new curriculum, whatever else is suitable.

Four coordinators specifically mentioned that both the number of things that the Coordinator can do within the school and the type of things he or she is permitted to do, vary greatly between the schools. A coordinator stated:

> Schools are different and the things you can accomplish in each school, as a result, are different....I don't feel competition between schools, among the on-site coordinators. The director (of PCS) is aware that the schools are different.

Two specific and unique problems were brought out during the interviews. One problem arose from the unique school where the coordinator was also functioning as the cooperating teacher (he was a fully employed science teacher in the school). This coordinator said:

> Things are not running as well, in terms of the curriculum improvement, this year as they were last year because we don't have a full-time coordinator. Another problem (unique to the situation) is that since I've been here (as a teacher in the school), people have come to know me as a colleague, not as somebody who can come in with fresh ideas. I'm one of them....It would have been better (not to function as both the on-site coordinator and the cooperating teacher) because here as the cooperating teacher I have a certain relationship with my preservice teacher and as the on-site coordinator, there has to be a different relationship. The on-site coordinator is the one who has to get on the preservice teacher and the cooperating teacher to do certain things. Because there was no on-site coordinator to sit on me (as the cooperating teacher) to get certain things done, they were done either improperly, late, or not done at all.

Another problem which was experienced by the on-site coordinators was reluctance on the part of the school science department faculties to accept the Project and the Hands-On Model for teaching science. The on-site coordinators indicated that the school administrators and science teachers did not share the same commitment to PCS. The degree of cooperation was measured as follows:

I. Principals:
   a. No cooperation (0)
   b. Little cooperation (2)
   c. A good deal of cooperation (4)

II. Science Teachers:
   a. No cooperation (2)
   b. Little cooperation (3)
   c. A good deal of cooperation (1)

One Coordinator suggested the following reason for the lack of cooperation that she experienced in her school:

> The teachers were told, at the initial conferences, to the effect that the project is going to come in and really redo your whole teaching. "We're the experts from New York University." That kind of attitude was what I came into. There was resistance. "Who are you to tell me."...If you're not wanted by the teachers, you shouldn't go. When I hear what some of the other people are saying that they can't wait for everybody to come because they're teachers who are out of license in science. They really have a crying need. And it's nice to know that when you have a need for somebody--you say to somebody "Come help me"--and someone does. It's a nice sharing. There's so little of that here.

Three Coordinators stated that their role in the schools has changed during the year. They each said that the change was due, in part, to a growth on their part, in their understanding of their own strengths and weaknesses, and a clearer perspective of what was entailed in the job of an on-site coordinator. However, the coordinators also indicated that there seems to be a rather predictable process through which the role itself developed and became incorporated into the structure of the on-going school system.

The Hands-On Model for Teaching Science

The six coordinators were asked to describe the model for teaching science which has been espoused by PCS. The model was variously described as:

a) "Hands-On" (4)
b) "Student-centered" Learning (2)
c) "Experiential Learning" (2)
d) "Guided Discovery Learning" (1)

The Hands-On approach was further characterized as:

a) more work to prepare, then easier than traditional (3)
b) involved use of simple materials and equipment (2)
c) groupwork (2)
d) equated with "labs" (2)
e) skills-oriented (1)
f) hypothesis formation (1)
g) teacher not in front of class (1)
h) asking students to think (1)
i) worksheets (1)
j) projects (1)
k) experiments (1)

The Hands-On model was seen as oppossed to:

a) Developmental lessons (2)
b) Lecture (2)
c) Programmed "labs" (1)
d) Demonstrations (1)
e) Expository teaching (1)

The coordinators found that the cooperating teachers were variously receptive to the Hands-On approach. In some cases, the cooperating teachers were already using a teaching method that was quite similar to the Hands-On model, and this was a factor in their being chosen as cooperating teachers. In other cases, the cooperating teachers, as well as the other teachers in the science department, were not at all receptive to the model. The coordinators found the cooperating teachers:

a) Very receptive to the model (1)
b) Interested to an extent (3)
c) Not at all receptive (2)

The coordinators reported that they found the following problems or limitations in the attempts to implement the Hands-On approach in the classrooms:

a) Procedural problems (complex and difficult) (2)
b) Bad planning on the part of intern (1)
c) Cooperating teacher intervenes during lesson (1)
d) Achievement level of students (1)
e) Behavioral problems among students (1)

Three coordinators carefully noted that Hands-On activities do not work well if they are used every day. These three coordinators said:

> There must be a balance between Hands-On activities and developmental lessons.
>
> Hands-On by itself with no discussion or any evaluation of it is absolutely, to my mind, a waste of time because they're not getting anything other than having a good time. The Hands-On Approach they refer to here includes discussion sessions, but some people seem to feel that Hands-On Activities mean just the activities with nothing to tie them up. That doesn't work because the loose ends are just left dangling. The Hands-On Approach, as I have learned it through PCS, is that there has to be a balance between the activity itself and the discussion that relates to it and develops from it.
>
> Hands-On activities are not "the answer." You can't use them every day. You have to be flexible. I don't see Hands-On as a replacement as it is an auxiliary for all the other methods. It's the method you use to create interest. But besides motivation, it gives the kids a chance to become involved. For example, the Science Fair. Most of the kids did not know how to strip a wire; did not know how to wire a battery in series. Because the teachers here have only worked out of textbooks. Now when you present them with a conceptual idea, they have a better picture of it. Hands-On gives you a concrete understanding of the subject.

The Interns and the Cooperating Teachers

Two of the six coordinators felt that a total of four of their interns were quite unsuccessful. The characteristics which the coordinators found were most important for the success of the intern in the project were:

a) A strong science background (3)
b) Cooperative personality (not competitive; can relate to students) (2)
c) Responsible/Dependable (1)

Three coordinators mentioned that the interns, to a great extent, can make-or-break the project's attempts to promote Hands-On as an approach to the teaching of science. One Coordinator explained this situation:

> If you have a student teacher who can get control of the class, he's structured enough and organized enough and can do a lab lesson and it works well and the kids enjoy it, the kids learn something, the teacher is inevitably and invariably impressed. Even if they don't show it right away. They get the feeling that there's another way to teach. The kids can actually enjoy it. If you get a student teacher who can do that, the teacher will be motivated to try it himself. On the other hand, the reverse can happen. You can have a teacher who doesn't organize the lesson very well, who doesn't control the class as well. His lab lesson turns out to be quite a failure. The kids are not accomplishing the goals. Then the teacher's going to get a little turned off. "You see, this doesn't work. My way works better." It just confirms the fears he already has. So you can get it either way.

The Research Efforts by the Project

Four of the six coordinators indicated knowledge of some research which had been conducted by PCS relating to the Hands-On approach. All four coordinators reported familiarity with a "pilot" study using a science attitude scale. One coordinator further mentioned a pilot test used in connection with the development of an observational instrument. Two coordinators said that they were directly involved with data collection; four said they were not directly involved. Three coordinators responded that they were actively involved in the dissemination of information regarding research in the area (i.e., brought in reports, published results in the school newsletter); three coordinators responded that they were not active in dissemination of research results.

Four coordinators indicated that there was no systematic study of the method by PCS. A coordinator stated:

> We haven't done any systematic study (of the Hands-On approach). We've done a study to see if (the children's) attitudes have changed toward science--it was a pilot test.

Another coordinator said:

> They've told us that, as of right now, "lab-centered" and "student-centered" activities versus lecture and developmental lessons--neither one has proven to be beneficial. "Lab-" and "student-centered" activities are not harmful. Nothing is lost.

Another coordinator concluded that the question of which method results in more learning is a complex one. He said:

> Our tests don't measure some of the things that children do pick up by doing "lab-centered" activities. Things like using machines, using a stethoscope, reading a thermometer--observation skills. If there are any tests which measure these skills, they're not the kinds of testing instruments used in our schools.

Suggestions for Further Evaluative Study

At the conclusion of the interview, each coordinator was asked to suggest hitherto unexplored areas or aspects of PCS which he or she felt should be subjected to evaluative study. The following comments were made:

> I would be interested to know if previous interns have taken teaching positions, are they trying to use Hands-On? If they are, what are the obstacles they have found?

> You should evaluate the role of the preservice in the schools to see that they do what we claim they do. Also, how well do we coordinate what we're doing out here in the field with what they're doing at the university. And, on the other hand, if what they're doing is relevant to what we're doing. We in the project feel we are relevant. We've asked the teachers in the school, "If you were given the opportunity to research, what problems would you research on?" They give us topics and we give them to the university, the research group. If I were you, I'd evaluate the research group--have they followed through?
>
> I felt a problem with selecting the preservice teachers. We had a difficult time selecting the candidates that, I guess, I truly would have wanted. I would really want a person who is science oriented, really interested in teaching.
>
> As an evaluator, I would look at the politics of the district, of the school. Because things happen differently in the different schools as a result of the politics.

Final Comments

One Coordinator stated:

> I'm sorry this (evaluation study) didn't occur in the beginning of the year because we've all had a chance, through staff meetings, to identify what are we really doing. We were going along hit-and-miss. You know what you're doing, but you don't. What I'm doing is each time I talk to any one of (the evaluators), I'm identifying for myself what I think are the needs. And then what I'm saying to myself afterwards is, "We really should do this or that." We do a lot of talking in the project about (evaluation).

As the interviewer, I noticed that the interns as compared to the on-site coordinators, were far more revealing and analytic in their responses. The preservice teachers were completing the program and did not look forward to any further involvement with Project City Science. On the other hand, the on-site coordinators were more guarded and protective in their remarks, they were looking forward to a continuing relationship with the project.

INTERVIEW QUESTIONS - INTERNS A-1

1. Would you say you were given a model for teaching--a unique point of view of science education? How would you describe it?

   - What is the model?

   - What are the most important aspects of the model? The model's <u>sine qua non</u>?

2. If I were to walk into your science classroom, how would I recognize that you were using the model to teach?

   - Would you be using particular equipment or materials?

   - Would the students be organized in a particular way?

   - Would your relationship to the class be different from the traditional relationship?

   - How would the students' activities reflect the model?

3. Do you plan to use the model in your own teaching? Why?

   - Are you comfortable with this model of teaching?

   - How would you modify the model?

4. Where did the model break down?

   -Were there difficulties you had in implementing or applying the model? What were they?

5. Did the instruction you received at NYU follow the "Hands-On" model?

6. Did the NYU instruction address itself to the realities of teaching in the inner city? How?

   -Do you feel it effectively prepared you for the classroom?

   -Was the balance between time spent in college classrooms and in the field appropriate? Why?

   -Could you have eliminated some of the courses?

   -Comparing the courses at NYU with your field work, was NYU vital? Why?

INTERVIEW QUESTIONS - INTERNS...continued

7. Did the instructors appreciate the problems you were facing in your Junior High classrooms?

   -If you went back with classroom problems, were you able to get the kind of help you needed? (Content, methodology, psychology/ sociology)

8. Were there important omissions in your preparation as a teacher? Things you feel should have been covered? What were they?

   -Did you feel free to offer suggestions, changes and/or modifications to the program? Was it flexible?

   -What changes would you suggest now?

9. How would you describe the role of the on-site coordinator?

10. Which aspects of the role are the most important to you? Why?

    -Which aspects of his/her background--his/her education, skills, experience, personality--are the most important for you? Why?

11. When the role of the coordinator didn't serve you, in what ways was it deficient?

    -availability?

    -training?

12. In what way was the cooperating teacher a model for you?

    -What was his/her role?

    -Was he/she helpful?

13. I understand that Project City Science sees you as a change agent in the school. How have you served as a model for teachers?

14. What aspects of Project City Science should we, as evaluators, be looking at?

    -What are some of the things that are of key importance?

    -If you were to come in to evaluate the project, what other things would you look at?

INTERVIEW QUESTIONS - ON-SITE COORDINATORS

1. How would you describe your role in Project City Science?

2. How has your role changed since the project began?

3. How were you prepared by Project City Science for your position?

4. Would you say the interns were given a model for teaching science--a unique point of view of science education?

   -What is that model?

5. If I were to walk into a science classroom, how would I know that the teacher was using the model to teach?

6. Are the cooperating teachers responsive to the model that PSC offers?

7. Are you convinced that Hands-On teaching is the most potent model for science instruction in the junior high?

8. What characteristics of interns are most important for a successful training experience?

   -quality of their science background
   -commitment
   -love of children/experience with the age group
   -natural teaching talent
   -flexibility
   -others

9. Has there been any research generated by the project that has been directly useful to you or your interns? What?

10. Do you feel that you or your interns have been involved in the research effort in a way that is useful?

11. What aspects of Project City Science should we, as evaluators, be looking at?

    -What are some of the things that are of key importance?

    -If you were to come in to evaluate the project, what other things would you look at?

APPENDIX D

Interviews of Project City Science

Preservice Interns:

1978-79

Penelope J. Haile, Ph.D.

June 1, 1979

REPORT ON INTERVIEWS WITH PRESERVICE TEACHERS AND ON-SITE COORDINATORS IN PROJECT CITY SCIENCE

INTRODUCTION

On March 28, 30, April 3, 4, 23, and 30, 1979, I interviewed fourteen preservice teachers and eight on-site coordinators involved in Project City Science. These interviews were conducted as part of a total evaluation of Project City Science. Each person interviewed was seen individually by me for thirty to forty minutes either within the school in which he or she had worked for the past year, or else in the Project City Science office of New York University. A guided or focused interview format was used. The interview protocols for the preservice teachers (interns) the on-site coordinators (coordinators) follow this report.

The following is a two-part report of these interviews. The first part analyzes the responses of the fourteen interns. The second part analyzes the responses of the eight coordinators whom I interviewed.

PRESERVICE TEACHERS (INTERNS)

Overview

While all of the interns had complaints or disappointments about specific aspects of Project City Science (PCS), it would seem that the basic objectives of the project to recruit and train science teachers for the inner-city schools were realized. Eleven of the fourteen interns (79%) mentioned that one of their expectations about their involvement with PCS was that they would learn to be good science teachers. Now, at the end of their training year, twelve of the fourteen interns (86%) plan to teach science for the next five years and ten of these twelve plan to teach in the city's junior or senior high schools. And, of these twelve who plan to teach, eleven plan to use the hands-on approach 40% or more of the time.

Most of the interns (71%) felt the basic structure of the project (team approach, year-long, work/study) was a facilitating factor in their success in meeting their goal of learning to be good science teachers. Five of the interns (36%) felt that the fieldwork school was a contributor to their success, and four interns (29%) mentioned the contribution of the project personnel to their successful training.

The objective of the project to influence the science teachers within the fieldwork schools to use a hands-on approach in their classes does not seem to have been reached. No intern reported that the hands-on model was generally used in their schools. Eleven interns (79%), in fact, reported that the hands-on approach was not generally used in the schools, and only three interns (21%) reported that the approach was used by a number (but less than half) of the teachers in their schools. As a matter of fact, only five interns (36%) said that their cooperating teachers used a hands-on approach as part of their teaching repertoire. Consequently, it is not surprising that half of the interns (seven) felt they have not learned the skills necessary to use hands-on effectively.

Interview questions about particular elements of PCS served to point out a number of areas that demonstrate the perceptions of the interns about the strengths and weaknesses of the project. The general areas investigated were: recruitment, coursework, the teaching model, the fieldwork, and the future. These five general areas of interest are analyzed individually below.

Recruitment

Table 1 summarizes the interns responses to the question that asked how they first heard about PCS. The number column indicates the number of interns who gave each answer to the question. The percentage column indicates the percentage of interns (out of fourteen) who gave that information.

TABLE 1

SOURCE OF INITIAL INTRODUCTION TO PCS

Source	Number	Percent
1. Board of Education circular	5	35.7
2. New York University catalogue	3	21.4
3. New York Times	2	14.3
4. Friend associated with PCS	2	14.3
5. Board of Education campus rep.	1	7.1
6. Daily News	1	7.1

The majority of interns first learned about PCS through either the New York City Board of Education circular sent on request as part of a packet of information about available teacher training programs around New York City, or through the New York University catalogue, which lists the project as part of its Science Education Department.

Table 2 indicates what the interns considered to be the initial points about PCS that interested them.

TABLE 2

INITIAL POINTS OF INTEREST IN PROJECT

Points of Interest	Number*	Percent
1. Financial aid	8	57.1
2. Preparation for teaching	7	50.0
3. Year-long project	6	42.9
4. Science-oriented	5	35.7
5. Field-based	5	35.7
6. Degree program	3	21.4
7. Focus on inner-city schools	2	14.3
8. Charismatic associate project director	1	7.1
9. Particular teaching approach taught	1	7.1
10. No teaching obligation	1	7.1

*Some interns made more than 1 response per question.

A majority of interns mentioned the prospect of financial assistance as an initial attraction for them. As one intern noted:

> Originally what attracted me was that it would be concentrated in the city environment and also that it was free. That's a very valuable thing that you can get an education without having to lay out tremendous amounts of money .

A majority of the interns also reported that preparation for teaching was an aspect of the project that appealed to them initially. Six interns mentioned that part of the attraction of the project for them was the fact that it was a year-long program rather than a crash-course taken during one summer. One intern said:

> I thought it would be very good to be in the school a year. You'd get a good view rather than standing on the outside looking in....You get into the school, you see what's happening and you can make an intelligent decision whether you want to stay in a system like this. If I just went through a regular program and came into the school, it would have been a shock. You would have, almost, burned your bridges before you got in--before you knew the job.

Table 3 displays the interns' expectations regarding their involvement with PCS.

TABLE 3

EXPECTATIONS OF INVOLVEMENT WITH PCS

Expectations	Number	Percent
1. Learn to be a good science teacher	11	78.6
2. Learn a new approach to teaching science	4	28.6
3. Financial aid/tuition-free courses	3	21.4
4. Intensive team program	3	21.4
5. Masters degree	2	14.3
6. Teaching certification	2	14.3
7. Opportunity to do research	1	7.1
8. Admission flexibility	1	7.1
9. Unique teacher training for urban environment	1	7.1
10. Experience in schools	1	7.1

A large majority of the interns considered the greatest promise the project held out for them was teaching them to be good science teachers (79%). A much smaller percentage of interns had more specific expectations from their involvement in the project. Twenty-nine percent expected to learn how to teach science using a "new" teaching method. Fourteen percent expected to receive state certification to teach upon completion of the program. One intern expected to participate in a unique teacher training program designed to prepare teachers for the urban environment.

Table 4 shows the interns' responses to the question that asked which of their expectations were satisfactorily met.

TABLE 4

EXPECTATIONS THAT WERE SATISFACTORILY MET

Met Expectations	Number	Percent
1. Trained to be a science teacher/certified	8	57.1
2. Tuition-free master's degree	7	50.0
3. Rewarding fieldwork experience	7	50.0
4. None	2	14.3

More than half of the interns (57%) reported their expectation of being trained by PCS to be science teachers was satisfactorily achieved. Similarly, half the interns acknowledged satisfaction of their expectation of receiving tuition-free university courses, and half reported satisfaction in their goal for field-based training. Two of the fourteen interns (14%) reported that none of their initial expectations of their involvement with PCS was met.

The list of interns' expectations that were not satisfactorily met appears in Table 5.

There is far more diversity of response with the unmet expectations. Much of the dissatisfaction seems to come from goals or expectations that were not realized by one or two of the interns for each goal. The most frequently mentioned unmet expectation was that not enough hands-on teaching techniques were learned by the interns. This response was given by three interns (21%). One intern said:

> I think I expected to see, according to their brochure, exemplary science teaching on a junior high school level. I expected to see how it should be done, presented in a much more structured and cogent format. I didn't expect this hands-on approach for learning in the way they carried it through to us. I expected to see classes in operation that were exemplary--that reflected the project's goal.

TABLE 5

EXPECTATIONS THAT WERE NOT MET

Unmet Expectations	Number	Percent
1. Not enough hands-on techniques learned	3	21.4
2. Inflexible program	2	14.3
3. Courses-not enough substance	2	14.3
4. Fieldwork-No role models/supervisor	2	14.3
5. No participation in research	1	7.1
6. Grades for courses not based on fieldwork	1	7.1
7. No different from other teacher training programs	1	7.1

Most of the interns would probably agree with their colleague who noted:

> I don't know if I had that many defined goals. They changed...the first month in school, my goal was to survive!...Maybe my goal was to be able to get up in front of the class and teach lessons and I do have a lot more confidence.

However, a smaller portion of the interns seemed to feel their expectation of taking part in a "project" was not realized. This point was mentioned by interns who had an on-site coordinator who also was a faculty member of the fieldwork school. An intern said:

> I haven't really been involved in any research. I was looking for something more flexible. I assumed it was more of a group effort; we would be working together. As it turns out, it's more as it is in most colleges where you're given certain courses.

Table 6 shows the factors the interns pinpointed as those that facilitated achievement of their expectations.

TABLE 6

FACILITATING FACTORS FOR ACHIEVING EXPECTATIONS

Facilitating Factor	Number	Percent
1. Structure of the program	10	71.4
2. Specific fieldwork school	5	35.7
3. Specific project personnel	4	28.6
4. Specific coursework	1	7.1
5. Personal factor (prior experience)	1	7.1

The majority of interns (71%) credited the structure of the program in general as the facilitating factor for achieving their goals for the program. The structure of the program includes the concepts of a field-based project, the contribution of coursework in general, the team-with-coordinator approach, and the hands-on methodology. To a lesser degree, the interns noted the contribution of specific aspects of the project, such as the 36% who attributed their achievement to the specific school in which they had done their fieldwork. One intern gave the following explanation of her achievement of her goals:

> I think it's a mix of things. I think it's me, for one thing--just getting the experience in front of the class. Being exposed, in some of the courses that we had, to different ways of approaching kids with hands-on--even actual ideas and curriculums,--was positive. And (the coordinator), he's great.

Question 6 asked the interns to comment on those aspects of PCS that perhaps, disappointed them. Table 7 summarizes the interns' responses.

TABLE 7

DISAPPOINTING ASPECTS OF PCS

Disappointing Aspect	Number	Percent
1. No team feeling/no support	4	28.6
2. Courses too shallow	4	28.6
3. No curriculum developed to start hands-on	3	21.4
4. Nothing	3	21.4
5. Inflexible program	2	14.3
6. Project goals too high, unrealistic	1	7.1

No one aspect of the project was a disappointment to even one-third of the interns. Twenty-nine percent of the interns were disappointed that their expectations with regard to the team aspect of the project (and, thus, the on-the-job support and supervision) had not been realized. One intern described the situation as follows:

> There's a lot of disillusionment. The program's philosophy--hands-on--is fine. I see that as important. And I try to do those things in my class. The only trouble is, I don't have a role model. My cooperating teachers don't know science. They're not all that enthusiastic about teaching; they've been teaching for a long time. They've seen, according to them, the system go down the tubes....Sometimes I think of how to prepare a lesson, how can I do it hands-on the best way and I'm confused. The only way I'm going to find out whether it works or not is to do it, because I have nobody to talk to. My cooperating teachers can't teach me how to teach science.

Table 8 summarizes the responses of the interns when asked to describe aspects of PCS that were better than they had expected.

TABLE 8

ASPECTS OF PCS BETTER THAN EXPECTED

Aspect of PCS	Number	Percent
1. Fieldwork excellent experience	4	28.6
2. Project staff helpful/supportive	2	14.3
3. Courses better than expected	1	7.1

Coursework

The titles or descriptions of the courses offered by New York University and the actual content of the courses did not seem to cause concern for most of the interns. An overwhelming majority (86%) of the interns felt the actual courses sufficiently matched the course descriptions. Table 9 summarizes the results for question 8.

TABLE 9

DID THE COURSE DESCRIPTIONS FIT THE COURSES?

Yes	12	85.7%
No	2	14.3%
Totals	14	100.0%

The actual adequacy of the intern preparation for teaching offered by the courses was not as clear-cut. Eight of the interns (57%) felt that the coursework adequately prepared them for their role as interns, and six interns (43%) felt the coursework was inadequate. A number of interns felt uncomfortable with the idea of on-the-job training, and felt they would have preferred to receive at least some structured teacher training before becoming a "student teacher." One intern, while generally pleased with the training program, made the following comment:

> I wish I would have been a little better prepared. I wish I would have come in as an expert rather than having the handicap of coming into the school without knowing what hands-on really is, then trying to be a student teacher. If I were trained in how to conduct a hands-on activity, if I were trained in a particular curriculum, and I came in and knew what I was doing, I would have been a lot more effective. Instead of giving us courses in unrelated fields, go over the curricula, go over hands-on and prepare us the first four or five months while we're going to school and we're observing.

A theme repeated over and over again is that the training in general was judged by the interns as unsatisfactory and the coursework as inadequate. In response to the question, "Have you been pleased with the training program at NYU?", a clear majority (86%) responded in the negative. One intern complained:

> They're (PCS staff) totally against passive education. We get what we can give, and I wish it weren't that way. I'm tired of teaching myself....They have a lot of materials, but it's totally disorganized. I was very angry and disappointed that I didn't have complete sets of curricula available. But they're not. We have to scrounge and scrape in between....I think one of the things they at least could have done in five years is organize their materials.

The interns were asked to specify those courses they enjoyed the most and those that were the most useful. Tables 10 and 11 summarize the results.

TABLE 10

COURSES THAT WERE ENJOYED

Course	Number	Percent
1. Curriculum	6	42.9
2. Methods	3	21.4
3. Implementations	2	14.3
4. Urban Ecology	2	14.3

When asked why they chose these courses as the most enjoyable, the interns mentioned that the courses involved more student-centered learning (2,14%) and required more work (1,7%).

TABLE 11

COURSES WHICH WERE USEFUL

Course	Number	Percent
1. Methods	3	21.4
2. Curriculum	3	21.4
3. Urban Ecology	2	14.3

When asked why they chose these courses as the most useful, the interns mentioned the courses stimulated their own creativity (3,21%), opened up new avenues of approach to science and teaching (1,7%), offered things to use with their students (1,7%), and were interesting (1,7%).

The interns were asked whether they would recommend dropping any course from the training sequence, adding any course to the sequence, or any other change in the coursework. Only one intern (7%) made the recommendation that more days be spent taking courses at NYU, but no specific additional courses were suggested. Three interns (21%) recommended that courses could be dropped: Urban Ecology (2,14%) and Implementations (1,7%). A number of interns, however, made specific recommendations regarding changes they felt should be made in the present coursework. Table 12 reports these recommendations.

TABLE 12

SUGGESTED CHANGES IN COURSEWORK

Suggested Change	Number	Percent
1. Improve instructors' presentation or change instructor	5	35.7
2. Develop our concrete skills	4	28.6
3. Demonstrate complete hands-on process	3	21.4
4. More depth-all courses	2	14.3
5. Spread courses out more	1	7.1
6. Less theorizing in curriculum course	1	7.1

Again, a number of interns suggested they do not feel adequately prepared to teach science using the hands-on approach. One intern said:

> Give more hands-on--to focus in on what this special thing is supposed to be....how to go about it.

Four interns (29%) mentioned that training in concrete teaching and science skills should be offered in the training program. An intern stated:

> Skills really need to be worked on. I think we should have had a whole course on lab techniques, because that's very important--how to run a lab. I think we should have gone through whole lessons. I think a whole course on audiovisual would have been very helpful--making films, slides. We should have skills to bring into the classroom.

More than one-third (36%) of the interns felt either the instructor should improve his/her presentation of the course content or a change of instructor was warranted. One intern said:

> Sometimes I get the impression anyone could have done what they've done. You really didn't need any special qualifications. I got the impression from one or two of the instructors that they didn't know what they were doing. To be a graduate student in that position just makes you lose respect for the whole thing in general. Especially when it's supposed to be a project-type thing where everyone works as a group. You're only as strong as your weakest link.

Table 13 summarizes the results of the interns' ranking of the NYU courses. The courses ranked at the top were reported (7,50%) to be the most "useful" and "interesting." Those courses ranked at the bottom were so because they were considered to lack depth of content (9,64%) or because the interpretations and content were challenged (1,7%), or because (1,7%), as one intern noted, the course was "too sixtyish--the days of the hippies are over."

TABLE 13

RANK ORDERING OF COURSES

TOP RANKING Course	Number	Percent	BOTTOM RANKING Course	Number	Percent
1. Curriculum	6	42.9	1. Implementations	6	42.9
2. Methods	3	21.4	2. Psychology	4	28.6
3. Urban Ecology	2	14.3	3. Urban Ecology	3	21.4
4. Implementations	1	7.1			
5. Student Teaching	1	7.1			

Speaking about the psychology course, which was ranked at the bottom by 29% of the interns, an intern voiced this complaint:

> It came across that the children's values are totally that different from middle-class values. It's not an accurate picture because I'm an inner-city person myself and that didn't always fit well.

The Urban Ecology course was ranked at the bottom by three interns (21%). An intern qualified the ranking by stating:

> There were interesting issues raised, but I find it very boring and a real waste in a lot of ways. I think the idea was okay and the instructor was very sincere and he tries to do a good job, but I just feel he's not that effective in the classroom and I don't know how much was gained from the course.

Teaching Model

The science teaching philosophy, approach, or model offered to the interns and in-service teachers by PCS was variously described by the interns as summarized in Table 14.

TABLE 14

DESCRIPTION OF THE TEACHING MODEL OFFERED BY PCS

Description of Model	Number	Percent
1. "Hands-on"	8	57.1
2 Student involvement	7	50.0
3. Use of labs in classroom	7	50.0
4. Student-centered instruction	6	42.9
5. Use of "projects"	4	28.6
6. Students taught to "think through a problem"	3	21.4
7. Use of instructional sheets	2	14.3
8. Teach skills	1	7.1
9. Use of filmstrips	1	7.1
10. "Discovery Learning"	1	7.1

The catch-word "hands-on" was used by the majority of interns(57%), but all further defined the term. Phrases like student involvement (7,50%) and student-centered instruction (6,43%) were used frequently. The interns reported the method involved use of labs (7,50%), "projects" (4,29%), instruction sheets (2,14%), and audiovisual aids, such as filmstrips (1,7%).

The interns were asked whether their cooperating teachers used the hands-on approach to the teaching of science. Five interns (36%) indicated that their cooperating teachers did use the method, but all five further stated that the cooperating teacher used hands-on less than 50% of their teaching time. Nine interns (64%) reported their cooperating teachers did not use the hands-on approach. A number of reasons were offered by the interns to explain why their cooperating teachers did not use the teaching model (see Table 15).

A number of the interns accepted their role in the schools as that of "change agent" and felt a sense of failure that their cooperating teachers were either unwilling to change teaching methods or styles, or that they, as preservice teachers, were not capable of influencing the inservice teachers. One intern stated:

> Most of the people here do not welcome our trying to influence them. It's a very difficult thing we're asking and they don't have enough support from NYU. It's very difficult to just come in and tell somebody they're doing something wrong and ask them to change. That takes a lot more giving of equipment and lesson plans and labs and assistance. You can't just go in to a person who has their family, their salary, their ...all considerations...and ask them to change for the betterment of mankind. You have to give them more immediate rewards. And, I think, three credits at NYU does not do it.

Another intern noted the extra burden placed on the teacher who chooses to use the hands-on approach:

> The other science teachers have a way of doing things. It's very easy. You just write the notes on the board and the kids just read the book and they answer the questions. It's safe, it's easy, it's the least amount of effort. Why should they be interested in changing?

TABLE 15

REASONS FOR COOPERATING TEACHERS NOT USING THE MODEL

Reason	Number	Percent
1. Teacher doesn't know science/lacks basic skills	4	28.6
2. Strain on teacher's time	4	28.6
3. More class control with teacher-centered instruction	3	21.4
4. Lack of equipment	2	14.3
5. Students not interested	1	7.1
6. Teacher lacks confidence	1	7.1
7. Intern not an effective model	1	7.1
8. Not teaching science classes	1	7.1

The interns were evenly divided in their opinion about whether they, themselves, had learned the skills necessary to use the hands-on approach effectively. Fifty percent (seven) of the interns felt they had not learned the necessary skills and 50% (seven) felt that they had.

The two most frequently mentioned restraints to their implementation of the hands-on model in their own teaching were that the science teachers in the fieldwork schools did not use the mode. (36%), and the lack of the degree of student discipline necessary for laboratory or project work (36%). These restraints, and the others mentioned, are summarized in Table 16.

TABLF 16

RESTRAINTS TO IMPLEMENTING HANDS ON MODEL

Restraints	Number	Percent
1. Teachers don't use model	5	35.7
2. Lack of student discipline	5	35.7
3. Lack of role model	3	21.4
4. Lack of equipment	2	14.3
5. Uncooperative school administration	2	14.3
6. School's rigid reliance on curriculum content and pacing	1	7.1
7. Length of class periods (some too short)	1	7.1

The interns were asked if they felt that the instructors of their courses at NYU themselves used a hands-on approach in teaching them. The majority of interns (see Table 17) reported that their NYU instructors use the hands-on method to some degree in their classes. Examples of hands-on activities used by the instructors included simulated lab lessons, case studies, projects, and role playing.

TABLE 17

DID NYU INSTRUCTORS USE A HANDS-ON APPROACH?

Yes	3	21.4%
Some	8	57.1%
No	3	21.4%
Totals	14	100.0%

Fieldwork

The role of the on-site coordinator was clearly a weak point in the project this year. None of the interns reported the coordinator was a resource person to whom they could go for immediate, on-the-job help. Five interns (36%) stated either they did not consider themselves as having a coordinator, or else that the nominal coordinator did not play very much of a role in the project for them. Contrary to the interns last year (where two-thirds reported the function of the coordinator to be supervision of lesson plans), only 14% of the interns this year said their coordinators played an active role in their lesson planning. Table 18 summarizes the results.

TABLE 18

FUNCTION OF THE ON-SITE COORDINATOR

Function	Number	Percent
1. Not much or nothing	5	35.7
2. Liaison with school administration	4	28.6
3. Observations/occasional visits	4	28.6
4. Planning	2	14.3
5. Discipline	1	7.1
6. Science Fair	1	7.1
7. Moral support	1	7.1

The most frequently mentioned (29%) functions of the coordinator were that of liaison with the school administration and provider of occasional visits and observations (29%). An intern noted:

> They (the coordinators) become middlemen between the management and yourself. There are a lot of things that are very hard to deal with--especially when you're being introduced to teachers. It's very hard to just come on and talk with them. If they're good coordinators, they'll smooth the way. A good one should be a buffer zone.

The interns reported the two most important characteristics of the coordinator were prior teaching experience (50%) and skills in interpersonal relations (43%). (See Table 19)

TABLE 19

MOST IMPORTANT ASPECTS OF THE COORDINATOR'S ROLE

Aspects of the Role	Number	Percent
1. Teaching experience	7	50.0
2. Interpersonal relations skills	6	42.9
3. Science skills	2	14.3
4. Knowledge of routine information	1	7.1

The main area of deficiency with respect ot the coordinator's role appears clearly from the data--unavailability. Three interns (21%) did not feel an on-site coordinator was ever available to them. Eight other interns (57%) felt the nominal coordinator was either not present at the school frequently enough, or else if he or she was present, his or her schedule and other duties did not permit the intern enough time. (See Table 20)

TABLE 20

AREAS OF DEFICIENCY IN COORDINATOR ROLE IN PROJECT

Areas of Deficiency	Number	Percent
1. Lack of availability/time	8	57.1
2. No on-site coordinator	3	21.4
3. No evaluations/observations/feedback	2	14.3
4. Lack of experience/finesse as supervisor	2	14.3
5. Lack of experience as a science teacher	1	7.1
6. Doesn't serve as a teaching model	1	7.1

All of the coordinators appeared to have dual roles, the second being that of doctoral student or of full-time faculty member in the fieldwork school. With reference to the situation where the coordinator was also a doctoral student, one intern complained:

> At the beginning of the term, he was more involved with his doctorate. He didn't have time then. Now, he's still working on his doctorate and they've given an edict saying he only has to be here one day. I don't feel that's giving me a fair deal, I do need guidance.

Another intern noted the similar problem encountered when the coordinator has another full-time position in the fieldwork school:

> I think it's hard for him (the coordinator) in a sense that he still has, pretty much, a full teaching load. He can't devote as much energy as someone who doesn't have a job, but he still devotes a tremendous amount.

Without the coordinator to give them day-to-day supervision and to observe their lessons, most interns turned to their cooperating teachers for the help they needed as preservice teachers. The cooperating teachers both observed the interns' lessons and provided them with feedback on their lessons (See Table 21).

TABLE 21
FUNCTIONS OF THE COOPERATING TEACHER

Did the cooperating teacher...

	Yes	Some	No
1. observe intern teaching?	5 (36%)	4 (29%)	5 (36%)
2. provide feedback on teaching?	5 (36%)	4 (29%)	5 (36%)

The cooperating teachers also guided the interns in developing teaching techniques, lesson plans, and class management skills (See Table 22).

TABLE 22

FUNCTION OF THE COOPERATING TEACHER

Function	Number	Percent
1. Help with teaching techniques	9	64.3
2. Help with lesson plans	5	35.7
3. Help with class management	3	21.4
4. Help with paperwork	2	14.3
5. Provided information about students	1	7.1
6. Provided feedback after lessons	1	7.1

The interns, however, did not mimic the cooperating teachers entirely. The majority of interns (57%) reported that they used the cooperating teachers as role models only to some degree (See Table 23).

TABLE 23

WAS THE COOPERATING TEACHER A ROLE MODEL?

Yes	4	28.6%
Some	8	57.1%
No	2	14.3%
Totals	14	100.0%

In response to the question, "Was the cooperating teacher a model for you?" one intern said:

> Yes and no. I decide what to do and what not to do. In other words, they're my models, both good and bad.

In response to the question whether their particular fieldwork school was a "good" school in which to be placed, the interns seemed to answer based on two rather separate emphases on their own roles in the project. For those interns who saw their primary function to be a preservice teacher in training, the high quality of the current science teachers in the school was a reason to consider the school a "good" school for fieldwork placement. The lack of current science teachers who used the hands-on method was considered a reason to consider the school not "good" for placement (See Table 24).

TABLE 24

WAS THE SCHOOL GOOD FOR FIELDWORK?

Yes 8 (57%)

Why?	Number	Percent
1. Very good science teachers	4	28.6
2. Good lab with technician	1	7.1
3. Physical plant excellent	1	7.1
4. Cooperative administration	1	7.1
5. School in desperate need	1	7.1

No 6 (43%)

1. No one using hands-on in school	3	21.4
2. Teachers not committed to project	3	21.4
3. No on-site coordinator	2	14.3
4. Not a typical inner-city school	2	14.3
5. No materials	1	7.1

However, for those few interns who saw their primary role in the project as that of change agent, the need for change and the possibility of effecting change in the school were considerations in their determining that the school was a "good" school. Two interns described this view as follows:

> This is not a typical inner-city school in many ways. We have science teachers. Many of the schools that we're in don't have science teachers. We have science teachers who've been teaching 13, 14 years. Like anything else, you get set in certain things, you think they work, and you get good results. You're not, necessarily, going to change because someone comes along and says, "Oh well, we can do it this way." And the project may not, necessarily, be of value to this school. This school could survive very easily tomorrow without the project. Whereas there are other schools, talking with others from the project, that seem to have benefitted from (PCS).

> This is a very good school because they're in desperate need. I came over here because, I said, this is the better school because here they have nothing going (science activities), they have a lot of problems. In a school like this, you can make a real impact, whereas in (another school) you would be just another cog in the wheel.

Twelve of the fourteen interns (86%) plan to teach science next year and for the next 5 years. Six interns plan to do their teaching at the junior high school level and six at the senior high school level. All except one of these interns (11) expect to be in the city schools (1 in a suburban school), and all except one (11) plan to be in a public school system (1 in a private school). Two interns (14%) do not plan to teach in the near future. One, however, plans to be employed developing science instructional materials.

Of the twelve interns who plan to teach for the next 5 years, all except one (11) will use the hands-on approach. Ten of these eleven estimate that they will be using hands-on at least 40% of their teaching time. One intern was not able to estimate the percentage of time he would be using hands-on in his classes. Figure 1 shows the distribution of responses to the question on percentage of time devoted to hands-on lessons.

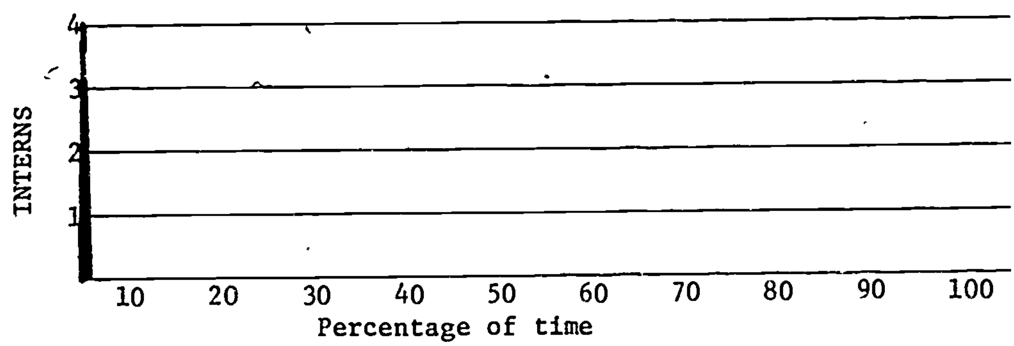

Figure 1. Percentage of teaching time interns plan to devote to hands-on teaching (N=11).

By way of explanation as to why he would not be using hands-on 100% of the time, an intern noted:

> Some science courses lend themselves to a hands-on approach more so than others. Earth science is better than, let's say, chemistry. Although, chemistry, you play in the lab, there's so much ambiguity involved. I'm mixing this and this and this, but what the hell is happening in this test tube? You can explain it by saying there's an electron transfer, changing ions, but what does that mean? I don't see it happening. Whereas with earth science, you pick up things, you can actually make a cloud in the classroom. You can understand the processes by which natural phenomena occur.

A number of interns reported they had already considered and rejected the possibility of a serious conflict between the goals and processes involved with the hands-on methodology and the educational climate of the early 1980s. Only two interns (14%) felt that the back-to-basics movement, competency testing, and the other emphases developing for our educational future will result in the elimination of the hands-on approach. The majority of interns felt that the hands-on approach either was an appropriate and effective method for teaching basic skills such as reading and arithmetic, or else that the hands-on approach could be used in conjunction with, and perhaps, to supplement traditional methodologies (See Table 25).

TABLE 25

USE OF THE HANDS-ON APPROACH IN THE 1980s

Use of Hands-On	Number	Percent
1. Hands-on teaches reading, math, skills also	5	35.7
2. Can be used as motivation	3	21.4
3. Cannot be used exclusively	3	21.4
4. Teaches process skills	2	14.3
5. Will not be used in the public school system	2	14.3
6. Continue hands-on and change testing method	2	14.3
7. Relate to curriculum and make each activity meaningful	1	7.1
8. Involvement of everybody (student, parents, community) in child's learning	1	7.1

One intern suggested that the hands-on approach was actually a return to the true "basic educational process." He said:

> I like to think of hands-on as more than just motivation--taking the activity of the community, of the family, to the way it was before, involving parents and community. You've got to involve everybody. Hands-on might serve to redirect learning to the way most people want it to be.

Suggestions

The following final suggestions and comments were made by some of the interns:

> The image that I get from the program is that they don't very well know what their goals are. Or perhaps they do know, but they don't communicate to us. So it took us a long, long time to get the feeling--get the feeling, not to really know--what was the goal....The other thing, it seems that each of the faculty is working independently, without communicating with each other.

> There aren't enough minorities (in the project). It's more than a matter of color, it's a matter of culture. It's being out of tune. I think it's one of the major problems between teachers and students now. They're out of tune with each other. They're not coming from the same scene. It's a big problem.

I think it's a very tight program, it's a very intensive program. And I think there's an openness there which you won't find under normal circumstances when you just go into a university and look at people who drift in and out and have different courses. It's more like a family--you have very open criticism and I think it's very good. So if you get very negative results, you should take them with a grain of salt. (The very positive comments) should also be (taken that way).

INTERVIEW QUESTIONS: INTERNS

I. Recruitment

1. How did you hear about the program(New York Times, Board of Education circular)?

2. What initially interested you about Project City Science and made you want to investigate further?

3. Prior to your involvement in PCS, what were your expectations of your involvement?

4. Which of your expectations were satisfactorily met? Were any unmet?

5. What factors facilitated achieving your expectations (Project factors, personnel, personal factors, etc.)?

6. Did any aspects of PCS disappoint you? Why?

7. Were any aspects of PCS better than you expected? Why?

II. Coursework - How well did course titles/descriptions fit the actual courses? Do you feel that the courses adequately prepared you for your intern role? Do you feel that you were as well-prepared for interning as other teacher trainees?

8. Have you been pleased with the training program at NYU? Which courses have you enjoyed and why? Which have proven most useful and why?

9. If you could improve the coursework aspect of the training program, what things would you change? Would you drop any courses? Would you add anything? Would you prefer to see content changed? Instructors?

10. If you had to rank-order your coursework, what course or courses would be at the top? Bottom? Why?

III. Teaching Model

11. How would you describe the educational philosophy or the teaching model Project City Science is offering you?

12. Does your cooperating teacher use the model? Why or why not? What percentage of the time does he/she use the model?

13. Do you see that such a model generally is used in your school?

14. Do you believe you can use this model effectively? Has Project City Science given you the skills you need to implement it? Are there restraints in the schools which have kept you from using it?

15. Have the instructors in your courses at NYU themselves used a hands-on approach in teaching you? How often and under what circumstances?

IV. Fieldwork

16. What function has the on-site coordinator played for you?

17. Which aspects of his/her rôle are the most important to you (education, science skills, experience, interpersonal relations skills, personality)? Why?

18. When the role of the coordinator did not serve you well, in what areas was it deficient (availability, training, experience)?

19. What was your relationship with your cooperating teacher? What function did he/she play in your training? Was the cooperating teacher a model for you?

20. Has this been a good school for field work (location, other teachers, administration, students)? Why or why not? Did your coordinator observe your teaching? Did she/he give you any feedback on your teaching?

V. Future

21. What do you plan to do next year (work, study, travel)?

22. Do you plan to teach within/for the next 5 years? What grade, subject, location (urban, suburban, rural)? Public/private?

23. Will you use hands-on in your teaching? What percentage of the time?

24. I'll play "devil's advocate" for a moment and ask you why you might use a method of teaching which seems to some to be passe now with the current emphasis on back-to-basics, competency-based teaching and testing, and accountability? How would you take hands-on into the 1980s?

VI. Suggestions

25. What aspects of Project City Science should we, as evaluators, be looking at?

26. Do you have any further suggestions or comments?

INTERVIEW QUESTIONS: ON-SITE COORDINATOR

I. Recruitment

1. How did you hear about the program (New York Times, Board of Education circular)?

2. What initially interested you about Project City Science and made you want to investigate further?

3. What were the factors that made you decide to become a participant--what were the promises that attracted you? What were your expectations?

4. Of these things that drew you into Project City Science, which of them proved satisfactory? Which expectations were fulfilled?

5. What factors facilitated achieving these goals (Project factors, personnel, personal factors, etc.)?

6. Which promises disappointed you? Which expectations were frustrated?

7. What factors impeded achievement of these goals?

II. Training

8. a. Did Project City Science prepare you to perform your supervisory function (for the interns; for the other staff members in the school)?
   b. How?

9. a. Was it sufficient?
   b. Do you feel as well qualified as a supervisory teacher?

10. Did your job as a supervisor coordinate well with your responsibilities as a doctoral student?

11. In what ways did these two aspects of your role (that of supervisor and of student) match or fit together? What aspects were at odds with each other?

12. a. Were you satisfied with the weekly meetings with the associate project director?
    b. What were your needs? Why were/weren't your needs satisfied?

13. Did you receive training in how to keep a diary, observe, give feedback, write a case history, or other supervisory tasks?

14. a. Were these exercises (diary, histories) themselves effective?
    b. Did the Project do something with these diaries, histories, etc.?

15. a. Do you feel that you profited professionally from the NYU faculty meetings with the full staff?
    b. Why or why not?

III. Supervisory Role

16. a. Do you generally find that you are successful in getting the interns to improve their teaching and methodology?
    b. What have been your frustrations, your problems?

17. a. Has the building administration facilitated you in your role as a coordinator?
    b. Is your role so defined that it allows you to work effectively?
    c. How was your role perceived by teachers/administrators?

18. a. Do the other teachers in the school understand and accept your role in the school, and use you as a resource person?
    b. What means did you use to get other teachers to understand/cooperate?

IV. Model District

19. Do you feel that your/PCS presence has changed the quality of science teaching?

20. Do you believe this school has enough trained teachers to demonstrate good hands-on teaching?

21. a. Has the project had an impact on this school?
    b. What has the project accomplished in this school?

22. What obstacles have you encountered in this school in your efforts to achieve the project goals?

V. Research

23. Do you feel that the project has defined a coherent line of research?

24. a. Is it one you want to pursue in your own work?
    b. Does it have practical significance?

25. a. Has there been any research generated by the project that has been directly useful to you or your interns?
    b. Would you describe research efforts with which you are familiar?

26. Do you feel that you or your interns have been involved in research in a way that has been useful?

27. a. What are some of the difficulties you notice with conducting research on the hands-on approach to teaching?
    b. Can the hands-on approach ever be experimentally shown to be more effective?

VI. Future

28. What do you plan to do next year (teach, research, study, travel)?

29. a. Do you plan to teach within/for the next 5 years?
b. What level?
c. What subject?
d. In what location (urban, suburban, rural)?.

30. a. Will you use hands-on in your teaching?
b. What percentage of the time?

31. I'll play "devil's advocate" for a moment and ask you why you might use a method of teaching which seems to some to be passe now with the current emphasis on "back-to-basics," competency-based teaching and testing, and accountability. How would you take hands-on into the 1980s?

VII. Suggestions

32. What aspects of Project City Science should we, as evaluators, be looking at?

33. Do you have any further suggestions or comments?

APPENDIX E

Interviews of Project City Science

On-Site Coordinators:

1978-79

ON-SITE COORDINATORS

Overview

Of the eight on-site coordinators who were interviewed this year, four were also interviewed last year in their role as coordinators in Project City Science (PCS). One other coordinator who was interviewed was also a coordinator last year, but he did not take part in the interviews last year. The coordinators were evenly divided between those (four) who were doctoral students as well as coordinators and those (four) who, along with being coordinators, also held faculty positions within the fieldwork schools. For those coordinators who were active members of the fieldwork schools, the primary reason for their involvement with PCS was to improve the quality of science teachings within those particular schools. For those coordinators who were doctoral students, the opportunity to work in a school while working on their doctoral degrees was an important incentive for participation in the project.

This fundamental dichotomy between the coordinators, however, went far beyond their reasons for joining the project. This basic difference in perspective and emphasis colored their responses to most of the interview questions. However, as with the interns, each individual coordinator had different opinions and responses to various aspects of PCS. The general areas investigated during the interviews were: recruitment, training, supervisory role, model district, research, and the future. The six general areas of interest are analyzed individually below. The interview questions follow this section of the report.

Recruitment

Table 26 summarizes the coordinators' responses to the question asking how they first heard about PCS. As with the report on the intern responses, the number of coordinators who gave each particular answer to the question is given along with their responses.
The percentage column indicates the percentage of coordinators (out of eight) who gave that information.

TABLE 26

SOURCE OF INITIAL INTRODUCTION TO PCS

Source	Number	Percent
1. Past experience with project	4	50.0
2. New York Times	1	12.5
3. Project recruited in school	1	12.5
4. New York University brochure	1	12.5
5. Deputy superintendent of district	1	12.5

Half of the coordinators (four) were initially introduced to PCS through prior experience with the project. These four coordinators all had seen the project in operation in their schools before they became coordinators. Two other coordinators were recruited from within the schools. One was recruited by the district deputy superintendent, and the other was recruited when PCS staff visited his junior high school.

Table 27 indicates what the coordinators considered to be the initial points about PCS which interested them.

TABLE 27

INITIAL POINT OF INTEREST IN PROJECT

Point of Interest	Number	Percent
1. Improvement of science education	3	37.5
2. Wanted project in school	3	37.5
3. Ph.D. or master's program	3	37.5
4. Work/study program	3	37.5
5. "Project" concept	1	12.5

The four most frequently mentioned initial points of interest in PCS--each of which was mentioned three times--can be divided into two categories. Improvement of science education and wanting the project in their schools were responses given by the four interns who were faculty members within the fieldwork schools. The following comment from a coordinator illustrates this perspective:

> They came in talking about the project as being something that would investigate a way of improving science education, both in the classroom and in terms of teacher preparation and preservice training and so on. And I, at that point, and I still do, feel that that was a very worthwhile kind of thing.

The work/study and doctoral aspects of the program were attractions for the four coordinators who were doctoral students. This perspective is illustrated by the following comments by a coordinator:

> The fact that it really was a work/study kind of thing where I could be a research assistant, work in the schools; I was interested in junior high school students and I wanted to have somewhat more contact with the people, with the staff.

The coordinators expressed a variety of expectations they had with regard to their involvement in PCS. Table 28 summarizes their expectations:

TABLE 28

EXPECTATIONS OF INVOLVEMENT WITH PCS

Expectations	Number	Percent
1. Improve science teachings in school	4	50.0
2. Work within the schools	3	37.5
3. Ph.D. or master's degree	3	37.5
4. Financial aid	2	25.0
5. Inservice courses	1	12.5
6. Learn more about curriculum, basic educational psychology, etc.	1	12.5
7. Opportunity to do research	1	12.5

Four coordinators were particularly interested in improving both the science teachings in their junior high schools, as well as improving the quality of science teacher training. One coordinator stated:

> I knew that I was not exactly satisfied with the kind of education that I had gotten in education school. What they had taught me in school in no way prepared me for what I found here. I thought it might be worth some time to try to help those coming up afterward and I wasn't exactly happy with what I was doing here. Since they also said that one of their goals was to improve the teaching in the school, in terms of inservice education, I felt it might be also very worthwhile for me to find out what they had to offer there.

One coordinator felt that the prospects of "extra loads" to help receive some of the duties of his overburdened faculty was an incentive for him to take on the duties of coordinator. When asked his expectations from his involvement in PCS, this coordinator pinpointed:

> Extra hands, primarily. The extra hands, hands-on things--and the extra hands in other things. There are so many reports and the clerical aspects of teaching, running tests off, marking tests, also taking over classes--if a student teacher should take over a class, the teacher can sit down and rest awhile, so you're saving them physically.

However, one other faculty/coordinator felt that he expected more from PCS than "student teachers." He reported:

> Prior to that time (the start of PCS), we had student teachers in here--not through Project City Science--and we are still getting them. So it wasn't a matter of that being the only way we could get "extra hands." Even now we still get student teachers who are not affiliated with PCS who come in. So that wasn't an inducement to me personally.

Three other coordinators, of the four coordinators who are not faculty members in the fieldwork schools, stated that one expectation they had had for their involvement in PCS was to acquire work experience in the junior high schools. One coordinator said:

> I think the experience of working in the school certainly has been something which you can't read about on paper--the experience...also the fact of working with people who are your teachers and, also, at times you feel they are your peers. That's been a nice experience.

Table 29 shows the coordinators' responses to the question which asked which of their expectations were fulfilled:

TABLE 29

EXPECTATIONS THAT WERE FULFILLED

Expectations	Number	Percent
1. Good school/fieldwork experience	3	37.5
2. Brought help to the school	3	37.5
3. Near completion of degree	3	37.5
4. Improved my teaching	2	25.0
5. Financial aid	2	25.0

Once again the dichotomy appears between the faculty and student coordinators. Three of the four doctoral student/coordinators felt that their goal of having a successful fieldwork experience had been fulfilled, whereas three of the four faculty/coordinators felt that their goal of bringing in help to their schools had been fulfilled. Two faculty/coordinators felt that their goal of improving their own teaching style and techniques had also been fulfilled. One coordinator stated:

> They did expose me to a number of new techniques. They made me aware of the shortcomings of what we are doing....They offered me the chance really to sit back and take a look at myself and say "Gee, maybe I'm really not doing all that I could." And then they came in with alternative ideas.

Three of the four doctoral student/coordinators were satisfied that their expectation of completing their degree program was near fulfillment.

Table 30 shows the factors the coordinators pinpointed as those that facilitated achievement of their expectations.

TABLE 30

FACILITATING FACTORS FOR ACHIEVING EXPECTATIONS

Facilitating Factor	Number	Percent
1. Structure of program	6	75.0
2. Personnel/staff	2	25.0
3. Coordinator meetings	1	12.5
4. Excellent interns	1	12.5

A decided majority of the coordinators (75%) credited the structure of the program in school as being the facilitating factor for achieving their expectations. The structure of the program includes such aspects as the work/study element, the hands-on methodology, and the team approach. Two coordinators (25%) specifically mentioned the contribution to their success made by the project staff.

The coordinators were asked to comment on those aspects of PCS that had perhaps, disappointed them. Table 31 summarizes the coordinators' responses.

TABLE 31

DISAPPOINTING ASPECTS OF PCS

Disappointing Aspect	Number	Percent
1. Limited impact on school	3	37.5
2. Can't adequately supervise interns	2	25.0
3. My time too limited	1	12.5
4. Nothing	1	12.5
5. Not a typical inner-city school for fieldwork	1	12.5
6. NYU disappointing--lack of extensive contact (for dissertation committee)	1	12.5

Most of the aspects of PCS that were sources of disappointment to the coordinators centered around the fieldwork schools. Three coordinators (35%) stated they were disappointed with the limited impact the project seemed, to them, to have on the schools. Two coordinators (25) expressed disappointment that they were not able to better supervise the interns assigned to them. And one coordinator (13%) expressed disappointment that the fieldwork was not done in a more "typical" inner-city school.

One coordinator mentioned one aspect of the problem of limited impact of the project on the schools might be due to a lack of direction within the project at the beginning. He stated:

> As we got more and more experience, we were making our own work more intensive and also more directional. If that had happened at the outset, we would have been far more productive. For instance, what we started doing in the schools this year, we should have done years ago, the delineation of expectations for preservice interns giving them more structure. We had less of that at the beginning.

Other factors the coordinators saw as impeding project or personal goal achievement are presented in Table 32.

TABLE 32

FACTORS WHICH IMPEDED GOAL ACHIEVEMENT

Impeding Factor	Number	Percent
1. Project goals unrealistic	3	37.5
2. School used for fieldwork	2	25.0
3. Science Education Department (NYU) not adequate for completion of degree	1	12.5
4. Teachers resistant to change	1	12.5
5. Outside job too time-consuming	1	12.5
6. Nothing	1	12.5

More than a third (38) of the coordinators felt the project goals initially were unrealistic and needed to be adjusted to the situation as found in the New York City schools. Setting goals not actually possible led to the inevitable sense of lack of project achievement. One coordinator noted:

> The project started to admit that the goals were unrealistic. We came out from trying to change a district to trying to change a school. And, eventually, we were trying to change teachers in classrooms. So, in a way, that's an admission of the fact that there was a discrepancy.

Along the same lines, another said:

> We've had administrators who liked the project and wanted the project there. We've had teachers who admired the same things, but the amount of energy that needs to be put out...that's when the qualification came between realizable goals and ideal goals. We had to drop back, in many cases, from the ideal to the realizable ones which, sometimes, was a little short of what we intended.

One coordinator felt that one of his major goals was thwarted by the New York University Science Education Department. He noted the department was not set up to move on research as fast as was necessary to accommodate the project and the project doctoral candidates. He reported:

> It's a function of the Science Education Department. The field training I got is really superb. The other research people (in the department) don't have as much experience in the field--or as much understanding of what's going on in the schools as I feel I do--working at it three years.

Training

The coordinators were asked whether they felt they had been adequately prepared for their duties as supervisors of preservice teachers and as coordinators of the inservice activities offered the teachers in the fieldwork schools. Their responses are summarized in Table 33.

TABLE 33

PREPARATION TO PERFORM SUPERVISORY FUNCTION

a. Did the project prepare you to perform your supervisory function?

Yes	1	(12.5%)
No	5	(62.5%)
No need	2	(25.0%)

b. How?

Learning-on-the-job	5	(62.5%)
From previous coordinator	1	(12.5%)
Conferences	1	(12.5%)

While four coordinators (63%) reported they had not received training for their duties prior to their actual assumption of these duties, five coordinators (63%) acknowledged they had received on-the-job training. One coordinator described the situation this way:

> In actuality they really didn't (provide preparation) because I didn't have any supervision experience before I came to the project and, of course, one of the things you're doing is supervising. It was a learning on the job, and I still feel I'm learning on the job. We did have a course that was on the books, "Supervision," so that over the two years we really had that kind of thing (two instructors), when they come up, will talk to us--we've done some audio tapes and things...now we haven't been as diligent in doing it--it hasn't been put in as a block of time, so, I would say that I haven't really had a formal course in supervision. But it is available if I know the right questions to ask.

Another coordinator concurred:

> They told me what they expected me to do and how they expected me to go about it. But the day-to-day, nuts-and-bolts kind of stuff. ...really the only way to do it is to go through it and see how things work out.

Two coordinators (25%), because of past courses, job assignments, and duties, considered themselves not in need of supervisory training.

Of the six coordinators who felt they had been in need of supervisory training, three reported the training they received (either "preparation" or "on-the-job" training) was sufficient. (See Table 34.)

TABLE 34

WAS THE TRAINING SUFFICIENT?

Yes	3	(37.5%)
No	3	(37.5%)
Not applicable	2	(25.0%)
Total	8	(100.0%)

Three of these six coordinators felt the training they received was inadequate. Of those who expressed the need for more supervisory training, two stated their preparation and training would have been better if there had been more formal supervisory instruction. However, overall, 75% (six) of the coordinators considered themselves well-qualified as supervisory teachers and only 25% (two) did not consider themselves well qualified.

One coordinator who has been with PCS for three years reported on his training through these three years. He stated he now felt well-prepared as a supervisory teacher because...

> ...In the last three years I learned when to strike with the right thing at the right time. For example, when to do an intensive classroom observation, and when to take the interns for some workshops or the Science Fair, a workshop on field trips. I got, really, a good experience in terms of that. In terms of classroom observations, after class when the intern, the teacher, and I met about the class, I felt my handling of the session became more sophisticated, more useful. What I'm saying is, in all dimensions (i.e., diagnosing, interpersonal relations, supervisory techniques, timing) I felt I improved a lot. That's where the field-based experience I was expecting was very helpful.

One coordinator, however, felt he could have done a better supervisory job if he had been more formally trained in the actual hands-on techniques the interns were to be using in the science classes. He stated:

> I felt that there were more curriculum--I'm talking about actual software curricula--that could have been presented to myself and perhaps to the preservice teacher, in a more structured way. You know some people react well to this (learning on-the-job) and some don't. They could have said, "Listen, you're going to teach a unit on physics, here are 10 things that we found that proved effective with the majority of cases--some more than others, some less.

When asked whether their supervisory duties coordinated well with their responsibilities as doctoral students, half the coordinators (four) indicated that the question was not applicable since they were not doctoral students. Of the four who were doctoral students, two indicated there was some coordination of the two functions and two stated two areas of responsibility did not coordinate well. (See Table 35.)

TABLE 35

DID JOB OF SUPERVISOR COORDINATE WELL WITH RESPONSIBILITIES AS DOCTORAL STUDENT?

Yes	0	(00.0%)
Some	2	(25.0%)
No	2	(25.0%)
Not Applicable	4	(50.0%
Total	8	(100.0%)

The two doctoral student/coordinators who reported there was some coordination of their responsibilities gave these reasons for the degree of coordination: evening classes at the university (1) and fieldwork affording opportunities to do research (1). A coordinator said:

> We get a little overworked because the demands are fulltime from here and fulltime from there. But the fact that we had evening classes helped.

All four doctoral student/coordinators reported the greatest difficulty they had with their positions as coordinators was a lack of time to do either job well. One further indicated another difficulty was that he, himself, was not provided with enough supervisory help.

When asked about their joint weekly meetings with the associate project director, three coordinators stated they did not attend these joint meetings because of their assignments as faculty members at the fieldwork schools. Of the five (63%) who attended these joint meetings, all reported satisfaction with these meetings and none were dissatisfied.

Table 36 summarizes the coordinators' needs that were met by these joint weekly meetings with the associate project director.

TABLE 36

NEEDS MET BY WEEKLY MEETINGS

Need	Number	Percent
1. Overview of supervisory job/project	4	50.0
2. Answers to problems	3	37.5
3. Development of plans	3	37.5
4. No needs	2	25.0
5. Probe problem areas	1	12.5
6. Coordination of project	1	12.5

One coordinator who could not attend the meetings felt he missed the opportunity to take part in discussions about mutual problems. He said:

> It would be nice if I got some kind of feedback. They put notes in my mailbox after it happens (the meeting). But I would like to be able to have some input into it or to get more insight. In other words, when a problem comes up and they discuss it, it's nice for them to write down the resolution of the problem, but I had no input into it. I may have had a similar problem and I may want to hash something out.

One coordinator stated his meetings with the associate project director gave him...

> ...A chance to quickly state what has happened, as an overview. It's forced me to say "Has anything been accomplished" and "What things am I looking to do the week following." And then (the associate project director) will always ask a little question or say "What do you think of..." and so it's a chance to see where we're at in the school on all the different levels--the administration and the preservice and what we're doing on our own here. So that's been helpful.

Seventy-five percent (six) of the coordinators stated they had not received training in how to keep a diary, conduct observations, provide feedback to interns, or other supervisory tasks. Of these six coordinators, five indicated the concept and format of the diary had evolved during the course of the year. One coordinator (13%) stated he had received training in certain supervisory tasks, and one coordinator (13%) stated some training was provided.

When asked whether keeping a diary was an effective exercise for them, a large majority (75%) of the coordinators answered "yes." (See Table 37.)

TABLE 37

EFFECTIVENESS AND USEFULNESS OF DIARY

	Yes	No	Don't Know
1. Was the diary an effective exercise?	6 (75%)	1 (12.5%)	1 (12.5%)
2. Did the Project use the diary?	2 (25.0%)	1 (12.5%)	5 (62.5%)

One coordinator said:

> I think it's a good idea because when you keep track, more or less, of how the intern is working out--in terms of, is he or she accomplishing more now than in the beginning of the year or have there been any changes in terms of attitudes?

Another coordinator used the diary to recall meetings and plans. He reported:

> Personally, it (the diary) was useful for the project, I'm not sure. Because the project needs a specificity. We wanted diaries this way. I wrote about the meetings I had in schools--the response, what kind of issues we talked about, what we were planning. Mostly I used it to recall meetings I had with the AP--what we talked about--to build on at the next meetings to assure progress.

One coordinator (13% felt the exercise of keeping a diary had limited usefulness. He stated:

> There's been a problem, in that they (the diaries) haven't been returned as rapidly as they could have. So I may not get as much out of them as I could have.

One coordinator (13%) felt the diary exercise was not effective. He said:

> (The associate project director) collects our diaries each week or every couple of weeks in our conferences with him, he usually asks us to talk about what we wrote in the diaries and the general situation in the school. It's hard to do. It's not a very regular thing. And it's kind of hit-or-miss, which is not that good. It is pretty bad. But given the circumstances in the project, there're so few people to do different things. As long as you keep on top of things and really feel that you have a grip on what's going on in the school, not make any gross errors or do anybody a disservice, then you're doing the job. So, unless there's a problem, it's (use of the diary) not intensive.

The majority of coordinators (63%) did not know whether the project itself made use of the diaries. (See Table 37.)

When the coordinators were asked whether they had professionally profited from attending the NYU faculty meetings with the full staff, six (75%) responded that they never go to the meetings. Two coordinators (25%) reported they occasionally attend the meetings to become aware of and involved with "wider issues."

Supervisory Role

All eight coordinators reported they were successful in getting the interns to improve their teaching and methodology. In a number of cases, however, the coordinators qualified their responses by indicating it was difficult for them to pinpoint any cause-effect relationships. Most of the coordinators had difficulty in assuming that they, personally, were responsible for the improvement they saw in their interns. One coordinator said:

> Yes, and I'm not sure it's me. I started out with two interns who were very sincere and really came intending to do a job. In terms of my own supervision of them, it's been very...I've offered suggestions based on what they've done. I've offered suggestions on what I think they might try to do and I basically left it to them. Each of them is different, obviously they reacted in different ways. But they've improved very well. They've done nicely. I don't think it's due to my supervision. I think it's due to the fact that they're really high quality people.

One coordinator described his job as a supervisor of the interns as one of "hand holding." Another coordinator said he "relied on the cooperating teacher" to promote the intern's professional growth. A third coordinator reported the improvement he witnessed in the intern this year was "less than in the past."

The coordinators reported they encountered a vast number of frustrations in their attempts to successfully train and supervise the interns. None of these frustrations was mentioned by more than 25% of the coordinators. (See Table 38.)

TABLE 38

FRUSTRATIONS ENCOUNTERED IN INTERN IMPROVEMENT

Frustrations	Number	Percent
1. Lack of time	2	25.0
2. Excessive absences of intern	2	25.0
3. Too much to do	1	12.5
4. Lack of materials	1	12.5
5. Personalities	1	12.5
6. Interns frustrated by students/teachers	2	25.0
7. Attitude of program "phasing out"	1	12.5
8. Fewer interns than previously	1	12.5
9. Needed more structure from project	1	12.5
10. Extended absence of cooperating teacher	1	12.5

One coordinator explained his own and his interns' frustrations as follows:

> The frustrations were that the philosophy came through early on about hands-on, but the "how-to-do it," the management problem and, also, the ability to get the materials from the lab assistant here, and have the teacher herself be affected, was hard. I think that the intern, for quite a while, put off the decision about how to do that. And when she did do a lot of it, she was frustrated because it was so difficult--so many things that she had to control at once--the materials, plus management and everything else and then said, "Well maybe I don't have to do it all the time." So now it's relaxed into a few labs and the rest demonstrations.

When asked whether the school administration had facilitated their role as coordinators, five of the eight coordinators (63%) answered that it had. Two coordinators (25%) stated, while the administration did not actively facilitate their efforts, neither did it offer opposition. A coordinator explained the situation this way:

> It's very, very--not strained but--I really don't think that he knows where I'm coming from and I really don't know, all that well, where he's coming from. We don't interact personally. But it's reasonable enough. We get along pretty well.

One coordinator did feel that the school administration had frustrated his attempts in his role as PCS coordinator. He reported:

> Our supervisor (AP) comes in and says, "these are the rules, you've got to do this. Everytime I come in to observe, you've got to have this up on the board." Of course he gets his orders down the line and if the deputy superintendent or superintendent walks into my room, he expects to see my planbook open on the desk, the homework assignment on the board, and the aim on the board, and they expect me to be following the New York City curriculum.

All the coordinators felt their role was so defined that it allowed them to work effectively. And 75% (six) of the coordinators felt the school administrators and teachers perceived that role as, essentially, a resource person. (See Table 39.)

TABLE 39

ROLE OF COORDINATOR AS PERCEIVED BY TEACHERS/ADMINISTRATORS

Role	Number	Percent
1. Resource	6	75.0
2. Inservice, informal training	2	25.0
3. Department coordinator	1	12.5

The most popular means by which the coordinators elicited the cooperation and understanding of the other teachers in the schools was through individual contact, especially during preparations for a Science Fair (See Table 40.)

TABLE 40

MEANS USED BY COORDINATORS TO ELICIT TEACHER COOPERATION

Means	Number	Percent
1. Individual contact (as through Science Fair)	5	62.5
2. Acting in role of colleague or supervisor (dual role)	2	25.0
3. Outside agency offering assistance	1	12.5
4. Fliers in teacher mailboxes	1	12.5
5. Assistance to special education teachers	1	12.5

One coordinator believed the teachers were not aware of his role as PCS coordinator, but used him as a science resource person because of his faculty function in the school. He said:

> I don't think (the teachers) are aware, in that sense, of my dual role.

Model District

Half of the coordinators (four) felt the presence of PCS had changed the quality of the science teachings in their schools. As an example of how the quality of teaching had improved, one coordinator stated:

> I'd become lazy over the years, speaking for myself. This year...this is the first year I've been teaching three grades. I think, without the project, I could never have done as many different types of labs and lessons.

However, half of the coordinators (four) reported the presence of PCS in their schools had not changed the quality of the science teaching there. One coordinator explained:

> They (the teachers) are a group that has been here 10 years. They're set in their ways. The best that I could say is that they teach effectively and it has nothing to do with the project...At this point, it's too much to change--coming from the outside agent. There's not enough motivation.

Another coordinator reported:

> Many, many of the teachers in this school are afraid to do anything but the traditional developmental lesson. I am constantly on their backs about it, but I can't make them move. And it's not really fair for me to demand it, because my supervisor is going to turn right around and say, "No, you can't do it."

Of the eight coordinators, five (63%) felt their schools did not have enough trained teachers to demonstrate good hands-on teaching. Three coordinators (38%) reported their schools did have enough trained teachers who used the hands-on approach.

Half of the coordinators (four) stated PCS had had an impact on their schools. A coordinator noted:

> I think it has had a very positive impact. It's made everybody more aware of science and how important science is...When I first came into the school, they weren't doing any science.

Two coordinators (25%) responded that the project had not had an impact on their schools, while two coordinators (25%) felt that some impact had been made. A coordinator stated:

> We probably set a, however little, higher standard on the Science Department in terms of creating new problems. For instance, since we've been there, there's been a very special program for gifted children, which was a proposal I wrote and got funded from the District. And there is another special program, Science Talent, that didn't start until we were there.

The coordinators listed a number of project accomplishments in their schools. (See Table 41.)

TABLE 41

PROJECT ACCOMPLISHMENTS IN SCHOOLS

Accomplishment	Number	Percent
1. Introduced new materials/ideas to teachers	2	25.0
2. Stimulated science teachers to work harder	2	25.0
3. Got grant monies into school	2	25.0
4. Set up library reference corner and displays	1	12.5
5. Built rockets with district science coordinator and sixth grade	1	12.5
6. Began science fiction club	1	12.5
7. Planted garden with health conservation class	1	12.5
8. Arranged field trips	1	12.5
9. Responded directly to student needs	1	12.5
10. Organized Science Fair	1	12.5
11. Encouraged science talent	1	12.5

A number of obstacles encountered affected the coordinators' efforts to achieve the goals of the project. Table 42 summarizes these obstacles.

TABLE 42

OBSTACLES ENCOUNTERED BY COORDINATORS IN EFFORTS TO ACHIEVE PROJECT GOALS

Obstacles	Number	Percent
1. Teachers "not ready," or feel threatened by project	4	50.0
2. Lack of equipment/time	3	37.5
3. My time limited	2	25.0
4. Lack of "impressive" number of project members in school	2	25.0
5. Administration not helpful or uncooperative	2	25.0
6. Teachers successful with present methods	1	12.5
7. Teachers not trained in method	1	12.5
8. Interns can't disseminate method because of heavy teaching load	1	12.5

The most frequently mentioned obstacle (50%) was the perception that the teachers in the schools were either "not ready" for change, or else were "threatened" by the project and its attempts to introduce the hands-on approach to science teaching. A coordinator stated:

> The first thing that anybody working for the project, in terms of the schools, should realize is that we are outsiders. My experience is that the moment we feel like insiders, it sort of backfires. The administration really gets threatened and we have to, in terms of that, really walk a tightrope. But as long as the school personnel and the school administrators feel that you are an outsider, that you are helping them, it's all right. But if you sort of show them that you are coming aggressively, to change things--that's the last thing they want.

Research

The area of project-sponsored research is another one in which a division exists between the four coordinators who are faculty members in the fieldwork schools, and the four who are doctoral students. The four faculty/coordinators did not know about any research. (See Table 43.) One coordinator responded:

> I'm not aware of the studies going on and I'm not doing any research right now.

And another stated:

> I don't know anything about the research.

TABLE 43

RESPONSES TO RESEARCH QUESTIONS

Question	Yes	No	Don't Know
1. Has the project defined a coherent line of research?	3 (37.5%)	1 (12.5%)	4 (50.0%)
2. Is it one you want to pursue?	2 (25.0%)	6 (75.0%)	0 (0%)
3. Does it have practical significance?	3 (37.5%)	0 (0%)	5 (62.5%)
4. Was the research generated by the project directly useful to you or the interns?	1 (12.5%	7 (87.5%)	0 (0%)

One coordinator who is a doctoral student noted that

> after the formation of the Research Team, I think the policy of getting research and the research areas were getting more and more defined.

When asked whether they would want to pursue the project's line of research in their own work, two coordinators (25%) said yes and six (75%) said no. (See Table 43.) A coordinator reported:

Further project-generated research, as described by the coordinators, is summarized in Table 44.

TABLE 44

PROJECT-GENERATED RESEARCH

Project Research	Number	Percent
1. Student attitudes/self concept*	3	50.0
2. Behavioral objectives	1	12.5
3. General science studies	1	12.5
4. Others' doctoral work	1	12.5
5. Hands-on evaluation sheet-pilot*	1	12.5
6. Small eigth-grade pilot*	1	12.5
7. Teacher attitudinal survey**	1	12.5

*Last year
**Two years ago

Seventy-five percent (six) of the coordinators felt neither the interns nor they themselves had, as yet, been involved in project-generated research in a way that was useful. Two coordinators (25%) reported either they and/or their interns were meaningfully involved with the project's research efforts.

Six of the eight coordinators felt they were not familiar enough with experimentation that addressed hands-on issues to be able to discuss difficulties about conducting such research. Two coordinators, however, did mention difficulties they noticed with conducting research on the hands-on approach to teaching. One coordinator mentioned physical problems--availability of the necessary schools, students, teachers, and materials necessary for adequate experimentation.

Another coordinator mentioned time as a difficulty. Many school routines and period schedules precluded allocation of adequate time for successful hands-on lessons.

All of the coordinators were unsure about the possibility of ever experimentally demonstrating that the hands-on approach to the teaching of science was more effective than another approach.

Future

Table 45 summarizes the coordinators' responses to the question about their professional plans for the next 5 years.

TABLE 45

COORDINATORS' PLANS FOR THE NEXT FIVE YEARS

Plans	Number	Percent
1. Teaching	4.5	56.3
2. Research	1.5	18.8
3. Study	1.0	12.5
4. Supervisory duties	1.0	12.5

Five coordinators (63%) reported they plan to teach at least part time for the next five years. Four coordinators (50%) plan to teach full time and one coordinator plans to combine teaching and research. The five who plan to teach at least part time will teach science in an urban setting, one at the high school level, three at the junior high level, and one at the college level. All plan to use the hands-on approach in their work. Two plan to use the approach from 50-75% of their teaching time, two between 25% and 50% of the time, and one coordinator could not estimate the percentage of time he might use the hands-on approach.

One coordinator stated:

> There are certain techniques that I've learned this year that I think will be useful (in teaching at the high school level)--slide presentations, classroom management, behavior modification, curriculum packages.

One coordinator felt he would be interested in pursuing research on the issues involved in the hands-on approach.

> I realize there hasn't been a lot of systematic research done on hands-on activities. I would consider doing some study on that.

Several uses for the hands-on approach were mentioned by the coordinators. The uses are summarized in Table 46.

TABLE 46

USE OF THE HANDS-ON APPROACH IN THE 1980s

Use of Hands-On	Number	Percent
1. Not the only approach that will be used	2	25.0
2. Offers necessary experimental base for learnings of science	2	25.0
3. Develop skills	1	12.5
4. Motivation	1	12.5
5. Help to overcome fears, perceptions of nature based on magic	1	12.5
6. Help children to "know what they're doing"	1	12.5
7. May be effective with minorities	1	12.5

The two most frequently mentioned reasons that the hands-on methods may be useful in the educational climate of the 1980s are that the approach will supplement traditional approaches (25%) and that the approach provides students with the necessary experiental base for the learning of science concepts (25%). One coordinator said:

> Going back to the case study we did, we finally struck a balance between how much hands-on a week and how much traditional, and we said you do three to two--three days hands-on, two days where you do some kind of summary, making sure that the concepts are understood by the kids. With that kind of arrangement you still test the kids, make sure that they can pass the tests so that accountability is taken care of. I'm not into this unstructured kind of hands-on, sort of open classroom. With some structure, it can be really, really useful.

Suggestions

Two coordinators felt that we, as evaluators of PCS, should note how much the project has used the community as a resource.

Another coordinator suggested that we talk with the cooperating teachers.

Two coordinators said that they would have found more frequent feedback from the evaluation team most helpful.

Finally, one coordinator showed the need for giving students an objective test of their attitudes toward science, with the expectation that if the project had been truly effective, the effects should be observable in the attitudes of the junior high school students.

INTERVIEW QUESTIONS: ON-SITE COORDINATORS

I. Recruitment

1. How did you hear about the program (New York Times, Board of Education circular)?

2. What initially interested you about Project City Science and made you want to investigate further?

3. What were the factors that made you decide to become a participant--what were the promises that attracted you? What were your expectations?

4. Of these things that drew you into Project City Science, which of them proved satisfactory? Which expectations were fulfilled?

5. What factors facilitated achieving these goals (Project factors, personnel, personal factors, etc.)?

6. Which promises disappointed you? Which expectations were frustrated?

7. What factors impeded achievement of these goals?

II. Training

8. Did Project City Science prepare you to perform your supervisory function (for the interns; for the other staff members in the school). How?

9. What was the training you received? Was it sufficient? Do you feel as well qualified as a supervisory teacher?

10. Did your job as a supervisor coordinate well with your responsibilities as a doctoral student?

11. In what ways did these two aspects of your role (that of supervisor and of student) match or fit together? What aspects were at odds with each other?

12. Were you satisfied with the weekly meetings with the associate project director? What were your needs? Why were/weren't you satisfied?

13. Did you receive training in how to keep a diary, observing, giving feedback, write a case history, or other supervisory tasks?

14. Were these exercises (diary, histories) themselves effective? Did the Project do something with these diaries, histories, etc.?

15. Do you feel that you profited professionally from the NYU faculty meetings with the full staff? Why or why not?

III. Supervisory Role

16. Do you generally find that you are successful in getting the interns to improve their teaching and methodology? What have been your frustrations, your problems?

17. Has the building administration facilitated you in your role as a coordinator? Is your role so defined that it allows you to work effectively? How was your role perceived by teachers/administrators?

18. Do the other teachers in the school understand and accept your role in the school, and use you as a resource person? What means did you use to get other teachers to understand/cooperate?

IV. Model District

19. Do you feel that your/PCS presence has changed quality of science teaching?

20. Do you believe this school has enough trained teachers to demonstrate good hands-on teaching?

21. Has the project had an impact on this school? What has the project accomplished in this school?

22. What obstacles have you encountered in this school in your efforts to achieve the project goals?

V. Research

23. Do you feel that the project has defined a coherent line of research?

24. Is it one you want to pursue in your own work? Does it have practical significance?

25. Has there been any research generated by the project that has been directly useful to you or your interns? Would you describe research efforts with which you are familiar?

26. Do you feel that you or your interns have been involved in research in a way that has been useful?

27. What are some of the difficulties you notice with conducting research on the hands-on approach to teaching? Can the hands-on approach ever be experimentally shown to be more effective?

VI. Future

28. What do you plan to do next year? (teach, research, study, travel)

29. Do you plan to teach within/for the next five years? What level, subject, location, (urban, suburban, rural)?

30. Will you use hands-on in your teaching? What percentage of the time?

31. I'll play "devil's advocate" for a moment and ask you why you might use a method of teaching which seems to some to be passe now with the current emphasis on "back-to-basics," competency-based teaching and testing, and accountability? How would you take hands-on into the 1980s?

APPENDIX F

Summary of Evaluation Reports from Consultants

Visiting University Classrooms

and Project Field Sites

1977-78

As one step in the evaluation of Project City Science, a group of science teachers, science-teacher supervisors, and college-level science educators were asked to independently observe and assess the teaching methods of Project City Science interns. To provide some information, however limited, concerning the nature of the instruction/training the PCS interns were receiving, an observation of a class at New York University was also made. This report synthesizes the observers' perceptions of and reactions to Project City Science at work.

Generally, the observers characterized instruction as average, unimaginative, and traditional. Most classes were described as teacher-centered if not teacher-dominated and were reported to lack the "hands-on" approach central to the PCS objectives. The scientific accuracy of the content of instruction was most often considered above average, although in one case the accuracy of content was rated as poor. Ratings of the rigor of the content and the significance of the topic generally fell in the average to above-average range.

Students were most often described as indifferent and clearly, not highly motivated. Although a few of the classroom observations make brief reference to an isolated "hands-on" lesson format, the student's role was generally felt to be a passive one.

In response to the model of science instruction employed and its characterization, most observers reported the usage of standard junior high school science pedagogy: lecture; question and answer; some experimentation; demonstration. In general, the form of the instruction seen was felt to be undistinguished.

The character of Project City Science instruction appeared to be teacher-specific. The positive aspects noted by the observers dealt with the individual intern's style: use of open-ended questions; field-trip planning; drawing from learner's experience; experimentation. No across-classroom trends were apparent in the strengths mentioned by the observers. Disparity between articulated goals and practice was reported often. Similarly, the observation of the New York University class that described the oral presentations of three PCS interns concluded that the interns' teaching was "didactic" and "uninspired" and did not reflect a sensitivity to the project's target population. Additional support for this impression was given in response to an on-location observation: lesson was not organized in a way to allow students time to complete a task; routines were not emphasized; lesson pace did not change to accommodate students' attention; content was not always relevant to real life; curriculum materials were often too difficult for the students.

Within the affective domain, the cooperating school administrators were generally pleased about Project City Science and the interns, although interns were considered "extra-hands" in one case. Observers' descriptions of the interns were both positive and negative with respect to both their academic preparation and their ability to effectively communicate with inner-city adolescents. Comments concerning extra-instructional apsects of Project City Science, i.e., the role of cooperating teacher and on-site coordinator, were also offered by some observers. Although in one case an intern's success was judged to be a function of the attitudinal and material support of the cooperating teacher, it was generally felt that difficulties inherent in student-teaching situations were compounded by placement in classrooms that lacked the appropriate climate and necessary back-up of cooperating teachers.

More careful placement and the possibility of summer training workshops for both interns and master teachers were suggested. On-site coordinators were described to be somewhat of an unused if not unavailable resource. Recommendations concerning their function included extended contact with interns in the form of observations, consultation, and curriculum planning and assessment.

In general, most aspects of Project City Science appear to vary from school to school and classroom to classroom. Despite the interns' knowledge of Project City Science objectives, it would appear that many of the participants observed were unable to translate these goals into instructional action. PCS interns, once in the classroom, no matter how zealous their attempts, were described to lack the necessary resources to motivate and successfully teach their students. These observations, in addition to the recommendations mentioned above, resulted in suggestions for richer training that would provide interns with a better understanding of the psychology of the situation as well as exposure to and facility with instructional methodology key to Project City Science philosophy.

APPENDIX G

Summary of Evaluation Reports from Consultants

Visiting University Classrooms

and Project Field Sites

1978-79

Summary of PCS Evaluators' Comments

In reviewing the PCS evaluators' comments, a common dominant motif is seen to emerge. The evaluators, whether or not using the supplied observation protocol, processed their observations through three generic questions: (1) Are the interns reasonably competent in and expressive of PCS methodology and intent?, (2) Are the interns and PCS program effectively supported on site?, and (3) In actual classroom situations, are PCS methods and intent being achieved? Possibly, another question may also be added, viz., Are the goals of PCS in themselves desirable? It is unnecessary, however, to dwell too long on this, as barring those instances where the evaluators rolled this fourth question into the first three, the answers turned out to be more panegyrical than substantive.

In regard to the first question, the PCS competency of the interns, the evaluators further distinguished two sub themes: (1) the background and motivation of the interns and (2) the relevancy of the PCS staff courses: content as well as teaching dynamics.

In general, the evaluators applauded the morale and qualifications of the interns. As one observer put it, ". . . the interns are well qualified by way of content background and professional interest." Another, when listing the strengths of PCS, straightforwardly declared it was "the enthusiasm of the teachers-in-training." In many cases, the evaluators took pains to separate their criticism of the project from their favorable comments about the interns. "The theory behind the program is commendable and the enthusiasm of the interns noteworthy. However, I find the actual implementation wanting." And again, "The morale of the interns seemed to be high--much higher than I had anticipated in view of some of the shortcomings of the Project as I observed and inferred."

As might be expected, steadfastly diverting criticism away from the interns while directing it toward the Project alone is not entirely consistent. One observer, after lauding the interns, was later forced to admit ". . . it became apparent from my observing one group (i.e., of interns in a staff class) that even such concepts as acceleration were not clear to the Project staff as well as the interns. ". . . I did not observe that the instructor either tried to find out what the conceptual base was for the interns, or tried to establish minimum concepts at the outset." In an earlier situation, the staff instructor even made "gross" errors in presentation, but the interns ". . . did not have enough background in physical science to know when errors were made, or simply felt it unethical or unimportant to comment or correct the mistakes."

In summing up the evaluators' comments about the background and motivation of the interns, it can be concluded that, though praising the preservice teachers, the evaluators did find the content background of the interns not as solid as called for or perhaps as anticipated by PCS. Furthermore, the quality of staff instruction appeared to be unequal to the task of remedying these deficiencies. Tribute was paid to the high morale of the interns, but this need not necessarily be attributable to PCS. In fact, as one student teacher exclaimed, "It is an experimental program and I feel as if I'm being experimented on." Perhaps the idealism, rather than the factual circumstances, of a new and exciting career adventure is what is really occasioning the high morale of many.

The observers' characterization of relevancy of the PCS staff preparation courses ranged from unfavorable to nearly condemning. One evaluator simply stated that course content ". . . had little or no relevance for either the interns or for the students they are preparing to teach." Later on, the same evaluator added that the ". . . materials made available to the interns. . . had little relevancy for junior high school instruction, in my opinion." Another observer raised a question about the "real uniqueness of the program," because the "expected urban thrust was not in strong evidence in the classes." And still another observer concluded, "Insufficient emphasis is placed on relating and adapting curriculum ideas to the inner-city situation." After observing one of the interns classes, yet another evaluator flatly declared, "I didn't recognize anything distinguishing this class as having something to do with teacher training for junior school or inner city."

Many of the observers believed that the <u>manner</u> in which the interns are taught will invariably influence the way the interns themselves will teach. In other words, PCS staff teaching dynamics will ultimately affect the goals of PCS. On this score, the observers noted many drawbacks. "The instructional mode, and the materials used, must be especially relevant for the interns. That was not at all the use as I observed it." PCS staff, in this case, are seen to be fostering a teacher-centered method basically in conflict with its own goals. An evaluator concluded, "I suspect that they, themselves (i.e., the interns), will lecture to their students in the public school. If they do, Project City Science will have its own staff largely to blame." Another evaluator observed, "the students do not have the opportunity to explore and experience the 'hands on' activities of the curriculum projects studied." In one situation, where a particularly ill-conceived experiment was conducted, the interns were not even led into a discussion. "The total group never discussed any of the observations they had been asked to carry out. A disastrous demonstration of teaching." Another observer noted: "The project is weak in training teachers in the areas of classroom management, lesson planning, and lesson implementation."

:The project does not seem distinctively innovative in its approach to teacher training." And, finally, "The project does not appear particularly well suited to the inner-city situation." A less terse, but no less telling statement came from two other observers who aptly express the common sentiment on this point: "A more experienced staff would seem to be indicated for the nature of the program being operated. The University teaching staff must certainly serve as models. In this instance, however, little was seen of dynamic exemplary presentation, of urban orientation, and especially of teaching strategies suitable for use with academically disadvantaged children."

With regard to the second question about effective on-site support for the Project and the interns, most observers expressed negative impressions of on-site coordinators and/or the cooperating teachers in the fieldwork schools. One evaluator, who had some positive things to say, did not have first-hand information. For the most part, the prevailing sentiment seemed to be that the "preservice teachers do not feel that their coordinators and cooperating teachers represent powerful supportive resources." Another observer was "a little distrubed that the on-site coordinators appeared to be somewhat weak in their ability and/or desire to give leadership and direction to the interns." Still another observer, while commenting on the PCS program, noted, "It is a worthwhile approach, but will take a long time because there are not enough cooperating teachers willing to accept the new approach." One observer who rated PCS very high in regard to the achievement of its goals, nevertheless, felt that the cooperating teacher was a major detraction: "The major criticism lies in the fact that the co-operating teacher did not allow the intern the academic freedom to deal with the scientific questioning of the students." Interestingly enough, this same observer went so far as to suggest giving the coordinators evaluative power over cooperating teachers. "The coordinator needs to have a power base in order to have control over an effective program of instruction." The "power base" referred to is school management. Later on, the observer concluded that "your coordinators need to have evaluative power over co-operative teachers, as well as the intern teachers." This position may appear more radical than those taken by the other evaluators, however, as will be seen in the following section, equally strong steps (at least by implication) are suggested by many of the other evaluators.

Regarding the third question concerning how well PCS is achieving its goals, most of the evaluators felt that the program was traditional or teacher-centered. It is important to note, however, that such characterization need not have affected the observers' comments on the effectiveness, rate of learning, scientific accuracy, etc., of the particular class or classes observed. For example, one observer rated the project less than average insofar as it adhered to its stated goals, but still rated many of those other factors much higher. The reason was that the teacher used a model that had merit, but was not PCS-developed. "The teacher, Mr. ______, developed and utilized this model of instruction prior to working with the Project City Science Program." Another observer rated the project only average in regard to its goal achievement even though a "hands-on" model was used. In this case, "the approach was 'hands on' but not student-centered. Too much of the activity was rushed through. The students did not have time to become involved in what was happening. Their questions, which could have lead to real involvement, were treated casually." Still another observer, after ending his description of the teaching model by citing that the teacher talked 90% of the time and the students 10%, went on to characterize the instructional approach as follows: "Absolutely nothing spectacular to rave about. Teaching was average, Lab session was average or below, student interest and motivation--very low."

Although most observers evaluated the attainment of project goals unfavorably, a strong dissenting minority did appear. Aside from the evaluator previously mentioned, another observer described the teaching model as "generally 'hands on.' Students were asked to choose or were directed to a kit, exercise, or task that involved their senses. They experienced the task or solved the problems by doing rather than just listening." Another observer thought the instruction "well-planned," "interesting " and executed with "variety" and "student involvement."

It is interesting to note that the pro's and con's in this issue do seem to have or imply a point of mutual convergence. The observer who rated attainment of project goals high, but faulted the cooperating teacher, actually was looking for a change in philosophy more in keeping with the spirit of PCS. "My recommendation is to find more cooperative, philosophically similar teachers to work with your interns." And on the other hand, an observer who described the program's success much more modestly, nevertheless made a similar point: "The concept that process is at least as important as content in science education has to be accepted by the cooperating teachers and administrators in the Model District Schools." Other evaluators observed that "The strict adherence to the N.Y.C. curriculum alleged by the staff is certainly a constraint in that it limits the opportunity to practice what is being taught and most likely, in the long run, the potential for making instructional improvements as suggested . . ." In other words, PCS seems to be beset by inconsistent themes, and until and unless the conflict in philosophy is resolved (i.e., from student training, to on-site teaching support), progress will continue to be uneven.

APPENDIX H

Consultant Report: Assessment of Project City Science Preservice Training Model: 1978-79

by

Dr. Frank X. Sutman

Dr. Matthew Bruce

Report on the Observation and Evaluation of the

In-School Training Component of Project City Science (PCS)

It would be helpful to the reader of this report to keep in mind that PCS was originally funded by the National Science Foundation with the knowledge that the inner-city school conditions prevailing in New York City basically did not lend themselves to changes in approach to teaching science or to change in science content taught. Successes probably would be small; yet there was hope that there would be some lasting impact because of the nature of the PCS staff. Funding most certainly resulted from the fact that the original project director has achieved considerable success in producing some substantive change in the teaching of physics through Project Physics. In addition, NYU in the area of science education within the New York City metropolitan area and in Puerto Rico has maintained a reasonable reputation. The analyses presented herein should be weighed against this background.

The report presented here results from visits to classrooms in schools in New York City (I.S. 141 and 137) housing PCS interns. The visits followed observation of a full day of on-campus instruction to the PCS interns at NYU. The on-site school visits included observation of several full-length classes taught by the interns, as well as opportunity to talk at length with the interns, their cooperating teachers, two school PCS coordinators, and with student-members of the classes being taught. One lesson was taught bilingually to a group of Spanish language competent youngsters by one of the PCS interns. One class was a traditional lecture question answer type presentation, and the third followed a laboratory individualized group project type format.

The content of the classes observed included: team project in a variety of content areas such as testing for various food components and quality control of household products; study of dinosaurs, and an audio visual presentation on the fertilization of frogs' eggs. The class presentation about dinosaurs was by a PCS intern covering a class for the regular teacher. The students in the class were being given background that would be helpful to them on a future trip to the Museum of Natural History.

Observations:

During the visits to two schools, the evaluators had an opportunity to observe and to speak with PCS interns, regular teachers, a science coordinator, an assistant principal, and a number of middle-school-aged students. Following are some of our observations:

1. The assistant principal, who served as PCS on-site coordinator for one school was most helpful and willing to share his experiences.
2. The interns were willing to discuss openly their experiences both in the field and at NYU; but in one instance, the intern did not know we were to visit that day.
3. The science coordinator interviewed was very responsive and gave us a longitudinal view of the project in her school.
4. The interns clearly viewed the teaching period as the most important part of the PCS program.
5. The New York City Public Schools' loss of many science teachers during the prior year, coupled with union problems that emphasize seniority instead of competence, had great effect on the relative impact of PCS.
6. The inconsistency in availability of funds for science materials had considerable effect on the value of PCS in the two schools visited.

In one school, profits from doughnut sales supplied funds for material. In another, requests for funds were honored by the school administration or were supplied by the PCS intern.

7. It was difficult to detect infusion of content and/or methodology unique to the needs and interests of inner-city children and citizens.
8. Orientation to teaching, teaching strategies utilized, and content being taught had little relation to the "academic program" presented to the interns at NYU, although the interns indicated that they did have access to curriculum materials at the University.
9. Little evidence was seen of continued or sustaining commitment to the original goals of PCS by the project staff or by the schools.
10. There was some suggestion that the city curriculum formed a limitation on the interns' ability to apply what had been taught to them at the University.
11. At the stage of their experience we observed, it seemed clear that the interns needed fairly close supervision. It was not entirely clear that they were getting it.
12. Suggestion was offered by one intern that more methodology of direct classroom applicability would have been useful. E.g., one intern clearly missed the opportunity to pursue a line of speculative questions with pupils (didn't recognize the opportunity?).
13. The interns felt that the Urban Ecology course was most useful (although no clear application of it was observed) and questioned the value of the "implementation" course.

Specific to PS 141:

1. The administrator in the building, who was also program coordinator for the building, was quite helpful.
2. Use was being made of second-language skills of one intern to serve the needs of the particular school population.
3. Science programs in operation were in place prior to placement of intern teachers by PCS, and apparently had not changed in any way related to their presence, except for having more "hands" available to operate it.

Specific to IS 137

1. Observation of classes was prevented by an assembly program and the absence of one intern.
2. Extended discussion with the regular science coordinator brought out the following points.
   a. There seems to be a reduced level of commitment on the part of project personnel. (This could be a perception related to the individual on-site coordinator.)
   b. The interns and the on-site coordinator seem "so carried away with hands-on approach," that they are short on organization and managerial skills.
   c. The capability of the interns seems higher this year. Interns are more <u>science</u>-oriented and less oriented toward <u>teaching</u>.

<u>Conclusions</u>:

1. There was little indication of regular teachers' behavior having been altered by the activities of PCS.
2. There was little indication of programmatic change relative to the presence of project personnel.

3. There was little indication of impact through injection of extra materials/supplies.
4. The teaching observed was of the quality one would expect from almost any teacher education program, but did not reflect any clear characteristics that would label the program that produced them as being unique. Also, there was little indication that PCS staff did or would have continuing impact on teaching content, methodology, or commitment by the schools to a "different" kind of science teaching
5. Most of the PCS interns would leave the inner-city environment and/or teaching altogether.
6. Interns had too little or no experience or involvement in the inner-city community for a variety of reasons:
   a. Most interns worked part-time outside the school.
   b. They became involved in the school and its activity too late in the year to truly develop such involvement.
   c. Devotion to project and goals waned quickly as interns ran into difficulties.
   d. There was lack of assurance that PCS staff or school personnel would back interns' decisions.
   e. The psychology course experience, which might have helped set direction, was too open-ended to be of support in dealing with inner-city type problems.

Summary:

It is, of course, not possible to generalize with total accuracy regarding PCS from the four man-days of observations. However, based on our observations and our years of professional involvement in education and in science education in particular, as well as information received by reading the PCS reports over the years, the two evaluators and writers of this report attempt here to make some general statements regarding PCS and its potential as a change agent.

The PCS staff has faced a number of educational problems common to most large city universities and school systems. The major difference in the PCS situation is that these problems or "roadblocks" are more severe and more advanced in New York City than elsewhere. The project has faced dilemmas such as the decision regarding the choice of coordinators. If these persons are employees of the school district, then they are responsible to the school district first. If they are university employees, their decisions need not be accepted by school district personnel. Over a four-year period it would be hoped that PCS staff would have gained the confidence of school personnel so that the NYU staff could serve as coordinators and so that their decisions would be accepted even though these decisions might create extensive changes in methodology, curriculum, etc.

A second example is the dilemma faced regarding research. It is true that large public school systems shy away from having "outsiders" conduct research in classrooms. At the same time, school district classroom personnel generally do not become involved in research activity on their own unless requested to do so from the central administrative offices. It would seem after a period of four years, however, that school district personnel should have developed enough confidence in PCS to permit useful research activity to occur with greater freedom that is often the case. The amount of research data accumulated and analyzed was amazingly large, but it appeared to have been obtained with considerable difficulty.

The writers wish, finally, to offer a few suggestions here regarding how PCS, if continued, might become a more effective change agent, building both on the difficulties observed and on the strengths inherent in an internship model.

The term "internship" has been widely used in describing many forms of field-based, supervised practice, covering a wide range of levels of responsibility. Michaelis[1] offered a definition, in the form of characteristics, for the academic internship, which should be useful here. The definition includes five characteristics, paraphrased here:

1. The intern possesses a baccalaureate degree and meets the criteria for admission to a teacher education program;
2. Begins the study of education at an advanced (postbaccalaureate) level and successfully completes a preservice training program;
3. Has responsibility for the instruction of pupils;
4. Is paid by the school district; and
5. Is supervised both by the college or university and the employing school district.

The model described here has been adapted successfully at a number of institutions, including Temple University.

Building on this definition of intership and the objectives and basic character of PCS, the writers of this paper suggest the following for PCS.

1. Following the preservice period, the intern should be involved in teaching five days a week through the school year, under the supervision of a "team" consisting of a PCS staff member and a competent teacher in the school.
2. The public school system should be asked to hire the interns on a

provisional certification basis, paying the interns at a rate comparable to the salary of a regular teacher. This would help the school district relieve its shortage of science teachers and also would make participation in PCS more feasible for interns. This latter ties to suggestion 5 , following, in that the salary would hopefully obviate the need for outside employment.

3. Supervision would be more intensive at the outset, tapering somewhat. This would tend to make the spring term supervisory load lighter than the fall, thus freeing some staff time for, perhaps, pursuit of some of the research activity that should arise from such a project. A concurrent seminar should accompany the supervised teaching at least during the first year.
4. Supervision should continue through the second year, at a level determined on an individual basis by the program staff to meet the needs of each intern. For many interns, this would mean a relatively low level during the second year.
5. Contact with the program <u>at the Univeristy</u> should be maintained through classes during the evenings and summer. The two year period should permit ample time for completion of certification and the U.Ed. degree. The one-day-per-week format now in use for classes during the teaching period is too concentrated and draws the interns away from the school programs and activities at a crucial time.
6. A culminating activity such as a master's essay or project should be completed under supervision by a PCS staff member during the final semester of the two-year period.

If the above suggestions were adopted, with modifications as needed to meet circumstances with which the writers are not familiar, the program would in the writers' view gain strength and increase its potential as a change agent through increased likelihood of retention of interns in teaching and in the city system, increased likelihood of impact by way of longer term consistency, and increased likelihood of concluding research.

1 Michaelis, J.V., "Teacher Education--Student Teacher and Internship," <u>The Encyclopedia of Educational Research</u>, 3rd ed., W.S. Monroe, ed., p. 1474 (New York: MacMillan, 1960).

APPENDIX I

INVOLVEMENT OF PROJECT CITY SCIENCE IN DISTRICT 4: A CASE STUDY AND EVALUATION

by

Marilyn Mangley
Laraine Bengis

I. BACKGROUND NARRATIVE

PCS went into District 4 in the winter of 1974-75; this district was selected because: (1) it was fairly typical of contemporary urban school district; (2) it had science supervisors and principals willing to cooperate with the Project; (3) the District was fairly stable politically; (4) it had a good working relationship between the superintendent and the UFT representative, and (5) geographically close to N Y U.[1]

Eleven science teachers from four intermediate schools in the district volunteered to work as resource teachers with the Project, participating "in a two-year program designed to improve their own science teaching and to prepare them to become master teachers in their district."[2] Through the Project, resource teachers could obtain an NYU science education degree or a teaching license, depending on individual need and background. Resource teachers would have the back-up and assistance of PCS "On-Site Coordinators" (one for each school) who would "serve as liaison personnel between their schools and PCS and would coordinate PCS activities, namely by teaching demonstration lessons, helping teachers prepare units and implementing new curricula."[3] Resource teachers in turn would train "In-service" student-teachers assigned to them. Teachers would receive inservice credits for the student/teacher arrangement and for attending PCS workshops.

[1]New York University, School of Education; Health, Nursing and Arts Professions, Project City Science; Quarterly Report #1, Sept. 1, 1974-Dec. 31, 1974, p. 2.

[2]New York University, School of Education, Health, Nursing and Arts Professions, Project City Science, Quarterly Report #2, Jan. 1, 1975-March 31, 1975; p. 3.

[3]New York University, School of Education, Health, Nursing and Arts Professions, Project City Science, Quarterly Report #5, Sept. 1, 1975-Nov. 30, 1975, p. 18.

The Project became operational in District 4 in the spring of 1975, with the approval of the district superintendent and the district science coordinator. Staff development workshops were conducted and individual conferences held as part of the PCS Resource Teacher Training Program to prepare teachers for participation in the Project.

The alliance between PCS and District 4 continued until the spring of 1976, when letters between the District 4 superintendent and the director of PCS--both stating intentions to withdraw the Project from District 4--crossed in the mail. Dissolution of the relationship was triggered by an episode in which a "controversial" research-related curriculum (on "Environmental Factors Which Influence the Development of Healthy Offspring") was brought into one of the schools without the foreknowledge or approval of the district science coordinator. Clearly, however, this incident was merely "the last straw" in an already uneasy and dysfunctional situation.

The present evaluation team was sent into District 4 in June 1978, charged with attempting to ascertain "what went wrong" and how the breach might have been prevented. Over a 3-day period we interviewed seven former PCS resource teachers, three assistant principals in charge of science education who had been involved in PCS, and the district science coordinator. The following is our report on the content of these interviews, as well as our assessment of the underlying dynamics of a highly complex and extemely difficult situation. It is our wish that our findings be used to improve the function of PCS in other school districts; we support the stated Project goals, and hope that these goals can be met, at least approximately, elsewhere in New York City.

II. PERCEPTIONS OF PCS ON THE PART OF SEVEN PARTICIPATING TEACHERS

The seven interviewed teachers had all volunteered to participate in the Project. Their assessments of the value of PCS to science teaching were divided: four teachers expressed satisfaction and praise for the Project, and three manifested disenchantment. From the data obtained, certain generalizations can be made regarding teachers who primarily viewed PCS positively as compared with those who viewed it negatively.

A. Teachers Who Viewed the Project in a Primarily Positive Light

Of the four teachers who felt that participation in the Project had been a valuable experience, three had a nonscience background and were unlicensed science teachers. They were clearly eager for help and ideas that would strengthen their teaching. In general they were impressed and satisfied with the calibre of the on-site coordinators. These four teachers made comments such as: "The coordinators were good people." "An asset." "I was sorry to see them go." "I was so sad that they left." The fourth teacher in this group, who did have a science background, described herself as "weak in the area of physics", and gratified to have assistance in this area from her On-Site Coordinator, whom she recalled as "brilliant."

This group reported receiving the following specific service from the coordinators: suggestions for making complex material intelligible to the students; alternative strategies for presenting content; course outlines; reference materials and teaching materials; observations of the resource teachers with followup evaluations; and the teaching of demonstration lessons.

In general, the resource teachers reported good rapport with the inservice teachers whom they were training and their comments suggested that these relationships were characterized by warmth, mutuality and flexibility.

These four resource teachers, describing their inservice teacher trainees, made comments such as the following: "He got me anything I needed." "We worked together very closely." "He got close to some kids, took them to NYU, got them certificates." "He got an aquarium for the classroom, paid for dissection samples." "One of the ways he helped me was by functioning as a lab technician after the school's lab technician got excessed."

Regarding criticisms of the Project, this group made the following comments: "The Staff was inexperienced at working with people. Sometimes too idealistically oriented--for example, they gave a demonstration on using materials in lab, when we had no lab." "PCS should have developed its proposal in conjunction with school staff members." "Staff should have been more sensitive, should have listened more." "My non-SP classes weren't ready for a hands-on approach which is only helpful if kids already have some kind of discipline and motivation. My kids got out of hand during hands-on lessons. They needed blackboard and notebook to keep them interested, and the teacher had to sneak the lesson in." "PCS doesn't understand the Board of Education mentality. They must go through channels, Principals must be kept informed."

But this group, interestingly, was even more critical of colleagues working for the Board of Education. "Most of the teachers were apathetic about the Project." "Teachers are very uptight people, afraid of change." "There are two kinds of teachers: one is open, looking for help, will use it; the other is closed, not receptive to help."

B. Teachers Who Viewed the Project in a Primarily Negative Light

Three teachers with science background felt that the Project had not delivered what it promised. This group appeared critical of (possibly even competitive with) the on-site coordinators, and tended to experience the inservice teachers as one more burden on their already burdened existences. They objected to the fact that "schools had no say in whether or not they wanted PCS to come in," and tended to feel that individuals working for the Project were merely using the intermediate schools to further their own careers.

Among their criticisms of PCS were the following: "If I asked the On-Site Coordinator for anything she acted like whe was doing me a favor." "They had preconceived notions of how things should be done in a school which didn't jibe with reality. They didn't understand specific problems of the District. They were out of touch with the realities the teacher faces." "They came in gung-ho--like they were selling the sky. They dangled the carrot." "They were preparing people to be teachers where there were no jobs--a cruel exercise in futility." "The Project wasn't well organized." "They weren't sufficiently aware of limitations of time for teachers, or of problems in the school." "In the beginning it looked as though the Project was just grabbing people off the streets." "PCS staff was overloaded with specialists in physics, at the expense of other science areas." "We didn't need them. What we needed was money for textbooks, money to get our excessed lab technicians back."

This same group did, however, have some positive comments to make about PCS: "They got me supplies, filmstrips." "Eventually we might have gotten it together." "The staff was well-equipped but not yet organized," "The type approach they were promoting is useful in SP classes." "The Project might have worked if there's been more commitment from resource teachers." "I wish they'd hired some true specialists--master teachers who taught model classes for the full school year, who we could have observed and learned something from". "I took a curriculum course through PCS that was very good." "I got my M.A. through PCS." "Some of the workshops were valuable." It must be noted that two of the three teachers, despite expressing disappointment with the Project, felt that had the Project been given more time to function in the District, it would have succeeded. Both teachers also responded, when asked, that if it were possible they would bring PCS back into the District, but in a more organized fashion.

C. Reactions Common to Both Groups

Two perceptions were shared by teachers who viewed the Project positively and those who viewed it negatively.

Both groups tended to feel that program planning (from the proposal level on through) should have been done jointly by NYU Project staff members and Board of Education personnel who would be affected. The type of input desired was (1) to apprise PCS staff of the problems and politics of intermediate school education in District 4; (2) to sensitize PCS staff to the levels of understanding and educational abilities of preadolscents in the District; and most importantly (3) to vent their frustrations and to voice what they felt to be their major problems and needs in order to upgrade the level of science instruction in their schools.

A second shared reaction was shock that PCS had been "ousted" without any consultation with the teachers involved. Most teachers seemed to feel that before taking such a step the District science coordinator should have solicted the views of the participating resource teachers and assistant principals. Only three of the seven teachers interviewed were aware of the controversial "birth defects" curriculum which triggered the severing of ties; none remembered receiving any official notification or explanation of

District 4's decision to withdraw from PCS. In view of the energies these teachers had expended, they felt that this was poor treatment.

III. PERCEPTIONS OF PCS ON THE PART OF THREE ASSISTANT PRINCIPALS IN CHARGE OF SCIENCE

Divergent views of the character of PCS were also manifested on the assistant principal level.

One assistant principal we spoke with said, "I'm just so sorry they had to leave." This assistant principal--new to the school at the inception of the Project, and bringing with him evident experience and skill in curriculum development, teacher training, project proposal development and community relations--had only good things to say about PCS. He welcomed into his school any and all resources that had potential for enriching the curriculum (and thereby the students); he believed PCS had been offering and would continue to offer such enrichment.

The second assistant principal interviewed had only negative things to say about PCS. Clearly, he saw the project as an imposition. "The school didn't have time to deal with it the way they should have. The Project had no impact on science teaching in our school." He complained that On-Site Coordinators had come to his office to confer with him <u>only</u> at the inception of the Project. Although expressing the view that he had "no time to spare" for the Project, he complained that there should have been weekly or bi-weekly conferences between himself and PCS staff. He felt there had been a lack of guidelines and reportage. The <u>Quarterly Reports</u>, he stated, were the only information he received in Project progress.

This assistant principal regarded curriculum resource materials and demonstration lessons brought into the classroom by PCS staff as "an interruption of the curriculum." He pointed out that his school lacked textbooks, science materials and staff (in particular, a lab technician), and expressed the view that Federal monies would have been better spent in remedying these deficiencies.

Was the Project staff competent? "I don't know."

How did you feel about the Project leaving your District? "I couldn't care less."

In the opinion of this assistant principal, PCS staff members were using the Project to feather their own nests, while the schools existed in a state of deprivation.

In what appeared to be a most objective assessment, the third assistant principal expressed his disappointment while admitting that he had felt no particular enthusiasm for the Project from its inception. He stated that he hardly ever saw the on-site coordinator and felt that inservice teachers were just using the situation to get teaching credentials. He was pleased, however, with some filmstrips and barographs that his school had received through the Project.

IV. PERCEPTIONS OF PCS ON THE PART OF THE DISTRICT SCIENCE COORDINATOR

The science coordinator for District 4--who was new to her job when PCS came into the district--impressed us as exceptionally intelligent, energetic, creative and committed to upgrading the teaching of science in her district. She recalls the events leading up to the discontinuance in the Spring of 1976 of District 4's participation in Project City Science as "one of the most horrendous experiences of my life." Two years later her feelings still run strong; and she welcomed the opportunity an evaluation team presented to express to these feelings.

As a district science coordinator, she is accountable to the District Superintendent for the content and implementation of science curricula within her district. She feels that she must be kept informed of activities in the science classrooms, and that new projects must receive her approval prior to initiation. In these instances, she is no more than adhering to the letter of her job description, as spelled out by the Board of Education.

In her view, PCS violated first one, then the other, of these trusts--initially by "not keeping her informed of the day-to-day in-school activities of PCS staff; and finally, by launching a "sensitive" new curriculum project without her knowledge or approval.

As the science coordinator recalls it, she consistently pursued PCS staff for information regarding their work (on-site activities, self-regulatory guidelines, schedules of meetings, indications of future plans), but such information was either not forthcoming, sparse, late, or at times inaccurate.

In addition, the district science coordinator was critical of some of PCS's curriculum workshops, feeling that their content often revealed a lack of insight into the interests, needs and abilities of students and often fell short of the mark. Some of the approaches and materials demonstrated were, she felt, oversimplistic and unoriginal; others overly abstract and difficult; and at least one, lacking in good taste and good judgement.

The culmination of an already uneasy relationship ensued when the research-related experimental curriculum on "birth defects" was introduced into a school without her approval. Upon learning of the project the science coordinator--feeling that portions of the curriculum content were controversial and potentially upsetting to students--demanded that it be brought to a halt immediately. When her decision met with opposition from PCS staff, it would seem that a chain of events were unleashed that eventually led to a recommendation to the district superintendent that ties between PCS and District 4 be severed. It is interesting to note that a letter from the district superintendent requesting severance crossed in the mail with a letter from the Project director to the same effect. And so ties were cut.

The science coordinator's current feelings regarding PCS and its leadership remain negative. She views PCS upper-echelon staff as self-serving, using the Project (and, by extension, others in the system) to attain personal ends not related to the needs of those presumably served.

V. CONCLUSIONS AND RECOMMENDATIONS

Clearly, the events leading up to the dissolution of ties between District 4 and PCS are complex. The decision to sever the relationship appears to rest on no single element, but was based on an accumulation of incidents.

There is ample evidence to suggest, however, that the Project did have its merits and that existing problems might have been resolved had tempers not been lost.

It would appear that the Project got bogged down because of poor planning, lack of coordination, and poor communication on the part of PCS staff and the district office. The already strained relationships were further aggravated by a tense working relationship between the district science coordinator and the assistant principal who approved the controversial curriculum without seeking district approval.

Interestingly, the resource teachers we interviewed--who gave their time and energy to the Project--were neither consulted by the district prior to severance nor officially notified as to why PCS left the district. Had their input been solicited by the district office, it seemed likely that the more positive aspects of PCS would have come to light as well as existing problems. This could have served as the starting point for a more constructive relationship between PCS and District 4.

In the hope that our findings may be used to improve the operation of PCS in other districts, the following recommendations are made:

1. It is vital that PCS woo, win, and retain the support of administrators in the districts in which the Project is operational.
2. All Project participants must become aware of and not violate Board of Education guidelines.
3. PCS should set more realistic goals and ones that are in harmony with the needs of the districts and their students.
4. It is vital that joint planning sessions be held regularly and that at these meetings Project participants be given the opportunity to vent their feelings.
5. If at all possible, PCS might use its "weight" (perhaps even some of its funds?) to help remedy some of the manpower and material shortages with which NYC Board of Education science departments are suffering.
6. A new screening device (some sort of personality inventory) should be developed to assist in determining which teachers possess the requisite openness and enthusiasm allowing them to work well with a program in the PCS.
7. The Project might consider retaining a troubleshooter/communications expert on its staff--someone who can go out into the field, ascertain where and why the Project is getting stuck.
8. It might be well to have on the staff a specimen of that rare bird -- the genuine master teacher--a man or woman who elicits content learning while staging electrifying theater. Such a master teacher could teach an ongoing class; district teachers could sit in and observe. The master teacher could

also work with resource teachers to upgrade their teaching performance and expand their view of what could be accomplished with students.

APPENDIX J

Results of Telephone Interviews

of Former Staff Members of Project City Science

1979

Results of Telephone Interviews of Former Staff Members of Project City Science

OVERVIEW

To do a more thorough evaluation of Project City Science (PCS), it was important to have a better understanding of what the project was like during some of its early days of planning and implementation. With this objective in mind, the former staff members of PCS were contacted by telephone and interviewed about their roles.

Ten former staff members were eventually reached by telephone. These people had been members of the PCS staff from the beginning of the project in May, 1974 until the end of its initial two-year funding period. At that time, not only the Project Director, but a majority of the original staff, including assistant professors, research assistants (junior staff), and secretarial staff, left the Project.

Of all the persons interviewed about Project City Science to date, the former staff members proved to be the most informative and perceptive about the Project. Their responses tended to be more objective and less emotional in tone.

The average interview lasted approximately forty five minutes and staff responses were recorded by hand. A copy of the interview protocol is included at the end of this section.

There was a rather large turnover of staff after the initial funding period ended: approximately ten of sixteen PCS staff members left the Project at that time. This seems to indicate a relative discontent within the staff. Their stated reasons for leaving PCS included: communication problems among various levels of staff, pre-occupation of staff hierarchy with other matters, fiscal crisis at New York University and in the New York City Public School System, problems with initial recruitment of doctoral candidates, and problems in intervention at the cooperating schools.

One former staff member stated that the basic idea behind PCS "to train people to teach science at a junior high school (JHS) level was unique, aimed at that particular age group." There was an "incredible turnover" of teachers in junior high schools before the inception of PCS because of two major reasons as stated by a former staff member:

a) the problems of puberty, experienced in a child's middle years, made teaching difficult at that level;

b) teachers weak in their subject matter had major problems teaching in the junior high schools

"The retraining of the staff of a major school system was very ambitious."

The project began under huge assumptions that, unfortunately, did not all materialize. Among these were:

1. There would be a 30% turnover in JHS science teachers in the city schools, who could be replaced by PCS-trained interns.
2. The Project would attract highly qualified interns to train and be trained in science education in the NYC public schools.
3. There would be more stability among the staff members.
4. The doctoral candidates who served as on-site coordinators

(OSC) would be doing their dissertation research for the project rather than for themselves.

5. The doctoral candidates would be strong sources for science content and serve as models for the dissemination of project goals.
6. The university affiliation with such a project would upgrade the teaching of science in a university, and the university science department courses would improve as a result of the university's affiliation with PCS.

UNIVERSITY AFFILIATION

Unfortunately, the fiscal crisis in New York during the first two years of PCS also affected the ability of the university to respond to the needs of the project. Once the project was funded, there was cooperation with the existing staff of New York University to obtain information and make valuable contacts with knowledgeable Board of Education members so as to introduce the Project into school districts that most closely fit the category of "inner-city" as defined by PCS. During the early years of the Project, when cooperation from NYU was strong, a joint effort of the various departments in science put together a course entitled, "Man and Nature, an Introduction to the Sciences," which is still offered by NYU. It combined the efforts of the Departments of Biology, Geology, Chemistry and Physics. It was this type of affiliation that was curtailed because faculty were not compensated by reduction in teaching load. Where the entire science staff of New York University could have been tapped for help in course content and support, the heavy teaching load of the professors, lack of funds, internal problems, and time allotment prevented individual departments within NYU from continuing their assistance to the Project.

A strong university affiliation must be an ongoing strength of any future programs designed to help improve instruction at the junior high school level. Future programs should have some stipulation written into their proposals to compensate university staff members who lend their support and expertise to such programs, including an open-ended proposal to allow for continued support. Herein lies our hope for future educational programs; we must recognize the need for university involvement and be ready to compensate staff for that need. We shall see in a future report where other key personnel involved in PCS also cite a university affiliation as important to the success of such a project.

PROJECT ADMINISTRATION

While the project was called a "casualty of inflation and a shrinking job market," many of the initial problems noted by the staff members were internal in origin. In the opinion of the evaluators, the individual staff members were extremely dedicated, highly qualified individuals. Individuals is what they remained, however, due to a lack of strong administrative counseling as to their specific duties, roles, and responsibilities in the Project. The responses of the former staff members were unanimous in citing "administrative problems" as having plagued them in their duties. Most felt this was a major weakness of the Project.

No one denied the brilliance and capability of the project director and assistant director during those initial two years. What was stated frequently was the dwindling involvement of the project director in the ongoing work of the Project. As one former staff member put it: "Where there is not administrative support, the staff morale bottoms out." While the hierarchical approach to staff organization left "the decision-making power centralized in the project director," his preoccupation with other responsibilities contributed to a "lack of leadership." While this may not have been a contributing factor in the later years of the Project, it does suggest an obvious need in future programs for more highly structured job descriptions with clear-cut responsibilities set down for all staff positions, while keeping open channels of communication between the various levels of staff.

RELATIONSHIP WITH THE COOPERATING SCHOOLS

One staff member commented that "the entire first year was taken up in establishing credibility in the schools." Initial problems of intervention in the various school districts should have been prevented by the administration's setting down guidelines as to: a) the level of involvement expected from the staff, b) its role in the individual schools, and c) its ultimate responsibilities (clearly stated) to those people with whom they would eventually have contact in the individual schools.

Many of the doctoral candidates who went into the schools believed they had been requested. One staff member said he assumed "the Project's original proposal had been written with the cooperation of the district people." Future programs of support for junior high schools should urge that a fuller consultation be conducted with the people such projects are designed to help, supported by appropriate commitments. Maybe a worthwhile program to be funded would be one that would accomplish just that goal--to investigate the stated needs of junior high school teachers, students, and administrators.

DOCTORAL CANDIDATES

The role of the doctoral candidates (junior staff) connected with the Project was not clearly defined. Many comments from former staff members related to the initial recruitment of these doctoral students. They would eventually play a key role in the success or failure of PCS in the schools in their capacity as on-site coordinators. Three former staff members, including research assistants, specifically stated that the inadequacies of the doctoral candidates with respect to science content background was a weakness of the program. Initially, the district schools expected science <u>experts</u>. Many times the science teachers and district coordinators were more highly qualified than the project staff. This problem, coupled with the lack of definition of staff responsibilities in the field and administrative problems, did not help consolidate the staff.

Once the project started to work in the individual schools, problems arose and there were "difficulties in responding speedily and effectively to the problems with the interns and the cooperating teachers." Possibly, as suggested by one staff member, "the rigid enforcement of staff hierarchy worked against the cultivation of new ideas brought about by the junior staff." Ultimately, the junior staff members, as on-site coordinators, would serve as the primary project representatives in the field.

PRESERVICE TRAINING

The prevailing strength of the Project is indicated by the positive responses of the staff interviewed to the preservice training program for teachers. "The preservice program is unique with an on-site coordinator." "The training situations for students were top notch!" "There was a joint effort to train students." "The structure of the preservice program was good." "Project was effective with the cooperating teachers." "Project was unique, aimed at that particular age group." Clearly, the need exists to train teachers to teach science in the junior high schools. A corresponding need is the development of an effective training program.

The key role of the on-site coordinator requires greater definition. Possibly a reevaluation by PCS of the on-site coordinators' duties, responsibilities, and qualifications is necessary so the OSC may fulfill that "unique opportunity to take science education in the schools and implement models of science instruction."

SUMMARY

To summarize briefly, the former staff members pointed out the following:

1. Fiscal crises in both the New York City public schools and within New York University itself were contributing factors to some of the Project's problems.

2. The hiring freeze, which occurred in New York City during the initial years of the Project, decreased the need for replacement of people in the junior high schools, so that the initial supposition of a 30% replacement in JHS science teachers with PCS interns was not realized.
3. Initial recruitment of master's and doctoral candidates requires revision in the procedures used and clearer role definitions.
4. There were not enough qualified people connected with the Project to serve as true models of superior science instructors.
5. There was definitely a lack of clear-cut definitions of staff responsibilities.
6. There should have been more interaction between PCS and district school personnel pertaining to how the Project could have best served its own purposes and those of the schools.

QUESTIONNAIRE: FORMER PCS STAFF MEMBERS

1. How long were you with the program?

2. What was your role in the Project?

3. What are you doing now?

4. What is your assessment of the Project as a vehicle for improving science instruction in the junior high schools in the inner city? Was it effective or not?

5. a. While you were on the staff of PCS what did you find were the major strong points of the program?

   b. While you were on the staff of PCS what did you find were the major weak points of the program?

6. Do you feel that you had any input into the direction the Project was taking while you were on the staff? If so, in what ways?

7. While you were on the staff, did you feel that PCS was moving toward the accomplishment of its goal to establish model schools of science instruction? Please comment.

8. Do you feel that PCS was moving toward its goal of developing a method of "hands-on" instruction in science in the schools? Please comment.

9. Why did you leave the program?

10. Have you had any contact with the present staff of PCS or the Project in general, since you left?

11. Would you consider becoming a member of the PCS staff again if it were possible?

12. Could you cite one outstanding reason why the Project (did) or (did not) have problems?

APPENDIX K

Results of Interviews of Administrators

and Science Teachers in PCS Participating

Junior High Schools

1979

RESULTS OF INTERVIEWS OF ADMINISTRATORS AND SCIENCE TEACHERS IN PCS PARTICIPATING JUNIOR HIGH SCHOOLS

INTRODUCTION

During the week of June 4, 1979, several days were spent visiting five junior high schools participating in the preservice training program sponsored by Project City Science. A total of four days were spent interviewing the principal or assistant principal in charge of science, a cooperating teacher, and a regular science staff teacher (two of whom were former PCS interns) in each school.

The purpose of the interviews was to evaluate the impact of PCS on these schools and teachers. Each interview lasted an average of 35 minutes. A copy of the interview protocol used for the administrators appears at the end of this section. The interview questionnaire used for the cooperating teachers and the science teacher is also included there.

RESPONSES OF ADMINISTRATORS

Of the six administrators interviewed, two were principals, three assistant principals in charge of science, and one was an acting assistant principal in charge of science.

Question one requested the administrators to define model schools. Responses varied with each school. There was no clear definition of what a model school should be. A model school was variously defined as:

"...a showplace for everyone to visit...a training ground for other teachers"

"...a science project room with materials centrally located"

"...parents aware of what the school can and should offer children"

"...an ongoing program with a college supplying student teachers"

None of the administrators were fully convinced that their school was such a model school, due in part to a lack of the necessary funds.

The role that PCS played in developing a model school was characterized by these responses:

"Gave us science fair."

"Extra hands to help teachers."

"Filled in gap for lab assistant lost due to budget cuts."

"Value of PCS is in enrichment-- the program is not bound by teachers' boundaries (other commitments of teaching staff)."

"PCS enabled me to revitalize my staff when they work with interns."

"PCS is a good academic stimulus--it shows us newer techniques and provides a source of new personnel."

These responses indicate some of the more positive benefits of a program like PCS. They do not indicate the establishment of a model school as defined by PCS.

In response to the question asking what attributes an on-site coordinator (OSC) should possess, the following responses are representative.

As on-site coordinator should:

"demonstrate latest techniques."

"have a strong science background."

"be a good liason between school and college."

"demonstrate good organizational skills."

"bring out the strengths of every teacher."

"give suggestions on new approaches and materials."

The administrators did not place as great an emphasis on the role of the OSC as did the classroom teachers. Perhaps the administrators saw the OSC role as similar to their own supervisory role, while the teachers as we shall see later in this report--saw the function of the OSC as being a resource person to both the science teacher and the intern.

Question three asked the administrators what qualities a teacher should possess and whether these qualities were exhibited by the PCS interns and On-Site Coordinators. Administrators wanted the following qualities in their teachers:

"a master teacher--devotion of time and energy."

"a good science background."

"to be able to use methods other than textbooks for teaching science."

"one who knows how to respond and convey information in different creative ways."

"understanding a child's needs."

When comparing these qualities to PCS interns and On-Site Coordinators, the administrators noted:

"The program is only as good as the people!"

"We changed them!"

The latter comment reflects both the separation and the conflict that continued to exist between Project staff and the administrators in the schools.

Table 1 summarizes the administrators responses to question four, which asked about the impact PCS had on staff, regular or science.

TABLE 1

RESPONSES TO QUESTION 4: DID PROJECT CITY SCIENCE HAVE AN IMPACT ON YOUR STAFF?

Yes	1	(17%)
Partial	3	(50%)
No	2	(33%)

One administrator who felt that PCS had had <u>some</u> impact on his staff stated that the Project offered

"help with the science fair."

Another administrator who reported some impact of the Project on her staff noted that PCS

"forced my teachers to think about methods for teaching remedial kids."

The administrator who stated that PCS had an unqualified impact on his staff said

"Hands on-on--my science staff will use it."

Interestingly, when asked to comment on the Project's strengths and weaknesses (in that order), almost everyone reported the weaknesses first. Also, administrator responses to the strengths of PCS sometimes contradicted the noted weaknesses.

The following strengths of PCS were reported by the administrators:

"Our children have done a lot more in science due to PCS."

"Good for career orientation."

"Flexibility of program in assisting people."

"Hands-on."

"Interns stay full year."

"Selection of interns good."

"Good people have an impact."

The administrators reported that the following represent the weaknesses of PCS:

"Came in too strong when they didn't really know."

"OSC not here every day."

"Interns leave work at NYU -- they lost time after class."

"Interns didn't start until mid-October--lost valuable organization time."

"Interns pulled apart in too many ways."

"College made too many demands --traveling to NYU."

"Should be field-based experience."

"Not too different from student-teaching program."

"People not always good."

The responses to question six of the administrators' questionnaire are summarized in the Recommendations and Suggestions section of this report on page eleven. The administrators' responses to "a single suggestion for the improvement of PCS" were of particular interest in light of suggestions for future funding by responsive agencies.

Question seven asked the administrators if there have been any permanent changes in their schools due to PCS. All the administrators (six) reported that there have been no permanent changes as a consequence of the presence of PCS in their schools. Thes_ unanimously negative responses were qualified by the following comments:

"In the area of revitalization...my teachers are getting interested in receiving more science background."

"It pointed out the need for a resource person."

"I had needs and they fulfilled those needs."

"Our science program has been enhanced."

When the administrators were asked whether they would recommend the continuance of PCS, they were unanimous in their affirmative response. However, when asked directly if they would choose PCS over a lab assistant, four of the six (67%), would choose the lab assistant. As one administrator noted:

"A lab assistant provides for the needs of 16 full-time teachers and 2150 students."

One of the two administrators who would choose PCS rather than a lab assistant was an assistant principal who would not have final say in this matter. The other administrator who would choose PCS would do so only ". . .if I got the right person. I wanted to use someone from my own school to act as coordinator."

RESPONSES OF COOPERATING AND SCIENCE STAFF TEACHERS

The same questionnaire was used for interviews with cooperating teachers and regular science staff teachers. Twelve teachers were interviewed. The average interview lasted approximately forty minutes. Years of service of the teachers interviewed varied from one to twenty-one years, with the average being six years of teaching experience in the junior schools. Table 2 summarizes the professional status of these twelve teachers.

TABLE 2

PROFESSIONAL STATUS OF THE COOPERATING TEACHERS AND THE SCIENCE STAFF TEACHERS.

	Number	Percent
Certified Junior High School--general science	6	50%
Certified Common Branches	3	25%
Per Diem Certificates --Junior High School	2	17%
Recertified Junior School--General Science	1	8%

The teachers' responses to question one indicate their ideas of a model school were not clear. One teacher stated:

"I don't know what a model school is."

Eight teachers (67%) felt that more materials and equipment would make their school a model school. Four teachers (33%) looked upon a model school as having a resource person available to demonstrate new approaches to teaching and to aid with the development of materials for students on different reading levels.

Eight teachers (67%) reported that they looked to the On-Site Coordinator for ideas. Four teachers (33%) wanted aid in the form of materials and equipment.

The role of the on-site coordinator, from the point of view of these teachers, included many responsibilities. The following comments illustrate the various responsibilities of the OSC as seen by the teachers:

"a translator between teacher and project."

"work with teachers to provide materials."

"bring to attention of teachers what's new and available in science."

"plan trips, provide experiences, get books, materials."

"bring resources to the school."

"Make equipment available to aid us in teaching."

"Should suggest different ideas on how to teach science."

"I'm looking for better ideas."

"Good organizer."

"Know curriculum--work with entire staff."

"Get community involved to give money for projects."

Evidently, all of the teachers interviewed had definite ideas as to what the role of the OSC should be. However, one teacher felt that the "On-Site Coordinators didn't even have a clear idea of what their role should be." Further comments were:

"The teachers should feel that this person has status."

"The OSC didn't understand what goes on in a school."

"The OSC's job was to work with the student teachers; it should have encompassed more work with the administrators."

The teachers were asked what special characteristics they thought a cooperating teacher should have to be successful in their school. Responses to this question elicited the following ideal characteristics:

"a willingness to want to be a cooperating teacher."

"to be able to give the intern some authority in the classroom."

"to be diplomatic, creative, an excellent disciplinarian."

"good in the art of questioning."

"to have thought about their philosophy and to be able to teach it."

"open to new ideas."

"delegate authority without being overbearing

"original ideas of student teachers should be complimented in class."

The cooperating teachers were asked whether they had received help from PCS in preparing them for their role as cooperating teachers. All of the cooperating teachers indicated they had not received any preparation from PCS. As one teacher noted: "Some cooperating teachers just blossomed, they grew with exposure to the project--they needed a proper model." Another teacher stated: "My role was ongoing...I was informed as it progressed."

When asked about the interns involved in PCS, the teachers gave more negative responses than positive responses. The negative responses included:

"Interns too science-oriented."

"Interns are subject-oriented, don't know how to deal with children."

"Not prepared enough."

"No behavior control."

"Many interns not eager to work--wanted to use other's ideas."

Some positive responses included:

"They helped run the science fair; they made it more successful."

"They interested teachers in workshops outside of school--in the university."

"Science background was not such a big criterion--they need to work with inner city students."

The following were made by the teachers, some of whom were former interns themselves:

"Interns took too long to get into schools, a waste of time, PCS wanted research from you on your choice of school... not relevant to intern."

"No practical classroom management courses."

"Not enough time to prepare for field work."

"Needed a lot of materials, short of supplies."

"NYU overemphasized academics--course work."

"Only six credits for all of your field work."

"They didn't want you to work while in the program--but you needed money to live, for lunch and transportation. Some people had families. I was lucky, I lived at home with my parents."

"People were under the assumption they would get their masters from the program--they still needed to pay for 10 more credits!"

Question five asked whether PCS fulfilled the teachers' expectations for establishing a model school. Four teachers stated that PCS did not meet their expectations for establishing a model school. Other responses included:

"When it boils down, all they're getting is a student teacher, another pair of hands."

A six-year veteran teacher stated:

"I expected people to give more suggestions, have more experience. I wanted different methods of science instruction--the On-Site Coordinator was less experienced than myself."

Three teachers felt that PCS met or came close to meeting their expectations, commenting:

"NYU tried harder than other colleges."

PCS warmed me up to 'Hands-on'."

"Yes, even though there were problems--the direction was more focused."

RECOMMENDATIONS AND OBSERVATIONS

In order to analyze and discuss the recommendations and observations made by both administrators and teachers, Question 6 of the administrators' questionnaire, which requested "a single suggestion for the improvement of PCS," was combined with the responses collected from the classroom teachers. These responses and comments were analyzed within these categories: 1) University affiliation with public schools, 2) interns, 3) cooperating teachers, 4) hands-on, 5) recruitment, 6) curriculum development, and 7) conclusion.

1. University Affiliation with Public Schools:

The public schools need help, funds, and interested people. They want the professional and educational stimulus that involvement with a large university gives them. They encourage interns to come to their schools as a professional stimulus for their individual teachers and departments. "A connection with a university increases the professionalism of the staff." One teacher summed it up this way:

> "It made me think about why I do things. It helped me grow. I liked being able to ask people for help."

Certainly, the need for a program such as PCS exists. However, the following comments demonstrate the need for cooperative effort to meet the schools needs:

> "I'm aware of the needs of the school. The school is! Therefore you can't build a school--recognize what's there first!"

> "Interpersonal relationships should be taken into consideration. Understand the 'old' teachers, interject things into the way they're working, suggest new approaches and materials. There are hard and fast rules as to the takeover of responsibilities."

Role definition apparently prevails as a problem for the project. Clear guidelines for staff, interns, and cooperating teachers were never developed. Part of the function of these questionnaires was to engage the schools in the task of establishing role responsibilities. One former cooperating teacher summed up what he thought the resonsibilities of an On-Site Coordinator should be; "Insure that the student teacher takes his work seriously.

Act as an intermediary. Be present constantly and take care of promised resources."

One teacher described the current On-Site Coordinator as:

"Aggressive--demanding of teachers to train their people!"

"Came on too strong, suggest but not force."

Another veteran teacher offered these comments about the responsibilities of the intern:

"An intern should have a knowledge of subject matter, learn how to make lesson plans, learn how to run a laboratory, and make up tests."

"Truthfully, I want a lab assistant to prepare materials for me. A student teacher has other responsibilities."

2. Interns:

Present PCS policy requires that the interns lose weeks of valuable field experiences while selecting their own field schools and cooperating teachers. The following comment illustrates the question some teachers and administrators have about the value of this policy:

"Interns should not take time to choose their schools--they lose the valuable, crucial beginning."

Another administrator stated:

"I don't want PCS to decide on the interns and coordinators for my school. I want to choose them!"

The schools and teachers appeared to the interns "shopping around" for a good cooperating teacher and a suitable school.

When a former intern was asked to explain his choice of a school, the response was:

"the time of travel and the equipment the school had. It was the closest school to my home. You didn't need to choose your school."

As a consequence of the school selection process, the interns entered the schools in mid-October when routines and programs had already been set up. In addition, they assumed class responsibilities for only four days a week. The instruction gap of one day a week had to be filled by the regular teacher. One respondent felt that the . . ."interns should be in school on a continuous basis, even if they leave two months earlier."

Another comment dealing with the interns in one school noted a problem of the ultimate responsibility for necessary equipment and materials:

"The interns used a lot of materials. We ordered materials for the interns' use. The university should provide materials and resource books."

This same administrator was asked about the science units developed for this school, as noted in <u>Progress Report #15</u>. When asked where they were, the response was, "They were in the project room but I guess they cleared them out when they left."

3. Cooperating Teachers:

PCS must more fully recognize the value of the field schools as a training ground for the interns, particularly the role played by the cooperating teachers. The added burden assumed by the cooperating teachers for the responsibility of training another teacher could be better acknowledged.

A problem arises in any program involved with training teachers in the field. Selecting and securing competent cooperating teachers who can serve as "proper models" for the interns is difficult. The following comments and suggestions were offered by administrators and teachers:

> "Traditional teachers resist change. They're too set in their ways...find something to turn them on."
>
> "There is a lack of cooperating teachers."
>
> "Most cooperating teachers don't need NYU credit."
>
> "Most don't even need inservice credit."

Perhaps, as suggested by one administrator, the university can offer teachers other incentives to encourage them to take on the responsibility of training preservice interns. Suggestions were made to:

> "...establish it as a professional kind of thing. Offer a weekend nature camp trip with families once in each season to sustain the interest!"
>
> "Maybe a tour of industrial sites to expose teachers to science applications and career orientation, outside of New York."

Other administrators offered these comments:

"Industry needs to accept science teachers. Provide alternative careers for 15-year veteran teachers--so as to make room for science teachers with more enthusiasm."

"There is no merit system. Give the principal the opportunity to reward merit...a positive incentive!"

The teachers themselves had other ideas about incentives!

"I was once a cooperating teacher with PCS. The credits from NYU didn't interest me."

"People would take cash for having student teachers."

With reference to the university affiliation, one teacher felt the university should have "an in-service course for teachers involved in the program to share information. I wanted information and they didn't make it available." Others had different suggestions:

"Receive in-service credit for having a student teacher--plus attending a workshop on new teaching methods, <u>in the district</u>."

"Maybe cooperating teachers should earn masters credits for just having a student teacher in the room."

"Have teachers receive credit for having a student teacher."

"A stipend---always nice!"

"A stipend---to buy additional materials."

"Compensatory time---preps!"

"Bring the university to the school--conduct programs and workshops within the district."

In one school the cooperating teachers were asked to give workshops at NYU to demonstrate science techniques.

The interview data indicate that university education departments should review their policy of tuition remission for cooperating teachers and look for alternative incentives to further enhance the "professionalism" of those teachers in the field to whom they give the ultimate responsibility of molding new teachers.

4. Hands-On:

The project placed a great deal of emphasis on the philosophy of "hands-on" instruction being especially helpful for slower children. However, discussions with some teachers elicited these comments:

"'Hands-on' did not work with the slower kids."

"'Hands-on' only for bright --not slow children--the brightest kids!"

Other teachers said:

"Change curriculum to adjust minicourses for slow kids."

"Resource person should provide activities for students on all levels. Help teachers make own reading materials on student level."

"Use hands-on where it's relevant--must be developed-- always revising."

"An ego trip for slow kids to do hands-on."

"I need extra help in a hands-on program."

A former intern, now a teacher in a junior high school, stated:

"I used hands-on infrequently....
I use hands-on now very little due to a lack of supplies...
Hands-on with slow kids took longer."

5. Recruitment:

It would appear that interns who had strong science backgrounds seemed less satisfied with teaching on the junior high school level--especially since many of the cooperating schools were actually intermediate schools (6-8 grade), where the depth of science instruction is not great.

One successful cooperating teacher whose background was a common branch license commented:

> "The subject matter is the same as in elementary school--only on a higher level."

Another successful common branch certified teacher, a former On-site Coordinator, felt that:

> "The age and level change was no problem. The science background is not such a big criterion. You need to be able to work with inner city students."

Perhaps the common branch certified teachers who wish to become recertified in junior high school--general science are the people the Project should attempt to recruit.

6. Curriculum Development:

> "You had one lesson converted four ways--due to the level of achievement in each class taught on the grade."

This comment should be investigated in the future. Many teachers felt the reading level of their students prevented them from teaching science effectively. Much time was spent in making "own reading materials on students' level." A former intern, now a teacher, stated, "You have to make up your own curriculum. It's good that we did that in the project."

Other teachers noted:

"Come up with a decent science curriculum."

"Junior high school teachers should not have to teach all four sciences. We need more specialization of subjects."

"The Human Body--most relevant to children. You can probably teach eighth grade curriculum from the standpoint of the life sciences."

One administrator stated:

"There is too much money for innovative programs and not enough support for ongoing, good programs."

7. Conclusion:

"The program (PCS) was excellent--they just put too much on everybody."

The Project staff put too much on themselves too. PCS goals proved to be unrealistic when faced with the problems the staff encountered once they started to work in the schools. Five years has not been adequate time for the project to successfully adjust its goals and focus on the training of teachers according to the stated philosophy. Unfortuantely, a cooperating teacher can still say:

"My student teacher was never observed--appointments made, never came!"

INTERVIEW QUESTIONNAIRE: PCS ADMINISTRATORS

1. If you were asked to describe a model school--one that would offer you a visible example of outstanding science instruction for the inner-city child--what would that school be like?

   a. Do you believe your school is such a model? Why or why not?

   b. What has been PCS's role in the development of a model for inner-city science instruction?

2. If you were going to be provided with a resource person from the colleges who would be available to help you improve the quality of science instruction in your school? What skills or abilities would you want that person to have? What tasks would you want them to perform?

   a. Do you believe that the PCS on-site coordinator was such a resource person?

3. If you were to describe a teacher who could join your science staff and serve as a positive change agent, what type of skills or demonstrated abilities would he/she have to possess?

   a. Did the preservice interns exhibit these skills?

   b. Did they serve as change agents?

   c. Did the on-site coordinator possess these skills?

4. How would you characterize the impact of PCS on your full teaching staff?

   a. On your staff of science teachers?

5. In relationship to the Project's ability to serve as a vehicle for improving science instruction in the J.H.S. in the inner city, could you cite:

   a. Two of the Project's outstanding strengths and

   b. two of its major shortcomings or weaknesses?

6. If you could offer a single suggestion for the improvement of PCS with regard to helping you improve science instruction in your school--what would it be?

7. The school and the university being different institutions with different goals--would you say PCS was successful in responding to your major needs?

   a. What permanent changes, if any, in the operation of your school or its science program have taken place as a result of your school's association

8. If your school were allocated a sum of $5,000 for science instruction, would you recommend continued support of PCS or would you select an alternate use.
   a. If you were given a direct choice between having the Project or a lab assistant, which would you choose? Why?

INTERVIEW QUESTIONNAIRE: PCS COOPERATING TEACHER/SCIENCE TEACHERS

Introduction as Evaluating Team Member

I wish to speak to you today in more depth concerning the relative successes or failures of PCS in establishing a "model" school here.

1. If you were to establish this school as a "model" school for science instruction, what things would be important to you? Would be necessary?

   a. physical set-up
   b. number of teachers
   c. administrator's role

2. Do you feel that the On-site coordinators have a place in your model school?

   a. could you define their role?
   b. Responsibilities?
   c. Did the PCS On-site coordinators fit that role?

3. What special characteristics do you think a cooperating teacher should have to be successful in your model school atmosphere?

   a. Did PCS help you prepare for your role in establishing a model school?

4. What about the interns or student teachers involved in a model school?

   a. What should their preparation be?
   b. What should their responsibilities be?

5. Lastly, do you feel the presence of a program like PCS in your school is the type of program that fulfills your expectations for establishing a model school?

Cooperating Teachers only:

1. How long have you been teaching?
2. Where?
3. What subjects?
4. Permanent Certification? - Master's?
5. Are you receiving credits for your affiliation with PCS?

APPENDIX L

Summary of Telephone Interview Responses

of Project City Science Intern Dropouts

PURPOSE OF STUDY:

Telephone interviews of PCS dropouts to determine their reasons for leaving the program.

OBSERVATIONS:

Most interns interviewed felt that the inordinate amount of course work at NYU (18 credits) burdened them to the point of interfering with their field work responsibilities (6 credits).

RECOMMENDATIONS:

It is recommended that some course work be prerequisite to field work, or that the credit status of field work should be increased. Practical methodology in preparing and sharing "hands on" materials and lessons should also accompany field work. On-site coordinators or PCS faculty could conduct credit status workshops at individual schools, after classes, to alleviate the credit load of interns. This would also give cooperating teachers and regular science staff the opportunity to take or to audit workshops for in-service credit within their own district schools.

SUMMARY OF TELEPHONE INTERVIEW RESPONSES OF PROJECT CITY SCIENCE INTERN DROPOUTS

INTRODUCTION:

Since the inception of Project City Science (PCS), there have been changes in administrators, staff members, on-site coordinators, cooperating teachers, and preservice interns. Over the past five years, a number of interns have left the program before completing their training. From the very beginning of the Project, according to records obtained directly from New York University (NYU), fifty-four interns entered PCS. Of these fifty-four interns, thirty have completed the full 24 credit program offered by Project City Science at New York University.

During the weeks of late April, May and early June, fourteen of the twenty-four program participants who had not completed the program were contacted by telephone and also by mail. The following report summarizes the responses of these former interns obtained through telephone interviews conducted to determine their reasons for leaving the program.

A copy of the interview protocol appears at the end of this report.

RESPONSES TO QUESTIONS:

Question 1: How long were you with the program?

Eleven of the fourteen intern dropouts were with the program for only one semester.

Question 2: How many credits did you complete as part of PCS?

Credits earned by the intern dropouts varied from 0 to 21 credits.

Question 3: What is your present occupation?

The occupations of the intern dropouts today vary from unemployed to systems analyst.

Only five are actually teaching school and of these five, four were qualified teachers before they entered the program. The only intern dropout who is presently teaching science in an inner city junior high school left PCS to take over a cooperating teacher's class. He stated that he will probably return closer to home to teach school next year.

Two other former interns are working in an educational capacity outside the classroom, but they, too, were in education before entering the program.

Question 4: What would you list as the program's strong points?

The major strengths of the Project, in the view of these former pre-service interns, were related to their field work experience. Eleven intern dropouts cited field work as the strongest part of the program. Four intern dropouts mentioned the influence of their cooperating teacher as a strong point, and three indicated the on-site coordinators exerted the most positive impact.

None of the former interns cited the coursework experience at NYU as a strong point of the Project.

Question 5: What were the major weaknesses?

The weak points of Project City Science, as noted by those interviewed, varied with each intern. A few responses were repeated by several, however. Many intern dropouts were unhappy with coursework requirements. Seven of the fourteen interviewed stated that the coursework requirements were far too demanding and rigid. Four of the former interns felt that the number of hours spent in the field was not commensurate with the number of credits earned--6 credits for field work and 18 credits for coursework.

No guarantee of jobs was stated by two former interns as a weak point of the Project.

Question 6: If given the chance, would you reenter the program?

Six of fourteen intern dropouts indicated that they might reenter the program if it were possible. That appears to be a relatively favorable level of response and an indication that some of those who dropped out may have done so for reasons that were unavoidable.

Question 7: Why did you leave the program?

Reasons for leaving the program were also varied. Four intern dropouts cited the need to work as a reason for leaving the program. This has been a consistant problem and is a weakness in a program that requires a year of non-employment. Four former interns were forced to leave PCS because health reasons prevented them from fulfilling the requirements of the program, either in field work responsibilities or in course work completion.

Question 8: Would you recommend the program to others?

Of the fourteen preservice interns contacted by telephone, twelve would recommend the program to someone else.

FINAL COMMENTS:

Any interviewer, having made personal contact with someone, must come away from such contact having formed some opinions. Hopefully these are based on an objective assessment of what are frequently subjective comments. The former interns appear to have had sound reasons for questioning the nature and the extent of the coursework required by the Project. They make a valid point when they highlight the inequality of credits assigned to the field work experience. All interns praised this experience, but also felt it was extremely time consuming, particularly considering the inordinate amount of course work required by NYU. The demands of preparing teaching lessons and the four full days spent in the schools was cited as strenuous by most of the interns. The coursework did not ~~fit~~ smoothly into the requirements of the field placement and took away time.

More of the interns may have completed the program had the above mentioned requirements not been so rigidly adhered to.

Sadly, the program did not convince any intern to teach junior high school science who was not already committed to a career in education. Of those without an educational background, none would leave PCS to teach in the junior high schools.

TELEPHONE INTERVIEW:

QUESTIONNAIRE: FORMER PCS PRESERVICE INTERNS

1. How long were you with the program?

2. How many credits did you complete as part of PCS?

3. What is your present occupation?

4. While you were an intern what could you cite as the two major strong points of the program?

   a.

   b.

5. While you were an intern what could you cite as the two major weak points of the program.?

   a.

   b.

6. If given the opportunity, would you consider reentering the program?

   Yes---------- No-----------

7. Why did you have to leave the program?

8. Considering your stated reasons for leaving the program, would you recommend it to someone else with a background similar to yours?

   Yes---------- No----------

   If no...to whom would you recommend the program?

APPENDIX M

Summary of Results of Telephone

Interviews with College and University Personnel

1979

Summary of Results of Telephone Interviews with College and University Personnel

INTRODUCTION

During the weeks of April 22, April 29, May 6, and May 13, 1979 telephone interviews were conducted with personnel in the teacher education departments of local metropolitan and suburban colleges and universities, and various universities in the Washington, D.C. and Atlanta, Georgia areas. An effort was made to contact high level personnel in the teacher education departments of these institutions to evaluate their knowledge of Project City Science.

The titles of the personnel contacted varied with each college or university. An effort was made to interview the particular person who was in a position to recommend to higher authorities the adoption of PCS into their respective curriculums.

A list of the names, affiliations, titles and addressess of those interviewed appears at the end of this section. Each college was assigned a letter for purposes of identification. A copy of the interview protocol also appears at the end of the section.

The results were analyzed in terms of the following categories:

1. Total number of colleges and universities contacted (36).
2. Institutions offering graduate teacher education programs (24).
3. Institutions offering only undergraduate teacher education programs (12).
4. Institutions specifically stated by PCS as being on the <u>Progress Report</u> mailing list (8).

OVERVIEW

Overall, the findings indicate a rather weak policy of dissemination on the part of PCS. Fourteen of the twenty-four graduate teacher education institutions contacted had prior knowledge of PCS. (See Table 1.) Seven of these fourteen indicated they had only limited knowledge of the PCS

Table 1

RESPONSES TO QUESTION 1: HAVE YOU HEARD OF PROJECT CITY SCIENCE?

Type of Teacher Education Program	Yes	No	Total
1. Graduate Programs	14 (58%)	10 (42%)	24 (100%)
2. Undergraduate Programs	2 (17%)	10 (83%)	12 (100%)
Totals	16 (44%)	20 (56%)	36 (100%)

"model" for the preservice training of teachers. None of the twenty-four graduate teacher education institutions plan to adopt PCS into their curriculums. The major reason cited was "a lack of information about the program."

Based on the data, it appears that the City University of New York (CUNY) system had a working knowledge of PCS. Of the five CUNY colleges contacted. four had a limited knowledge of the "model" proposed by PCS, in that they recalled having seen something written about it in literature received in the mail. None of the CUNY member colleges planned to adopt the program into their curriculums.

There are eight universitites on the PCS Progress Report mailing list located in the Washington, D.C. and Atlanta, Georgia areas. These schools were chosen for telephone interviews because of their proximity to an inner-city environment. Four of the eight schools had heard of PCS, two of these had a limited knowledge of the "model," and none planned to adopt the program. A summary of the responses given by the contact people from colleges and universities offering graduate teacher education programs is included at the end of this section.

The response from the twelve schools offering undergraduate teacher education programs indicates a similar lack of information about PCS. (See Table 1.) Two had prior knowledge of PCS, and that knowledge came from a circular sent to them in the mail from the New York City Board of Education. All of the twelve undergraduate schools interviewed are local metropolitan area schools. One school had limited written information about the PCS "model." None of the schools intend to implement any part of the PCS program. A summary of the responses given by the contact people from colleges and universities offering undergraduate teacher education programs is also included at the end of this section.

FINAL COMMENTS

While some of the college and university personnel did acknowledge a limited knowledge of the PCS "model" of preservice training of teachers, none of the personnel interviewed were able to articulate clearly what they felt PCS was attempting to do. None, for example, referred to the attempt to encourage greater use of hands-on as an instructional model, and few even referred to the Project's special emphasis on the junior high school level. Therefore, a "limited" knowledge of the "model" indicates that the contact person was familiar with the basic structure of PCS, but was not familiar with the content and unique features of this teacher training program. It should be noted that approximately 20% of the personnel interviewed cited the prestige and reputation of both the former and the present project director as their reason for having had some prior knowledge of Project City Science.

LIST OF COLLEGE AND UNIVERSITY PERSONNEL INTERVIEWED

NAME OF INSTITUTION	CONTACT PERSON AND PHONE NUMBER
Adelphi University Garden City, New York 11530	Miss Julia Pratt
Brooklyn College City University of New York Bedford Avenue & Avenue H Brooklyn, New York 11210	Prof. J. Lemke (Science Coordinator)
City College City University of New York 138th Street & Convent Avenue New York, New York 10019	Prof. Hal Speilman
Columbia University Teachers College 606 West 120th Street New York, New York 10027	Dr. Willard Jacobson Department Chairperson Secondary Ed.
Hunter College City University of New York 695 Park Avenue New York, New York 10021	Prof. Elizabeth Lawlor
H.L. Lehman College City University of New York Bedford Park Boulevard West Bronx, New York 10468	Prof. Ron Ellis (Secondary Ed.) Prof. Archie Lacey
York College City University of New York 150-14 Jamaica Avenue Jamaica, New York 11451	Dr. McGee Science Chairperson
College of Mt. Saint Vincent 263rd Street & Riverdale Avenue Riverdale, New York	Mr. Michael Kelly Coordinator of Secondary Ed.
Dowling College Idle Hour Boulevard Oakdale, New York	Prof. Donald Smith Administrator of Adelphi Satellite Program
Hofstra University 1000 Fulton Avenue Hempstead, New York 11550	Dr. Holzinger Secondary Ed. Chairperson

NAME OF INSTITUTION	CONTACT PERSON AND PHONE NUMBER
Fordham University Lincoln Center New York, New York	Dr. Vinci Science Coordinator
L.I.U. Brooklyn Center 385 Flatbush Avenue Extension Brooklyn, New York 11201	Prof. Madeline Long Chairperson Education Department
C.W. Post College Greenvale, New York 11548	Dr. Arneson Chairperson of Department of Instruction
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TELEPHONE INTERVIEW QUESTIONS: COLLEGE AND UNIVERSITY PERSONNEL

Telephone interview directed toward:

- College science education department heads
- Chairpersons of graduate and undergraduate education departments
- Science education staff members

INTRODUCTION

I represent an evaluation team under contract with the National Science Foundation to evaluate a program going on at the present time in the New York City Public Schools.

QUESTIONS

1. We are interested in finding out whether you have ever heard of a program called Project City Science?

IF YES:

2. Are you familiar with their <u>model</u> for the preservice training of teachers?
3. Do you plan to implement or adopt this program into your own science education curriculum?
4. Could you cite one outstanding reason for your acceptance or nonacceptance of the program?

IF NO:

Briefly explain what Project City Science is about and discuss the extent of interest in such a program.

SUMMARY OF RESPONSES TO TELEPHONE INTERVIEWS

WITH PERSONNEL FROM SCHOOLS OFFERING GRADUATE TEACHER EDUCATION PROGRAMS

	College	Question 1	Question 2	Question 3	Question 4
1.	A	No	-	-	-
2.	B*	Yes	Limited	No	No-use their ideas.
3.	C*	Yes	Limited	No	No-lack of information
4.	D	Yes	Limited	No	No-exposure to all programs.
5.	E*	Yes	No	No	No
6.	F*	Yes	Limited	No	No-lack of information
7.	I	No	-	-	-
8.	J	No	-	-	-
9.	K	Yes	No	No	No-lack of information
10.	L	Yes	Limited	No	No-lack of resources
11.	M	Yes	No	No	No-lack of information
12.	T	Yes	No	No	No-lack of information
13.	V**	No	-	-	-
14.	W**	Yes	Limited	No	No
15.	X**	No	-	-	-
16.	Y**	No	-	-	-
17.	Z**	No	-	-	-
18.	AA**	Yes	Limited	No	No
19.	BB**	Yes	No	No	No
20.	CC**	Yes	No	No	No-lack of information
21.	EE**	No	-	-	-
22.	GG	Yes	No	No	No-exposure to all programs.
23.	HH	No	-	-	-
24.	II	No	-	-	-

SUMMARY OF RESPONSES TO TELEPHONE INTERVIEWS

WITH PERSONNEL FROM SCHOOLS OFFERING ONLY UNDERGRADUATE TEACHER EDUCATION PROGRAMS

	College	Question 1	Question 2	Question 3	Question 4
25.	G*	No	-	-	-
26.	H	Yes	No	No	No-lack of information
27.	I	No	-	-	-
28.	N	No	-	-	-
29.	O	Yes	Limited	No	No
30.	P	No	-	-	-
31.	Q	No	-	-	-
32.	R	No	-	-	-
33.	S	No	-	-	-
34.	U	No	-	-	-
35.	DD	No	-	-	-
36.	FF	No	-	-	-

*Indicates college is part of the City University of New York
**Indicates college on PCS Progress Report Mailing List

APPENDIX N

Comments by the Evaluation Team

The PCS staff have expressed the belief that the evaluators have shown insufficient appreciation of the difficulties they face. This may be so. It is impossible for those outside the Project to know in any depth the impact that external events had on Project morale and capability. Some aspects of this do cause us concern, however. There is little in the record of the time to indicate the Project staff itself understood the problem. Progress Reports issued during this period offer no hint of the retrospective confusion now recalled by staff. Indeed, one of the most optimistic of the Quarterly Report 8, was issued in the midst of this crisis.

Further, the Project staff may themselves misunderstand the nature of some of the criticism. A project determined to work in an urban environment like New York assumes a certain burden in terms of potential confusion and difficulty. It is very much part of the terrain. That has been not only acknowledged by evaluators connected with the Project, but has been used to warn the staff against what was believed to be their unrealistic view of the difficulties they faced. That has been a major concern of the present group of evaluators. The whole of Chapter I has as its underlying theme the gap between Project ambitions and the reality of what is possible in a major urban center. This was also the concern of an earlier team of evaluators, who similarly pointed to the immensity of what the Project was attempting and questioned whether it were possible.* The PCS staff took strong exception to such a view.

> It is, needless to say, very encouraging to read that "the staff is good, it has good ideas, it has gotten off to a good start. The Project is well-supported by a number of educational leaders of the City, seems to be tolerated by most, and opposed by none. Most of all, we are pleased with the judgment that "the project is admirably attending to the needs and problems of the classroom teacher as a whole."

*The original CIRCE report of Phase I of the Project.

> All the more depressing, then, to be told that "the job is too big, the manpower needs are overwhelming, the resistance of the City is too great." If either the Project staff or the National Science Foundation had been that pessimistic, the Project would never have been attempted in the first place.*

The evaluators submit then that underestimating the difficulties which the Project would face was, at best, not a one-sided affair. It has been an implicit part of the thinking of the present evaluators and the cause of a continuous emphasis upon the Project's need to reexamine what it could realistically accomplish. In terms both soft and otherwise, the Project has been warned that its ambitions are badly out of line with the unpredictable and rapidly changing circumstances that are a normal condition in urban environments. That this was viewed as criticism and not sound advice did not stand the Project in good stead. In our view, events, including present expressions of staff about the difficulty of the task, have borne out the accuracy of that concern.

We should mention our predecessors in this evaluation endeavor, whose report we found informative and accurate. For those who have been with the Project for the full period of its funding, it makes interesting reading. While we would object to the tone of some of what is said, the content itself is insightful and the Project would have been well-advised to consult it carefully. Based on this experience, we would advocate the use of such quick and inexpensive evaluations. They have their uses and can be very valuable.

*<u>Quarterly Report</u> 4, pp. 30-31.

APPENDIX O

Project City Science Revised Proposal:

Submitted to NSF in 1975

PROJECT CITY SCIENCE

Revised Proposal
September 1, 1976 to August 31, 1979

The main purpose of Project City Science remains unchanged: to improve intermediate and junior high school science teaching in New York City and to learn something in the process that will be useful to colleagues in other universities and in other urban areas. At the level of funding in the revised budget (May 5, 1976), it will not be possible to accomplish this as rapidly as originally proposed, or with the same probability of success. In radically revising the proposed budget downward it was, of course, necessary to reduce staff and to eliminate or cut back certain activities. This cutting was undertaken using three criteria:

1. The Project's chief characteristics must be preserved. These include utilizing a cooperative and functionally comprehensive approach, keeping the school district as the chief unit of attention, being knowledge-generating, and making and keeping long-term commitments. These features were to be regarded as more crucial than extensiveness and magnitude.

2. Those activities most likely to lend themselves to institutionalization should be favored. To insure continuing reform, this must be sought in the university, school and community settings.

3. Whatever is to be undertaken must contribute to the development of a concrete, describable, "visible" entity or product that has dissemination capabilities.

Reformulation of Goals

To translate the above criteria into operational constructs, the Project goals were reformulated. At the level of funding now available, the Project will work toward the achievement of four definite "products." These are: 1) two model districts; 2) a unique preservice program; 3) a research and evaluation institute; and 4) a strategy model for change and institutionalization.

Model Districts:

It was decided to contract operations by concentrating on the development of two "model districts" rather than four. Substituting intensity for extension, the Project will apply itself to working with two selected districts in New York City in an effort to bring them to the highest possible level of intermediate level science teaching.

Within the two districts (one to be carried over from the current set and one to be newly acquired), the emphasis will be on selected programs. Inservice staff development will have the highest priority. The development of a change model focusing on an administrative and university support system will also receive special attention. For this reason, Citiscience notes and the design of resource materials will be continued. All in all, in New York City we propose to have within three years two school districts operating in such a way as to stand as visible, visitable examples of what can be attained even in the face of inner-city economic and political problems.

A Preservice Program

The second main permanent outcome to be achieved by the end of the three-year refunding period is a model preservice training program. Such a program is urgent from several standpoints: as an institutionalized embodiment of the Project's philosophy, its standards and its approaches to inner-city intermediate school science teaching; as an ongoing link to the model districts; and as part of a stablilized financial base for continuing Project activities.

In order that other universities may adopt a similar approach to the preparation of inner-city junior high school science teachers, the Project will have its system tested and in operation by 1980. Explicit descriptions will be made available in the literature concerning all aspects of the program, including selection processes, field aspects, the content and structure of special courses developed for the program, assessment procedures and results, and placement outcomes.

Research and Evaluation

A third product will be an intensified, articulated, and ongoing research and evaluation enterprise. Since the Project, taken as a whole, will not be as extensive as originally contemplated, it becomes more important than before to plan for the dissemination of knowledge. The intent is to design a lasting mechanism that will begin to make headway in generating systematic knowledge about the science learning of early adolescents in the inner-city situation, and also about how to achieve science teaching in the inner-city schools.

To this end, we now plan to have in operation by the end of academic year 1978-79 what we are for the moment referring to as the Institute for the Study of Inner-City Science Instruction. We hope to have this survive as an NYU activity for at least 15 years. Its purpose will be to provide a place and a focus for research related to the title of the institute. The functions will include: serving as a clearinghouse for research on inner-city intermediate school science teaching; identifying and promulgating related research needs; providing a location and a focus for post-doctoral and doctoral study; undertaking continual synthesis of accumulating knowledge; making possible longitudinal and group studies on important questions; and disseminating information on a continuing basis. The Institute will also capitalize on the experience the Project has gained in assessing its own programs by developing an evaluation capacity to be put at the service of other organizations throughout the country that are working on the improvement of city science teaching. This may eventually help broaden the financial base needed to sustain the model district/teacher training/research/change enterprise.

Project Programs

A Change Model

The fourth proposed outcome will be a well articulated model for change and instituionalization. A preliminary model has already been made that draws on the experience that this and other such projects have had at many levels in their attempts to change teachers, administrators and communities towards better urban intermediate science instruction. This model will be further tested in the next few years especially in terms of institutionalizing the changes that are seen as most worthwhile.

Within the reduced budget, the Project will be able to continue to some degree its four major systems: Training, Analysis, Research and Implementation. However, some of the programs within those systems will be severely cut back, some maintained at current levels, and a few to be given increased emphasis. Briefly, the following can be expected:

1. The Resource Teacher Training Program will, as described in the original refunding proposal, shift in emphasis to general staff development. That is, the Project expects to be able to work with nearly all of the science teachers in two (rather than four) participating districts to develop those teachers to their fullest capacity. The best of these will serve as resource teachers over the next decade as originally conceived.
2. <u>The Preservice Teacher Preparation Program</u> will receive somewhat more emphasis than described in the refunding proposal. This is because, as suggested above, such a

program is needed to serve as the continuing link between the university and the participating school districts, as a major catalyst for rapid change among the cooperating teachers, and because it can serve as a focus for dissemination.

3. The Inservice Teacher Improvement Program will be merged with the Resource Teacher Program to emphasize general staff development.

4. The Resources Development Program cannot be as ambitious as hoped for. Nevertheless, as part of the support system for the teachers in the two model districts, some permanent mechanism will be established helping teachers to locate and/or develop the teaching materials necessary for activity oriented science teaching.

5. The Clinical Professor Training Program will continue to be an essential ingredient of the Project. The total number trained has been modified slightly downward.

6. The Alternative Settings Program will receive reduced attention. It is still expected that by the end of the Project at least three junior high schools in New York City will have been identified that are significantly different in their approach to science teaching and that can be co-opted into a permanent working relationship with the university and the two model districts.

7. Because its outcomes will be necessary as a conceptual foundation for the model districts and for the pre-service program, the Standards Formulation Program must be retained. The intention is to create an informed consensus on a set of standards specifying what knowledge, skills and attitudes an inner-city junior high school science teacher needs, and on what conditions of instruction are essential to the attainment of good science teaching. This formulation should be ready by year five to submit to city and state officials for validation and approval.

8. The Cooperative Self-Study Program remains essential as part of the process of building the two model school districts.

9. The same statement is true concerning the Curriculum Needs Assessment Program.

10. The Education Technologies Utilization Program, which has been slow in developing, will not be heavily invested in. The current economic situation in the school, one that will probably persist for a long time, mitigates against the widespread utilization of the newer technologies. Also, initial costs are high whatever the long term cost and education advantage might be.

11. While efforts will be made to make informal but informed judgements about the cost-effectiveness of various aspects of our work, a formalized approach, as originally contemplated in the Cost Assessment Program, will not be undertaken.

12. How much can be accomplished in the Basic Investigations Program depends, first of all, on how thoughtful a research model we can develop, and then on our ability to persuade other researchers to address themselves to questions identified by the Project. Thus, our efforts for the immediate future will be directed toward the development of such a model rather than the doing of basic research.

13. On the other hand, the doing of research of the sort contemplated in the Research Applications Program will receive increased emphasis. We expect to have identified key questions necessary for the improvement of science teaching in inner-city intermediate schools, to have matched that against the current state of knowledge, to have identified the most useful research approach, and to have made some headway in our research. It is also anticipated that the two model districts will serve as sites for the application of research findings and for studies on how to use research to modify practice.

14. By the same token, greater emphasis will be placed on the Program Evaluation Program. The Project expects not only to provide summative evaluations of indiviual components of the Project, but also to describe its evaluation techniques in the literature so that they can be used by others. The skills gained in program evaluation will be necessary to continuing work of the proposed Project initiated research institute.
15. The intent of the Project Evaluation Program was to assess the overall effectiveness of the Project. Now, however, we propose not to undertake such an evaluation ourselves, but to leave it to an outside group, separately funded. This will allow the Project to concentrate on the analysis and assessment of various aspects of its work (i.e., on Program Evaluation) and for the dissemination of results to other groups wishing to undertake a similar effort.
16. The Institutionalization Program is surely as crucial as ever. At the very least, as indicated above, by the end of the five year of Project activities, we expect to have (a) two model districts operating permanently under their own funding in New York City; (b) a new preservice program designed, tested, in operation, and officially adopted by NYU: (c) a recognized research institute underway; and (d) a well articulated and tested strategy for educational change.

17. The Dissemination Program will match the intended outcomes as outlined above. The model districts will serve as places of observation and as examples of attainable standards in the city setting. The preservice program will have been fully described, including all of its field and academic components and publication of follow-up studies on its effectiveness and will have been started. Finally, the ongoing research institute will disseminate research findings and information about the continuing impact of the Project and other cities will have been made aware of possible educational change models that might be applicable to their particular situations.

APPENDIX P

PROJECT CITY SCIENCE REFUNDING PROPOSAL:

GOALS, TASKS, ACTIVITIES SECTION

GOALS, TASKS AND ACTIVITIES

In the original proposal the thrust and structure of Project City Science was presented in the framework of sixteen programs (kinds of activities) clustered into four systems (kinds of functions). In the previous sections of this present proposal progress and change were reported on much within that same context. But any major educational enterprise can generally be usefully examined in more than one way. In this sections, in order to provide a different perspective, an effort is made to outline the actual activities (current and planned) of the Project as they relate to specific tasks to be completed and broad goals to be achieved.

In order to avoid unnecessary redundancy and to keep the length of the proposal within reasonable limits, the assumption has been made, in what follows, that most of the substantial matters to be mentioned are treated sufficiently elsewhere (i.e., in the original proposal or in the earlier sections or appendices of this one). Consequently the format is intentionally terse and cryptic, and no attempt is made at this point to defend the goals nor describe the tasks and activities in detail. In the subsections below: first, the six broad goals of the Project City Science are stated; second, the specific tasks which the Project has set for itself are listed, grouped according to the goals with which they are associated; next, a sample is given showing the relationship between tasks and activities; and, finally, an enumeration is presented of the Project's most important activities.

The Goals of Project City Science

The overarching purpose of Project City Science is to improve intermediate and junior high school science teaching in New York City and to learn something useful in the process. That purpose can be usefully analyzed into six broad

Project goals. Note that achieving the first of the listed goals is necessary to the attainment of the others, and that each goal except the first relates to a particular Project system.

Goal I: To develop a cooperative working relationship among those key institutions and individuals having an interest in improved science teaching in New York City. This goal (Cooperative Interaction) includes two components:

1) establishing a functionally sound and enduring relationship between the Project and students, teachers and administrators in the participating schools, the neighborhoods in which those schools are located, various departments and bureaus of the central Board of Education, the United Federation of Teachers, New York University, other universities, and state and federal education agencies; 2) gaining an ability to catalyze cooperation among these as necessary to achieve sound science education ends.

Goal II: To improve the ability of teachers to help children in grades six through nine gain a better and more rewarding understanding of science. Associated with this goal (Staff Development and Support) are three sub-goals. These are 1) improving the skills and insights with which intermediate school science teachers do their job; 2) updating the science curriculum they utilize; and, 3) developing a feasible support system for them.

Goal III: To find out and continually reassess the state of science instruction and learning in each participating district. This goal (Needs and Resources Assessment) encompasses: 1) learning what the major science teaching/learning problems are as variously perceived by different groups in each district, discerning what factors impede the solution of those problems, discovering what human and material resources exist to help ameliorate them, and determine what the implementaion cost is likely to be for any particular reform measure in terms of money, time and education side effects; and 2) achieving this in such a way as to help district personnel (teachers, administrators, and parents) learn how to make such analyses themselves with a minimum of external help.

Goal IV: To gain generalizable knowledge. This goal (Research and Evaluation) is taken to include gaining knowledge of and insights about: 1) early adolescence as a unique period (psychologically, physiologically and culturally) in the lives of young people; 2) attributes of the inner-city situation that affect the science learning of early adolescents; and 3) the effectiveness of the Project City Science model in promoting desired changes.

Goal V: To build Project City Science into "the system" This goal (institutionalization) will be achieved to the extent that the various programs and activities of the Project become adopted as part of and integrated into the standard operations of the appropriate participating institutions, including District administration and schools, the Board of Education, the United Federation of Teachers, New York University and the State Department of Education.

Goal VI: <u>To extend the influence of the Project beyond the boundaries of New York University and the participating districts.</u> This goal (dissemination) can be achieved only if the Project is reasonably successful in reaching its first five goals, and in addition is able to communicate information effectively to other districts in New York City, to other cities, to other universities, and to all interested individuals.

<u>Goal-Related Tasks</u>

For each of the six goals listed above, the Project has assigned itself a set of tasks to be accomplished. The tasks are different from each other in complexity, importance and current status. What they have in common is the formation of operational links between broad Project goals and actual day-to-day activities.

I. <u>Cooperative Interaction</u>:

Meet regularly with administrators of each of the key elements to inform them of Project City Science goals and activities.

Coordinate Project City Science and community goals by working through local school board coordinators of community services, health services, etc.

Utilize the resources of the Board of Education and the United Federation of Teachers to upgrade facilities and the training and licensing of teachers.

Cooperate with social and educational organizations of the city in training staff and working in schools.

II. Staff Development and Support:

Implement the teacher training programs. Develop professionalism, peer support, supervisory techniques, etc.

Emphasize new developments in science related materials, methods and concepts.

Coordinate science related resources in the schools.

III. Needs and Resource Assessment:

Gather and assess basic information about the needs of schools and teachers.

Analyze the attitudes, interests and perceptions of students about science, their school and their lives.

Study the needs and expectations of parents.

Ascertain the resources of the school in terms of finances, available material and personnel.

Study the resources of the community in terms of cultural ethnic richness, park and museum facilities, health and industrial services.

Locate available city, state and national institutions, program and funding.

IV. Research and Evaluation

Gain an overview of the knowledge available. Search for new ideas for finding and using this knowledge.

Locate the basic information available in our schools.

Begin psychological and sociological studies in connection with university courses and related field work.

V. Institutionalization

Show the feasibility of adopting and adapting various programs or Project City Science for other institutions.

Continually check that avenues of communication and cooperation are kept open.

VI. Dissemination

Disseminate information about the goals and activities of Project City Science to individuals within each of the main elements listed above (school, community, etc.)

Pay special attention to meetings with administrators and university science educators.

The Relationship between Tasks and Activities

There are two difficulties in trying to portray accurately the complete task-activities analysis made by the Project. One is that the carrying out of a given task typically involves many particular activities; the other is that any given Project activity usually contributes to the accomplishing of several different tasks. Rather than present the entire complex of interrelated activities and tasks, this section provides two examples to serve as samples of the whole. The first shows how one activity relates to several tasks. The other does just the reverse.

Example One:

Activity	Goal	Tasks
Publishing Citi-science notes every month	I	Coordinate PCS and community goals Cooperate with social and educational organizations.
[See Appendix K for a copy of notes]*	II	Emphasize new developments Coordinate science related resources in school.

*[Original reference changed to Appendix S in the current report]

Page Six Example One continued:

Activity	Goal	Tasks
	III	Study the resources of the community Locate available institutions, programs and fundings.
	IV	Locate basic information in our schools.
	V	Show feasibility of adopting PCS activities.
	VI	Disseminate information about the goals and activities of PCS to administrators, and teachers, etc.

Example Two:

Goal II: Staff Development and Support

Tasks	Activities (Numbers refer to the list of activities in the next section.)
Implement the teacher training programs.	#51 - Preservice # 1 - Inservice #51 - Clinical- Professor
Develop professionalism, peer support, supervisory techniques etc.	# 4 - Surveys # 1 - Seminars, Workshops #37 - Courses # 1 - Meeting place in school
Develop awareness of science related materials.	# 9 - Equipment, inventory # 2 - Inexpensive materials
Develop awareness of methods	# 3 - Team teaching # 3 - New demonstrations # 2 - New hands-on labs # 1 - Classroom management #15 - Field trips # 9 - Educational technology

Page 7 Tasks and Activities continued:
Example Two:

Tasks	Activities
Develop awareness of concepts	# 1 - New curriculum ideas # 3 - Unit development
Develop awareness of science related resources in the school	#15 - Media center #11 - Library #11 - Shop #43 - Alternative schools #16 - District resources-- Science Centers, etc. #10 - Proposal writing

Activities

School Centered Activities

1 - Implement the Inservice Staff Development Program

2 - Try to introduce new materials and concepts especially through workshop activities.

3 - Introduce new techniques by means of a team teaching collaboration.

4 - Gather baseline data from the files and reports about schools and and districts, as well as from individual teacher interviews.

5 - Assess curriculum needs in each district to find out from teachers, administrators and university educators, what the realistic curriculum needs are.

6 - Begin the Cooperative Self-Study Program (cf Appendix A)*

7 - Begin the Standards Formulation Program (cf Appendix A)*

8 - Plan and arrange Alternative School Programs in cooperation with each district.

9 - Analyze the educational technology available in each district and train teachers to use it.

*Appendix A not included in current report.

Page 9 Activities continued

10 - Aid teachers in writing proposals to get funding for school needs.

11 - Develop awareness of school resources that may influence science education (library, laboratory equipment, shop, etc.).

Community School Board Centered Activities

12 - Meet regularly with District Superintendent and District Science Supervisor.

13 - Cooperate with Supervisors of various district departments: +Health--to set up Community Projects that involve parents, students, and the community at large around an important health program (sickle cell anemia, heart disease, drugs, etc.).

14 - +Community Services--to help survey the district's needs and resources.

15 - +Special Services--to help plan district publications; to help arrange museum programs and field trips; to develop media centers..

16 - +Cooperate with District Science Supervisor to: (a) Write proposals for outside funding; (b) involve elementary schools (6th grade) in science activities; (c) plan lecture and workshop activities in the district; (d) plan and develop use of district science center; (e) gather material for district description or profiles.

Community Centered Activities

17 - Inform parents and other community members of PCS goals and activities by meeting with District Steering Committee biannually.

18 - Meet to explain PCS goals and activities with various parent organizations such as: Parents for Educational Action; Harlem Interfaith Community Service; Lectorium Publications, Inc.

19 - Use sociology and psychology course field components district surveys to study the cultural richness, the ethinc heritage, the needs and resources of the neighborhood around each school.

20 - Develop community related projects in conjunction with the district offices that provide worthwhile connections with the schools (health services field trips, etc.).

United Federations of Teachers (UFT) Centered Activities

21 - Meet to inform UFT leaders of PCS goals and activities.

22 - Vice President - Advisory Board Meetings, District Representative - Steering Committee meetings.

23 - Seek funding from the UFT to support a PCS Science Development Center.

24 - Cooperate with UFT in establishing special licensing for Intermediate School teachers.

25 - Contribute PCS press releases and articles to UFT publications.

Outside Organization Centered Activities

26 - Utilize the resources of the Workshop Center for Open Education in training staff and teachers.

27 - Consult with the Creative Teaching workshop regarding their Principal Leadership Program.

28 - Cooperate with Industry in: obtaining free materials. arranging speakers and films and arranging field trips to industrial plants.

29 - Seek help from the Urban Coalition in selecting a new district "C" planning a PCS Science Center and training staff and teachers.

30 - Help in the schools and district to get funding by writing proposals to city, state and national organizations.

31 - Aid other universities to adopt and adapt PCS programs for their own.

32 - Advertise PCS to recruit qualified students from other universities and community colleges.

Central Board of Education Centered Activities

33 - Inform the Central Board science leaders bimonthly of PCS activities.

34 - Utilize the special city-wide programs of the Central Board: bilingual, reading, etc.

35 - Cooperate with the Central Board of Examiners in deciding on realistic standards and measurements for middle school teachers.

New York University Centered Activities

36 - Arrange the Symposia Series.

37 - Plan and implement special courses: Integrated Science, Early Adolescent Psychology, Science in the City and The City.

38 - Articulate the Project change model more fully and show its position relative to contemporary theoretical models.

39 - Organize and give a priority to the research questions and thrusts proposed by the Project staff and its advisors.

40 - Monitor doctoral studies as part of the Clinical Professor training Program and seek publication of staff and associated faculty scholarly studies.

41 - Increase the relevance of the science education research being done.

42 - Improve the fidelity of the application of science education research to real school situations.

43 - Trial test NYU Medical Center Alternative model where eighth grade students will rotate each week to receive their formal science instruction and work on a project utilizing the Medical Center's teaching laboratories and staff.

44 - Explore the advisability of Project City Science and the Department of Science Education joining with other faculty in the University to form a new Department of Science, Technology and Social Change.

45 - Prepare a trial series of paired science and science teaching videotapes to be utilized for the school science staff development.

46 - Plan a Science Development Center in cooperation with the UFT, Urban Coalition and individual Districts.

Project City Science Centered Activities

47 - Coordinate PCS activities. Overall responsibility: Director and Assistant Director. District level responsibility: Research Assistant Professors. School level responsibility: Clinical Professors.

48 - Recruit and maintain staff according to Timetable.

49 - Maintain District involvement according to Model.

50 - Search for new districts C and D in cooperation with Coalition, Central Board of Education and the UFT.

51 - Develop and implement Teacher Traning Programs:
Clinical-Professor Program (Appendix Q);
Inservice Staff Development Program (Appendix R);
Preservice Program.

52 - Recruit candidates for Research Assistant Professors, The Clinical Professor Program, the Preservice Teachers Program, and the Staff Development Program.

53 - Publish the Quarterly, citiscience notes, press releases, New York City Science Field Trip and Resource Guide and District Supplements.

54 - Arrange regular meeting for the PCS staff with the teachers, administrators and community as mentioned in individual sections above.

55 - Meet with and make presentations to science educators: Nationally - NSTA, AAAS, AERA, NASSP: Locally - NSTA, AETS, Academy of Science, other University Science Education Departments.

56 - Evaluate impact of the Project in general and of each of the separate Programs. (This will be done internally by the Board of Education Bureau of Research and Evaluation, and staff as ongoing procedure, by an external group if funded by the NSF.)

57 - Make a cost assessment of each of the 16 Programs to provide other institutions with a realistic idea of what it means to adopt one or more programs.

APPENDIX Q

Analysis of Questionnaire and Interview

Data

During the course of the evaluation, a variety of questionnaire and interview data was collected from different sources connected with the Project. Some of this data is reported in appendices which should be read to obtain a fuller understanding of the views of participants and observers. In Appendices A and B, the results of interviews with interns and on-site coordinators are offered. They are reported in fuller fashion than was possible in the main body of the report. Appendices C - E consist of summaries of or reports by outside observers of Project activity. Appendices F - M are separate reports of surveys of former PCS staff, intern dropouts, interest of local colleges and assessments of the Project offered by school administrators.

The following sections display and summarize some of this questionnaire data.

PRE-SERVICE INTERNS

The Queens College evaluation plan included the use of a questionnaire designed to measure the pre-service interns' perception of various aspects of their total PCS experience. This questionnaire was administered to all 1977-78 and 1978-79 interns toward the end of their program.

In addition, a slightly modified version of this questionnaire (see questionnaire items 3, 22, and 27) was sent to the 77-78 group in May of 1979 as a follow-up. Because of the anonymous nature of the questionnaire, it was impossible to correlate the responses for any individual. However, the positive/negative nature of the groups' reaction to the questionnaire items in the form of those responding positively, negatively or neutral is displayed in Table 1.

RESPONSES TO INTERN QUESTIONNAIRE
1977-1978 PRE-SERVICE INTERNS'
FOLLOW-UP ONE YEAR LATER
% (#) N=15(78); 9(79 follow-up)

TABLE #1

	POSITIVE [1]		NEUTRAL [1]		NEGATIVE [1]	
ITEM #	78	Follow-up 79	78	Follow-up 79	78	Follow-up 79
1	46.7(7)	22.2(2)	40 (6)	55.6(5)	13.3(2)	22.2(2)
2	26.7(4)	44.4(4)	66.7(10)	33.3(3)	6.7(1)	22.2(2)
4	53.3(8)	66.7(6)	20 (3)	33.3(3)	26.7(4)	
5	73.3(11)	77.8(7)	20 (3)	11.1(1)	6.7(1)	11.1(1)
6	60 (9)	77.8(7)	40 (6)	11.1(1)		11.1(1)
7	35.7(5)	44.4(4)	7.1(1)	11.1(1)	57.1(8)	44.4(4)
9	26.7(4)	11.1(1)	46.7(7)	77.8(7)	26.7(4)	11.1(1)
11	50 (7)	88.9(8)	42.9(9)	11.1(1)	7.1(1)	
12	12.5(2)	11.1(1)	18.8(3)	11.1(1)	68.8(11)	77.8(7)
14	73.3(11)	100 (9)	13.3(2)		13.3(2)	
15	53.3(8)	77.8(7)	33.3(5)	11.1(1)	13.3(2)	11.1(1)
16	43.8(7)	77.8(7)	18.8(3)	22.2(2)	37.5(6)	
17	13.3(2)	33.3(3)	6.7(1)	33.3(3)	80 (12)	33.3(3)
18	73.3(11)	100 (9)	13.3(2)		13.3(2)	
19	73.3(11)	75 (6)	20 (3)	12.5(1)	6.7(1)	12.5(1)
20	80 (12)	77.8(7)			20 (3)	22.2(2)
21	33.3(5)	44.4(4)	26.7(4)	22.2(2)	40 (6)	33.3(3)
22	53.3(8)	44.4(4)	26.7(4)		20 (3)	55.6(5)
23	46.7(7)	33.3(3)	13.3(2)	11.1(1)	40 (6)	55.6(5)
24	33.3(5)	22.2(2)	13.3(2)		53.3(8)	77.8(7)
25	35.7(5)	33.3(3)	28.6(4)	11.1(1)	35.7(5)	55.6(5)
26	66.7(10)	66.7(6)	26.7(4)	22.2(2)	6.7(1)	11.1(1)
27	33.3(5)	25 (2)	40 (6)	25 (2)	26.7(4)	50 (4)
31	46.7(7)	37.5(3)	6.7(1)	25 (2)	46.7(7)	37.5(3)
32	62.5(5)	50 (4)	12.5(1)		25 (2)	50 (4)
33	13.3(2)	37.5(3)	40 (6)		46.7(7)	62.5(5)
34	21.4(3)	33.3(3)	35.7(5)	22.2(2)	42.9(6)	44.4(4)
35	21.4(3)	33.3(3)	28.6(4)	11.1(1)	50 (7)	55.6(5)
36	28.6(4)	44.4(4)	28.6(4)	11.1(1)	42.9(6)	44.4(4)

[1] Responses 1&2 of the questionnaire have been combined and labeled "negative"; 4&5 - "positive"; while #3 has been classified as "neutral".

Response rate:

May '78 - 15 sent and 15 returned = 100%
May '79 - 15 sent and 9 returned = 60%

RESPONSES TO INTERN QUESTIONNAIRE
1978-1979 PRE-SERVICE INTERNS'
% (#) N=13

TABLE #2

ITEM #	POSITIVE	NEUTRAL	NEGATIVE
1	7.7(1)	76.9(10)	15.4(2)
2	23.1(3)	46.2(6)	30.8(4)
4	38.5(5)	30.8(4)	30.8(4)
5	61.5(8)	30.8(4)	7.7(1)
6	61.5(8)	23.1(3)	15.4(2)
7	69.2(9)	15.4(2)	15.4(2)
9	7.7(1)	46.2(6)	46.2(6)
11	69.2(9)	23.1(3)	7.7(1)
12		30.8(4)	69.2(9)
14	84.6(11)	15.4(2)	
15	30.8(4)	30.8(4)	38.5(5)
16	61.5(8)	23.1(3)	15.4(2)
17	23.1(3)	23.1(3)	53.8(7)
18	69.2(9)	23.1(3)	7.7(1)
19	76.9(10)	23.1(3)	
20	69.2(9)	15.4(2)	15.4(2)
21	38.5(5)	15.4(2)	46.2(6)
22	46.2(6)	46.2(6)	7.7(1)
23	38.5(5)	15.4(2)	46.2(6)
24	15.4(2)	7.7(1)	76.9(10)
25	8.3(1)	8.3(1)	83.3(10)
26	38.5(5)	30.8(4)	30.8(4)
27	30.8(4)	23.1(3)	46.2(6)
31	53.8(7)		46.2(6)
32	33.3(4)	25 (3)	41.7(5)
33	30.8(4)	30.8(4)	38.5(5)
34	7.7(1)	23.1(3)	69.2(9)
35		23.1(3)	76.9(10)
36	30.8(4)	53.8(7)	15.4(2)

N.B. Sample responses to the open-ended items (#'s 8, 10, 28, 29, 30, 37) have been reproduced and follow the commentary on the non-open-ended questions.

ITEM # 3

1977-78 PCS Courses

Rank ordered in terms of their (perceived) usefulness to you as a teacher

	May 78 Rank	$\bar{X}$	May 79 Follow-up Rank	$\bar{X}$
Methods of Science Education	1	1.846	1	2.111
Science Education Curriculum	2	2.154	2	2.375
Psychology	3	2.667	3	3.000
Intergrated Science	4	2.923	4	3.625
Sociology	5	4.500	5	3.750

1978-79 PCS Courses

Rank ordered in terms of their (perceived) usefulness to you as a teacher

	Rank	$\bar{X}$
Methods of Science Education	1	2.462
Student Teaching	2	2.769
Science Education Curriculum	3	2.846
Psychology	4	4.462
Urban Ecology I & II	5	4.596
Implementation	6	6.417

Commentary

Several general comments, sometimes contradictory, appeared to be appropriate after an examination of the responses to the pre-service questionnaire.

The passage of a year, frustrations in obtaining a desired teaching position, difficulty in applying the PCS model are among a myriad of intervening variables which may have had an influence on the changes in responses after the one year for the 77-78 group. In addition, the responding follow-up group in 1979 was an unidentifiable sub set of the 1978 group. Needless to say, the evaluators can not attribute changes in response to any single or combination of variables with a reasonable degree of certainty.

Comparisons presented below, therefore, were made between the initial (post completion) questionnaire for the 77-78 group and those administered to the 78-79 group after they completed the program.

- 46.7% of the 1977-1978 Pre-Service Interns and 7.7% of the 1978-1979 group rated the NYU course work as being positive (#1), while 73.3% and 61.5% respectively believed that the methods taught could be effective with inner city JHS students (#5). Similarly, 26.7% (77-78) and 23.1% (78-79) felt the course work was applicable to their classroom situation (#2).

- Supplementing the above, 35.6% (77-78) and 69.2% (78-79) reported that there were important omissions in their preparation as teachers. (#8)

- 80% (77-78) and 76.9% (78-79) did not feel that their cooperating teacher used an instructional model, which was consistent with PCS (#17) yet both groups overwhelmingly reported that these cooperating teachers made an effective contribution to their growth as classroom teachers. (#18)

- 73.3% (77-78) and 76.9% (78-79) rated their actual teaching experience as positive in terms of helping them learn to be a good teacher. (#19)

- 53.3% (77-78) and 30.8% (78-79) reported that the NYU courses represented a "good" demonstration of an activity oriented, "hands-on" instructional approach. (#15)

- Both groups of students (77-78 and 78-79) were split as to their opinion of the effectiveness of their building coordinator in helping them grow as a teacher. (#23) (see also items 31-33)

- 66.7% (77-78) and 38.5% (78-79) felt that they have been well prepared to become a science teacher in an inner city school (#26), while 26.7% (77-78) and 46.2% (78-79) report that they do not plan to teach in such a school. (#27)

- 21.4% (77-78) and 0% (78-79) believed that their school could serve as a usable model of science instruction; while 28.6% (77-78) and 30.8% (78-79) expressed that belief about their own classrooms.

1978-79 PRE-SERVICE INTERN FOLLOW-UP QUESTIONNAIRE

A follow-up questionnaire was administered to the 78-79 group after the evaluation group learned of additional items that the interns wished to be asked (these items were not administered to the 77-78 group, and therefore no comparisons are possible) The results are displayed in Table 3 below.

FOLLOW-UP QUESTIONS ADMINISTERED TO 78-79
STUDENTS AFTER COMPLETING ORIGINAL QUESTIONNAIRE

TABLE #3	YES	NO	UNDECIDED SOMETIMES
1	8.3(1)	83.3(10)	8.3(1)
2	21.4(3)	64.3(9)	14.3(2)
3	61.5(8)	30.8(4)	7.7(1)
4	50 (7)	28.6(4)	21.4(3)
5	21.4(3)	42.9(6)	35.7(5)
6	30.8(4)	61.5(8)	7.7(1)
7	42.9(6)	35.7(5)	21.4(3)
8	46.2(6)	53.8(7)	
9	35.7(5)	57.1(8)	7.1(1)

COMMENTARY

Although 50% of the group would choose to become a PCS intern.. knowing what (they) now know, (#4) and 61.5% would recommend the project to a friend(#3), it is safe to summarize the balance of their responses as less
list of proposed changes (#10), reproduced in Appendix c , is consistent with their responses to Items 1-9.

CONCLUSION

While it is impossible to average the results of the questionnaire items, it would be safe to say that the respondents showed great variability in their reaction to the different components of their PCS total experience. Of the items which could be answered positive, neutral or negative, the 77-78 group responded more positively than negatively (18-10) while the 78-79 group's responses were more negative (13-15).

In summary, it appears that the PCS students of both years evaluated their experiences in a specific rather than global fashion. Their assessment is clearly mixed.

PCS graduates were administered a set of questions concerning program completion, teaching status, and placement experience. The results are displayed in Table 4 below.

PRE-SERVICE INTERNS
PROGRAM COMPLETION QUESTIONNAIRE

TABLE # 4

	YES	NO	SOME
1	88.2(15)	11.7(2)	
2	64.7(11)	35.2(6)	
3	27.7(5)	72.2(13)	
4	76.4(13)	23.5(4)	
5	75 (12)	25 (4)	
6	25 (4)	75 (12)	
7	88.2(15)	11.7(2)	
8	64.7(11)	29.4(5)	5.8(1)
9	46.7(7)	53.3(8)	
10	60 (9)	40 (6)	
11	64.7(4)	35.3(6)	

Program graduates appear to have been relatively successful in gaining teaching positions at the junior high school level (#4,5), though of these only 1 of 4 are teaching in an "inner city" school. Almost 70% of those who located a position, reported that the Project was helpful in obtaining their current position.

64.7% reported that they would prefer teaching at some level other than junior high school, a disappointing but not unexpected situation.

PRE-SERVICE INTERNS
RESPOND TO OPEN ENDED QUESTIONS
1978-79

Question 8: If you feel there were such omissions, would you briefly describe what they were?

Classroom management techniques, dealing with administration, clerical duties, hands-on course should be taught before going into schools, clearer picture of the kind of course work, opportunity to do more creative work, more information on different cultures, other important ways of teaching lectures, demonstrations, discussions.

Question 10: In addition to your response for number eight, what suggestion would you offer that could improve the course work given at N.Y.U.

Lenghthen curriculum course to 1 year, shorten ecology course to 1 semester, more lab instruction, including important principles, more "hands-on", have us teach some of old curricula in first semester and write our own in the second.

Question 28: List 3-5 adjectives that best describe your feelings about having been a Project City Science participant?

Critical, aware, realistic, understanding, cooperative, disillusioned, skeptical, overburdened, satisfying, hard work, excited, stagnant, inactive, confused, good, frustrating, dangerous, positive, negative, helpless, shell-shocked, older and wiser, more experienced, disappointed, befuddles, enriched.

Question 29: When you complete your work in Project City Science, what are the things you will recall as your greatest successes?

Having gotten certification, to be able to know that kids learned something from you, getting through; becoming more relaxed in front of a class, getting down to where kids are and working with that, some hands-on classes I taught.

Question 30: What will you recall as your greatest frustrations?

Not really wanting to teach in ghetto, not being able to teach because of discipline problem, 6 hrs. of sitting at NYU and no change of scenery, lack of coordination between project and school, lack of real support from all parties involved, trying to implement some hands-on activities, low level in the teaching, wanting more curricula and materials available, wanting to trade ideas, problems and successes.

Question 37: If you do not feel your school is such a model, what do you think could or should be done to make it such a model?

Science Teacher licensed in the field, money put in Science Department, project provide workshops for coop teachers, project relies too heavily on student teachers to provide model, more of teamwork approach to "Project" in the school.

PRE-SERVICE INTERNS
RESPONSES TO OPEN ENDED QUESTIONS
1977-78

Question 8:

Lack of supervision, very little observation by professor while teaching, no feedback, classroom management, should have learned the standard approach stressing discipline before hands-on.

Question 10:

Decide what goals are, survey course of 7,8,9 grade curriculum and ideas to adapt it to classroom use, each pre-service should give a mini-lesson so they can learn how to write lesson plans, also tips on how to make lessons more interesting, make it harder, too much emphasis on hands-on, don't give too much work..

Question 28:

Intense, a different experience, good, unusual, confusing, stimulating, frustrating, tiring, happy, experiential, interesting, exhausting, exciting, frustrating, happy, lucky, tired, over-worked, warm, sheltered knowing, delighted, enjoyable, interesting, rewarding.

Question 29:

Relating to other individuals in a humanistic fashion, relationships with students staff and peers, working in the schools and learning how to teach, surviving, having students react positively to your teaching methods, knowledge of inner city school system.

Question 30:

Being introduced as a panacea for the school when in actuality I was unprepared unexperienced and scared, little interaction with staff at NYU while in the school, coping with the kids, not having the opportunity to give attention needed to individual students, not knowing what we were going to do next, always needing assistance with class lesson plans, getting criticized after a lesson was taught without the co-op teacher extracting pit-fall errors previously, dictation by the coordinator on what to do..

Question 37:

Less apathy, no idea, school already is such a model.

Questionnaire: Pre-Service Interns

We would ask you to respond to the questions below as honestly and accurately as you can. You will be asked to rate some of the questions on a five-point scale. Select that point on the scale which most closely approximates the extent of your agreement on that particular item. A 5 would represent a strong positive reaction or agreement while a 1 would represent a strong negative reaction or disagreement.

1. Overall, how would you rate the project-related courses you took at N.Y.U. during the year?
2. Overall, was the course work applicable to your classroom situation?
3. List in rank order the courses you took in terms of their usefulness to you as a teacher?
4. Would you say you were given a clear model for science instruction?
5. Do you believe the instructional methods you were taught can be effective with inner city, junior high school students?
6. Do you believe you were effective as a teacher using these methods?
7. Do you believe there were important omissions in your preparation as a teacher?
8. If you feel there were such omissions, would you briefly describe what they were?
9. Was the course work consistent with your teaching needs?
10. In addition to your response for number eight, what suggestion would you offer that could improve the course work given at N.Y.U.?
11. Do you believe that a "hands-on" approach to science instruction is the most effective model to use in the junior high school?
12. Do you believe the more traditional lecture technique is more effective?
13. If you believe a combined approach would be more effective, what kind of a mix do you feel would be most appropriate?
14. Are you personally comfortable with the "hands-on" approach?
15. Overall, did the instruction you received in your courses at N.Y.U. represent a good demonstration of an activity-oriented, "hands-on" instructional approach?
16. Would you say the cooperating teacher(s) you worked with was (were) effective with his/her own students?
17. Did the cooperating teacher use an instructional model that was consistent with what you were being taught in Project City Science?
18. Did your cooperating teacher(s) make an effective contribution to your growth as a classroom teacher?

19. Has your actual teaching experience been satisfactory in terms of helping you learn to be a good teacher?

20. Was the teaching experience extensive enough?

21. If the opportunity were available, would you accept a job teaching in the school you are now working in?

22. Do you plan to become a junior high science teacher?

23. Would you say the coordinator in your building was effective in helping you to grow as a teacher?

24. Do you believe the coordinator was effective in helping regular teachers in the building improve their instruction?

25. Do you believe that Project City Science has had widespread influence in improving science instruction in your school?

26. Do you feel you have been well prepared to become a science teacher in an inner-city school?

27. Do you plan to teach in such a school?

28. List 3-5 adjectives that best describe your feelings about having been a Project City Science participant?

29. When you complete your work in Project City Science, what are the things you will recall as your greatest successes?

30. What will you recall as your greatest frustrations?

31. Was the coordinator in your school available to you often enough to meet your professional needs?

32. How helpful was the coordinator in regard to pre-lesson planning?

33. Do you feel you were observed sufficiently by your coordinator for him or her to do an effective job of helping you in <u>post</u> lesson evaluations?

34. Would you characterize the school you are now working in as a place where a high level of science teaching takes place?

35. Do you believe your school would serve as a visable model of effective science instruction?

36. Do you believe the classroom(s) you are working in would serve as visable models of science instruction to which other teachers should be invited?

37. If you do not feel your school is such a model, what do you think could or should be done to make it such a model?

COOPERATING SCIENCE TEACHERS

During May 1979 a brief questionnaire was sent to 19 cooperating PCS teachers in the schools. This questionnaire was designed to help the evaluation team learn more about these teachers assessment of various aspects of PCS. Their responses are displayed in Table 5 below.

Table 5

Questionnaire Responses of PCS Cooperating Teachers

1. Do you believe that the presence of PCS has made your school a model of superior science instruction?

   yes 16.7% (2) no 83.3% (10)

2. Do you feel that the presence of PCS in your school has had a significant positive impact on the level of science instruction in those classes where there are PCS interns?

   yes 41.7% (5) no 58.3% (7)

3. Has the presence of the PCS on-site coordinator contributed to the improvement of science instruction in your school?

   yes 41.7% (5) no 58.3% (7)

   If yes, please explain in what ways.

   Ways in which the on-site coordinator contributed to the improvement of science instruction in the school

   -provides source materials
   -planned trips
   -curriculum references
   -coordinator of science fairs
   -provided model lessons
   -provided workshops

4. Based on your prior experience, are these pre-service intern(s) better prepared or more skillful than other student teachers with whom you have had contact?

   yes 58.3% (7) no 41.7% (5)

5. The PCS interns have been in your school since October, so they have been interning for 1½ semesters, 4 days per week. Do you believe this extended time resulted in their developing superior teaching skills when compared to a more common one semester student teaching experience?

   yes 83.3% (10) no 8.3% (1)

6. Have your teaching techniques been improved as a result of having a pre-service intern from the Project in the room?

yes 33.3% (4) no 58.3% (7)

7. Have the OSC been an effective liaison between you and the pre-service intern? Between you and the Project?

yes 81.8% (9) no 18.2% (2)

8. If you were in a position to develop a program to prepare pre-service interns to become effective junior high school science teachers what areas would you stress in your program? Please number from 1-6 in order of importance.

goals/activities	AVERAGE RANK	RANK ORDER	
classroom management tech.	2.0	1	
"hands on" approach	3.6	3.5	
Dev. Science content bkrnd	4.7	6	
Finding master teacher-	3.6	3.5	
maintaining discipline technique	2.7	2	
familiar with curriculum	4.2	5	N=10

9. Do you feel that PCS did a responsible job in preparing you for your role as a cooperating teacher, offering you and your intern appropriate help when needed?

yes 33.3 (4) no 50.0 (6)

10. The following comments were offered as aids to evaluating the efforts PCS has made in the schools.

Student teachers are very well prepared in content.
The problem lies in the lack of a realistic approach in Methods courses.
PCS has a nice budget, but no funds were funnelled into our school. We don't really see difference between PCS and any other program.

Master teachers should be more directly involved in the program and they should receive compensation for the time and work.

All on-site-coordinators do not know the children. Hands-on becomes boring too. Limited supplies, room layout is a problem.

Interns lack basic courses needed before entering classroom. PCS must establish before term begins a commitment or lack of one re: materials and teaching aids, and help with classroom management and disciplinary control. Tried to accomplish too many tasks at the same time.

Commentary

-Cooperating teachers were split in their assessment of the influence of PCS on the level of science instruction in their school and in the cooperating classrooms. (items #2 & 3)

-Similarly, they rated the interns as being better prepared than other student teachers by a majority of only one. (one teacher responded positively for this year's intern only -- past years' were the 'pits'). (item #4)

-The respondents were unanimous in their belief that the extended internship was beneficial. (item #5)

-Fifty percent responded negatively with regard to PCS's preparation of the cooperating teachers for their role and their help for the intern and cooperating teacher. (item #9)

SCIENCE TEACHERS

During May, 1979 a brief questionnaire was sent to 51 science teachers in the PCS cooperating schools in order to learn of the effect PCS has had on science instruction in their schools.

Their responses are displayed in Table 6 below.

Table 6

Questionnaire responses of science teachers in PCS cooperating schools (N = 27).

1. Do you believe that the presence of PCS has made your school a model of superior science instruction?

Yes		No	
23.1*	(6)**	76.9	(20)

2. Do you feel that the presence of PCS in your school has had a significant positive impact on the level of science in those classes where there are PCS interns?

Yes		No	
69.2	(18)	30.8	(8)

3. Has the presence of the PCS on-site coordinator contributed to the improvement of science instruction in your school?

Yes		No	
38.1	(8)	61.9	(13)

4. Please indicate your present status as a science teacher

certified		recertified	teaching out of license	
77.8	(21)	0	22.2	(6)

5. Have your teaching techniques been improved as a result of having a pre-service intern from the Project in your room?

Yes		No	
36.4	(8)	63.6	(14)

6. If you were in a position to develop a program to prepare pre-service interns to become effective Junior high school science teachers what areas would you stress in your program?

Please number from 1-6 in order of importance.

* Per cent of total population responding in this manner.

** Actual number of respondants.

6.

	Av. Resp.	Rank
Classroom management techniques	2.259	1
A "hands on" approach to teaching	3.704	4
Developing science content background	3.963	5
Finding a master teacher with whom to place interns	3.222	2
Showing interns how to maintain discipline	3.333	3
Familiarizing interns with the curriculum	4.481	6

7. Would you offer any comments you have that might aid us in evaluating the efforts that Project City Science has made in your school?

> The Program should be more selective in recruiting its teachers and trainers. It is a glorified student teaching program. The two PCS people were an aid in classroom and pupils benefitted from PCS aids.

> Master teachers are more productive because of the presence of student teachers. More labs and demonstrations have been offered.

Sample "ways in which the on-site coordinator contributed to the improvement of science within your school."

> -tried to add activities relating to Science, new ideas,-science fairs,-talent classes.

COMMENTARY

The evaluation responses of the non-participating Science teachers were somewhat mixed.

> 76.9 (20) did not believe that the presence of PCS made their school into a model of superior science instruction -(item #1).

> -In contrast, 69.2 (18) believed that the project had a significant positive impact in the class where PCS interns were assigned-(item #2).

> 38.1 (8) felt that their presence of the on-site coordinator contributed to the improvement of science instruction in the school, in contrast to 61.9 (7) who did not share that view-(item #3).

> 63.6 (14) of these teachers, the greatest majority of whom, were certified in science 77.8 did not report that their teaching had improved as a result of having a pre-service intern in the room (items 5 and 4).

ADVISORY BOARD

During the Spring of 1979 questionnaires were sent to the 19 members of the PCS Advisory Board in order to learn of their experiences with and their attitudes toward PCS. A total of 9 members responded, 2 of whom indicated by letter that they resigned their position on the Board. The remaining 7 responses are displayed in Table 7 below.

Table 7

Advisory Board responses to a mailed questionnaire (N = 7).

1. Are you still active as an Advisory Board Member?

   yes 57.1* (4)** No 42.9* (3)**

2. Have you served as a Project City Science (PCS) Advisory Board Member for more than one year?

   Yes 85.7 (6) No 14.3 (1)

3. How many meetings have you attended?

   All 57.1 (4) Four 14.3 (1) Two 14.3 (1) Do not recall 14.3 (1)

4. Are you satisfied that the project has kept you adequately informed as an Advisory Board Member?

   Yes 85.7 (6) All but this year 14.3 (1)

5. Do you feel the publications put out by the project (Progress Reports and Citi-science Notes) have been a useful and efficient means for disseminating information about PCS?

   Yes 85.7 (6) No basis for assessing 14.3 (1)

6. Do you feel your background, experience, and expertise were used effectively by Project City Science?

   Yes 50 (3) No 16.7 (1) It depends 16.7 (1) Moderately 16.7 (1)

7. Has the project actively sought to use in its dissemination efforts (e.e. making an oral presentation at a professional conference)?

   Yes 28.6 (2) No 71.4 (5)

8. In your opinion, do you think the Advisory Board Meetings were effective in establishing policy direction for the project?

   Yes 71.4 (5) No 14.3 (1) Moderately 14.3 (1)

* Per cent of total population responding in this manner

** Actual number of respondants.

9. Do you feel suggestions made at meetings were effectively implemented by the project?

Yes 57.1 (4) No 14.3 (1) It depends 14.3 (1) Where appropriate. 14.3 (1)

10. Did you receive a copy of the independent evaluation report completed in Summer 1978?

Yes 71.4 (5) No 28.6 (2)

11. Were you asked to comment on this report?

Yes 71.4 (5) No 28.6 (2)

12. In your opinion, do you believe the Project as it nears completion of its funding, has achieved its major goals?

Yes 57.1 (4) No 14.3 (1) As well as such projects do 28.6 (2)

13. Was there any one phase of the project about which you felt most informed?

Yes 42.9 (3) No 57.1 (4)

14. Was there any one phase of the project that you were most involved in while on the Advisory Board?

Please list the phase (Two listed dissemination and one indicated staffing).

15. Please make any additional comments about PCS, or your role as an Advisory Board Member, that you feel would help us in evaluating the achievements of this project.

(1) I believe that we should have been meeting more frequently and to have greater input from the point of view of our expertise.

(2) As a past (official of an influential educational group) I made various offers for PCS to utilize (our group)...It was never accomplished.

(3) I feel that the program had merit. It was tackling a difficult problem - science for the middle level student - under very difficult conditions. Some of its achievements were noteworthy.

(4) I believe the very active cooperation of the UFT made the project a success.

(5) PCS was staffed by first rate people and able administrators, but they lacked the political skill and the will to get the things done that they wanted to do...the program objectives were quickly redrawn in order to say they wanted to do, what they could do easily. This is unfortunate.

COMMENTARY

Clearly, the responses indicate a mixed reaction to the members' involvement in PCS.

-While 85.7% (6) were satisfied that they had been kept adequately informed about PCS (one responded positively except for current year-(item #4) only 50% (3) felt that their backgrounds were used effectively by the Project-(item #6).

-71.4% (5) felt that the Board meetings were effective in establishing policy direction, while one other member, 14.3% felt they were "moderately successful"-(item #8). Similarly, 57.1% (4) felt that suggestions made at Board meetings were implemented. 28.6% (2) offered a qualified yes to the question-(item #9).

-71.4% (5) reported that they received a copy of the evaluation report of June 1978 and that they were asked to offer comments or reactions to it-(items #10, 11).

-Only 14.3% (1) responded that the project had not achieved its major goals, while 57.1% (4) responded "yes" and 28.6% (2) answered with a qualified "yes." (item #12)

It appears that, in general, the members of the PCS Advisory Board were positive in their reaction to the project. The most consistent "negative" comment was the desire, on the part of some members, to have been more involved.

PROGRESS REPORTS

During the Spring of 1979 a questionnaire was mailed by the PCS staff to all of the recipients of the Progress Reports -- (N = 500) (See Appendix). Responses were received from 16.4%(82) individuals. While the great majority of those respondents who regularly received the Progress Reports viewed them in a very positive manner, the percentage of responses was too low to allow for any reliable analysis to be made. The responses received are displayed in Table 8 below, without comment.

TABLE 8

RESPONSES TO PROGRESS REPORTS QUESTIONNAIRE.

Question % (#)

1. What is your primary professional role, the work which requires the vast majority of your time?

20.7	(17)	Classroom teacher: Grade ____ Subject ____
25.6	(21)	Science supervisor
2.4	(2)	Building administrator
6.1	(5)	District administrator
29.3	(24)	College instructor
15.9	(13)	Other, please specify ____

2. Your name is on the mailing list for the tri-annual publication produced by Project City Science called Progress Report. Have you been regularly receiving this publication from the Project?

Yes 84.9% (62) No 15.1% (11)

Comment (if any)

3. Do you regularly read the material contained in the Progress Reports when they arrive?

Yes 87.1% (61) No 12.9% (9)

Comments:

4. Do you ever consult them for information at a later time?

Yes 64.3% (45) No 35.7% (25)

Progress Reports
(con't)

5. If you have been a regular reader of the PROGRESS REPORTS, how would you rate their overall usefulness to you?

Exceptionally useful 6.4% (4) highly useful 45%(27) useful 36.7%(22) not very useful 11.7%(7) no use 0

6. If you have not been a regular reader of the reports, what is the major reason?

6.3% (1) A. Lack personal interest

0 B. Not my professional area

25% (4) C. Cannot find the time

18.8(3) D. Their content does not interest me

6.3%(1) E. The reports have little useful information

43.8%(7) F. Other reasons or additional comments:

G. 6.3% (1) Staff Member

H. 37.5% (6) did not receive

Please answer the following questions only if you regularly read the reports:

7. How would you rate their usefulness in regard to informing you about teacher training practices?

Exceptionally useful 6.7%(4) highly useful 41.7%(25) useful 40%(24) not very useful 11.7%(7) no use 0

8. How would you rate their usefulness in regard to informing you about instructional methodologies?

Exceptionally useful 5.1%(3) highly useful 33.9%(20) useful 45.8%(27) not very useful 15.3%(3) no use 0

9. How would you rate the usefulness in regard to reporting on current science research?

Exceptionally useful 10.2%(6) highly useful 18.6%(11) useful 42.4%(25) not very useful 27.1%(16) no use 0.

10. Given the information you have about the activities and interests of Project City Science, do you consider this Project one of the leading forces in the field of science education to whom you would turn for information and direction?

Completely agree 3.4%(2) strongly agree 27.1(16) agree 55.9%(33) strongly disagree 13.6%(8) completely disagree 0

11. Please add any addition comments about the Progress Reports you would like to make:

CITISCIENCE NOTES

A brief questionnaire was mailed by the PCS staff to the 1800 recipients of citiscience notes. Responses were received from 105 readers for a response rate of 5.83%. Although the responses were generally most favorable, the return was clearly inadequate for any reliable analysis. Therefore, the results are displayed in Table 6 below without comment.

TABLE 9

RESPONSE TO CITISCIENCE NOTES QUESTIONNAIRE

% #

1. What is your primary professional role, the work which requires majority of your time?

76.1% (82) classroom teacher: Grade____ Subject____

13.1% (14) science supervisor

1.8% (2) Building administrator

4.6% (5) District administrator

1.8% (2) College instructor

2.6% (3) Other, please specify ____

2. Your name is on the mailing list for the monthly publication put out by Project City Science called CITISCIENCE NOTES. Have you been regularly receiving this publication from the Project?

Yes 76.2% (80) No 23.8% (25)

Comment: (if any)

3. Do you regularly read CITISCIENCE NOTES when they arrive?

Yes 95.9% (93) No 4.1% (4)

Comment:

4. Do you keep copies and consult them at a later time for information?

Yes 80.2% (73) No 19.8% (18)

Comment:

5. If you do not read CITISCIENCE NOTES, would you give your major reason or reasons?

6. If you read CITISCIENCE NOTES, would you rate their usefulness in providing you with information about activities taking place in New York City?

Exceptionally useful 12.8% (12) highly useful 38.3%(36) useful 38.3%(36) not very useful 10.6%(10) of no use 0

7. If you read CITISCIENCE NOTES, how would you rate their usefulness in offering you suggestions for good classroom activities?

Exceptionally useful 11.8% (11) highly useful 33.3%(31) useful 45.2%(42) not very useful 9.7%(9) of no use 0

8. If you read CITISCIENCE NOTES, how would you rate their usefulness in offering you suggestions for effective instructional approaches?

Exceptionally useful 9.8% (9) highly useful 27.2%(25) useful 53.3%(49) not very useful 9.8% (9) of no use 0

9. Overall, how useful have the CITISCIENCE NOTES been to you?

Exceptionally useful 10.6% (10) highly useful 27.7%(26) useful 52.1%(49) not very useful 9.6%(9) of no use 0

10. If this publication were to ceasé, it would represent a real loss to the education community.

Completely agree 20.2%(18) strongly agree 31.5%(28) agree 37% (32) strongly agree 12.4% (11) completely disagree 4.5%(4)

11. Would you add any additional comments about CITISCIENCE NOTES you would like to make:

ON SITE COORDINATOR

At the close of the 1977-1978 school year a questionnaire was completed by 5 of the on-site coordinators (See Appendix). The results are displayed below.

TABLE 10

ON COORDINATOR

QUESTIONNAIRE 1977-1978

(N=5)

#5 How would you rate the teaching effectiveness of the intern in your school?

POOR	FAIR	AVERAGE	GOOD	OUTSTANDING
	(1) 20%		1111 (4) 80%	
#6		111 (3) 60%	(1) 20%	(1) 20%
#7	11 (2) 40%	111 (3) 60%		
#8		(1) 20%	1111 (4) 80%	

ON SITE COORDINATORS

(1) How would you define the role of the on-site coordinator?

Provide resource role for preservice interns and cooperating teachers ("hands-on" workshops given to disseminate new ideas, assist in lesson planning, field trips, provide materials on curriculum adaption); provide role model for teachers and preservice interns - observe and evaluate methods of planning and instruction; involve and coordinate other school departments. Efforts in science activities (Art department projects for science fairs, newsletters; English department involvement in proposal writing for State and Federal grants); liason between PCS office at NYU and cooperating schools' administration to establish and meet goals in line with PCS philosophy; be aware of community resources volunteers, possible topics for research efforts; assist research team.

(2) What do you believe the Project expects you to accomplish in your role?

Provide role model according to PCS philosophy to train interns to be effective, innovative teachers; provide resource role for cooperating teachers and pre-service interns; liason with school administration; establish working relationship with other than science faculty to integrate subject areas; assist research team.

(3) What are your personal goals or expectations in this role?

Experience in developing and supervising programs; establishing relationships with faculty members to work toward common goal; opportunity to resolve educational problems on a school level; become more aware of and involved in education issues.

(4) How would you describe the model of teaching you are seeking to have the interns implement?

Guided discovery approach using experimental "hands-on", "manipulative", "concrete" experiences; group and individual interaction with projects; use of visual aids; activities which allow for active student involvement; ability to use a variety of methods.

(9) What in your opinion represents the greatest success or the most positive aspect of the coordinators role?

The ability to work closely with interns on a daily basis - talking personally, evaluating lesson plans, observing interactions with students, trying out new ideas; getting teachers interested in assisting with the training of preservice interns.

(10) What in your opinion represents the greatest failure or most negative aspect of the role?

Not enough time to accomplish requirements, negative attitude of staff members to change or adaption of curriculum; lack of prior training and experience in supervision and working with administrators

(11) What limitations or difficulties within the structure of the confines of the school caused you the greatest frustration or concern?

Cooperating teachers' and interns' classroom problems; lack of cooperation between PCS, cooperating teacher and administration; science department problems.

(12) What limitations or difficulties within the structure of PCS itself was the cause of your greatest frustration or concern?

Lack of direction and communication; vagueness as to goals; lack of materials and individual activities as promised by PCS; lack of sensitivity as to time commitments to perform role.

HIGH SCHOOL CHAIRPERSONS

Questionnaires were distributed to all Chairpersons in the high schools to whom PCS children were sent. This was done to ascertain their perceptions of PCS. Responses are displayed in Table 11 below.

Table 11

Responses in % and (#) of H.S. Science Chairpeople

1. Are you (or the department teachers) receiving copies of Project Citiscience Notes? (see sample attached copy)

   yes 0% (0)   no 100% (14)

2. If you are not receiving Citiscience Notes, do you feel that they are of sufficient interest and value to secondary science teachers to have your department receive them in the future?

   yes 85.7% (12)   no 14.3% (2)

3. Have you, or department teachers, ever received copies of Progress Reports, the major publication of Project City Science?

   yes 0% (0)   no 100% (14)

4. Was the work of the Project City Science Staff in the junior high schools made known to your teachers before you received this questionnaire?

   yes 0% (0)   no 100% (14)

5. Was any effort made by Project City Science Staff to involve you in the Project's activities?

   yes 7.1% (1)   no 92.9% (13)

6. Have you observed that Project City Science students now attending your school, are better prepared for high school science classes compared to those students coming from traditional junior high school classes?

   yes 0% (0)   100% (4)*

7. Have you either observed, or heard about, any positive results of Project City Science teaching in the intermediate, or junior high school classes in the Project Districts?

   yes 0% (0)   no 100% (12)

8. Could you please give us a brief estimate of your impressions of the Project City Science activities?

   85.7% (12) did not have enough knowledge of PCS to make judgment
   7.1% (1) believed it had significant value
   7.1% (1) reported that it was "fine" for Elementary and Intermediate students, but lacked substance for High School students.

*Nine responded that students are not identified as to PCS involvement.

On the basis of the data collected it is safe to say that the High School Science Chairpeople responding had no prior contact with PCS and little to no knowledge of its operational aspects.

APPENDIX R

Examination of Project City Science's Use of Diffusion and Change Models

This project has been in existence for five years. During that time several shifts, some basic, some just minor, have taken place. The first such change was the substitution or modification of a planned institutional change model mentioned by the Project Director in the Progress Report of 1975.[1] This modification led to the combining of the fourth component (institutional change model) into a dissemination-diffusion model. The following Appendix traces this modification and discusses the implications for Project evaluation.

Social Interaction Strategies: A Project follow-up to the cooperative change model

In the other sections of the full evaluation report, mention was made of the lack of a well designed dissemination plan.[2] Recommendations were made at several points to the PCS Staff to devote more time to the development of such a plan. As of the writing of this report, no formal plan has been developed or written for organizing the dissemination program. However, as data and information were being collected and sorted during the past few months of 1979 (especially via interviews with Advisory Board Members, PCS Staff, and some school personnel) the skeleton of a plan or perhaps the vestige of a former dissemination model did appear. Describing the design as an informal, unwritten plan is most accurate. A brief assessment of the plan's impact on the present and future efforts of the Project will be attempted here. It should be noted that formulation of this unwritten, or informal plan, in the opinion of the evaluation team, can be an effective operating plan for innovative projects such as PCS, if the Project adapts itself satisfactorily in the institutional setting.

One process used for PCS dissemination resembles, to some degree, a set of strategies and tactics classified by researchers as the social interaction model of innovative diffusion.[3] It is noted that this set of strategies is not stated explicitly in the Progress Report, nor is it reported as the "formal" system employed by the Project Staff in dissemination. It is frequently not followed faithfully, consistently, or systematically, or perhaps even with full awareness by its users. Nevertheless, the steps of working with "the system" (school districts, Advisory Board, unions, etc.) strongly and clearly parallel the social interaction (S-1) schema described by Havelock:

(a) Natural diffusion--a spreading of the innovative word through the social system by natural process (e.g. teachers, students, administrators)

(b) Natural communication network utilization--identifying opinion leaders and circles of influence (Advisory Board, Union, Central Board)

(c) Network building--diffusion networks using informal contacts for "selling" innovations (teacher unions, principals' organizations)

(d) Multi-media approaches--different media are effective at different stages of diffusion-awareness, interest, evaluation, trial and adaptation (Progress Reports, TV presentations, conferences)[4]

The PCS staff seemed more at ease using such an informal strategy. This may explain, in part, the transition from the explicitly identified formal institutional change model of the early phase of PCS to the more informal diffusion model. It may also help to explain these observations:

a. The social-interaction strategies supplemented, or replaced, any original plan for an institutional change model that would be used to analyze and critique Project adaptation in the schools. It is possible however that such an institutional change model may still be a long-range objective for PCS.

b. The cooperative change model cited in Progress Report 5 (September 1, 1975-November 30, 1975), preceded the social interaction strategies and may have set the tone for use of these methods.

c. No written reference is made to any institutional change model since the early Progress Reports (1975)

d. "(The model) is really a combination of the four most often used change models as described by Havelock."[5]

As described in an early Progress Report, the original cooperative PCS change model (See Progress Report #5) outlined these steps to be followed in dissemination:

> "define audiences, identify the main interest groups, establish cooperative connections, assess specific needs and identify resources, organized for basic research, organize for general evaluation and dissemination."

The elements of the cited model however, are more a series of methods to be used in the diffusion of Project ideas and not an institutional change model or a paradigm for analyzing on-site implementation problems. This shift from the original Project direction toward developing a formal institutional change model to the use of an information-sharing dissemination model was a serious shortcoming, in the view of the evaluation team, since it did not allow for careful planning of the steps needed for effective implementation at the Project school sites. In addition, the dissemination model did not address such issues as the usefulness of other outside change specialists vis-a-vis use of inexperienced on-site coordinators and interns.

From 1977 through 1979 specific tactics and strategies were employed by the Project leadership. Opinion leaders who were persuasive, influential, and visible were sought by the Project to help in the dissemination process. Teacher union leaders, science educators, Central Board administrators, and others were enlisted in the effort to attract students, and interest school districts. It was an informal, but "natural" diffusion at the district and school levels. Pre-service interns, on-site coordinators, cooperating teachers, and building principals were all involved in publicizing the Project. It was the intention of PCS to have each building develop a project "identity" and transmit the hands-on science methodology to interested staff and administration.

The use of a social-interaction orientation is hindered, however, by obstacles present in the "natural dissemination network." These obstacles include the difficulty involved in identifying the most influential opinion leaders, the slow rate of "spreading the word" on PCS, and the distortion of messages as they are transmitted through the huge city system. Moreover, the S-I orientation is based on the successful "selling" of an innovation after it has been completely tested and packaged. PCS of course has not "packaged" any of its key features. For better or worse, the Project has not put together any instructional or curriculum packets for easy dissemination to teachers in other districts. This, of course, was not an original goal of the Project. However, for an S-I orientation to be successful, the Project staff would need to have considered such an approach.

PCS Viewed as an "Outside" Innovation and its Effect on the Dissemination Program

The Project's main ideas were originally formed and developed in a university setting. It was funded through a national agency. The change specialists were basically university people.

The various school personnel interviewed during the past year perceived PCS as an "outside" innovation, imported by the district for a variety of motives. This was both natural and accurate in regard to all the basic elements of the PCS model. Cooperating teachers and administrators generally see the "hands-on", and pre-service teacher dimensions of PCS as "university" associated, and not the result of any specific set of internally generated educational needs. Of course on the other hand, the Project is often perceived by district personnel as an "add on" and viewed positively since it provides them with extra hands and minds. Basically, the cooperating-teacher personnel in any school consist of volunteers who accept certain risks for certain rewards. For example, a cooperating teacher who accepts a PCS student teacher may do so because it will provide additional time for planning lessons or marking papers or for tuition free NYU courses. Such a system has been going on in most schools for many years.

The type of teaching approach employed by PCS was felt by some cooperating teachers to involve greater risk then the ordinary student teacher arrangement. These risks included lack of goal clarity in the use of "hands-on", appearance of possible classroom safety factors, discipline problems, and lack of support by administrative staff. Some teachers reported they were reluctant to try this approach because they lacked the science background and could not spare time to take courses or attend workshops in this area.

In today's educational climate, traditional classroom procedures for teaching basic subjects have a strong attraction, especially in urban areas where there are many external pressures on teachers and administrators. A "hands-on" instructional approach is running against some basic trends in urban centers at this time. "Back to basics" has brought forth a new rhetoric, and

City school personnel respond to some of its appeal. Supervisory and administrative personnel, especially at central office levels, have expressed more concern over competency-scores and measures of reading skill then innovative methods for junior high school science instruction. The PCS staff has indicated to some degree, its intention of responding to this trend, and mentioned the possibility that Citiscience Notes may broaden its themes to include development of reading skills using science content. Still, the resistance to "hands-on" was high.

Applying an "outside idea" to those "inside" the system presented the on-site coordinators with a difficult dilemma. Some of the more effective on-site coordinators were able, through the use of interpersonal skills and good judgment, to help teachers see the benefit of trying new instructional approaches. Dissemination of Project ideas was difficult when left solely to on-site coordinators and interns, however. One effective tactic employed by the Project was its effort to develop a cooperative working relationship with teachers. The PCS staff complemented this through its work with union leaders. Support by the teacher union leadership has been reported, and teacher membership on the Advisory Board led one union representative to state:

"Project City Science works through and with the teachers."

Though considered an "outside" idea, PCS was <u>not</u> viewed by cooperating teachers as an innovation that was forced on them by central office administration. Thus, the staff avoided a mistake some proponents of innovation make. They did not become so identified with central office administration that teachers in the classroom began to distrust the Project's motives.

One unintended outcome of the Project's concentration on working cooperatively with teachers may have been the development of a schism between supervisory and administrative personnel. Interviews have revealed that a schism existed between PCS staff and a few district administrative personnel. Some of this had to do with the role of curriculum in the Project's conduct of "hands-on" instruction. It was the understanding of the central office staff that master teachers would prepare pre-service interns, and that the district curriculum would remain intact. As time passed, some supervisory personnel became concerned with the efforts of PCS staff to change the curriculum. A deeper cause of the schism,however, was the result of the Project staff's not maintaining contact with some of the administrative personnel. Interaction after the initial years was all but non-existent. That is a bad misuse of a potential resource and a suprisingly inept mismanagement of what were otherwise reasonably smooth relationships with school personnel. For dissemination purposes, it was an unfortunate area in which to perform poorly.

In seeking advice about implementing change in the schools, the PCS staff brought the matter to the attention of their Advisory Board at the June 1975 meeting. They received some excellent counsel from one of their Board members, who anticipated the difficulty they would face.

> "...the project needs a change model. (The Board member) stated that the project must assume that teachers know more about how to improve the situation than they can implement, instead of assuming only lacks and deficits in the part of the teachers.
>
> (The Board Member) felt that the project needed to adopt an explicit change model or strategy, perhaps by adding an organizational change specialist to the staff." 6

This Advisory Board Member's recommendations were implemented to the extent that a diffusion model was outlined for use, an institutional change model was not. The evaluation team believes that an institutional change model, while not insuring success, could certainly have helped the University staff, analyze and evaluate a wide range of tactics they could have used to encourage wider use of the "hand-on" approach in the schools.

University-sponsored projects face strong resistance among some staff and administrators. This was true for PCS as it is for most innovative programs. A key factor in the acceptance of a new instructional system is the teaching staff's perception that the innovative efforts are central to the goals of the school. As the evidence from interviews with the on-site coordinators, pre-service interns and cooperating teachers indicates, the hands-on approach never assumed such a view in the minds of too many of the key personnel in the schools.

1. Progress Report #5, September 1, 1975 - November 30, 1975, Appendix VIII

2. Appendix A and B, Evaluation Report.

3. Havelock, Ronald G., The Change Agents Guide to Innovation in Education, Educational Technology Publications, Englewood Cliffs, N.J., 1973.

4. Havelock, Ronald G., Planning for Innovation, University of Michigan, 1969, cited in Progress Report #5, Appendix VII.

5. Ibid.

6. Minutes of Advisory Board Meeting 6/7/75.

APPENDIX S

SAMPLE EDITIONS OF CITISCIENCE NOTES

citiscience notes

Things to do - places to see for the intermediate school science teacher

Project City Science is a National Science Foundation-funded project, operating from New York University, to help improve intermediate school science teaching in New York City. We are currently at work in Districts 4 (East Harlem) and 17 (Crown Heights, Brooklyn). As part of our attempt to aid all intermediate junior high school science teachers in the City, we intend to publish each month citiscience notes.

This month's issue, our first, will include descriptions of major scientific places and events of interest to intermediate school students and teachers. The notes will be divided into categories including Museums, Media, Workshops and Conferences, and Free Materials. We are considering incorporating into the notes additional topics such as Student's Activities and Accomplishments, Field Trips and District Fairs and Activities. We welcome any advice you can give us on how to make these notes more useful to you.

Museums

Each month, in addition to listing information on major metropolitan museums, the notes will highlight one institute of particular interest to New York City teachers and students in grades 6-9. This month's "feature" is the New York Aquarium:

THE NEW YORK AQUARIUM.
Boardwalk, West 8th Street, Brooklyn,
(212) 266-8540.
Open every day from 10-5
Fee: Adults-$1.25;Children(6-12)-.60¢

The Aquarium is a particularly enjoyable field trip for junior high students, and offers a wide range of educational programs to school groups. These programs stress biology, and can serve as an exciting teaching resource and laboratory. A brief description of tours as offered in the Aquarium's brochure guide for grades 7-12 follows:

Aquatic Habitats. Principles of the ecology and biological significance of aquatic habitats utilizing specific animal exhibits to explain basic concepts.

Adaptations: Teacher's guide to forms of animal adaptations to aquatic environment, e.g. sensory functions, locomotion.

Adaptations: A discussion of the evolution of animal life allowing animals to adapt to adverse conditions in their aquatic realm, coloration patterns, poisonous devices, body coverings and behavior patterns.

Additional topics include Oceanographic Tools, Endangered Species and Aquatic Ecology.

In addition, lectures ranging from 1/2 to 1 hour in length on varied topics are available for classes, and are conducted by Aquarium instructors [illegible] nteers.

Basic Information on Other Major New York City Museums follows:

THE AMERICAN MUSEUM OF NATURAL HISTORY.
Central Park West at 79th Street,
(212) 873-1300.
Mon.-Sat. 10-4:45, Sun. & Holidays 11-5
Pay-what-you-wish admission fee.
Group visits before 1 pm. by appt. (873-7320)

HALL OF SCIENCE OF THE CITY OF NEW YORK.
Flushing Meadows, Corona Park, P.O. Box 1032, or 111th Street & 48th Avenue, Flushing, New York,
(212) 699-9400.
Weds.-Fri. 10-4, Sat. 10-5, Sun. 1-5
Admission is free, but there is a 25¢ charge for the Planetarium and 25¢ for the "Rendezvous in Space" Show. Reservations for school trips can be made by calling 699-9400.

The Hall is offering a "Saturday Science Adventures" series of special science programs for children 6-13. The program consists of 4-week courses at 10, 12, and 1:30 on Saturdays beginning November 1. The fee is $8.00.

MUSEUM OF THE CITY OF NEW YORK.
Fifth Avenue & 103rd Street,
(212) 534-1672.
Tues.-Sat. 10-5, Sun. 1-5
No admission fee.

In November, a puppet workshop is offered to children 6-12 for a fee of $25.00. The classes meet on November 1-8-15-22.

AMERICAN MUSEUM OF NATURAL HISTORY-
HAYDEN PLANETARIUM.
Central Park West at 81st Street,
(212) 873-8828.
Mon.-Sat. 10-4:45, Sun. & Holidays 11-5
Admission: Adults $1.75; Youths 17-under $1.00; Students over 17 $1.00.

Of particular interest is "Laserium:The Cosmic Laser Concert." Performances are every Friday thru Sunday night at 7:30-9:00-10:30. Guaranteed seating is available at Ticketron. Fee $3.00. For more information call 724-3413.

THE NEW YORK ACADEMY OF SCIENCES
2 East 63rd Street, New York,
(212) 838-0230.
Since it was founded in the 1800's, the Academy has played an important role in science education. Today the Academy organizes conferences which relate to research, and holds a particular interest in the interrelationship between science, society and government. The Annals is published as a record of the proceedings of Academy conferences. In addition, the Academy publishes a magazine entitled The Sciences.

citiscience notes

things to do - places to see

for the intermediate school science teacher

January 1978

SCIENCE ON A SHOESTRING

This special issue of *citiscience notes* is full of lists, lists and *more* lists of FREE and INEXPENSIVE science materials you and your students can use in class and at home.

This sampling of pamphlets, films, cassettes, maps and charts will give you a good idea of the variety and quantity of science aids availabe *free* from public and private sectors.

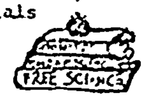
GUIDELINES FOR REQUESTING AND USING FREE MATERIALS:

- When requesting materials, use official school stationery.
- Be as specific as possible about the kinds of materials you need.
- Review materials *before* using them in class. (Many items reflect the biases of the issuing organization; others may contain either controversial subject matter or controversial treatment of subject matter.)
- Return *promptly* and in *good condition* those materials that are on loan.

IDEAS FOR USING FREE SCIENCE MATERIALS:

- To supplement textbooks and library readings
- To use as displays for class bulletin boards
- To illustrate student reports and projects
- To enrich classroom collection of study prints
- To give students experience selecting, classifying and cataloguing science materials

MAKING AN INITIAL INVESTMENT:



Building a free materials resource library will be time and money well spent. Project City Science staff members have found the following references invaluable sources of booklets, charts, slides... free!

Educators Guide to Free Science Materials Educators Progress Service, Inc., 214 Center Street, Randolph, Wisconsin 53956. $11.25 + $0.95 postage and handling.

Selected Free Materials for Classroom Teachers by Ruth Aubrey. Fearon Publishers, Belmont, California. Available at Barnes & Noble bookstores. $2.50.

The Science Teacher and *Science and Children* Magazines published by the National Science Teachers Association, 1742 Connecticut Avenue, N.W., Washington, D. C. 20009. Comprehensive membership in the NSTA brings you both magazines for $35.00 per year (price includes membership and subscription fees)

To help you get started on your search for free materials, we've listed below, in alphabetical order, public and private organizations that offer *free* and/or *inexpensive* materials to science teachers and students.

Those marked with an asterisk have been checked out by PCS staff as being particularly valuable and worthwhile sources of information.

Unless otherwise indicated, all offerings are made to teachers.

Please remember that this information is subject to change.

ALUMINUM ASSOCIATION 750 Third Avenue, New York, NY 10017

"The Story of Aluminum"* -- pamphlet: up to 30 copies sent free.

"Recycling, An Ecology Study"* and "Challenge & Change, A Story of Science & Technology"* -- audiovisual kits and teaching guides sent on loan.

AMERICAN EDUCATION PUBLICATIONS Education Center, Columbus, OH 43216

Ecology booklets, grades 4-6* -- sold as a set @ 35¢.

AMERICAN GAS ASSOCIATION Att'n: Education Service, 1515 Wilson Boulevard, Arlington, VA 33309

"How the Jet Engine Works," "Look to the Future," "Fuel Cells," and "Science Behind Your Burner" -- these four films are available on loan.

Natural Gas Newsletter, "Story of Gas Energy," Experiments: Properties of Gas & Heat Energy; Stencils and Teacher's Guide* -- one copy each sent free.

THE AMERICAN MUSEUM OF NATURAL HISTORY, Central Park West, New York, NY 10024

Excellent courses given to teachers with college credit available. Contact the Education Department. Natural History magazine sent monthly to museum members. Special exhibits and lectures for all age groups featured monthly; contact museum for group information and reservations.*

AMERICAN PAPER INSTITUTE 260 Madison Avenue, New York, NY 10016

"How You Can Make Paper"* -- 30 copies of this chart available free of charge.

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Published monthly during the school year by Project City Science funded by the National Science

Workshops and Conferences

Under this category we will bring to your attention several workshops and conferences of potential interest to you. Again, we welcome you to contribute any information on activities or resources you know of which might be of interest to other teachers.

LILLIAN WEBER'S WORKSHOP CENTER FOR OPEN EDUCATION
City College, Convent Avenue & 140th Street,
(212) 368-1619.
Mon.-Thurs. 4-6, Sat. 10-1

The Workshop offers workshops and other activities of help and interest to teachers, principals, supervisors, para-professionals, parents and students in the New York City area. It was established in 1973, and is a free facility. The Workshop publishes a quarterly journal, monthly Notes and a monthly calendar of its activities (available at a subscription fee of $1.50 per year). Workshop topics are varied, and samples include: Reading Assessment, and Making Simple Science and Math Equipment.

Project City Science itself is offering weekly workshops for the benefit of our teachers in participating districts. All intermediate school science teachers are welcome to attend these workshops. There is no fee for attendance. Please note that all workshops in District 17 meet at the District Offices at 2 Linden Boulevard (at the corner of Flatbush Avenue near the Church Avenue stop of the 7th Avenue IRT in Brooklyn). Meeting places in District 4 workshops are noted. A listing follows:

Wed., Nov.5 (District 17) 3:30-5:00
COPES (Conceptually Oriented Program in Elementary Science) This and the following workshop will introduce the COPES science project as a means of supplementing existing physics units with a hands-on-materials approach. Emphasis will be on the conceptual schemes: conservation of energy. This concept will be illustrated by means of activities with heat and mechanics.

Wed., Nov.12 (District 17) 3:30-5:00
COPES Continued.

Mon., Nov.17 (District 17) 3:30-5:00
"Reading and Science Teaching" Prof. Trika Smith-Burke will discuss ways of teaching reading and reading skills in the context of science lessons.

Thurs., Nov.13 (District 4) 3:30-4:45
Science Center, D4. P.S.101 (111th Street, West of Lexington Avenue).
Community Resources Field Trip: Where do you get eyeglasses for free if you live in District 4 and cannot afford them? How can you use street resources as the basis for a science lab? We have some insights on how to try to do these things and will explain how.

Thurs., Nov.20 (District 4) 3:30-4:30
I.S.117 (109th Street, between 2nd & 3rd Avenues)
"Race, I.Q., and Genetics"

Audiovisual Aids, Free Materials

Earlier this year, the AAAS published its Science Film Catalog. The 398-page book contains a description of, and index to, elementary, junior high and adult films relating to science, broken down into categories such as social sciences, life sciences, history of science, medicine, etc. In future notes we will include brief descriptions of one or two inexpensive or free films that might prove useful to you as supplements to your classroom presentations.

Free materials can serve as a "saving grace" to any teacher. The Educators' Progress Service, Inc. of Randolph, Wisconsin publishes an Educator's Guide to Free Science Materials which contains descriptions of hundreds of such materials. Films, slides, tapes, magazines, posters, charts, etc. are all included in this valuable resource book. The following free materials might be of particular interest to teachers this month:

Biology:
Miss Goodall and the Wild Chimpanzees, a 16mm sound color film, 28 minutes in length. The film, recording Goodall's 5 years in Tanzania studying the life of wild chimpanzees, can be obtained from Aetna Life and Casualty, Public Relations and Advertising Dept./ Film Library, 151 Farmington Avenue, Hartford, Conn. 06115. Borrower pays return postage. Two months advance booking.

General Science:
Alaska Earthquake, 1964, a 16mm color sound film, 22 minutes in length, which is available from the U.S. Geological Survey, Branch of Visual Services, 303 National Center, Reston, Va. 22092. Borrower pays return postage.

Earth Science:
Beyond Disaster, a 16mm sound color film, 28 1/2 minutes long, recreating the hurricane of 1928 which killed 2000 Americans. Recent methods of water management are presented in this film which can be obtained from the Central and Southern Florida Flood Control District, Florida Dept. of Commerce, P.O. Box 6, West Palm Beach, Fla. 33402. Borrower pays return postage, Book one month in advance.

Physics:
The World Beyond Your Light Switch focuses on the dramatic work of the Bonneville Power Administration crews. The film is 28 minutes in length, 16 mm color sound, and is available from the B.P.A. at the U.S. Dept. of the Interior, P.O. Box 3621, Portland, Oregon 97508. Book two months in advance. Borrower pays return postage.

Media

WNYE-FM 91.5 is the Board of Education's radio station. In the fall term, a course entitled Twentieth Century Science is being offered for students in Grades 5-9. November's schedule is as follows:

Nov. 3: Freud: Exploring the Unconscious
Nov.10: Fleming and Florey: The Penicillin Mold
Nov.17: Enders,Salk,Sabin-Conquering Polio
Nov.24: Transplants: A New Kidney, A New Life

Shows are broadcast at 10:15 Tuesday, 1:15 Wednesday and 11:15 Thursday.

WNYE also has a t.v. station (25) which carries its programs. November's schedule follows:

Nov. 3: Medicine
Nov.10: Mass Production
Nov.17: Electronics
Nov.24: Agriculture and History

Broadcasts are Tuesdays 1:00, Wednesdays 2.30 and Fridays 10:30.

The Project City Science office is located at N.Y.U., School of Education, Press 52, 32 Washington Place, N.Y.C. 10003. Our phone numbers are 598-2131, 2132, 2019.

PROJECT CITY SCIENCE
CITISCIENCE NOTES

NEW YORK MARCH-APRIL 1978

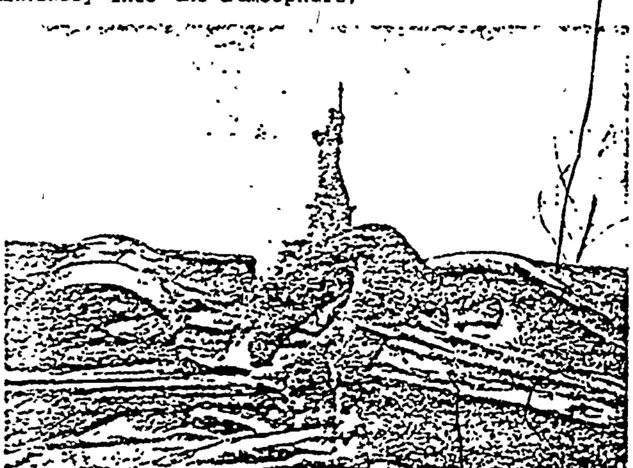
THE GREAT GARBAGE ISSUE

NEW YORK CITY is piled higher and deeper in garbage than any other city in the world. 30,000 tons of solid waste get dumped daily into pails, bins, trucks, lots and, of course, the streets.

And things are not getting better. By the mid-1980s, New Yorkers will be tossing 40,000 tons of papers, peels, cans and cartons onto the garbage stockpile daily.

when smoke gets in your eyes...

Solid refuse is only part of the problem. The air you breathe carries sulfur dioxide, nitrogen dioxide, oxidants and carbon monoxide. The average person breathes 35 lbs. of air each day, and for every man, woman and child living in New York, there are about 600 lbs. of these pollutants dumped annually into the atmosphere.



And have you ever tried to take a swim in the Hudson River or sought a moment's peace in Grand Central Station? Water and noise pollution are such urban hazards that water filters and ear plugs are becoming a way of life in New York City.

Pollution threatens people, animals and plants alike, and in our highly industrialized society there is no getting under, over, around or above it. Traces of DDT are found as far south as Antarctica.

This double issue of *citiscience notes* takes a look at the grit and grime that plagues the city and offers some suggestions for incorporating urban environmental protection into science lessons.

For classroom gardeners there are garbage gardening projects that will turn city classrooms greener this spring. Enjoy!

What Science Teachers and Students Can Do:

conduct science lessons on the different types of urban pollution and its effects on the urban ecosystem

suggest pollution preventing science projects students can do at home

build an environmental reference library in your science classroom (see suggested references)

start students on a letter-writting campaign as part of an environmental science course (see suggested references)

inquire about permission to involve your class in a lot cleanup; expand this project into lot gardening

make family and friends aware than when they carelessly toss wrappers, cigarette butts and papers on streets and in parks they are contributing to the heap

The Environmental Protection Agency of New York City offers the following suggestions for reducing the problems of air, water, noise and garbage pollution. You may want to incorporate some of these ideas into environmental lesson plans.

use mass transportation whenever possible

save a watt

support clean air and water legislation

find out if your apartment and school incinerators are installed with properly maintained pollution control equipment

put refuse in recyclable bags and seal whenever possible; try to put out trash only on collection days

use litter baskets and classroom garbage pails for refuse

sweep your sidewalk

avoid overpackaged products; return redeemable bottles and save cans and bottles for recycling centers

don't dump -- call your local department of sanitation for bulk pickups (if you are discarding usable or repairable furniture, clothing or appliances, contact a nonprofit organization such as the Salvation Army, Goodwill Industries, Volunteers of America, etc., they may be able to put these items to good use -- ed.)

clean up after pets; it's the law

Published monthly during the school year by Project City Science, funded by the National Science

AMERICAN PETROLEUM INSTITUTE 1271 Avenue of the Americas, New York, NY 10020

Free educational/environmental materials available.

CALIFORNIA REDWOOD ASSOCIATION 617 Montgomery St. San Francisco, CA 94111

"Trees, Lumber, Forests"* -- free pamphlet sent to teachers and students.

CHANNING L. BETE CO. 45 Federal Street, Greenfield, MA 12301

"It's a Dirty Old World" -- free booklet sent to teachers and students.

COCA COLA 515 Madison Avenue, New York, New York

"Man and His Environment" -- free kit.

CON EDISON 4 Irving Place, New York, NY 10003

"How to Use Electricity & Gas Wisely & Save Money Too," "Save a Watt Energy Savers #1-8," "An Electric Talking Picture"* -- free, unlimited copies sent to teachers and students.

EASTERN AIRLINES Educational Programs P.O. Box 752, Darien, CT 06920

"Eastern Ecology Kit"* -- teacher guide,lesson plans and filmstrip sent on loan to teachers.

EDISON ELECTRICAL INSTITUTE SERVICE 90 Park Avenue, New York, NY 10016

"Conservation of Electricity," Electricity Comic Books, Cardboard Models of Electric Power Systems and Multimedia Kits* -- free to teachers and pupils.

FOOD & AGRICULTURE ORGANIZATION OF THE UNITED NATIONS Liason Office,1776 F Street N.W., Washington, D.C.

"Fishery, Soil, Food, Plants, Animal Cycles"* -- seven individual charts sent free to teachers & pupils.

UNIVERSITY OF MINNESOTA Agricultural Extension Service, Bullet. Room, St. Paul, MN 55701

"Trees and Our Environment" -- free booklet.

NATIONAL AIR POLLUTION CONTROL ADMINISTRATION Publications Unit, Rockville, MD 20352

Free materials available to students and teachers.

NATIONAL AUDUBON SOCIETY 950 Third Avenue, New York, NY 10022

A wide variety of high quality teaching aids at minimal cost. Descriptive brochure sent free.

NATIONAL WILDLIFE FEDERATION 1412 Sixteenth Street N.W., Washington, D.C. 20036

"Ranger Rick" and Teacher Packet* --"Ranger Rick" environmental magazine available by paid subscription, teacher packet sent free.

NEW YORK LUNG ASSOCIATION 22 East 40 Street, New York, NY 10016

"Air Pollution"(glossary),"Respiratory System"and "Breathing: What You Need to Know"*(pamphlets) -- free to teachers and students.

SACRAMENTO COUNTY OFFICE OF EDUCATION Instructional Materials Center, 6011 Folson Boulevard,Sacramento CA 95819

"Indoor/Outdoor Natural Learning Experiences, A Teacher's Guide" -- individual and classroom activities for the elementary level. 90 pp. $1.50.

SAN DIEGO ZOOLOGICAL SOCIETY Department of Education, San Diego County, San Diego, California

Duplicating masters & lesson plans in wildlife free. Large mounted photos can be purchased at minimal cost.

SUPERINTENDENT OF DOCUMENTS, Government Printing Office, Washington, D.C.

This government office disseminates a wealth of information to the general public at low or no cost. Free listing of publications available.

TAYLOR INSTRUMENT COMPANY Consumer Products Division, Arden, NC 28704

"All You Want to Know About Humidity" and "Weather Forecasting With Your Barometer"* -- free pamphlets sent to teachers and students.

THOMAS ALVA EDISON FOUNDATION Suite 143, Cambridge Office Plaza, 18280 West Ten Mile Road, Southfield, Mich. 48075

"Energy Conservation Experiments You Can Do," "Environmental Experiments," and "Electricity & Chemistry Experiments"* -- free to teachers & pupils.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Washington, D.C.

"Recycling"(glossary),"Noise"(chart),and "Fun With the Environment"(booklet)* -- free to teachers and students.

UNITED STATES DEPARTMENT OF THE INTERIOR 604 South Picket Street, Alexandria, VA 22304

"San Andreas Fault," "Collecting Rocks," "What Is Water," "Our Changing Continent," "Gold," "What Is the Ocean," and "Metric Conversion Facts"* -- free booklets sent to teachers and students.

ZERO POPULATION GROWTH 50 West 40 Street, New York, New York

Free materials available. Information may prove controversial; teacher discretion is advised.

These are just a few good sources of information and materials. Contact local, state and federal conservation and energy offices for other classroom ideas.

Editor: Nancy Stone

Free Materials compiled by PCS staff members Christine Abate and Marcia Rudy.

OUT OF THE CAN AND INTO THE CLASSROOM

For information, booklets and help with pollution problems, *write:*

The Environmental Protection Agency (EPA)
Public Information and Education
2345 Municipal Building
New York, NY 10007

Department of Air Resources (Division of the EPA)
120 Wall Street
New York, NY 10005
(contact this office for info on noise pollution and for a citizen's noise complaint affidavit kit)

Department of Water Resources (Division of the EPA)
2345 Municipal Building
New York, NY 10007

or call (in New York City):

Air Pollution Complaint Center
966-7500

Airplane Noise
995-2823

Hydrants (broken or running)
966-7500

Lot Cleanup
677-9470

Mayor's Action Center
566-5700

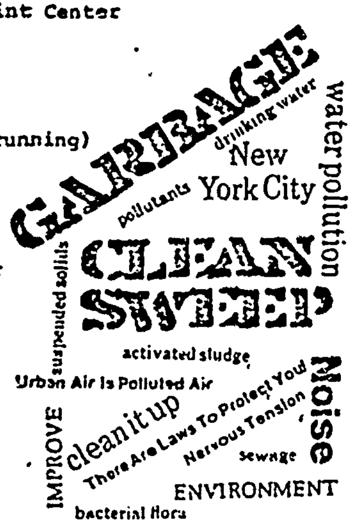
Parks Information
472-1003

Pest Control (Rats)
566-7726

Pot Holes
566-3681

Sanitation Complaints
964-1800

Water Pollution
966-7500



send for EPA booklets

GARBAGE -- We all know what it is and where to find it, but what can we do with it?

A lot of "junk" can be recycled into science equipment and projects. For instance, you might try "garbage gardening" or build a balance from cups and scraps of wood.

All it takes is a little imagination and the right kind of garbage. Listed below are items to look for that can be used in a science classroom.

<u>SUPERMARKET STUFF</u> - cartons, fruit crates, packing materials, styrofoam fruit and meat trays...

<u>JUNKYARD JUNK</u> - electric motors, mixers, radios, wire screening or mesh...

<u>AROUND THE HOUSE</u> - jars, candles, fish bones, cottage cheese cartons, 35mm film cans, ice cream containers, seeds from fruits and vegetables, shoe boxes, wire hangers, egg cartons, bottles, jars, foil, milk cartons...

<u>JOB LOTS</u> - cardboard boxes, carpenter's supplies, dental tools, electronic materials, plastic materials...

<u>LUMBERYARD SCRAPS</u> - doweling, floor & wall tiles, scraps of wood...

<u>HOSPITAL SUPPLIES</u> - adhesive bandage cans, analysis tubes, chemical stains, corks or rubber stoppers, cover slips, discarded transfusion equipment (sterilized, without needles), flexible vinyl tubes, hose clamps, medicine cups, pill vials, plastic containers, plastic eyedroppers, narrow-mouthed bottles, plastic petri or culture dishes...

N.B. Some of these items may be difficult to obtain. Some states require a permit for possession of syringes. After using such equipment, be sure to collect it all before dismissing the class.

Now that you have collected, cleaned, labeled and stored garbage "finds," what do you do with them? PCS staff members offer some ideas:

turn gallon mayonnaise jars into simple aquariums and terrariums

fly old mimeos and other paper handouts as paper planes; use old handouts to create oregami art

grow your own vegetables and fruits from seeds thrown out after cooking at home

sprout roots and new leaves from carrot and pineapple tops

fill washed cups, jars and containers with powders and solutions; use these items for storage

use spice shakers and jars to dispense and hold powders (e.g., iron filings)

build animal habitats from scrap lumber and old screening

experiment with fiber from old clothing and rags

fly a kite made of paper and plastic bags

conduct an experiment in sound by filling large, empty bottles with varying levels of water and striking them with a wooden dowel, pencil or broom handle

strain substances through netting from potato or onion packaging or use old stockings

start seeds in milk cartons

cut open old transitor radios and dry cell batteries

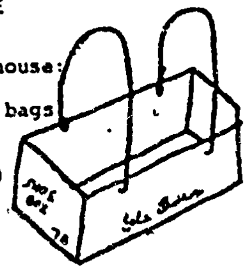
conduct absorption, reflection and solar energy experiments with aluminum foil; use tin cans for heating solids and solutions (file sharp edges)

build a pinhole camera with soup cans and wax paper

grow a garden in a greenhouse built from old lumber scraps

STARTING FROM SCRAP

BUILDING A CLASSROOM GREENHOUSE



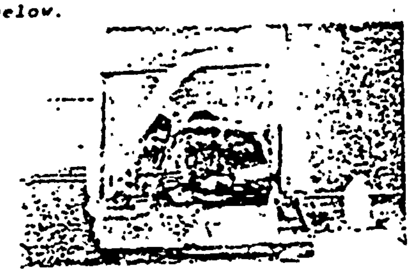
Materials for small greenhouse:

large plastic drycleaning bags
shoe box
wire coat hangers (2)
electrical tape (optional)

Instructions:

1. take the two wire coat hangers and bend into large "U" shape to fit across shoe box
2. either secure each hanger to outside of box (one at each end) with heavy duty tape or run wire through box and over edge
3. line shoe box with plastic bag *(you may either fill box with dirt, starting with a layer of gravel for drainage, or fill box with small planting receptacles)*
4. drape plastic covering over hangers and secure with tape to outside of box

This "mini-greenhouse" is ideal for starting seedlings. Place in indirect sunlight (e.g., northern exposure). When seedlings begin to mature, you may want to transfer them to a larger, more substantial greenhouse. Instructions are given below.



Students at I.S. 115, Bronx

Materials for large greenhouse:

large fruit crate
large plastic drycleaning bags
approximately 9 2'x4' boards or similar scrap lumber
hammer, nails, stapler

Instructions:

1. remove about one-half of the wooden slats on fruit crate so that crate stands approximately 6" high
2. build a frame over the orange crate with lumber and nails *(see picture above)*
3. line crate with plastic and drape plastic over frame
4. follow instructions given above for planting

BUILDING FROM JUNK

BUILDING A PINHOLE CAMERA

Materials: 1 shoebox
1 small sheet of wax paper
scissors
tape

Instructions:

1. cut out one end of shoebox
2. cut a square of wax paper to fit over cut out end and tape to box so that wax paper fits tightly over the cut out space
3. with a small, thin nail, thick needle or similar object, punch a small hole in the opposite end of the box
4. secure lid of shoebox with tape

This design can be improved upon by making the following adaptations:

1. cut out large viewing hole in one end of shoe box and leave open
2. cut out a hole approximately the size of a quarter in opposite end of shoe box; cover securely with tin foil and make a pin prick in the foil
3. tape a square of wax paper inside box parallel to and approximately 10" from end with viewing hole

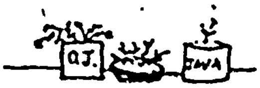
You can also build pinhole cameras from tin cans by following these instructions:

1. wash and dry thoroughly two large soup cans (or cans of similar size)
2. take one can and open both ends and cover one end with wax paper
3. take the other can, leaving one end unopened, and punch a small hole in unopened end
4. paint the inside of both cans with black paint
5. attach the two cans together with masking tape so that no light can seep in

Instruct students to point the pinhole towards a bright object. Looking through the viewing hole, they will be able to see an image on the wax paper.

Remind students that in a real camera film is used instead of the wax paper, and a lens takes the place of the pinhole. In fact, if the pinhole camera were light-proof, film could be used with fairly good results.

GROWING A GARBAGE GARDEN



There's no need to spend money on seeds that are readily available from home or from the school cafeteria. Have students collect some of the following seeds to plant in a classroom greenhouse:

squash, watermelon, avocado, lemon, orange, tomato (keep citrus seeds wet until planting)

And why spend money on pots and planters? Almost all of our food stuffs are packaged in containers that are easy to clean, easy to store, hold water and dirt and make a good start for growing seedlings. These are:

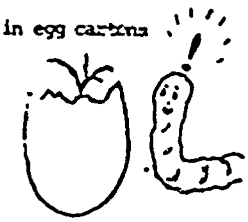
margarine tubs, plastic containers from deli salads, coffee cans, milk and juice cartons, soup cans

<u>You can also start seedlings on the half-shell!</u>
Fill half an empty eggshell with loose, sterilized potting soil. Tin foil pressed into shape in an egg carton may be substituted. You may start two seeds per unit.

Place planted eggshells or tin foil in egg cartons

Place seedbed by sunny windowsill

Keep bed moist -- not wet! Cover with Saran Wrap to preserve moisture



As seeds begin to sprout, remove Saran Wrap for one hour each day, increasing this exposure by an additional hour daily, for five days. Remove wrap entirely on fifth day.

To transplant maturing seedlings, simply crush eggshell (gently) and transplant in garden or larger pot. If you have substituted tin foil, simply unwrap the foil.

FOR THE BOOKSHELF

Abraham, George and Katy, *Green Thumb Activities for Classroom Gardeners*. The Instructor Publications, Inc., Dansville, New York 11437. 1975. $2.45.

Cheap but Interesting -- A Conglomeration of Gadgets and Gizmos Made Primarily Out of Junk Which May Be Useful in Your Classroom. Project on Elementary School Mathematics and Science, University of Illinois at Urbana-Champaign, 606 East Grove Street, Champaign, Illinois 61820. 1973. *Write for price information*. (The Project is a course content improvement project funded by the National Science Foundation.)

Boehm, Robert G. *Illustrated Treasury of General Science Activities*. Prentice-Hall, West Nyack, New York. 1975. $13.95.

Rockcastle, Verne N., Salamon, Frank R., et alia. *STEM Elementary School Science, Teacher's Edition, Level Six*. Addison-Wesley, Reading, Massachusetts. 1975. School price: $10.56.

MARINE BIOLOGY IN THE INTERMEDIATE SCIENCE CLASS
A PROJECT CITY SCIENCE OPEN WORKSHOP. MAY 8, 4P-6P. NEW YORK UNIVERSITY, 28 WASHINGTON PLACE, PRESS ANNEX BASEMENT. CALL (212) 598-2131. SEE YOU THERE.

THE COMMUNITY COLUMN

PROJECT JABES

Jamaica, N.Y. One seventh-grade class in Queens is concerned with the pollution problem in its own backyard. Miss Josephine Casey and her science students at Robert Goddard Junior High School, Ozone Park, are working in Jamaica Bay under the Jamaica Bay Environmental Study (Project JABES), observing and investigating the flora, fauna and problems facing the area.

Originally a cooperative effort between Robert Goddard Junior High and Beach Channel High, the program involves students in experimental work in physical and chemical oceanography, marine biology and ecology. All research is now being conducted in the Robert Goddard oceanographic lab.

Field trip activities include studying wildlife in its natural habitat, collecting sample organisms for closer scrutiny in the lab, and researching the history and environmental problems facing Jamaica Bay environs and wildlife inhabitants.

As a result of this interest and close study, Miss Casey and her students have produced a concise booklet reporting their research and findings.

If more New York City science teachers and students became active in similar environmental projects, perhaps areas such as Jamaica Bay would not be sentenced to a slow death from raw sewage, gas and oil spills, and contaminated wildlife.

("Project JABES" booklet sent free on request. See address below.)

For information on teacher and study-oriented environmental programs in New York City, contact:

COUNCIL ON THE ENVIRONMENT OF NEW YORK CITY, 51 Chambers Street, Room 228, New York, New York, 10007 (212) 566-0990

ENVIRONMENTAL ACTION COALITION, 156 Fifth Avenue, Suite 1130, New York, New York 10010 (212) 929-8481

GATEWAY ENVIRONMENTAL STUDY, Floyd Bennet Field, Brooklyn, New York 11234 (212) 252-7307

HIGH ROCK PARK CONSERVATION CENTER, 200 Nevada Avenue, Staten Island, New York 10306 (212) 987-6233

JAMAICA BAY COUNCIL, 321 Beach 57th Street, Arverne, New York 11692 (212) 474-6507

WAVE HILL CENTER FOR ENVIRONMENTAL STUDIES, 675 West 252nd Street, Bronx, New York 10471 (212) 549-2055

MONUMENT OR MONSTER?

Bronx, N.Y. What's Pelham Bay Park when it isn't a park?? It's home of a 160-foot high man-made garbage mountain. Residents of the area as far as six miles away can catch a whiff and a glance at this towering heap on a clear day.

Why Pelham Bay Park? According to the Department of Parks, there's no other refuge for the refuse, although some people think that Ferry Point Park has been without a mountain for too long.

Editor: Nancy Stone

Project City Science, School of Education, Health, Nursing and Arts Professions
New York University, Press 52, New York, N.Y. 10003

APPENDIX T

Project City Science Preservice
Selection Guidelines

Preservice Selection Process

1. Basic questions of applicants answered (usually by phone).
2. Description of Project City Science and application forms sent to applicant.
3. Interviews arranged with Associate Director and one or more staff members. The attempt here is to answer the basic questions: How good are the applicant's chances of success in teaching science in a NYC junior high/intermediate school in terms of future relationships with
   a) administrators
   b) other teachers
   c) students of grades 6-9
4. Site visits to Project schools when possible for most of one day. This visit is usually the best place for an interview to take place because of the spontaneous reaction, questions and discussions that take place with students and teachers.
5. Interview with Associate Director (see attached).
6. Associate Director discusses each applicant with staff who also has interviewed them
7. Full Project staff considers all applicants for acceptance.
8. Letters of acceptance and details of program sent out.

Types of questions used to judge attitude toward children

1. Teaching

Why do you think you will like a teaching career?

How long have you been thinking about it?

2. Children

Any previous formal experience with teaching, with children (camp counselor, neighborhood volunteer, coach, etc)?

How do you remember yourself in grades 6-9?

Experience with children in own family or neighborhood (babysitter, etc.)?

What subject would you like to teach in the future? Where? At what level? (many talk about a single subject at private high school level here)

3. Adults

How was your own student career (K to college)?

What kind of teachers did you like? Dislike?

What do other members of your family do? Any teachers?

4. City

How long have you lived in NYC? Other urban area? Like it?

What is special about urban schools? When were you last in one?

5. Jobs

What jobs have you liked best? Least? Why?

How long worked there - why leave?

Do you feel you are starting, continuing, changing your career ideas? Why?

6. Science

Have you considered another science career (research, technologist, applied, etc.)? Why decide otherwise?

Interview with Associate Director

Aim: To predict the applicant's chance for success in teaching in grades 6-9 of the NYC public school system, especially in those schools where Project City Science is involved.

Time: Usually about 45 minutes

Prior preparation: Have read applicant's

a) grade transcripts

b) NYU application forms

c) answers to PCS six essay questions

1. What personal and/or work experience contributed to your choice of teaching as a profession?

2. In your opinion, what personal qualifications do you possess that make you particularly suited to a career in teaching? Discuss strengths and limitations that might influence your effectiveness as a teacher.

3. Project City Science is committed to improving the learning experiences of inner-city early adolescents. What do you see as the main problems and advantages of this work? Have you had contact with adolescents in grades 6-9?

4. Why do you wish to pursue your degree with the Project City Science team?

5. How would you describe the quality of your academic experience with courses you've had in science and education? Do you expect that graduate work in these fields will be different?

6. In terms of your educational and career goals, how do you envisage yourself five years from now?

Procedure: A) Fill out form (attached) of basic information given verbally by applicant which will later be used for course advisement. This also serves to help the applicant relax. B) Consider the following attitudes and possible problems while asking the type of questions given below.

Attributes

Considered: (Based on PCS staff desired qualities for dealing with administrators, teachers, students)

1. How open, honest, sincere?
2. How sympathetic, empathetic?
3. How expressive, articulate, communicative?
4. How realistic, practical?
5. How patient, tolerant, calm?
6. How energetic, creative, imaginative?
7. How self-confident, determined, secure?

Problems (Looked for in reading essays & transcripts and listening) considered:

1. Large, <u>unexplained</u> differences in academic record.
2. Many job changes within short periods.
3. Many questions about salary, time involvement rather than goals.
4. Many commitments for the coming year.