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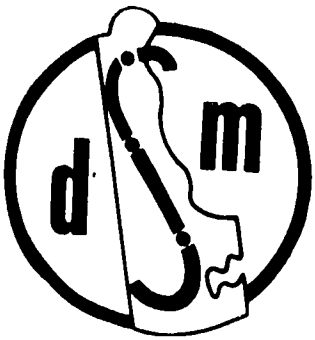
ABSTRACT

This report describes the creation, funding, promotion, and evaluation of the three resource centers and the instrument repair center of the Del Mod System. Included in the document are descriptions of the three science-mathematics resource centers at the University of Delaware, Delaware State College, and Delaware Technical and Community College. The mechanics of operation of a resource center and teachers' and field agents' views regarding centers are described in some detail. A summary includes comments about various aspects of the center programs with recommendations for future activities and for others interested in similar developments. Appendices include the original Del Mod proposal, operational policies, questionnaires, and cost data. (RH)

del-mod system

1971-1976

STATE OF DELAWARE



The Evolution of the Del Mod System's Science and Mathematics Resource Centers 1971-1976

By Sarah Richardson

Foreword by John R. Bolig

FINAL REPORT

VOLUME II

THE EVOLUTION OF

THE DEL MOD SYSTEM

SCIENCE AND MATHEMATICS RESOURCE CENTERS

1971-1976

By

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Research Technician
May 20, 1976

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Director of Research

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FOREWORD

A separate report on Del Mod Resource Centers seems appropriate as Del Mod terminates. Over the past five years, two aspects of the Del Mod System have received the greatest national attention; the resource centers and the field agent programs. Since communities outside of Delaware would be unlikely to consider a systems approach to science education or an interrelated resource center/field agent program, separate reports on each have been prepared. From Del Mod's perspective in Delaware the two programs are separable, but combined they are a strong entity. Anybody considering a resource center or a system of centers can profit greatly from the discussion of Del Mod's centers.

There are three resource centers and an instrument repair center (see Appendix G), and to varying degrees, they are very successful. But, from a strictly Del Mod perspective, only one met the 1970-1971 proposed objectives. A second center was forced by circumstances to adapt itself to the needs of its host institution, and the third center has yet to evolve into a strong representative of either the Del Mod System or of its host institution. The instrument repair center was created in lieu of an originally planned fourth center when the need for this service was discovered.

Resource centers are not a new concept in education, nor was Del Mod's approach particularly innovative. Nonetheless, there is a great need for the supportative services centers can provide for teachers and school administrators. The selection of appropriate curriculum materials for teaching in the 1970's can be very confusing, and the re-education of teachers to use new materials can be very difficult at a school or at a district level. The saving in money that can be realized by the centralized collection of new materials at a center for review purposes by districts can more than justify the center's existence. Without these resources, districts are at the mercy of salesmen from the various publishing companies. It has been Del Mod's experience that districts can become involved in very expensive programs which end up on store room shelves due to a lack of understanding of the nature and expense of science and mathematics programs offered by salesmen who take their profits and run.

The report which follows discusses the creation, funding, promotion, and evaluation of centers. It was a difficult report to assemble due to the imprecise nature of much of the data available. It is the Del Mod position that Miss Richardson

has done the best job possible, but we invite the reader to visit the centers, all of which will continue to exist and function following Del Mod's termination in June, 1976, because a visit will most dramatically convey the essence of the value of centers to teachers.

John R. Bolig
Del Mod Research
Director

CHAPTER I

INTRODUCTION

INTRODUCTION

The Del Mod System was conceived as an experimental model. The System was designed to improve science and mathematics education in Delaware through a cooperative effort of the components in the State's educational system. Through experimentation it was hoped that the viable and beneficial features of Del Mod would be separated from the less successful features, and subsequently be worked into the State's system as permanent programs.

The programs proposed for the Del Mod System were designed to meet the needs cited in the Purnell Report.* A Field Agent Program was designed to provide teachers with a means of improving teaching techniques for general problems and individual concerns. Resource Centers were developed to make available those materials which teachers often felt were lacking in Delaware science education. At the outset, Resource Centers were perceived to be the nucleus of Del Mod, around which all else would revolve. They were home base for the field agents, disseminators of newsletters, physical facilities for workshops and inservice days, and sources of science and math resources for inservice teachers. Every major component of the Del Mod System was in some way associated with the Resource Centers. Initially they were designed to house science resources, and in 1972, mathematics resources.

The development of the Del Mod System idea and the institution of Resource Centers were really almost casual. However, once the idea of the systems approach was hit upon as a viable solution to the weaknesses of Delaware science education, nearly two years were devoted to careful work and planning. It seems as though the conception of Del Mod is really a function of the right people being in the right place at the right time.

The development of something similar to Del Mod was inevitable in light of the climate of thought in science education. By 1968 the National Science Foundation (NSF) had been primed for the systems approach to education. Both Dr. Theodore Reid and the new head of NSF, Dr. McElroy, were in favor of "grassroots"

*Purnell, C. H., The Status of Science Teaching in Delaware, 1969.

support for NSF through grassroots contact. Such support would strengthen the foundation of NSF against cutbacks of future funding.[1]

Also, in 1968, Governor Peterson and Representative DuPont were elected to their respective offices. Each man was quite interested in education, particularly secondary education. They provided the added boost which prompted the Purnell Report in the winter of 1969, and the subsequent support of the Del Mod System.

Finally, there was a feeling of need in the schools and among the teachers themselves. The lack of adequate materials was a primary concern, leading to the concept of the Resource Centers.

It has been reported that Del Mod was born "over crabs and beer on the beach." There is a grain of truth in that. It had been previously established that the State and NSF would together attempt to create a means of improving science education in Delaware. The first decisions concerning the format of the plan for improvement did take place at a beach party during the summer of 1969, attended by Russell Peterson, Theodore Reid, Burt Pratt, Charlotte Purnell, their spouses, and Dr. Magat.[2]

By the end of January, 1970, steady communication between NSF, the University of Delaware, the Governor's office and the DuPont Company had been established. Plans were being made for a joint meeting and funding for a Science Teaching Center (the precursor of the Resource Center concept) was being discussed. NSF had stated that science education in Delaware "should be at the top of the list of new comprehensive programs in science education for the United States. The important factors were (1) the careful planning and good communications among the various interested groups, (2) the small size of Delaware and the wide variety of types of school districts, which should provide an ideal setting for innovative experiments, and (3) the local industry support and interest, which represents a unique factor and is regarded as highly favorable."[3]

In March, 1970, an important meeting took place in the Governor's office. The distinguished gathering included the State Superintendent of schools, the Presidents of Delaware Technical and Community College, Delaware State College and the University of Delaware, NSF representatives, and Department of Public Instruction representatives. Ideas for the system were

solidified, and it was concluded that a formal proposal should be compiled. Once such a proposal was submitted, the money was almost assuredly forthcoming.[4]

The preliminary work for the proposal was completed during the summer of 1970. In September, a conference involving Delaware's supervisors, educators, and industry and college representatives was held (see Appendix B). The conference provided a unity of purpose and reaffirmed ideas compiled over the summer. The ground work for Del Mod had been laid, and the focal point was to be the Resource Centers.

The transition from the amorphous ideas of 1969 to the 1971 proposal for the Del Mod System (see Appendix A) was affected by many interested people from the Governor's office, the State's colleges, NSF, DuPont, Hercules and DPI. The first proposal was written by Charlotte Purnell, State Science Supervisor. That was submitted February, 1971; funding began July 1, 1971. The first resource centers were opened by February, 1972. The preliminary work done, Del Mod could then set to work building itself.

The Del Mod System is comprised of many components, and financially was supported by many institutions. The National Science Foundation has been Del Mod's primary benefactor. Several industries in Delaware have contributed substantial support to many of the Del Mod programs. The DuPont Company's generous funding has opened up possibilities for projects for which federal money, by law, could not be spent. Hercules provided money for individual teacher projects; Crystal Trust donated a complete videotape outfit to facilitate field agent workshops and one or two dissertations. The support of State Industry in an educational project speaks well for both the industries and the project.

The history of the creation of Del Mod is probably not essential to the monograph. However, it should better explain the reasons for the format and goals set forth in the first proposal. Although the main focus here is on the Resource Centers, it is difficult to separate them out of the System, at least during the first years of Del Mod.

From the beginning stages, it was planned that the housing institutions of the Resource Centers would gradually assume more and more of the expenditures. The structure of the financial proposal for the Centers implied and intended permanence.

Fortunately, the Resource Centers have proven to be very viable and beneficial products of the Del Mod System. While it is still uncertain what parts of Del Mod will continue after the termination of the NSF Grant, it is apparent that the Resource Centers have already been absorbed into the housing institutions.

Each Center has fulfilled the basic guidelines of a Del Mod Resource Center. All the Centers are equipped with the core collection of materials; all are relatively conducive to meetings, workshops, seminars, or professional get-togethers; all have duplicating and audio-visual equipment available; all the collections are supervised and updated periodically; all serve teachers from the surrounding areas.

In many ways, the similarities between the respective Resource Centers end there. By associating each Center with a different institution, an interesting and logical phenomenon has occurred. Because each Center is housed in a different institution, a different personality and nature is manifest in each Center. And, because each Center is used by varying populations, the materials in each Center have been adapted to individual institutional needs. Consequently, it is not possible to look at only one Center; rather, the three Centers constitute a Resource Center System.

In the past, the Resource Centers have been criticized as lacking originality and uniqueness. On a national level, perhaps that is true. However, on a State level, the Resource Centers have filled a large gap that formerly existed in science and mathematics education in Delaware. The small collections in most school districts were generally inadequate. The money from the NSF Grant gave the State of Delaware three highly developed and sophisticated collections to serve 26 districts.

The clearest idea of what the Resource Centers were intended to be can be found in the first proposal, a section of which can be found in Appendix A. The Resource Centers and the Field Agent Program are considered to be the most successful aspects of Del Mod. (A study of the Field Agent Program is being undertaken elsewhere.) This study will attempt to account for the success of Resource Centers as compared to the original proposal. It will also show the evolution which must necessarily take place when the Resource Center Program is implimented as it was in Delaware.

The funding for Del Mod officially began on July 1, 1971. At that time the February proposal was implemented almost without change. There were minor alterations, resulting primarily from reduced financing. However, for the most part, the fundamental objectives of the February 1971 proposal remained unaltered then and in the subsequent years. In fact, "the resource center objectives have been the most consistent parts of Del Mod."[5]

One function of this report is to analyze how the working Resource Centers compare to the hypothetical ideal. What the Council of Presidents envisioned that a Resource Center should be is evident in abstract form in the proposal which follows the "Science Resource Center Operational Policies," (see Appendix C).

The few basic changes between the proposal and the final form of the Del Mod Resource Centers were logistical in nature. For instance, the Center proposed for the Wilmington Delaware Technical and Community College Campus never materialized. In its stead, two years later, the Instrument Repair Center was established (see Appendix G). For the most part, the proposed equipment and materials can be found in each Center. Not all the intended teacher activities take place in all the Centers because of the nature of each Center.

This last observation leads up to one of the most important aspects of the Resource Center experiment. Each of the three Centers has a very different nature. The differences between the Centers can be accounted for in terms of each housing institution. Although Delaware Technical and Community College, Delaware State College, and the University of Delaware all have a basic common purpose, providing a college level education, they each serve different populations and operate under slightly different philosophies. These varying philosophies in part are reflected in each Center.

The original proposal describes a single prototype for a Resource Center. Interestingly--and logically--these differences are a result of the intention that the Resource Centers be absorbed by the housing institutions. If a college or university is going to absorb the costs of such an operation, those costs have to be justified to the institution. In this case, the Centers have been adapted to the particular needs of each institution, in addition to serving the State's inservice teachers. This phenomenon can best be seen in the descriptions of the three Resource Centers in Chapter II.

THE PURNELL REPORT

In the late 1960s Delaware began to take a good, hard look at the State's educational system. Science education was of particular concern. As a result, the State Science Supervisor set to work studying and evaluating the status of science education in Delaware. This study resulted in the report published under the name of "The Status of Science Teaching in Delaware," known as the Purnell Report.

The status of elementary, junior high school, and senior high school science was evaluated. The backgrounds of Delaware science teachers were noted. Of particular interests were the continuing education of science teachers and the kinds of laboratory work done in the classroom. The conclusions were that both aspects were less than what they should be for effective and dynamic classroom science.

Provisions for science education had never been adequately made for the elementary level. It was discovered that even by the upper elementary level, the average time spent on science daily was only forty-five minutes. Of that forty-five minutes, "about 75% of the time spent in science was teacher-centered using lecture-demonstration methods interspersed with discussion. Films and filmstrips were widely used, but laboratory experiences were considerably limited."[6]

> Educational television was used rather widely throughout Delaware. Greater utilization was made at the primary level than at the upper elementary level, but most teachers admitted that there was little preparation or follow-up activities for the telecast. For most, the television series served as an enrichment activity. [7]

Students were hearing science principles, and via Educational Television were even seeing science study; but, most elementary children were not being shown how to <u>do</u> science experimentation.

> Manipulative equipment for student use was scant in quantity, except in those programs which used kits as their medium for accomplishing student involvement.... In general, the equipment tended to be of the kitchen variety or cast-off from another school. [8]

The conclusions about elementary science education revealed what had been learned by the Purnell study, and the limitations involved in evaluating what students were learning.

> 1) Science in the elementary school was largely a reading program with little student participation. 2) The utilization of the AAAS program has added the dimension of student participation to science teaching, but this program was only prevalent in the primary grades. 3) About 1/3 of the schools were departmentalized for science teaching at the upper elementary level. 4) Little equipment was available for science teaching. 5) Educational Television was used as an enrichment activity by about half of the schools. 6) Program evaluation and student evaluation were based largely on student performance on tests. 7) Monies spent on science instruction were slight in comparison to other areas. 8) Evaluation criteria varied from teacher to teacher.[9]

In short, science education in the elementary classroom was somewhat less than optimum.

Science at the junior high school level was characterized by little to no continuity of program throughout the State. "... The amount and kinds of activities were largely determined by the facilities in which the program was taught..."[10] Proposed curricula could only be implemented if the facilities available met the needs. Most junior high schools (or middle schools) were old buildings with antiquated science facilities, if indeed, there were any facilities. Other buildings had exceptionally fine equipment left by former high school classes.

> In general, the type of program in the junior high school grades varied from: 1) a totally teacher-oriented one with the lecture-demonstration technique utilized totally (about 38% of the classes) or 2) laboratory activities on a scheduled basis (16% of the classes) or 3) a combined lecture-demonstration and laboratory program with laboratory activities as an integral part of the program within the classroom (46%).[11]

By the 7th, 8th, or 9th grade, students were being exposed to scientific experimentation, at least from in-class demonstrations.

However, there was no guarantee that every student could cease to live under the misconception that science was strictly a textbook discipline.

Evaluating the junior high school science programs was not only a problem for the Department of Public Instruction (DPI) team, but also for the schools.

> Little effort was made to set up a continuous evaluation procedure, and the impact of a program was ascertained only by teacher opinion. Some teachers sought anonymous student critiques at the end of the marking period; others circulated desk lists, but the impact these student remarks made on the teaching style or the content of the course was difficult to determine.[12]

The summary of conclusions about science education on the junior high school level were somewhat disturbing.

> 1) Course offerings in grade 7 were mostly life science, in grade 8 life science, and in grade 9, physical science. 2) The predominant teaching method was the lecture-demonstration technique with laboratory experiences not a dominant phase of the program. 3) Here service load was approximately 160-170 students with the average class size of 33 students. 4) Seventy-five percent of the science classes were conducted in converted classrooms. Relatively few schools had science labs per se. 5) The average per student expenditure was $2.35 but many teachers feel this cover was high. 6) Laboratory equipment was minimal. 7) Students' progress was evaluated mostly on test scores and little attempt was made for continuous program evaluation."[13]

The status of science education on the junior high level was not outstanding. In fact, this was later determined to be the level where Delaware science education was the weakest.

The senior high school level proved to provide the better science education of the three levels. However, some problems with a complete science program peculiar to the senior high level. During the 1969 study, "...it was interesting to note that there was seen an appreciable drop in student participation at the 11th and 12th grade levels, and that most of the students who did elect science were those of superior ability."[14]

> Contrasted with the junior high school program there was much greater emphasis on laboratory activities. Almost all courses had closely correlated laboratory programs, and many, especially physics, chemistry, advanced science, and academic biology courses, had extended time periods for laboratory. This trend did not hold true for non-academic programs.[15]

Apparently those students who were in non-academic programs were being taught science in much the same way they had been for nine years--primarily out of a textbook. Only the academic elite at the high school level were receiving the best science education the State could offer.

The conclusions of the report were as follows:

> 1) The predominant science in grade 10 was biology, in grade 11 chemistry, and in grade 12 physics. 2) Teachers estimated that almost all students enrolled in a biology course at sometime during their high school career. 3) There was considerable drop in student enrollment in science courses in grade 11 and grade 12. 4) There were few science courses for non-academic students after grade 10. 5) The service load was 120-130 students per day with an average class of 24. 6) Although the leading teaching strategy was lecture-demonstration, laboratory experience increased at this level. 7) Science facilities were in general good and laboratories well-equipped. 8) The average per pupil expenditure was $4.30 but many teachers considered this high. 9) Evaluation of student progress was based mainly on test scores, and little provision was made for continuous program evaluation.[16]

There were definite short-comings in Delaware science education. The problems apparently stemmed from two sources: money for materials and facilities, and teaching techniques. Science education was not a top priority in schools. The bulk of school monies was allotted to other disciplines, presumably the area of humanities. However, money for education is a constant problem for all school boards -- there is truly never enough for anything.

The other factor, the teachers themselves, was an issue touched upon by the report. All science teachers had at least the minimum academic requirements to teach in Delaware; however, very few had any more. The Department of Public Instruction

was concerned about teachers terminating their education upon graduation from college, particularly when science is such a dynamic discipline.

The most significant aspect of the "Status of Science Education in Delaware" was the results of interviews with teachers. The needs teachers cited coincided with the Department of Public Instruction's observations.

> It is noteworthy that almost all of the needs cited by science teachers deal with teaching techniques and strategies other than the need for further studies into their particular discipline. Almost universally the question of the slow learner was tantamount. The lack of materials and ways to work with the slow learner were again cited by most teachers. It was also of interest that the plight of the bright student was down on the list, and only rarely was the average student mentioned. Likewise, the problem of discipline per se was not mentioned, but rather the factors which lead to disciplinary problems were of concern.[17]

Presumably, the dissastifactions expressed by the teachers were related to textbook-oriented teaching methods. When a class is taught from a book at a level geared toward the average student, the slow learners invariably fall behind. Teachers also mentioned the lack of science materials, which might modify teaching techniques and ultimately student response and success. Each teacher's needs for new teaching techniques and strategies, coupled with the limited material resources had produced the short-comings of Delaware's science education.

It was concluded that "the needs of science teachers were in the area of teaching techniques and strategies rather than content."[18] The conclusions also point to the role of the National Science Foundation in teacher education. At least a percentage of teachers in the State were open to the idea of the NSF Summer Institutes, and found them beneficial. However, for the non-participants of NSF programs, time and distance were very real problems.

One can finally determine that the status of science education in Delaware was a direct result of a general dearth of science manipulatives and laboratories and certain non-material teaching needs expressed by science teachers. Rectifying this situation takes time and money. The Department of

Public Instruction report stated the situation of science education in 1969. It offered no solutions to the problems and no real commendations for the successes; it merely "told it like it was."

Within a year, however, one of the authors of the report responded to "the status of science education in Delaware." With this study as incentive, ideas for solutions to problems expressed by teachers and observed by the Department of Public Instruction were constructed. The Purnell Report is actually a part of Del Mod's history. The needs reported inspired the concept of the Resource Centers, which led to the creation of Del Mod.

CHAPTER II

DEL MOD SCIENCE AND MATHEMATICS

RESOURCE CENTERS

OVERVIEW

The concept of the Resource Centers came about in response to the need for innovative and "hands-on" materials cited in the Purnell Report. Obtaining statistics on the alleged dearth of materials in schools was virtually impossible. The reports from teachers on what was available in schools was the primary source of reference. Apparently large districts had "collections of things -- and they (were not) much more than things".[1] Most districts had nothing other than what was housed in individual classrooms. An overwhelming percentage of the science materials that were owned by districts had been purchased from catalogues sporting color photographs and glowing descriptions of the particular kit, text, or program being advertised. Those materials frequently ended up gathering dust in closets.

In the past five years, the aims and purposes of the resource centers have remained constant. In fact, "the resource center objectives have been the most consistent parts of Del Mod."[2] Those objectives can be found in the proposal in Appendix A, and are reiterated in every subsequent proposal.

Before field agents were chosen and assigned to centers, there was a need for people who were knowledgeable enough about science materials to begin an effective center. To accomplish this, Delaware's own resources were tapped, and an Advisory Committee was formed. The end product was envisioned, and the Advisory Committee was one means of getting there. A 31-person group was named in October, 1970, to determine the basic collection to be housed in each resource center. The group consisted of six secondary teachers, six elementary teachers, four principals, three science supervisors, four Chief School Officers, four people from the industrial community, and several Del Mod planners.

In addition to assessing the basic needs of the schools and the teachers, the group compiled the list of materials, which, if used, could help meet those needs. The core list became the basis of each of the three resource center collections. The committee, having completed its purpose, was dissolved in late 1972.

Once the Resource Centers were planned with the help of the Advisory Committee, work on the physical plant had been begun, and the Resource Center Directors chosen, it was then the policy

of Del Mod to turn over control of the Centers to the Directors. A list of basic required facilities was included in the 1971 proposal. The Advisory Committee aided in formulating the core list, the minimum collection each Center was required to have (for the list see Appendix D of Proposal Renewal, March 1, 1972). After it was seen that each Center would meet the minimum needs, they were almost completely in the hands of the center Directors and the respective housing institutions.

The Del Mod Director did retain control of the budgetary concerns. Each Center was given money annually according to the judgement of the Director of Del Mod, but with the recommendations and proposals of each Center. Over the past five years, the financial support from the National Science Foundation monies has been reduced for two of the three centers, as originally planned, and the housing institutions have phased in support according to their needs and desires. For instance, for FY 1972, National Science Foundation money alone established the Delaware Technical and Community College Resource Center; by FY 1976, DTCC is paying 75% of the Center's costs.

The original proposal contained a provision for field agent offices in the Centers. It was planned that each field agent would have one center to call home. This was set up under the premise that "centers could function without field agents, but field agents could not function without centers." Each field agent is "physically under the jurisdiction of his or her respective center, fiscally under the Del Mod Director."[3]

The three locations mean that the Field Agents no longer have to operate out of their cars (as was done in the 1970 field agent pilot program). Over time the collections at Delaware State College and the University of Delaware also began serving the college communities. "Resource centers, like field agents, have been one of Del Mod's more successful ventures. They have become not only centers for the inservice teachers, but also college curriculum centers."[4]

The Resource Centers were designed as much more than the locations housing collections to loan to teachers. In fact, the primary purpose of the collections is that of a sample stock. As had been determined from the outset, teachers tended to order strictly from catalogues, essentially because they had no other alternative. By being able to inspect or test kits or texts, teachers could make better decisions about what would work with their classes.

The Centers are more than just science and mathematics collections by design; they were also intended to house workshops and field agent offices, provide meeting places for teachers, field agents and Del Mod personnel. "It has been stated that the Science (and Mathematics) Resource Center is the pivot around which all phases of the Del Mod System revolve and is the locus for all activities."[5]

The pivotal nature of the resource centers in part explains the stability and different successes of the resource centers. However, as Del Mod is completing its last year, the resource centers are now less focal points and more independent entities than before. The field agents are "in the field" most of their time, although they all maintain offices in the buildings housing the Centers. Fewer workshops are being held in the Centers. The amount of use by inservice teachers varies center-to-center, inversely proportional to the number of preservice teachers using the Centers.

The prototype resource center collection is reminiscent of the sample stores in Edward Bellamy's Looking Backward. The stores of Boston in 2000 A.D. were showrooms for the goods housed in warehouses outside the city. A customer could inspect an item before purchasing it and then have it delivered at his home. This arrangement allowed a person to see what he was going to buy in three-dimensions, and not force him to purchase some household item from a catalogue. Likewise, the resource centers allow a teacher to see exactly on what he is going to spend his district's and the taxpayers' money before ordering it from a catalogue, and risking poor judgement.

As Del Mod is concluding its existence as a formal program, the service offered to inservice teachers is dwindling in two of the resource centers. One of the responsive evaluators warned against this trend in the institutions with undergraduate preservice training:

> The resource centers represent a potential source of very valuable service to the science teachers. Del Mod in providing the basis for their establishment has made a genuine contribution. One can only wonder why this type of service was not established long since within the State. The location of these centers at educational institutions is altogether reasonable. This will probably mean that their greatest use will be for pre-service training. However, once these have been established for an extended

> period of time, their value for in-service training will steadily increase. It will be important, however, if their usefulness to science teachers is to be well realized, that continuous attention be given to the convenience and needs of these teachers. There will be a very easy tendency to regard the prime needs of regular students as of such dominant and sufficient importance to overlook the regular teachers. Such a simple matter as the problem of transportation and parking for visiting teachers was frequently mentioned. It will be very important in the long run for there to be some personal contact such as can be provided by the field agents to insure an active inducement and follow-up on utilization of the resource centers.[6]

Resource Center Uses

The kinds of uses received by individual Resource Centers are all mentioned in the descriptions of each Center. To itemize these uses is a more satisfactory way of visualizing the diverse populations utilizing the Del Mod Resource Centers.

Inservice Teachers. Del Mod's target population has always been the inservice science and mathematics teachers in Delaware. As of December 1, 1975, there were 4,240 teachers on Del Mod's roster. These were teachers who had participated in Del Mod projects and workshops, visited a resource center, or asked a field agent to place them on the rolls.

Of these teachers, it is difficult to determine how many have actually used one or more of the Centers. Two of the Centers ceased providing a guest book long ago, and the third maintains a policy of non-aggression in terms of requesting visitors' signatures. Consequently, it is likely that there are a number of teachers who utilize the resource who are not on the Del Mod roster. It would be presumptous to guess at numbers, but questionnaires and conversations seem to reveal that well over 2,000 of the State's teachers have visited a Resource Center at least once.

The teachers utilize the Centers in various ways: the most important use involves examination of the resources of the Centers. Teachers tend to visit the Resource Centers based on comments of their colleagues, suggestions given by field agents, knowledge of the Centers through workshops, and the persuasion

of newsletters (the latter is particularly true at the Georgetown Resource Center). When the teacher arrives at a Center, he or she either examines the resources at random, or requests specific information on a particular aspect of his or her discipline.

In examining the resources at a Center, the teacher may have certain end in mind. He may be searching for information to supplement his classes; he may be searching for "hands-on" materials with which to experiment in his class; he may be sampling materials with a purchase for his district in mind. Very often the equipment borrowed is too expensive for a district and therefore unavailable to the teacher without the Del Mod collection. At all three locations, materials may be borrowed for classroom use for one week. Many times, if a program or kit is extremely successful, the borrowing will result in the purchasing of the material for the district (it having been proven to be a worthwhile expenditure in the classroom).

Teachers tend to take advantage of the newsletter "tear-offs" with regularity. They also make extensive use of telephone service. The State Courier is not as widely used, because not all teachers are aware of the Courier. It has been mentioned that workshops are or were held in the Centers. Attending a workshop is often the first exposure a teacher has to a Resource Center. One of the Centers has ceased housing workshops, at the option of the field agents. After the termination of Del Mod, there will be no workshops, and Inservice Day meetings at the Centers will be at the discretion of the districts.

With regard to the inservice teachers, the Del Mod evaluators on the whole tended to prefer the one center housed in an institution with no undergraduate population utilizing the Center. Mr. Alan Osborne speaks to this as a success factor in future resource centers:

> Free the centers from institutional constraints imposed by having them serve both pre-service functions and the needs of teachers. The evidence of use in Delaware indicates the center that single-mindedly serves inservice teachers (Sussex County) is the most successful.[7]

Preservice Teachers. Two centers are housed in schools with an undergraduate population majoring in Education. The University of Delaware and Delaware State College Resource

Centers are housed in the education buildings of the respective campuses. It is, therefore, quite natural that the schools would use the Resource Centers to the advantage of future teachers.

The primary use of the Centers for the preservice teachers stems from the Education Methods courses. Since preservice teachers are usually required to construct curriculum suggestions and student teachers are required to submit lesson plans for a given period of time, the Resource Centers provide the focal point for the students' plans.

> The resource centers offer several potential benefits to the educational institutions where they are housed. First, they can serve the students as a major resource with regard to current developments in educational materials. They can also bring a sense of currency and reality to the academic program by having working materials on hand and also by conducting their own programs of familiarization. Second, by serving the public school teachers, they can bring into the university a direct contact with the realities and problems of the classroom. Third, they can enhance the service role of the University by making available to the public school system resources and capabilities not otherwise so readily accessible.[8]

An additional advantage of utilizing the resource centers on the undergraduate level is that a generation of teachers are being produced who are aware of the resource centers and know how to use them. Furthermore, the student teachers carry information from and about the resource centers into the schools.

The depth of student involvement varies center-to-center. Since Delaware Technical and Community College has discontinued its Science Technician Program, there is no student use of the Science and Mathematics Resource Center. The Delaware State College Resource Center is used by both the Science Education majors and various science and mathematics majors. The Methods courses for the Science Education majors stress familiarity with the resources. The University of Delaware Resource Center serves the entire College of Education. Because they have expanded their collection so radically, they are equipped to deal with any discipline that would be of concern to an education major.

These collections provide the materials necessary for in-

depth Methods courses and curriculum studies for the preservice teachers. Student teachers occasionally make use of the "hands-on" materials in their classrooms. The primary advantage of serving future teachers is that their exposure to "hands-on" instruction might well improve the education of the future.

Field Agents. Each institution housing a resource center has provided office space for at least one field agent. In the first year of Del Mod, there were two field agents, one science field agent housed in the Willard Hall Education Building on the University of Delaware campus and the other science field agent housed in the Resource Center in Georgetown. During the 1974-75 fiscal year, there were six field agents: a science field agent in the Georgetown Center; a mathematics field agent in the Humanities and Education Building in Dover; two field agents at the University (one science, one mathematics); one science field agent in the Alfred I. duPont district; and one science field agent in the Wilmington district.

The field agent usage of the Resource Centers was the subject of a study in 1975. Some responses to that can be found in Chapter IV. Let it suffice to say that the amount a field agent depends on a Center is proportional to the amount in-service teachers depend on that same Center. Whether this is an a priori situation, or whether field agents and teachers tend to respond to the same stimuli at a resource center is difficult to determine.

A field agent's overall use of a Center is diverse, and it represents the pivotal nature of the Resource Centers. Field agents utilize the Centers' collections and make suggestions which help keep those collections up to date. They use the Resource Center spaces for workshops and meetings with individual teachers. They rely on clerical and informational assistance from the Centers.

It was hoped that the Field Agent Program would serve as a natural link between inservice teachers and Resource Centers. That kind of relationship existed with some of the field agents, but it was not the general rule. Field agents are invaluable to the success of the Del Mod System, but not always in relationship to the Resource Centers.

An interesting reaction from the responsive evaluation countered some of what Del Mod personnel have always presumed about the field agent/resource center relationship. The resource

centers have been regarded as an asset to the Field Agent Program, dependent upon the field agents for publicity and for the more well-rounded and in-depth service offered only by experts in a discipline. Mr. Osborne, however, suggests a closer dependency on field agents for a higher quality resource center; in fact, he suggests that resource centers are almost a subset of the field agent program:

> Tie the operations of the Field Agents more directly to the centers. Cowan uses the Sussex Center effectively. No comparable use is made of the Dover or Newark centers ....Of the two, the field agent operation seems more important to me. I think of the resource centers as a useful extension of the field agent operation...[9]

If Mr. Osborne is correct, and the Field Agent Program terminates with The Del Mod System, the Resource Centers may well suffer. The Directors of each Center think this is not the case. The Field Agent Program has been an asset to initiating center use, but whether there is a true symbiotic relationship will be seen in the Georgetown Center in the next few years.

Workshops. Del Mod Workshops are mini-courses or seminars conducted by field agents, teachers, or college professors on various aspects of science, mathematics, or metric study. The participants in these courses sometimes receive University credit for the course work, but usually take the courses for their own edification.

For several years, the Resource Centers were convenient, central locations for workshops. During the 1974-75 academic year, nearly 50% of the Del Mod sponsored workshops were held in a resource center. It has been shown through surveys (see Chapter IV) that the workshops have had an effect on the exposure of resource centers to the inservice teacher population.

Inservice Days. Each year the State teachers are required to attend several Inservice Day programs. Through the Department of Public Instruction, Del Mod has sponsored several Inservice Day programs, statewide and district-wide. Usually several sections of the inservice teachers meet in the Resource Centers. These visits to the Centers are often the first for the teachers, and serve as an introduction to the facilities. This year (1975-76), there will be no statewide Inservice Day, but districts are still taking advantage of the facilities for

their Inservice Days.

Comment

Hopefully the Centers have not only increased the effectiveness of educational money, but have increased teacher interest in science and mathematics education. Determining what impact the Resource Centers have had upon Delaware students is an impossible task. Any improvements can be attributed in part to field agents, workshops, resource centers, or a combination of some or all programs.

One of the Stufflebeam Evaluation* team members mentioned a discussion he had in Delaware regarding the Resource Centers:

> I asked a mathematics supervisor what should be continued after Del Mod. He says, "First, the field agent project; second, teacher training through in-service." I ask, "What about the resource centers?" "Oh," he says, "I take that for granted, so I didn't talk about them....I hear only favorable things from teachers. Their only criticism is the restriction of time things may be kept. It is a useful thing, and might be incorporated as part of the University of Delaware, Delaware Technical and Community College, and Delaware State College."[10]

* The Stufflebeam Evaluation was conducted in 1974 by a team of evaluators, headed by Daniel Stufflebeam. The National Science Foundation hired this group to evaluate both of its systems approach experiments in Delaware and Oregon.

UNIVERSITY OF DELAWARE

The Facility The Resource Center in New Castle County is located on the campus of the University of Delaware in the School of Education. The Center first opened in January, 1972, as the Science Resource Center. The second floor location in the Willard Hall Education Building (spread throughout several rooms in two suites) was temporary. The move to the bottom floor of the building facilitated the consolidation of the Center's materials and the future expansion of the Resource Center.

The location upstairs consisted of two sets of rooms. One contained conference rooms, individual study/testing spaces, an audio-visual preview room, video tape viewing, periodical library and circulation desk; the other set was the Self-Instructional Audio-visual Equipment Laboratory.[11] The move downstairs was planned in the summer of 1972, and made in September, 1972.[12]

Once the Center was in its permanent location, the hours were expanded from the previous 9 A.M. to 7 P.M. schedule. As of the fall of 1975, the hours of the Resource Center were as follows: 8 A.M. to 10 P.M. Monday through Thursday; 8 A.M. to 5 P.M. Friday; 9 A.M. to noon Saturday; and 8 A.M. to 4:30 P.M. weekdays in the summer. The night hours work well for both the student population and the teachers taking evening courses at the University.

The Center now consists of four rooms plus administrative offices. The first room holds the circulation desk, tables and chairs, reserve books for the School of Education, and auxillary collections to be discussed later. Off that room is the computer project PLATO. The main room houses a vast collection which includes the Del Mod Science and Mathematics Collection. Also in this room is the large self-instructional audio-visual laboratory. A small adjoining room houses the video tape equipment.

The tables in the main room serve the self-instructional lab and also provide working space for workshops. In the past, many workshops of up to thirty people have been held there. In the last year of Del Mod, the trend among the field agents has been to spend most of their time "in the field". Consequent-

ly, no workshops are being held there this year, reducing the number and kinds of activities held at the Center. (It is important to note that the courses given for teachers by the University and Del Mod are still held in classrooms, and are not to be confused with field agent workshops.)

The Collection The collection began with the materials on the core list. The University almost immediately combined these materials with those from the Science Education Reading Room and the Elementary Science Classroom.[13] In a short time, mathematics education was added to Del Mod's list of concerns. Consequently, the Science Resource Center became the Science-Mathematics Resource Center. Another expansion of the Center was under way by September, 1972: "the University of Delaware (had) already been influenced by the development of the Del Mod Resource Center. The immediate impact (was) seen in the plan for creating a College Resource Center for all curriculum areas."[14]

Thus, the Resource Center collection grew to encompass all disciplines which are of concern to a preservice teacher. The partial collections from all over the School of Education were moved down to the Resource Center. By 1975, the Resource Center was given custody of the Learning Disabilities and Special Education Collection. Money has been allocated to hire and train a Special Education Advisor to supervise this collection.[15] Several text-oriented collections have been housed in the outer room: population education, the Special Education and Learning Disabilities Collection, reserve books, and supplementary texts owned by professors.[16] This collection is by far the largest of the Resource Centers, by virtue of the many disciplines represented in the collection.

The Del Mod collection of science and mathematics material is kit- and program-oriented, with an eye to "hands-on" learning. The Director has estimated that the Del Mod collection constitutes approximately forty percent of the total collection, and utilizes about fifty percent of the shelf space. Although records of who uses the collection were not available, the records of the circulation of mathematics and science items were. Between December, 1974, and May, 1975, 508 mathematics items (14.9% of the total circulation) and 1,167 science items (34.2% of the total circulation) were checked out of the Resource Center by students and teachers.[17]

The collection is supplemented by pamphlets, periodicals,

and an idea file. There is a "junk area" stocked with expendable materials for self-constructed manipulatives. The Director, Mrs. Giebelhaus, says that these materials were conceived as "takes", but many students and teachers treat them as "borrows" and often contribute additional materials when returning borrowed ones.

The Audio-visual Laboratory What the University has done with the audio-visual equipment is quite impressive. The Center was initially stocked with the audio-visual equipment required by the first proposal and the Operational Policies (see Appendices A and C). The School of Education then expanded the array and amount of equipment into a Self-Instructional Lab.

The Self-Instructional Lab is designed for audio-visual machine training. Dr. Carlton Knight devised a program whereby students could learn on their own how to operate many pieces of audio-visual equipment in only two and a half hours. The program is based on tape recordings which give step-by-step instructions on the operations of the slide projector. The slides in the projector are the key to the next machine. Tapes and written instructions carry the student through all the machines in the program. Since a working knowledge of audio-visual equipment is necessary for teacher certification in certain disciplines, this program was deemed to be the most efficient means of instructing as many students as possible. The equipment, of course, is available for general use by both students and teachers.

Expanded Services and Personnel Some of the other equipment the Center possesses include a ditto machine, Xerox machine, drymount machine, and a machine that makes transparencies.[18] To pay for this last machine, the Center has established a service of making and selling transparencies. One final adjunct to the Center is Project PLATO, a computerized testing system. Terminals to the Computer are set up in the room off the circulation desk. Many courses have been put on disk, retrievable by students at any time. Also, for some courses, tests are kept in the computer and taken by students on the terminal.[19]

It is apparent from the direction in which the Center has expanded that the Resource Center serves students well. There are services for teachers as well. The primary service is aiding a teacher in the retrieval of materials. To facilitate this, and to keep up with the paperwork, filing and organizing, there is a large staff at the Center. The Director of the entire Center is Robert Uffelman. He is responsible for

all facets of the Resource Center. Barbara Giebelhaus is the Del Mod Librarian, responsible for the Science and Mathematics materials; because she is hired by the University, her duties extend to the rest of the collection also. Mary Trenholm helps with the collection and also supervises the self-instruction laboratory. Beyond these full-time people, there is always part-time student help to man the Center.

The number of personnel is an asset to the collection but not always sufficient for the inservice teacher. Because there are so many people working, the collection is always in order and up to date. Despite the number of personnel, there is very often no one available to help the inservice teacher. The Center is so large and the work required to maintain it is so demanding, that there must be a trade-off. If a teacher rushes in on a break for some quick assistance, that teacher may or may not find help immediately. If that person has time to peruse and wait, someone "in the know" will eventually appear and offer very helpful guidance. To maintain such a large and comprehensive Center, some of the personal attention must be given up.

Comment To digress for a moment, a defense for this criticism of the largeness must be offered. It is true that the Center can feel big, and the people around can seem like a mass of bodies. However, the personnel, particularly the Del Mod Librarian, have a special attitude toward the Center visitors. Since most of her contact with visitors is during the day, the Librarian knows the student population far better than inservice teachers. Yet, she makes a point of knowing the names of as many people as possible.

While the author was interviewing her one day, sitting at the circulation desk, nearby a dozen and a half students walked by. Mrs. Giebelhaus was able to speak to at least half of these people personally. She knew the names and something about each of the nine or ten people. In a place the size of the University of Delaware, to know so many people is an incredible feat.

Del Mod Services; Attracting Inservice Teachers There are several other services for inservice teachers offered at the Resource Center. For a year the Center published a newsletter. Finally the cost became prohibitive. (DTCC has the financial advantage of owning its own printing shop, and having students who can publish their newsletter as a classroom exercise.) The phone service at the University Resource Center

is really quite important for inservice teachers. Because parking is a problem in the Willard Hall Building area, teachers will often call before making a visit to the Center. Teachers will also renew materials they have borrowed, or reserve an item until they can find the time to visit, all done by telephone.[20]

The newsletter was a form of advertising for the Center. The University had the same problem all the Centers did: how does one attract an inservice teacher to the Center? For a few years workshops were held in the Center, providing many people exposure to the existence of the Center. Field Agents were an asset in the Public Relations area. They would at times meet a teacher in the Resource Center, or suggest to a teacher that such-and-such a program might meet his needs, and he could find a copy of it in the University Resource Center. Although the Field Agents spend little time at the Center now, they still are the second best form of advertising available to the Center. The first is the collection itself.

A unique means of attracting teachers to the Center is the preservice teachers. They make extensive use of the Center in their courses. By the time they go out in the schools for their student teaching sessions, they are well acquainted with the facility. It is reported that many inservice teachers have visited the Center on the strength of the student teachers' experiences.[21] Because Delaware State College's Science Education Major is still quite small, this process does not work effectively for them.

Inservice Teachers The inservice teachers who use the Center fall into two categories: those who visit due to a classroom need and those who are taking night courses at the University. The first group visits because of what a field agent or a colleague has said about the Center. Often they discover the Resource Center in a workshop or inservice day program.

The second category uses the Center as a direct or an indirect result of evening courses. The education courses sometimes require use of the Resource Center. Also, teachers taking courses will use the Center because it is immediately convenient. Since the teachers have to park and go onto campus for a course, the marginal return from using the Center far exceeds the marginal cost of getting there. Parking is admitted by everyone to be the major drawback of the Center.

From these two groups of inservice visitors comes the band of teachers who consistently use the Center's collection. There is a small group of "regulars" known by the daytime personnel. However, at this Resource Center, it appears that most of the inservice teacher visits are at night when the Center is manned by student help. Since the guest book was long ago abandoned (due to lack of use), there is no real way of determining a pattern of teacher use. Records are kept of all the "borrows", and statistics of the number of students and teachers utilizing the Center are issued periodically, but no pattern of visits has ever been established.

The goals of the University's Del Mod Resource Center as written in 1973 follow: the Center's "purposes are to serve as a resource library for science and mathematics teachers; provide space for workshops and meetings conducted by field agents, University faculty and school district personnel; and to serve as a central core for the College of Education Resource Center."[22] The goals of the Center have not changed significantly since then. This brings up an interesting point. Although the original Del Mod collection was specifically provided for inservice teachers, placing the Center on the University's campus required the inclusion of the student population in the Center's design. In a University such as this, many of the campus participants play dual roles. In this instance, there are many inservice teachers who are also night students at the College of Education. It is, therefore, difficult to make a distinct demarcation between teacher and student users since some people are both.

In 1974, the Stufflebeam Evaluation was conducted in Delaware. Although some of the aspects of Del Mod were regarded unfavorably, the Resource Centers were generally well received. One report made an interesting observation concerning the source of the duality of the Resource Center at the University:

> Although this is not critical and I do not wish to make too much of this point, the Resource Center at the University reflects the University's ambivalence regarding its various functions of scholarship, the training of its own students, and service to the outside community.[23]

Preservice Teachers The ratio of inservice visitors compared to student visitors is probably quite low. From the University's perspective it is understandable that the direction of growth in the Center is toward the College of Education.

This direction of growth counters the ideal goals of a Del Mod Resource Center, at least superficially. However, since a moderate number of inservice teachers take graduate courses in the College of Education, they too are part of the student population toward whom the Center is geared.

It is obvious, though, that statistically the undergraduate population benefits the most from the Resource Center. One responsive evaluator saw this as an unintended, but positive, outcome of Del Mod funding at the University.

> Despite the minimal use of the Center by the primary clients of Del-Mod, it promises to be an important asset to the University and to the State through its contributions to undergraduate education, a solid accomplishment of the Del-Mod System.[24]

The Center is the source of many Methods Courses exercises. The audiovisual self-instructional lab provides an accessible means of fulfilling one requirement for teacher certification. The students at the University use the Center extensively--if the number of students studying in these rooms at any given time is an accurate barometer. In four years, the Resource Center has become an important adjunct to the College of Education.

Field Agents The two Field Agents attached to the Resource Center share an office on the third floor of the Willard Hall Building. Because they are physically removed from the Center, one could surmise that their use of the Center is somewhat reduced. Even so, the Del Mod Librarian sees both Barbara Logan, the Science Field Agent, and Peter Shannon, the Mathematics Field Agent, almost daily. The visits are either professional or social, and sometimes both. They do keep in touch with the Center, but do not rely heavily upon the collection (having in their years as Field Agents, built up personal collections of basic program needs). A former Field Agent who is working in the schools at present, still occasionally uses the Center, but the other two Field Agents (from Kent and Sussex Counties) do not visit at all.[25]

From the University's point of view, field agents are a non-essential adjunct to the Resource Center. However, they seem to be an important link to the Resource Center from the perspective of the practicing teacher: " At Georgetown, Ellie Sloan could handle a classroom instructional need with no problem. At the University of Delaware, most teachers went through Barbara Logan, the (science) field agent."[26] That would indicate that

use of the Center by inservice teachers will be reduced if and when the Field Agent Program is discontinued.

After the termination of Del Mod, the Resource Center at the University of Delaware will continue unscathed. The University is taking over the costs and will continue to run the Center as it has all along. Since field agents have been phasing themselves out of the Center, the transition to a Center without field agents will be made with ease. In the past, field agents have been helpful by giving advice about the collection and the Center, but the survival of the Center is not dependent on field agents any more than it is on inservice teachers.

The Resource Center in the Del Mod System In the first days of this Resource Center, there was frequent contact with Del Mod and the Director's Office. The Center has slowly moved away from its parent, and is completely under the jurisdiction and policies of the University. The Del Mod Librarian's and part of the Director's salaries are paid by Del Mod. All the personnel are under the rules of the University, and receive the same vacations and benefits as a University employee.

Similarly, relative to the other two Del Mod Resource Centers, this Center is different due to its expansion: to the Del Mod collection has been added an enormous amount of materials, the audio-visual training program, video taping and the PLATO program. The Center has grown away from the Resource Center prototype and toward the College of Education. As can be seen in the other center descriptions, never have there been meetings with all the Centers' personnel or Directors. Exchange of materials has taken place infrequently with the Delaware Technical and Community College Resource Center, and reportedly never with the Dover Center.[27] There is some verbal communication between the Centers, but even that occurs rarely.

There is still a thread of a financial and mental relationship existing between the Resource Center and Del Mod. However, Del Mod looks upon the Center as its product to a greater degree than the Center regards itself as Del Mod's child. Del Mod probably tends to view the Center as a disappointment, based on the original objectives of a Del Mod Resource Center. The University's College of Education is quite pleased with the Center, and justifiably so. The students depend on the Center for their education courses, and they like the Center. However, the Del Mod money was paid to

establish the Resource Center for inservice teachers.

Present teachers are not being served to the fullest -- but, the University is preparing future teachers with the aid of the Resource Center. How can one place value judgements on something that fails under one set of criteria, but is a smashing success in another context? One cannot judge and one should not. This Center is beneficial to many students and will continue to be so.

DELAWARE STATE COLLEGE

The Facility The Del Mod Resource Center at Delaware State College was originally scheduled to open by September, 1972. The opening was plagued with a series of delays. The building which would house the Center was under construction and was the victim of a six-month strike. Although the collection had been purchased, the Del Mod Director decided not to open in a temporary location, but to wait until the completion of the Humanities Building.

The Science and Mathematics Resource Center finally opened on February 1, 1974. The original Director had left before the Center's opening, and Leon Gardner had been hired to replace him. The directorship is actually shared by Mr. Gardner, whose title is Librarian/Media Specialist, and the Component Coordinator at Delaware State College, Ralph Hazelton. On February 7, 1974, the Center sponsored an Open House to make itself known to the County educators.

The Center is housed in a large, high-ceilinged room in the Education and Humanities Center on the south side of the Delaware State Campus. The room has a set of five double shelves, a dozen and a half carrels, magazine rack, chairs and tables for about forty people, and is still roomy. Next door to the Center is a classroom which holds about sixty people and is used for large workshops. The Center is large enough for the flexibility of growth.

The Resource Center has been used for workshops, inservice days, and meetings. Between February, 1974 and April, 1975, "six inservice workshops serving approximately two hundred teachers" were held. There was also a mini-workshop for twenty-five held during the summer of 1974. Three groups utilized the facility for meetings: the Academy of Science (three meetings), the Delaware Science Symposium, and the Augmented Council of Presidents.[28]

The 1974 proposal to the National Science Foundation stated that "the Center should be opened at least 12 hours Monday through Thursday, 8 hours on Friday, and possibly 4 hours each day of the weekend." For various reasons, that schedule was not kept. The present hours are as follows: 8:30 to 6:00,

Monday through Thursday; 8:30 to 4:30, Friday; 8:30 to 4:30, Monday through Friday in the summer. The Center is closed on school vacations, except for the weeks between the end of school and the beginning of summer session.[29] The current schedule evolved from the proposed one because of the alleged dearth of use the Center was receiving at nights and on the weekends. Students tended to use the Center during the day and teachers would come by after school or on breaks during the school day.

Since Delaware State College's Resource Center was the last one opened, it had the advantage of benefiting from the experience of the other two Centers. In the first days of setting up the Center and cataloging the collection, Eleanor Sloan came up from Georgetown to help with the process. She had not only established the Georgetown Center, but had been operating it for two years. After Mrs. Sloan gave Mr. Gardner and the Center the initial boost, the Center was completely in the hands of Delaware State College.

The Collection The collection at Delaware State College Resource Center is almost entirely Del Mod's. It began as the core list materials and grew as the needs arose or when the Director discovered a program which would be an asset to the collection. The breakdown of the collection is difficult to determine: approximately 10% consists of metric materials and there are more science resources than mathematics. The materials which have grown from the core list are primarily geared toward the Science Education Major Program, an outgrowth of UPSTEP. As part of the collection there is a fairly substantial array of periodicals and catalogs available.

Audio-Visual Equipment A positive characteristic of the Center is the openness of the facility emphasized by two open doors and two glass walls flanking the hall. Because Mr. Gardner is hired by Delaware State College as the Librarian/Media Specialist, he has responsibilities and duties to perform as part of his contract. That means, unfortunately, that the Center is frequently left unattended. Therefore, since the Center is open, a teacher on a brief leave from school might select a time when no one is there to assist him or her.

By encouraging easy access, the collection and equipment are vulnerable to inexperienced operators and the occasional people open to the temptation of unauthorized "borrowing". Because of this, the Director has felt a need to protect the

Resource Center financially by keeping the audio-visual equipment locked up. The trade-off for an open-door policy and easy access to the collection is the maintenance of tight security for the more expensive instruments.

To offset this apparent rigidity, it is quite easy to obtain the audio-visual equipment for use at the Center. A simple request to the Librarian/Media Specialist will produce the desired equipment and an explanation of how to use it. As Mr. Gardner's title would indicate, his specialty is Media and Audio-visual study. He also helps with the self-instructional laboratory in the Resource Center.

Personnel Updating and organizing the collection is a major function of the Librarian. It is a time-consuming job which requires cataloging, filing, replacing and repairing materials, and extensive reading of Science and Mathematics Companies' catalogs. The Center does have part-time student help to work on some of the filing and cataloging; otherwise, Mr. Gardner is responsible for the Center by himself with assistance and support from the Component Coordinator.

Del Mod Services; Attracting Inservice Teachers The aim of Del Mod is service. The services offered at the Dover Resource Center are recognized as standard Resource Center services throughout the State. The service of helping teachers and students in the Center is a crucial part of the Librarian/Media Specialist's job.

Inservice teachers now make as many telephone calls to the Center as they do visits. The telephone is an important means of obtaining information about a program or materials the Center may or may not have. It is also a way for teachers to reserve materials they know they need until a time when they can get to the Center.

In conjunction with services offered by the Resource Center is the communications system established to reach inservice teachers. Attracting inservice teachers to a Resource Center, particularly when it first opens, requires diligence. This group of "services" is designed to advertise and make the Center known to the inservice teachers. The first open house in February 1974, was a means of introducing the Center to County School Supervisors and principals. The Center director also visited the schools to inform them of the Resource Center and the services it offered. Newsletters are sent quarterly to Kent County teachers, to keep them up to

date on additions to the collection and activities at the Center.

The most effective way of advertising the Center through non-service means is by word-of-mouth. Teachers often visit the Center on the strength of what another teacher has said about the resources. Field agents have also served the function of "spreading the good word" about all the Centers.

The original proposal mentioned that a guest book should be provided at each Center for record-keeping purposes. The Delaware State Science-Mathematics Resource Center originally kept a guest book, but discovered it was not serving its intended purpose. Teachers would forget to sign in or resent the inconvenience, leaving the records very incomplete. These records instead come from the borrowed materials. Each time any text, program, or kit is signed out, a record of that visit is automatically made. Since most inservice teachers who visit this Center do borrow materials, the guest book also became a duplication of effort.

Inservice Teachers The Delaware State College Center is one of two of the Del Mod Resource Centers which were designed to serve both inservice and preservice teachers. This Center is predominantly used by the preservice science education majors. Of the teachers who do use the Center, it seems as though there is a group of "regulars". The teachers who come in once either never return or become firm believers in the Center. Although the Resource Center is generally not visited by the Educational Administrators, principals and supervisors do on occasion use the phone service.

Because of a series of factors, inservice teachers do not utilize the facility as much as had been hoped. When asked what changes he would like to see in the Resource Center, the Librarian/Media Specialist said he was pleased with the Center itself, but thought ideally that more inservice teachers should be served.[30] The factors which have reduced the volume of inservice teacher use will be discussed in Chapter IV. However, in the first fifteen months, "more than 450 teachers actually utilized materials from the Center in their respective school districts; many others visited."[31]

It has been mentioned before that changes take place in a hypothetical resource center when it is incorporated in an already established institution. Given the original objectives

of the resource centers, the objectives have not been completely met; for to mee he objectives, the inservice teachers should be more widely served.

This is not to say, however, that the Resource Center has not been a success. Although the Del Mod objectives have not been entirely met, the facility and its benefits are there for teacher use. The objectives of Delaware State, on the other hand, have been met, with regard to the science education, mathematics and science majors.

An example of this dichotomy of success can be seen in the two opinions stated below. The first is from an inservice teacher expressing his view for a responsive evaluation; the second is from an out of state educator who recognized the contributions the Resource Center has made to Delaware State's science education program.

> The Delaware State Resource Center in Dover seemed short on materials. It did not appear to be teacher-oriented. In fact, the best way I could describe it would be to say it was sterile. This might be unfair as there were no personnel there for me to interview.[32]

> After interviewing personnel in the chemistry and physics departments within the college, I was convinced that these departments envisioned the Science Resource Center as being a real asset for teacher preparation. There was evidence of academic departmental planning and coordination between these academic departments and the Science Resource Center. Preservice students indicated that the Center enabled them to take theoretical concepts to which they had been exposed and put them into proper perspective in the Science Resource Center.[33]

Preservice Teachers Part of Delaware State's involvement in Del Mod included UPSTEP (Preservice Science Teacher Education Training Program). This program came under the wing of Del Mod in 1971, one year after Delaware State initiated the program. UPSTEP has grown and evolved into the science education major. The major depends upon the Resource Center for its methods courses.

Because of the science education major, Delaware State College's science program in general has expanded. Many non-science majors are participating in more science and mathematics courses and consequently are using the lab facilities and the Resource Center. The Center has proven to be a vital part of science at Delaware State College. For that reason, a large percentage of the user population is from the student body at Delaware State. It must be said that the Resource Center is serving a worthwhile purpose. Although the inservice population benefiting from the available resources is minimal, Delaware State with the help of the Resource Center is providing an education for future science teachers, before unavailable. The Resource Center is contributing to that education.

Use of The Collection The kind of materials used by the visiting population varies. Inservice teachers tend to utilize the "hands-on" type of resources and equipment. Delaware State students tend to use a wider variety of materials and equipment. The teachers, therefore, do not regard the Resource Center a library; they use it for the unique resources. The students rely on the texts to familiarize themselves with the basics of science education, and the programs to catapult themselves into the realm of "hands-on" teaching. Presumably, these preservice teachers will be better prepared for the teaching of science than many of the inservice teachers were.

Field Agents From the outset of Del Mod, a special relationship was intended to exist between the resource center and field agents. Each field agent was to maintain a desk and files in one center, and regard that center as "home-base". One of the mathematics field agents does maintain an office in the Humanities Building. He "has contributed greatly to the purchasing and planning of the Center."[34] The other field agents stay close to their own Centers and do not frequent the Dover Resource Center. The field agent occasionally uses the collection to bring himself up to date on mathematics programs, and has in the past brought a few teachers into the Center for consultation. However, now the trend among the field agents is to spend most of their time in the field, in schools or districts.

Initially, a kind of symbiotic relationship existed between field agents and resource centers. As each field agent established himself or herself in the schools, and as the resource centers were being advertised more by the teachers themselves, the once inherent dependency began to fade. This is particularly

true in Kent County, since the Field Agents had to fend for themselves for two and a half years before the Center opened.

The math Field Agent does use the materials and equipment on occasion, but rarely if ever is "dependent" upon the facility. Likewise, the Science-Math Resource Center at Delaware State College had developed means to advertise itself without the need of a Field Agent. When Del Mod terminates, and if the Field Agent program goes with it, it is predicted that the surviving Center will not suffer.[35] Although it is not put in such terms at Delaware State College, the constant use by Delaware State College students will justify the Center's existence, with or without the inservice teachers.

The Resource Center in the Del Mod System An interesting relationship exists between the Resource Center and Del Mod. From the Librarian/Media Specialist's point of view, there has been a shift in "power". In the beginning, Del Mod was the boss through the Component Coordinator. Del Mod paid for the Center and its personnel, but the contracts were with Delaware State College. Because none of the administrative end of the Center emanated from Del Mod, the responsibilities shifted toward Delaware State College.[36] This is, in fact, what was intended to happen. The housing institution was supposed to absorb the Center; for them to do this, it was necessary that they be able to shape it and meet their needs also.

A resultant phenomenon is the weakening of ties between the Centers. There are no meetings between Center directors or personnel expressly concerning Resource Center procedure or collections. It was originally hoped that an inter-Resource Center loan system would operate. There has been some exchange of materials between the Dover and Georgetown Centers, but the need for such a service has been minimal. Except for the guidance offered by the Georgetown Center Director in setting up the Center at Delaware State College, there is no formal idea exchange system. Constant communication with the other two Centers probably would have a positive effect on the collection.

Although the Del Mod System has brought the heads of the three colleges together, and has opened up channels of communication, it is obvious that none of these institutions wants to lose its autonomy. Not surprisingly, this is reflected in the dearth of communications between all the Resource Centers. In short, the Delaware State College Science-Math Resource Center functions almost entirely as a self-maintained entity. When the financing for the Center comes completely from Delaware

State College in July 1976, it will also be a self-supporting entity.

A Survey In a survey conducted among the Science Education Majors, many interesting comments about the Resource Centers emerged. Some of the questions and answers relevant to the Resource Centers follow.

What do you like about the Delaware State College Science Eduction Program?
...Some equipment and new ideas for student oriented learning.
...The equipment and facilities used in teaching potential science teachers were excellent.

What do you dislike about the Delaware State Science Education Program?
...More emphasis should be placed on audio-visual aids and the use of materials available at the Science and Math Resource Center.

How has the Science Education Program improved since you first entered it?
...The Resource Center is an asset, although I feel a need for much improvement here.
...The program has improved by the addition of the Science and Math Resource Center and the availability of new classrooms and equipment.
...The Science research center is better organized and more materials are available to us.

When asked to rate the Resource Center on a scale of 1 to 7 (1 lowest, 7 highest), the ten students responded as follows: 1=0%; 2=0%; 3=20%; 4=0%; 5=20%; 6=10%; 7=50%. Obviously, overall consensus was good, and half the students rated the Center as excellent for their needs.

The comments on the Resource Centers specifically included the following:

...More night hours--possibly 7:00-10:00...Resource Center was always helpful. Now while teaching, it will be difficult to come the hours it is open.
...fully equipped.
...excellent now, poor at onset.[37]

Comment A closing comment on the Delaware State College Science-Math Resource Center is prompted by criticisms of the

collection. The criticisms have afforded an opportunity for an object lesson. Negative comments regarding the Resource Center were cited in the student survey and in an evaluation in 1975 (to be discussed in Chapter IV). Any deficiencies in the collection come primarily from the limited money which is available.

Del Mod can pay only a certain amount of money annually. Delaware State College has spent most of its available funds on upgrading and expanding the Science Education Major, aided at present only by scholarships from the DuPont Company. A well-equipped, consistently up-to-date Science-Math Resource Center is an expensive proposition.

For the money available, Delaware State has produced an effective, albeit minimal collection center. The student reaction attests to that. Once again, though, a Resource Center cannot be bought cheaply, but with the proper amount of dedication and service, even a minimal collection can prove beneficial.

DELAWARE TECHNICAL & COMMUNITY COLLEGE

> In the Del Mod System, the center at Del Tech in Georgetown represents a highly innovative model for other locales who are interested in developing a center to serve in-service teachers. Its location at a two year college limits its usage bacause of the lack of pre-service teachers and graduate students. A component of their center, MAC (Materials Assembly Center) developed during the past year shows great promise as a mechanism for involving volunteer help (parents, senior citizens, etc.) to make much needed classroom materials. This innovation is particularly important in an era when allocation of money for educational resources is decreasing.[38]

The Science and Mathematics Resource Center at Georgetown's Delaware Technical and Community College has a special reputation among the people related to Del Mod. The teacher reaction says it best, and that can be seen in Chapter IV. This Resource Center was one of the first two centers which opened, hence, is more firmly established in the inservice teacher community than Delaware State College's.

The Advisory Committee attached to the Resource Centers planned the fundamental needs of a science resource center, and saw them through implementation in Georgetown. After the collection needs were met, they also aided in determining public relations needs and the procedure requisite to making the Center known to the teachers in Sussex County.

The advisory group, with Mrs. Sloan, the newly hired center Director, devised the newsletter, Science and You (SAY). They also concluded that community relations could benefit from opening the facility to local service organization meetings. These activities were services to the county, and would also serve to announce the Resource Center to the in-service population.

Much of the first year was spent purchasing and cataloging the core collection and additional needs. Because the needs reported in the Purnell Report were greatest on the middle school level, the first year of purchasing "concentrated on supporting programs for middle school and upper elemen-

tary science teachers," with as much money allotted to high school programs as possible.[39]

By September, 1972, eight months after the February 1 opening, the Center had accumulated a respectable collection.

> Over 500 catalogs, 1200 texts and 60 periodicals were accessioned in addition to 105 filmloops; all major elementary and high school curriculum studies; hundreds of pamphlets, brochures and newsletters; hundreds of give-away copies of ideas; slides and transparencies for BSCS and HPP and a community resource list of speakers and places to visit.[40]

Although the collection continued to grow, and mathematics curriculum problems came under the jurisdiction of Del Mod, the Center personnel was scant in numbers. For the first years, Mrs. Sloan was the only personnel at the Center. There was one field agent attached to the Center, who proved to be a tremendous asset, for more reasons than one. Mr. James Gussett was able to "advertise" the Resource Center "in the field". He also had a part-time secretary, whose services he graciously loaned to the Center. Thanks to her services, the secretary kept the Center open at night while doing her work for the Field Agent.

The original proposal recommended that the Resource Centers be open for twelve hours a day during the week and some time during the weekend. By mid-1972, the Center had determined that 8 to 8 was an ideal time to be open for inservice teachers. There were many teachers who tended to call before the opening of school, or even to stop by to pick up a kit at the last minute. It had become evident in the first year that very few teachers used the Center after 8:00 at night.[41] Presumably for cost reasons, there are no weekend hours. The hours during the last year of Del Mod are; 8 to 8, Monday through Thursday; 8 to 4 on Friday; and 8 to 4 on the weekdays during the summer.

A great deal of effort went into creating the Science and Mathematics Resource Center.

> The Center evolved from the gutting and refurbishing of a high school home economics room. New wiring, walls, ceiling, and air conditioning system had to be installed and plumbing capped throughout the room. Wall and floor

> cabinets, sinks and stoves were ripped out to accommodate flexible and multi-purpose use of the room. A storage area had to be built, carpet laid, movable furniture installed and materials for the Center ordered.[42]

The finished product yielded two walls of shelving, one wall of idea and giveaway files, and one wall for the Director's records.

The room is somewhat small. An amazing amount of materials has found its way into every nook and cranny of the room. There are five work tables, two desks, three typewriters, and several smaller shelves. The room apears to be chaos incarnate; yet everything is in its place and can be found with reasonable ease. It is reported that twenty-eight people can fit into the room comfortably for workshop meetings; sixty have been housed with great discomfort resulting.[43]

Personnel There have been improvements in the personnel situation. By 1973, Mrs. Sloan had part-time help to run the Center during the day, and someone hired to keep the Resource Center open at night. In October, 1975, the Learning Disabilities Collection for Sussex County officially opened in the Resource Center; the additional funding made it possible to hire people to be there at all times. The people working in the Center have greatly helped relieve the Director of many time-consuming jobs, and given her more time to work with teachers. Also, each person is taught to perform all functions necessary to the maintenance of a resource center.[44]

The Collection The collection is a greatly expanded version of the core collection. Many extra non-text, non-kit, non-program features have been added. "There is also a miscellaneous vertical file with newspaper and magazine articles, tables and charts, lists of free materials and science bibliography and suggestions by grade level.[45]

Several years ago, the Department of Public Instruction decided to move all the State's metric materials to the Delaware Technical and Community College (DTCC) Resource Center. This move created a central location for the complete collection, and also got the materials out of the attic of the Townsend Building. The State's purpose was "to stress the availability of Metric learning materials to a point where the Center (would become) a 'metric mecca'."[46]

Since most of the Resource Center money was spent on the collection and not on personnel, the Center rapidly met most of the mathematics and science needs. Thus, the Center was able to expand in directions not specified in the proposal, but important to learning in Sussex County. "In addition, an assessment of area needs resulted in the decision to give priority to learning materials for non-readers; students with learning disabilities; slow learners; stress on environmental materials, and a complete resource laboratory."[47]

Later, as mentioned above, the learning disabilities materials were moved to the Center from Ennis School. In previous years, many learning disabilities teachers had been using the Resource Center collection to supplement the Ennis collection. It became evident that combining the two collections would greatly benefit the county's learning disabilities teachers. Technically the collection is not a part of the Del Mod System. However, it is housed with the Del Mod collection, and the Center director is also the steward for the Learning Disabilities collection. The funding for the maintenance of this additional material comes from the State. The extra money has made it possible to hire additional student help for the Center.

Audio-visual Equipment The audio-visual equipment has received less attention than the collection. The minimum requirements have been met. "Available for try out is a 16 m.m. projector, 8 m.m. projector, cassette tape recorders, reel-to-reel tape recorder, filmloop projector, filmstrip projector, overhead projector, slide projector, sound filmstrip projector, record player and screen as well as auto-tutorial material and facilities."[48] Space limitations simply do not allow the sophisticated audio-visual program found at the University to be developed in Georgetown. Also, the emphasis on audio-visual use and experimentation found at Delaware State College has not been a part of the Georgetown Resource Center. However, the University and Delaware State College Centers cater to different populations than the DTCC Center. In Georgetown there are no preservice teachers' methods courses to contend with; inservice teachers' needs are the prime concern at DTCC.

Del Mod/Delaware Technical and Community College Services The Georgetown Resource Center has a special reputation in Sussex County because of the Center's objectives. By way of comparison, it can be seen that it has met the original Resource Center objectives where the other two Centers have not. The original proposal wanted the Centers to be service oriented, and that service was to be directed toward the

inservice teachers. (See "Science-Math Resource Center: What Makes it Go" in Appendix E.)

Because each Center was attached to a housing institution, each Center has taken on the personality and philosophy of each institution. In the cases of the two northern Centers it was essential that they respond to the needs of the pre-service teachers, which inevitably resulted in a truncated response to the needs of the inservice teachers. Time and money would not allow it to be any other way. By virtue of Delaware Technical and Community College's philosophy, the Resource Center responds to the needs of inservice teachers only. The philosophy of DTCC is "service not research," as is Del Mod's. Therefore, teachers are served in the Resource Center as part of the community served by DTCC. In that respect, this Center has done no more than follow the philosophy of the housing institution.[49] The fact that the original objectives of Del Mod have been met is almost accidental.

Since this Resource Center is concerned with service, several special services have been created. One recent creation is the Materials Assembly Center. Teachers had often expressed the notion that a location to build classroom materials cheaply would be an asset to "hands-on" learning. The Center provides a vast array of inexpensive and recycled materials which can be used for the construction of simple Math and Science manipulatives. The aim is to have teachers design and/or build a model of what they need, and to have volunteers build as many needed from the model. Already, retired teachers and Retired Senior Volunteer Program volunteers have helped out in the Center. It is hoped that parents will eventually become involved in the Materials Assembly Center.[50]

The idea of a Materials Assembly Center is very sound fiscally and according to one evaluator, transportably attractive:

> The use of volunteers in the Del Tech Center is an impressive idea for community colleges, especially in a time of financial austerity. These retired citizens seem to be used effectively because they are in a "hands-on" situation. They work in the preparation of teaching materials with sincerity and enthusiasm and they bring unique skills and insights to the tasks. The use of retired volunteers in a center is a concept that most community colleges could copy.[51]

As the Advisory Committee deduced, the Georgetown resource center had to resort to self-proclamation to become

known. The one field agent attached to the center was physically able to come in touch with only a finite number of teachers. The newsletters were a means of more extensive advertising. They had (and still have) the special feature of a "tear-off", an order form requesting either information or the monthly give-aways. The free materials idea was a good psychological maneuver encouraging teacher awareness of and attendance to the center.

"During February, 1972, over 350 letters were sent to Sussex and lower Kent County school personnel inviting them to preview the center." The first tactic was the direct approach, and it had a positive effect on the participation in Del Mod. "Before the opening (of the Georgetown center) only 14% of the area teachers were participating in Del Mod projects. After resources were centralized in Georgetown, the number of teachers from various school districts participating in activities and center usage increased to 50%."[52]

Further means of "spreading the word" about the resource center included newspaper ads, radio announcements, meetings in schools, workshop and field agent exposure, word-of-mouth advertising from teacher-to-teacher, and a mailing list that has grown to over 1600.[53] One more rather ingenious idea of combining service with advertising, was the "Del Mod Bags". These were bags with "Del Mod" and the logo printed on them, to facilitate carrying loose kits or portions of kits. Since teachers tended to reuse the bags, their colleagues were exposed to the name.

Inservice Teachers. The principal users of the resource center are the inservice teachers. The visitors are often teachers there for the first time, and often the people who come back frequently and consistently. The Director estimates that of those teachers who visit for the first time, greater than 50% will come back. Often those teachers participating in a workshop will use the resources religiously, and will abruptly cease visiting after the termination of the workshop--often until the next workshop. Teachers from as far away as Smyrna are reported to visit infrequently, but call, write or mail in the tear-offs with some regularity.[54]

It is not unusual for the principals in Sussex County to give their teachers release time to visit the Center. This is particularly true during the spring when ordering supplies for the following year occurs. Many teachers, if they are close enough, drop in during their free periods. However, the majority of the teachers come by after school, until 8:00 at night.

Facts on the use of the DTCC resource center were supplied in the most recent annual report. Comparisons with the first year were included. For the academic year 1974-75, 2005 teachers visited (doubled since 1971-72); 1,645 items were checked out (five times the number in 1971-72); 62 meetings were held in the center (doubled since 1971-72) and the personnel assisted the teachers 3,328 times (10 times the number in 1971-72).[55]

The popularity of the center rests on its relatively convenient hours, its emphasis on service, and its philosophy of letting a teacher discover the relative value of a particular kit or program empirically. The director does not ever recommend one specific program as the solution to a need; rather, she will offer several alternatives (if several are available) and report on past successes and failures and the situations surrounding those judgements.[56] The Director knows that what is perfect for one classroom may be disasterous for another, and that the reverse is also true.

This center received the highest of commendations from an inservice teacher-evaluator: "The Georgetown resource center stands above the others in this area (making available a facility for teachers to develop their own programs). Their Materials Assembly Center was most impressive. Georgetown is geared to the teacher. A teacher can go there with a problem and come out with a solution."[57]

Science Technician Education Program At the outset of Del Mod, DTCC established the Science Technician Education Program. It was anticipated that with the kind of training to be offered, the lab work in the public schools could become the responsibility of the Technician. With this arrangement, more lab work could be accomplished in science classrooms. In 1972, the Program began with five students at DTCC. Although the lab in the training program was elsewhere, the "library" was the resource center. Unfortunately, when four students were graduated from the program in 1974, the economic situation had done away with the jobs promised in 1972 for these people. According to the policy of DTCC, the program was discontinued. ("A job for every graduate" is the reigning criterion for programs offered.) With the termination of the Science Technician Education Program went the only student population who made use of the center.

School Administrators Another important segment of State education is the school administrators. Nearly 100% of the

Sussex County public school principals have visited the Resource Center. Although most of these people have been there only as the result of a meeting, awareness of the Center is broadened by administrative exposure to the facility. Many principals do use the Center as a source of information, via telephone. For many people, the telephone is the most important service offered at the Resource Center.

Field Agents There seems to be a close relationship between the Field Agents and the Resource Center. For more than three years James Gussett, a Del Mod Science Field Agent, was attached to the Resource Center. His desk was in the Center itself (unlike the field agents at the other Centers), almost forcing an intimate relationship with the Resource Center. Mr. Gussett has since moved on and been replaced by Chuck Wall, whose desk is across the hall in the Materials Assembly Center.

The Materials Assembly Center is the result of the labors of Mrs. Sloan and a Math Field Agent, Richard Cowan. Together they turned a room into a unique and useful workshop. This endeavor effectively and unofficially located Dr. Cowan in the Georgetown Center, at least part-time. Because he was spending time downstate establishing the Materials Assembly Center, he came to work quite closely with Sussex County teachers. The two field agents attached to the University of Delaware occasionally conduct workshops of inservice programs at the Georgetown Resource Center, but generally they remain in New Castle County.

Mr. Gussett initially "shared" his secretary with the Resource Center. The Center in turn eventually handled much of his clerical work, scheduling, and aided in the organization of the materials he would take into schools. The people at the Center do the same for Mr. Wall, and frequently manage some of Dr. Cowan's paperwork.

The Field Agents are considered an important adjunct to the Center. Mrs. Sloan described the Resource Center-Field Agent relationship as a total process available to teachers. The example of a school which needs a new science or math curriculum was cited. The Center can provide the groundwork for a new curriculum. The resources, programs, kits and texts are all available for perusal, comparing and contrasting, all under guidance of the Center staff. The Field Agent is then the person who can guide, direct, and shape the writing or rewriting of a curriculum program--a task for which the Center alone is not equipped.

The relationship between the Field Agent program and the Georgetown Resource Center is complementary rather than symbiotic. The Center handles many of the "behind the scenes" work for the Field Agent, and the Field Agent in turn encourages the use of the Resource Center by the teachers, through words and actions. The collection at the Center expands the possibilities of the Field Agent job and makes the task of helping and guiding teachers easier.[59]

However, it cannot be said that there is a dependency existent between the two most successful elements of Del Mod. The Resource Center will prevail--and probably flourish--after June, 1976. It must be remembered that the Center is well-known and established in Kent and Sussex Counties. The credit for the "fame" that the Center has must in part go to the Field Agent Program. Whether S.A.M. could have "made it" on its own is indeterminable; with the running headstart it has, this Center will succeed without the Field Agents, even with the limitation of services which will result from the termination of the Field Agent Program.

The Resource Center in the Del Mod System The responsibility of hiring the Resource Center directors has always been left to the housing institutions. Eleanor Sloan was, therefore, hired by Delaware Technical and Community College, and considers DTCC, not Del Mod her "boss".[60] Again, it was the intent of Del Mod that the Resource Center would be absorbed by the housing institutions. That transition has been easily accomplished by directing the loyalties to DTCC, while maintaining a rapport with the Del Mod System.

It can be seen in the descriptions of the other two Resource Centers that there were never meetings between the Center Directors. They met at general Del Mod meetings, and were certainly not strangers to each other, but there was never a provision for a formal exchange of information and ideas. At Georgetown, the Center director obtained most of her information of Del Mod happenings through the Field Agent. Because this was a rather haphazard way of keeping informed, the System meetings were established. Meetings for just Center directors never materialized, primarily because of the extensive commitments and priorities in the Centers. There just was not time, but, as Mrs. Sloan said, "they would have been nice."[61]

Speculation can be dangerous, but it seems as though periodic Directors meetings would have made very little difference

in the personality or collection manifest in each Center. The information exchange does exist without formal meetings, as does the materials exchange. In both areas, however, there is not as much as there should be. The DTCC Center has exchanged materials with the University of Delaware "a few times". In Dover, the Georgetown Center has loaned texts and programs to the component coordinator, but not to the Center.[62] Since each Resource Center is attached to a different institution of higher learning, each tends to function as a separate entity, relative to the other centers.

Center The immediate future of the Science and Mathematics Resource Center in Georgetown is assured; the distant future has yet to be decided. Delaware Technical and Community College will take over the Director's salary as of July, 1976. The State Legislature has budgeted additional funds to Del Tech to maintain the resource center through 1977, and apparently 1978 is being negotiated at the present time. This really is a special resource center in the minds of Sussex County teachers, with a special personality. As Mrs. Sloan once said, "The personality of a center is what makes it go."[63] This Center is going strong.

An analysis by an outside and impartial observer explains, in part, the success of the resource center in Georgetown:

> There is no such ambivalence in the resource center at Delaware Technical and Community College in Georgetown. The resource center is what it promised: a resource for the community's schools and teachers. It is housed in rather cramped and somewhat cluttered quarters and reminds one of the old corner grocery--a friendly place to browse, taste and buy. It is presided over by an enormously engaging, and may I say, resourceful graduate of Del Tech itself. I dare say the center reflects her person as much as anything else.
>
> The motto is service, and the center has become much more than a repository or even circulating library of materials. For example: You want to see some "bad" materials? We have them--don't buy them "blind" from alluring advertisements. You need some new ideas? We have them--examine our "idea file". You have to have some mounting equipment right away? Try ours--it's on the house. Help with transparencies? Of course--no trouble.
>
> Perhaps I ought to add to the figures and hard data already contained in the Traveling Observer's account just

to show that I care about these too. For the week of March 4-8: Total persons through the center--197, Meetings--2, Circulated books--45, Circulated kits--17, Circulated films--14, Xerox copies of materials--271, Telephone inquiries--9, SAY requests (newsletter tear-offs)--21.

But these numbers, even though manifestly impressive, do not give the flavor of the place. Let me say simply that I have recently been asked to join the Board of a Foundation that intends to install resource centers in the Illinois area--I shall urge the director to visit with Ms. Eleanor Sloan of the Del Mod Resource Center at Del Tech. [64]

CHAPTER III

THE MECHANICS OF OPERATING A RESOURCE CENTER

STARTING A CENTER

The Resource Centers, as they were conceived by, the planning committee can be pictured by reading the 1971 Proposal and the Operational Policies (see Appendices A&C). Beyond lists of objectives, there is very little reference, to the procedure of establishing a Resource Center. If one is to claim that these Centers are transportable, one should supply more than a history and description of the Del Mod Science and Mathematics Resource Centers.

Speaking to the claim that the Resource Centers are transportable, it is obvious from the differences between Del Mod's three Centers that the concept is adaptable. This flexibility and adaptability must be part of the planning of a Resource Center. The planning stage is crucial to the form, quality and success of a Resource Center.

An evaluator from the 1975 Del Mod responsive evaluation spoke to this point:

> To visit the various center of activities of Del Mod and interact with the people, both the producers and consumers of Del Mod, one must be cognizant of the preplanning activities. The tremendous amount of negotiations, give and take, cooperation, coordination, number of meetings and correspondence, and the long range commitments made by people, for people, so that all efforts are pulling in one direction for the common good of science education within this State, has been the big payoff. This one impression is first and foremost in my mind.[1]

The three Directors (librarians, librarian/media specialist) of the Resource Centers were interviewed about setting up a Resource Center. Their experience and hindsight were felt to be an invaluable source of authoritative knowledge--more so than a group of educators planning a Center intuitively. Perhaps it is not surprising that many of the directors' suggestions were in fact stated in the original documents. That would indicate that the Centers were quite conscious of the Del Mod goals, and despite the varied manifestations of these

goals, deliberately adapted the Centers to the needs of each housing institution. Such a phenomenon further emphasizes the Resource Center adaptability.

Styling A Center The Field Agent attached to the Georgetown Center was instrumental in determining teacher needs. With information about the target population, the job of styling a Resource Center was facilitated. Meeting those needs was a relatively sure means to success.

The following represents the results of this Field Agent's research. It is also a sample of one starting point in establishing a Resource Center.

> The Field Agent for Del Mod South asked his teachers at their first meeting, "In doing Science, it would be most helpful to _____." Four out of five most mentioned needs were:
>
> Having a collection of simple experiments.
> Having specific items and techniques.
> Knowing new and different ways to reinforce subject materials.
> Seeing demonstrations of procedures and activities.
>
> Fulfilling these immediate teacher needs fits into the mosaic of Del Mod objectives--to coordinate Science education for all students; to improve teaching; to provide a climate for Science research and development.[2]

The form of the ideal Del Mod Resource Center was derived from the needs cited in the Purnell Report, the needs as determined by the Advisory Committee, reports such as the one above from field agents, and intuition. Below is an analysis of what the Center Directors now think is necessary in establishing a resource center.

Establishing A Resource Center The directors all agreed that the key to a Resource Center is in the planning stage. Each person verbally approached this task from a different angle.

> Eleanor Sloan, Delaware Technical and Community College Resource Center: The first thing to be done in establishing a center is to form an Advisory Committee. This Committee should be directed to determine teacher needs: what do

they want to be exposed to, what are the weaknesses in the system (one cited was too frequent reliance on catalogs for ordering). After the needs are named, the committee should then decide what things would solve these needs. In the case of the Del Mod objectives the solutions could be met at least in part by providing a broad selection of materials to be tried out and examined by teachers before recommending that their districts purchase particular materials. The Advisory Committee should consist of people in the field, "in the know". This kind of group should be relied upon to help design the basic collection for a Resource Center.

Leon Gardner, Delaware State College Resource Center: To stock a resource center with materials, one must begin "at rock bottom". First the target grade level of levels should be mapped out. A sufficient collection of books for the intended levels should be acquired along with kits corresponding to the books. Then as many kits, games, resources--"hands-on" materials--should be purchased from as large a cross-section of companies as possible. In essence, the aim should be to build a collection which encompasses the entire level of the specific discipline in mind. Furthermore, to supplement and broaden the possibilities of the collection, audio-visual equipment should be purchased.

Barbara Giebelhaus, University of Delaware Resource Center: She answered this problem with a list of instructions for a resource center Director. Know the objectives of the Center and the budget contraints. Contact the schools "to see if this is what they want". Clearly determine the policies for operation, money, services, and acquiring and maintaining the collection. Read all the literature pertaining to objectives of the Center and needs of the target population. Establish a method of (at least) an "in-house" evaluation. Determine the necessary staff and train them to understand the objectives. Talk to people who have established and operated resource centers (for any discipline) in order to be prepared for the pitfalls of maintaining an up-to-date collection. Research existing resources in the surrounding areas to avoid duplication of materials and effort. Locate the Center centrally for the target population. Establish a buying policy and use normal library or school ordering

processes. (In the case of a Del Mod Resource Center,) rely on the Field Agents, because one "cannot do it without the Field Agents." Finally, give a lot of thought to the groundwork, for it is the most important basis for success of a Resource Center.

Experience has taught the Directors that the preliminary groundwork is crucial in establishing a resource center. Setting up an effective center seems to require sensitivity, listening, and other intangibles. The work required to establish a science and mathematics resource center is different than what is needed for a history resource center. However, there are many commonalities (which has been learned in the University Center), and those are the insights important to transportability.

The Directors agree that knowing the target population and its needs is a necessary starting point. The means to this knowledge can differ: an advisory committee, one or more field agents, or direct interviews with the target population can all yield the same information. The basic source of information is the target population. Do teachers want and need a collection which emphasizes "hands-on" learning? In Delaware the answer was yes, but that answer was determined long before the Directors were hired.

One of the Directors did work with the Advisory Committee which designed the core collection. The basic collection for any resource center can be designed by almost anyone who knows the needs and who is well-acquainted with the materials on the market. It is important to begin with a solid, well-rounded collection and build from there, rather than buying materials piece-meal and haphazardly.

The needs assessment in Delaware revealed that the first target population should be the middle school level, and an emphasis should be on "hands-on" instruction. Based on those objectives, the core collection built upon the standard commercial programs and texts in science and mathematics. Alternative kits and programs were purchased, as were an array of manipulatives and audio-visual equipment. In the past three years, many additions have been made to the collections, based upon recommendations from teachers and field agents. Programs which appear to be perfect in catalogues have been purchased to show teachers what the programs really are like. Knowing the needs of the group being served is essential for establishing and maintaining a resource center.

The Minimums to Make a Resource Center "Go" Again, the Directors addressed this topic from different angles.

Sloan: The general criteria for running a Center are knowing the needs of the target population and responding to these needs (in terms of grade level, area of study, material needs, and service). If money is limited, a center should search for the less expensive programs which generally can be utilized as effectively as the more expensive, glittering programs. The Del Mod System emphasizes service, so services should be planned and executed as needed.

Gardner: The materials are what attract teachers, so the greatest attention should be given to the collection. If money is limited, it should be spent on the collection of texts and kits. A total array of programs and kits is secondary to a solid core collection, and audio-visual equipment can be kept to a minimum if necessary. Essentially a good collection is the minimum a resource center should have, and it should be carefully built to meet the needs of the user population.

Giebelhaus: To begin with, a resource center needs one person "who is willing to work very, very hard". Additional staff is a luxury which is needed only when the center expands beyond a minimum facility. The atmosphere of the facility should be pleasant and should be provided with a sink, tables, adequate shelving and filing cabinets. Even (or especially) with a limited collection, the location relative to the target population is important. The collection at the very least (for the purposes of Del Mod) should include resource books for hands-on teaching ideas; from those kinds of books, teachers can improvise effectively. With the help of people who can judge the quality of a program, and determine whether the expenditure is worthwhile, copies of the newer teaching programs on the market should be purchased. However, idea-resource materials should take priority over commercial kits. If preservice teachers are being served by the Center, programs used in local schools should be stocked, to prepare the students for student teaching. The fundamental minimum, which can further guide a Director, is communication with the schools -- "know your schools".

If the Resource Centers are designed to serve the inservice teacher population, then it is crucial that their needs be understood. Constant communication can reveal how money can best spent to cater to that population. On this the Directors agree. They also believe that if a core collection is all that a center can afford, then teachers will make do, if the core collection meets a needs assessment. The primary objective must be to establish a minimum collection which responds to the maximum number of needs.

Audio-visual equipment is not necessary, but can be a tremendous asset even on a limited basis (for instance a film-loop projector is almost necessary if the Center is stocked with filmloops). If the population included preservice teachers, and the Center is used as a training ground by its undergraduate institution, then more audio-visual equipment must be included in a minimum collection.

Finally, the facility itself must be considered as part of the minimum of a center. A center must be attractive to the target population; the collection will draw teachers to a resource center, but the people and atmosphere will keep them there and help bring them back. For a center to be successful, it must be used by the target population.

Operation of a Resource Center The directors were asked to supply some general suggestions on the operation of a resource center. What they did not mention in regard to this was the tremendous amount of work involved in the day-to-day maintenance of a Resource Center. The collection must be examined daily to make sure everything is in its proper place for easy retrievability. Updating the collection is a continuous job: catalogs must be read, suggestions from teachers and Field Agents considered, new acquisitions must be labeled, filed, and cataloged. Supplementing the collection with giveaways, periodicals, manipulative ideas and educational articles of interest requires time and devotion.

> Sloan: Once the core collection is established in the Resource Center, assuming funds are available, thought and time must be given to expanding the collection. The most efficient means of updating a resource collection is to give that responsibility to the Director. If the Director is to avoid ordering materials guided only by intuition, he or she will rely on a myriad of

sources for suggestions: field agents, teachers, periodicals, newsletters, catalogs, and generally perceived needs. The Advisory Committee is a viable and valuable concept for formulating a core collection; however, if subsequent purchases were decided by committee the purchase might arrive after the need. If the Director is responsible for all ordering, and a teacher runs into the Center, desperately needing a particular kit which the Resource Center does not yet own, the Director can immediately call in the order to the company. This "power of the purse" needs to be accompanied by good fiscal sense on the part of the Director and the Center.

Gardner: The effective operation of a Resource Center in part rests upon the ready assistance available to teachers. Since the teachers who visit a resource center are generally searching for materials or ideas for their classes, help should be provided to facilitate their search. If a resource center serves preservice teachers, the assistance required will be more diverse. Students visiting the center will need information for methods classes, problems in student teaching and an overall knowledge of the kinds of "hands-on" resources available for a classroom. In short, a resource center is meant to provide information and the operation of a resource center must respond to that.

Giebelhaus: Keeping informed is the key to operating a resource center. Maintaining communications with the target group and spending as much time as possible with the resources and pertinent literature is important to the operation of a center. The services offered by a resource center should be predetermined and provided. The Director has found that organization is what makes a resource center function smoothly. With a vast collection organization facilitates retrieval and orderly maintenance of the collection.

The three opinions in combination reveal a fairly accurate picture of some of the roles of a resource center. A center must adapt to the population(s) it is serving and try to be prepared for anything. Knowledge and information are the best resources a resource center can offer. Communication, incoming and out going, is the best means to information.

Again, a resource center, to be successful, seems to rely on a set of intangibles. An itemized list of duties, services, and attitudes is no substitute for the experience of operating a resource center. The answers provided by the Directors were not entirely satisfactory; alone, the answers would make a poor handbook on "how to set up and operate a resource center." However, it has been clear that the best way to operate a resource center is by knowing and responding to the needs of the target population and the needs of the center. "Flexibility" is a word used by all three Directors more than once. A resource center can be whatever someone wants it to be; to be worthwhile a resource center must be adapted to the needs of the group being served.

One of the responsive evaluators described a process of beginning a resource center:

> Who can disagree with the obvious advantages of having an up-to-date Resource Center? If it is accessible to teachers and offers them a tangible service, it will be used. An easy way to form a small resource center would be to collect the materials from the different consultants ans supervisors within a school system and organize them in one location. If teachers could then check out items to use with their children, they could then rely more on actual experience rather than on a catalog description when buying supplementary materials.[3]

Mr. Ogle accurately perceives the intended use of the resource centers. He seems to oversimplify the job of assembling a collection, however. For example, the materials in a district may not alone respond to the needs of the teachers, even if they are available for loan at a central location; teachers also need to be given more than materials if a center is to be successful.

THE RESOURCE CENTER DIRECTORS*

The search for a Director of a resource center is to be done with seriousness. At the risk of being melodramatic, a Director can make or break a resource center. It is not appropriate here to judge whether any of the Directors are good or bad for their role, or whether any of the centers have made it or been broken. Instead, it is appropriate to hear from the Directors what their job entails, and what qualities they deem necessary for their jobs.

The Augmented Council of Presidents issued the Operational Policies of the Resource Centers in 1971. (See Appendix C). Inherent in the policies are the requirements for the directors of these Centers. The council further recommended qualities to look for in prospective Center Directors. Finding and hiring the people to establish and operate the Del Mod Resource Centers was then given over to the housing institutions.

The Affirmative Action Procedures of each institution were used in hiring the Librarian/Media Specialists. The Del Mod Component Coordinators, along with the appropriate members of the housing institutions, were responsible for advertising, interviewing, and selecting the Librarian/Media Specialists respectively. Since the housing institutions eventually would be entirely responsible for the Resource Centers and because the Centers and Directors were to follow the roles of the housing institutions, it was best that the Directors be hired by these institutions.

This shift of responsibility was also a gesture from the Del Mod Director signifying that control of the Resource Centers belonged to the housing institutions (University of Delaware, Delaware State College, and Delaware Technical and Community College). There were stipulations and requirements

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*The term "Director" is the author's. The people in charge of the Del Mod Resource Centers are title "Librarian/Media Specialists." This terminology has been altered for the sake of brevity and because the author is interjecting her own perception of the breadth of the job.

to be met by each institution if the funds for the Centers were to be forthcoming. Requirements for the job of Librarian/Media Specials were included.

The nature of the position actually defined its own job description. Del Mod required that a Center Director have at least an Associate Degree in Library Science, or the equivalent experience. The role of a Center Director entailed so much personal contact and so much work, that a gregarious, hard-working and self-motivated person was needed. The Del Mod Director, of course, had nothing to do with the hiring, but did act in a consulting capacity. Through interviews, and at the Director's urging, "people-oriented individuals were hired as the Librarian/Media Specialists.[4]

In the first year of Del Mod, two of the Science Resource Centers opened. The Center Directors were hired in the fall of 1971, and both Centers officially opened by February, 1972. There was little time for any training during this period; most of the time went to ordering materials and organizing them into a coherent system in the Centers.

Little thought was given to training Directors for three reasons. First, there was no one connected with Del Mod who had even operated a Resource Center, hence no one who could "train" the Directors. Secondly, the knowledge pertinent to the job (library procedures, flexibility, familiarity with education, and a love of working with people) was expected as a prerequisite. Finally, there was a practical side to beginning the Centers as soon as possible: if there were to be funding for Resource Centers a second year, the Centers had to prove themselves the first year. That precluded using several months for training.[5]

The Science and Mathematics Resource Center Directors were interviewed about their jobs, and what they perceive to be the essential qualities for effective execution of their positions. The topics they addressed follow.

Prerequisite for a Resource Center Director

Sloan: The job requires some knowledge and training in library procedures. This director had little specific

knowledge of math or science. The important quality is an ability to learn about the discipline on the job. In fact, by not knowing the discipline intimately, there is room for mutual exploration on a subject with a teacher which would not be there if an "expert" in science or mathematics held the position. A basic knowledge of library skills (for organizing and purchasing materials), secretarial skills (for typing, filing, budgeting, and bookkeeping), if coupled with creativity and imagination, surpasses the need to know the subject matter at the outset.

Further, the Director must be able to deal with people and be willing to help people. The only real gratification the Director receives in the job is the immediate reactions of teachers being helped--the progress of a classroom cannot be turned into concrete proof and taken back to the Center. The Director must be able to delegate responsibility because the Center will reach a stage in its development where the Director will have to have help.

A Resource Center Director must be proficient in letter writing, reports, and statistical analysis (for purposes of self-evaluation). The Director should be able to construct and maintain an effective out-reach program to attract the target population. Finally, and most importantly, a Resource Center Director must be flexible, and willing to put in the time, effort, and energy to work with people. Essentially, a Director must be people- and service-oriented.

Gardner: A resource center Director is responsible for an array of activities. The Director must know the books and materials and constantly update the collection and list of materials available. Keeping in touch with new procedures and techniques in education is important to the growth of the collection. The Director is also responsible for the overall maintenance of the collection--the organization and any necessary repairs.

The Director must be able to meet the demands of the job. In the case of the Science and Mathematics Resource Center, the Director should have a varied knowledge of science and mathematics, with some library science background. Because of the repairs often necessary on the materials, manual dexterity is an asset.

An empathy with and understanding of teachers and their problems is best derived from teaching experience, preferably for five or more years. A Master's Degree is not necessary either in library science or in the subject matter of the materials. Finally, a knowledge of audio-visual equipment is helpful for assisting pre- and in-service teachers.

Giebelhaus: The most important skill for ordering and updating a resource center collection is a knowledge of the selection tools. That encompasses knowing who to rely upon for purchase recommendations and from where and how to order purchases. Some library training is necessary for setting up an efficient circulation system, cataloging and filing. Also, experience in library systems and/or curricular materials is more valuable than an MLS of Master's Degree in a specific area. If not teaching experience, then knowledge of the public schools facilitates the understanding of teachers' problems. Personal flexibility and organization are characteristics which will allow a resource center to adapt to the peculiar needs of a locality and population. The Director of a resource center must be able to accept input and suggestions from field agents, faculty, teachers, and people with experience. Finally, some experience and knowledge of science and mathematics is helpful for the purposes of purchasing materials for the resource center.

A definite transition has taken place between the Resource Centers on paper and the Resource Centers in reality. Each has emerged with very different characters and somewhat different collections. Each Center has adapted to the dictates and desires of the housing institutuions. That indicates that for at least one characteristic, the Directors have practiced what they preach: flexibility and adaptablity.

The Directors have varying opinions on several prerequsites for their job. Not surprising, they were often describing themselves and their own experiences when discussing the prototype background for a resource center Director. All agree that for practical purposes a foundational knowledge of library procedure is necessary for cataloging and ordering. One Director had ten years of experience in every aspect of running a conventional library. Although that experience was invaluable at the

outset of the Resource Center, it has become easier and more effective to utilize imaginative and unconventional modes of cataloging and filing.

All agree on the importance of relating to people and being willing to go the extra step to help a teacher (or a student) with a problem. The underlying goal is service, which runs through all Del Mod activities.

On two points in particular the Directors disagree. Two of the Directors put strong emphasis on the library science and procedure as an experience background; the third Director mentioned that in passing only, but put great importance on the value of teaching experience. Two of the Directors believed that a knowledge of science and mathematics (or whatever disciplines a resource center concentrates) are important in dealing with specific teaching problems; the third Director preferred learning about the materials with the teachers. To resolve what appears to be a dichotomy of opinion, all the Directors would have to agree that personal adaptability and intelligence is more important than a list of specific skills. No one Director had the experiences that the three collectively recommended. However, all have learned what they needed to learn in all areas pertinent to a resource center Director's job--even the areas in which each had some "deficiency" of experience or training.

The academic and experiential backgrounds of each of the Directors is quite different. One Director taught school at the secondary level for two and a half years. She subsequently taught for two years at a technical institute where she helped create a library out of an empty room. She also has an MLS. The second Director majored in Elementary Education, and had eight years of teaching experience (with apparently no formal library work) before arriving at the Resource Center. The last Resource Center Director has an Associate Degree, and has taken some library courses. For ten years she was President of her town Library Commission, which entailed ten years of work experience in every aspect of library procedure.

Each of the Directors went through a similar interviewing/hiring process. They were interviewed first by the Component Coordinator of each institution, then by the Dean of the College. The hiring decision was made by the Component Coordinator, Dean,

and President of the College or University. The job description from the University of Delaware can be found in Appendix D.

One of the responsive evaluators received the qualifications of a Director (manager in his terms) quite well:

> The success of a resource center is highly dependent on the center's personnel. The Georgetown Resource Center is successful mainly because of the competency and enthusiasm of Ellie Sloan, the center's manager. She is supported by field agents, part-time student aides and the center's part-time administrator....
>
> When selecting people to staff a resource center, the most important position is a full-time center manager who must have specific qualities. Among the most important qualifications are:
>
> a) interest in being of service to teachers and other users of the center.
>
> b) ability to manage a system which involves handling requests of many users and a great amount of resource materials.
>
> c) ability to organize and supervise the work of part-time students and community volunteers. [6]

Director Training The Directors were asked if they felt they had needed any training before beginning their jobs in the Resource Centers. Del Mod's opinion on this issue was stated in the first part of this Chapter.

> Sloan: If the job description requirements were met, no training would be necessary. The Director felt well-prepared for the job, and capable of learning through experience. Once the Director was hired, Del Mod and the Component Coordinator turned the responsibility over to this Director completely. It was believed that to do the best job, the Director should be given a free hand with the Resource Center and the collection (within fiscal and objective limitations). If the red tape is eliminated, and the Director is allowed to use his or her discretion in shaping and stocking a center, the resource center will operate more smoothly.

Moral support from the housing institution coupled with a clear knowledge of the needs of the target population is more beneficial than training.

Gardner felt comfortable with the position from the start. However, training in filing resource organization, and records-keeping would have been helpful. As it happened these procedures were learned "on the job."

Giebelhaus: The concept of Del Mod can be very hazy to someone who first encounters it. This Director needed a clearer understanding of the objectives of a Del Mod Resource Center and an idea of the specific tasks to fulfill them beyond the lists of abstract goals and specific materials with which to stock the Center. Training per se was not needed, but clearer explanations were. Also, encouragement at the beginning to work with experts in the specific disciplines (field agents, for instance) would have accelerated constructive expansion of the collection.

The responses speak for themselves; obviously any training needs vary with the Director. A standard training program would have been unnecessary. If the prerequisites for the job of the Director are well-thought out and met in hiring, there is no benefit to a training program.

The Role of a Director In all the Resource Centers, organizing and cataloging the collection is a major function of the Director. All estimates seem to indicate that nearly half the time in a resource center is devoted to maintaining the collection. The other half of the time is devoted to visitors in one capacity or another. At the University much help takes place from behind the circulation desk, and some in the collection. The Director must also devote time to tours and working with field agents and faculty.[7] At Delaware State College, the Director works closely with the students and also is involved with audio-visual programs for the College.[8] Mrs. Sloan now has people trained to do most of the filing and cataloging chores, leaving her with budgeting, bookkeeping and organizational concerns. She spends the rest of her time in preparing the newsletter, talking and working with teachers, and generally keeping informed. It is difficult for the Directors to say what they do; every day is slightly different than the previous day. What do Resource Center Directors do? An almost non-answer would be that they respond to whatever

needs arise, within the limitations imposed by the housing institutions and time.

The ordering policies differ center-to-center. In one Resource Center, new materials cannot be ordered without a formal request from a field agent or teacher. Another Center has given free reign to the Director, and purchase orders are essentially only rubber-stamped by the Component Coordinator. The third Center's policy lies somewhere in the middle; the Director and Component Coordinator mutually decide upon collection purchases. Throughout the Del Mod System, field agents and teachers are relied upon for suggestions and direction, no matter what the ordering policy is.

Two of the Directors were asked what impact they perceived that they had made on their Centers. An institution like a resource center is affected by personalities, not just by the housing institution, but also by the personality of the Director.

Barbara Giebelhaus has been at the University Resource Center since it first opened. Her personal contributions have been many. Her library experience enabled her to help set up the Center and to get it running. The Director spends much time serving faculty, students, and occasionally field agents, in the forms of reference aid, research, and personal contact and assistance. She does not see many inservice teachers (since she works during the day and students operate the Center at night). However, Mrs. Giebelhaus has helped establish good public relations generally. Unlike the usual University procedure, I.D.'s are not required to use the Center or to borrow materials and there are no fines charged for late returns.[9]

Leon Gardner was hired for the Delaware State College Resource Center about the time the Center opened. He was not the original Director, so he missed the original planning and purchasing stage. He sees his greatest contribution to be innovative ideas and uses of audio-visual equipment. Also, he brought a good, varied experience of science, mathematics, and teaching to his job. That is particularly beneficial in his work with the College students.[10]

Both Mrs. Giebelhaus and Mr. Gardner have made a positive impact on their Resource Centers, especially in terms of the student populations. In an effort to be objective, they both

have failed in drawing to the Centers as many teachers as they should. However, the Newark Resource Center is hampered by its location and parking, and the Dover Center is limited by its hours. In Dover, a teacher can arrange night hours or a night appointment by a simple telephone call to the Director. It is doubtful that most teachers in Kent County know this. There are also many New Castle County science and mathematics teachers who know nothing about the Resource Center. This lack of information among the teachers is a function of the Centers' concentration on internal institutional visitors.[11]

Perhaps in future resource centers the administration of the center should be handled differently. If there is an undergraduate population to consider, and a center also wants to attract inservice teachers, maybe the directorship should be divided between two people. With their constant responsibilities to undergraduates, neither Mrs. Giebelhaus nor Mr. Gardner can devote the time to inservice teachers that Mrs. Sloan can.

The most important part of the job of a resource center Director was discussed by Eleanor Sloan. By her own definition, a Director must be willing to give "that little extra". Mrs. Sloan supplied one example and one story to support this.

Assume a teacher walks into the center and asks for material on fractions. The Director has three alternatives, the last being the best. He or she can ignore the teacher, point to a place on the shelves, or take the teacher to the one, two, three or more places in the center where materials related to the teaching of fractions are kept. If, however, the teacher really just wants to browse, then he or she should be left to his or her own divices, until assistance is requested.[12]

An interesting story about "that little extra" was related by Mrs. Sloan. Apparently about a year ago, four teachers came to the Center to search for a new science program for their classrooms. They had seen a very sophisticated program in a science catalogue, and wondered if the Resource Center owned it. When they discovered that the Center did not, they asked Mrs. Sloan what she thought of the program. The description in the catalogue sounded as though this was the ideal solution to the teachers' problems. Mrs. Sloan had learned to not always depend entirely upon

catalogues with glowing descriptions and glossy colored photographs. Besides, the program would have been a $1600 expenditure.

With that in mind, she suggested that they request a demonstration of the program from the company. Three of the teachers said no, that would be time consuming, and it was easier to go ahead and order the program. The fourth persuaded her colleagues to wait for a demonstration. Mrs. Sloan immediately contacted the company and arranged for an agent to be in Georgetown the following week. When the teachers finally saw what the program entailed, they unanimously agreed that, nice as it was, the science program was about two years too advanced for their classes. Without the Resource Center they would have spend $1600 of the district's money, in good faith, with bad results. Instead, they found a near perfect program from the Center's collection for far less money.[13]

CHAPTER IV

RESOURCE CENTERS:

TEACHERS' AND FIELD AGENTS' VIEWS

1976 QUESTIONNAIRE

Thus far this study has been based primarily upon the observations of Resource Center Directors, out-of-state evaluators and the author. Comments by in-state teachers acting as Del Mod evaluators have been inserted only occasionally. A true picture of the Resource Centers in Delaware must include the opinions of the target population, the in-service teachers.

In January, 1976, a questionnaire on the Resource Centers was mailed to 194 teachers in the State. Another seventy-five were left in the Resource Centers. The list was taken from the Del Mod roster of mathematics and science teachers in the State. The roster consists of 4,240 teachers who have taken Del Mod courses, have been receiving the Del Mod newsletters, have visited resource centers, or have requested that a field agent place their names on the rolls. There are also many teachers whose names have somehow slipped into the roster without direct participation in Del Mod.

The questionnaire was issued in an effort to determine what the teachers perceive to be the success of the Resource Centers. The Centers were designed for the teachers, and what they think of the Centers is ultimately more important than any philosohpical interpretation that an outsider or a Director might attach to the Resource Centers.

When the list of teachers who would receive the questionnaire was constructed, an effort was made to include mathematics and science teachers, teachers who had participated in many projects and teachers who had participated in none, male and female teachers, and teachers in elementary, middle and high schools. Because there was a conscious selection working to yield a homogeneous group, much randomness was lost.

A sample of the questionnaire can be found in Appendix H. This was distributed to approximately five percent of the teachers in each district on the Del Mod roster, with at least one sent to every district. One hundred ninety-four were mailed out, and fifty-six were returned. Twenty-five were placed in

each Resource Center, but only two were returned (both from the Georgetown Center).

A breakdown of the respondents by grade level follows:

	Elementary	Middle	High School
Respondents	21	20	17
% of polled	23.1%	33.3%	40.5%
Visitors	12	18	6
% of polled	13.1%	30%	14.3%
Non-visitors	9	2	11
% of polled	9%	3.3%	26.2%

The answers to the questions given by the teachers must be regarded realistically. They do not represent a concensus or a percentage of opinion. Rather, the answers represent what some teachers think of Del Mod Resource Centers. The opinions of these teachers are no less valuable because they cannot be expanded into general truths. It is safe to say, however, that the responses of the teachers point to the direction of opinion about Resource Centers.

Years Teaching in Delaware

	Visitors	Non-visitors
Total people	36	22
Average years/person	7.8	8.1

From the records on the roster, it is impossible to determine how many years the overall population has been teaching in the State. Since the averages above are consistent, and the span of years represented by the questionnaire was relatively small, it seems reasonable to assume that the average Delaware science or mathematics teacher on the Del Mod roster has been teaching eight years.

Geographical Distribution

	Visitors	Non-visitors
New Castle	13	16
Kent	8	3
Sussex	11	1
Parochial	4	2

When one is dealing with a sample population, it is foolhardy to extrapolate from the sample and make a statement about the whole. However, there is a pattern which is revealed by the sample which yields a general source of information. It is evident above that the overwhelming majority of the respondents from Sussex County have visited a Resource Center (all have been to the Georgetown Center). More than one-half from New Castle County and nearly one-third from Kent County have not been to a Resource Center. (Only half of the Kent County visitors have been to the Kent County Center at Delaware State College).

Resource Center Visitors

Thirty-six of the fifty-eight respondents have visited Resource Centers. Two of these teachers filled out questionnaires acquired from the DTCC Resource Center. Four of these to whom the questionnaires were mailed teach in parochial schools. Where a separate listing for parochial school teachers is not given, these people are included in New Castle County.

Circumstances of Visiting a Resource Center

	UD *	DSC **	DTCC
Workshops	9	3	7
Inservice Days	7	1	8
Research	11	3	11
With Field Agent	4	1	3
Other	2	1	1
Total Respondents	17	3	16

If these numbers can be relied upon, it is obvious that Inservice Days and Workshops held at Resource Centers have been an asset to the exposure of all three Centers. Field Agents have probably worked better in New Castle and Sussex Counties than they have in Kent, in relation to the Resource Centers. As will be seen below, each teacher indicated which Centers he or she had visited. The listings by Center have been determined by which Resource Center the teacher has visited the most. Parochial school teachers have only visited the University of Delaware Resource Center.

* University of Delaware
** Delaware State College

The teachers were asked about the reception and service they received at the respective Centers. The DTCC group for the most part evaluated the Center attitude as "excellent," "friendly," and "helpful." The University of Delaware received comments ranging from excellent to good, but with a fairly even distribution of responses. The Delaware State College Center was regarded by one person as "excellent," but by the others as adequate.

A teacher's comment about the Georgetown Resource Center is complimentary: "They are very cordial and glad to be of any help. The assistance is fantastic. You couldn't ask for it to be better."* Teachers seen to rank the DTCC Center first, the University's Center second, and the Delaware State College Center third, in the realm of service. Although teachers did not mention the influence of students, it is not a coincidence that no undergraduates are served at DTCC's Resource Center. As conjectured in Chapter II, teachers benefit more when students are not a part of the target population.

One question stated: "Del Mod perceives the Resource Centers as filling a gap in the State educational resources. Based on your district's resources, do you think this is true?" All teachers but one answered "yes". The reason given for the dissent was an insufficient collection of 16 m.m. films at the University Resource Center. Other teachers had more positive things to say:

> Quite often it is easier to go to Del Mod than to put an "all points" request within the district (Wilmington). At Del Mod there is a definite organization of material that facilitates the location of the materials. ...the district does not have enough funds for all areas of learning--the resource centers fill in the gap that is needed to motivate learning.

The teachers were asked how they first discovered the Resource Centers. The responses were fairly evenly spread between field agents, other teachers, and newsletter. The one exception involves the field agents at the University:

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*Because of a promise of confidentiality, none of the teacher quotation sources will be identified.

eight out of 38 first discovered the Resource Center from the New Castle County field agents. In its small way, this answer supports the claim that the outreach program at the University of Delaware is dependent on field agents for attracting in-service teachers.

All aspects of Del Mod are interrelated and hopefully benefit each other. Since no one institution of Del Mod (field agent, workshops, newsletters) is overwhelmingly responsible for advising teachers about the existence of Resource Centers, it might be difficult for a new resource Center outside of a system of services to gain recognition from the inservice teacher population.

One of the State teachers involved in the recent responsive evaluation of Del Mod analyzed the Field Agent/Resource Center relationship from his perspective, supporting the responses from the questionnaire. He felt that in one case the field agent was as valuable a source of contact with the Resource Centers as any public relations efforts in the other Centers:

> Georgetown Resource Center puts out a very excellent newsletter. It also relies on the Field Agent to stimulate teachers to use the facilities. Georgetown tends toward teacher contact and use directly. This means that the Field Agent is not necessarily the primary teacher contact. Teachers use the center primarily; teachers use the Field Agent secondarily.
>
> The University of Delaware Resource Center appears to be the reverse in usage by science teachers. The primary contact is with Barbara Logan, the Field Agent. She will procure programs or materials from the center or refer the teacher to that part of the center that will assist the teacher with his problem. The staff at the University of Delaware Center does not appear to be as teacher oriented as Ellie Sloan at Georgetown.
>
> Both Centers could attract more teachers if lists (of materials) were published so that a teacher could plan over a longer period of time. More inservice activities using facilities would encourage teachers.[1]

When asked about materials borrowed from Resource Centers, or purchased as a result of having seen equipment at a Resource Center, teachers gave a variety of answers. Some responded with lists of specific materials or kits; some responded with quality evaluations. The real importance of these questions is discovering the general use of each collection in each Resource Center.

	DTCC	DSC	UD
Borrowers	15	3	11
Purchasers	9	2	5

The Director at the Georgetown Center sees the main function of a Resource Center to be aiding in the purchasing of materials. If the results of this questionnaire are any indication, the DTCC Center seems to have been successful in this endeavor. In fact, in terms of the numbers of specific items, these teachers have indicated that they use the collection to guide their choice of purchases more than they borrow items from the Center. The situation is reversed in the two northern Centers.

It is not expected that Resource Centers would be responsible for dramatic changes in a teacher's methods of teaching. However, these teachers responded positively when asked how the Resource Centers had affected their teaching ideas or methods. Any direct influence in this area, within the Del Mod System, comes from field agents. The Centers are designed to provide exposure to and use of materials otherwise not readily available to teachers. How they use those materials is a personal decision. It should not be alarming that the Center has had no influence on teaching methods for several teachers. It would be alarming if the Centers had not been a help and a positive service to the teachers. All three Centers have served the latter function to one degree or another. One teacher commented: "It (the collection) has stimulated thinking -- it has given me the opportunity to have students participate in planning."

The teachers were asked about the various resource center services (telephone, courier, newsletter tear-offs) of which they had taken advantage. The tear-offs are from the Georgetown Resource Center newsletter. This category was provided to indicate the relatively far-reaching influence of that newsletter. Sure enough, almost two-thirds of all the Center visitors had used the newsletter tear-offs. The questionnaire

revealed the lack of knowledge among the teachers of the State Courier service. Evidence beyond the teacher responses exists. This questionnaire was sent to teachers by Courier, and was supposed to be returned by Courier (as was stated by the cover letter). However, 50% returned the questionnaires through the U.S. mail. Probably an equivalent percentage of the teachers who know about the Resource Centers do not know about the Courier service.

The newsletter is received by more than 1600 teachers statewide and is appreciated:

> The newsletter is extremely nice. (I am able)... to hear about new materials and send for items -- like the recipe in metric for candy canes -- to use in class activities without having to try to get to one of the Centers after school.

The teachers were asked to evaluate the Centers they had visited. The DTCC group answered with descriptions including excellent, very good, pleasant, good, helpful, well-equipped, unorganized, friendly, and fun. The Delaware State College Center received one judgement each of excellent, good, "has potential", and unsatisfactory. The University's Center received the same comments's as Georgetown's, with the addition of organized and crowded, and the deletion of friendly and fun.

One teacher said of the Delaware State College Resource Center: "Very unsatisfactory -- could not locate consultant, seemingly disorganized." Several comments about the DTCC Resource Center included: "Superb, constantly helped in finding materials, hospitable personnel." "The materials are excellent and well-supplied. The physical facilities at Georgetown, although a little small, are quite adequate, because the personnel are very efficient and helpful in locating things and make up for the lack of space. As for the atmosphere, I find it very friendly and relaxing. Even when I'm tired, I enjoy working there and don't want to leave when the time is up."

One question asked teachers for recommendations on changes they would like to see in the Resource Centers. Their answers represented a multitude of areas. One area which several people from New Castle County cited as needing improvement was that of communications. An outreach program is

essential, and can effect the success of a resource center. One teacher who claimed she had never been to a Del Mod Resource Center added the following note to her questionnaire:

> I did not know they existed. I know of a resource room at the University of Delaware but it's not just math and science so I assume it's not yours. I found it useful but did not have much time to visit it. If it had been closer to north Wilmington, I'm sure I would have visited it more.

Obviously she had visited the University's Del Mod Resource Center, but no one had ever provided her with the full details on the Center.

Other comments from teachers include: "Del State needs more organization -- more materials -- more inservice programs (Earth Science!)...I have seen little change in the Del State (Resource Center) since I've been using it. I wish Georgetown were closer." A Kent County teacher said: "I would like to see a Resource Center for the Language Arts area or it incorporated into present resource centers."

The woman from New Castle County mentioned the distance of the University Center from where she teaches and probably lives. Another teacher said, "The New Castle County Center is geographically mislocated." Georgetown and Dover are in the center of their respective counties. Newark is in the mid-western portion of New Castle County, and because of the congestion in the county, could be time-consuming to reach. If the funding had been available, there would have been a second location in the northern county at Delaware Technical and Community College in Wilmington. Since that Resource Center never came to be, the driving time to the Newark location is probably burdensome for many teachers.

When the questionnaire recipients were asked about observable changes in the Resource Centers in the past four years, the responses were rather vague. Admittedly, it was a poor question with an unclear end in mind. The intention of the question was to see if teachers recognized a change as the Resource Centers moved away from Del Mod and toward the respective housing institutions. No mention was made of this phenomenon. In fact, the teachers never mentioned the undergraduates and their use of the two northern Centers. Perhaps the aforementioned hypothesis, that the presence of under-

graduates in a Resource Center detracts from its usefulness to inservice teachers, could be wrong. It is also possible that teachers are not really aware of the effect students seem to have on the Centers.

One brief anecdote might illustrate this. Two researchers from the Del Mod Dover Office attended the NSTA conference in Philadelphia in March. One gentleman approached us and said, "I see you are from Del Mod. I have taken many of your projects with Barbara Logan (a science Field Agent)." He was obviously impressed with what Del Mod was doing in the workshop/field agent area. I asked him about the University Resource Center. Yes, he had used it many times. Did he mind the students using the Center? "Good grief, no. They are a tremendous help to me." He was referring to the students who worked at the Center, and helped teachers find materials. I again asked him whether he minded the student use of the Center for research purposes. He reacted to the question rather vaguely, and responded, "I guess not." I do not think he was really aware of the fact that University students did more in the Center than serve teachers. The interpretation could be wrong. However, the marked differences center-to-center can be attributed only to the institutional differences stemming from committments to undergraduates.

Of the fifty-eight respondents, twenty-two had never visited a Del Mod Resource Center. These people were asked if they had heard of the Resource Centers. Their answers listed by where they teach, were as follows:

	New Castle	Kent	Sussex
No	5	1	1
Yes	13	2	0

The seven teachers who had never heard of the Resource Centers constitute 12% of the respondents and 31.8% of the 22 non-visitors. One New Castle County teacher was in a parochial school. The two Kent and Sussex County teachers taught in vocational-technical high schools.

Twelve of the teachers who had never been to Resource Centers responded to "how did you hear about them?": five heard by word-of-mouth, four from Del Mod newsletters, three from Del Mod workshops, and two from Field Agents. Either

their sources of information were not terrible persuasive, or these teachers felt there was no need for the Resource Center services.

Nine teachers from New Castle County indicated a need for the Resource Center collections. Several comments on this were offered. "Many materials are too expensive to have assigned to individual classrooms so the materials must 'float'. Then, unless you're the first to get the use of the materials, there are often parts missing or expendables used so that I become frustrated. As a result, I usually make or buy my own materials--as much as possible."

One teacher acknowledged the positive psychological effect that the Field Agent program has upon teachers, even to a greater degree than Resource Centers: "I don't think it's the collection of materials so much as the fact that someone has been there to offer suggestions and help with the materials."

If so many of the 22 non-visitors perceive a need for the Centers, why have they not made a visit to the Centers? Their reasons included location, hours, no need, no time, and no language arts or learning disabilities materials. Some of these reasons deserve comment.

The location of the University's Resource Center, although seemingly well-placed, is really out of the way for these teachers from districts north of Wilmington (although one teacher from Newark claimed location was her reason for never visiting). It is ironic that two New Castle County teachers would consider hours as a deterrent since the University of Delaware Resource Center is open more hours (four nights a week until 10 and Saturday mornings) than any other Resource Center. Another unfortunate fact is that the three language arts and learning disabilities teachers have no concept of the breadth of the University's collection. That would indicate that many more teachers in New Castle County are unaware of the all-encompassing nature of that collection.

In 1975, a questionnaire relating to Resource Centers was issued to teachers (to be discussed later). Then, one of the major reasons for not visiting the University's Center was convenience, presumably meaning parking. None of the teachers polled in 1976 felt that parking was a significant

deterrent. However, even the Del Mod staff will attest to the difficult parking situation at the University.

One teacher said about the University of Delaware Resource Center: "I didn't realize that any teacher could use it." That same teacher wanted "information concerning 1) hours, 2) location, 3) lending period, and 4) materials available." There is a gap in communications in New Castle County.

The teachers were asked "What might induce you to visit a Resource Center?" The two major responses were time, meaning release or inservice time, and information. Obviously, some teachers feel that the schools ought to allow release time to make a trip to a Resource Center. This opinion has been expressed for several years by teachers. Time always seems to be a problem for most teachers. "We just don't have all the neat materials you provide--I've just never gotten to the Center....I never find the time....I'll come--I promise."

After four years of operation, no teacher should have to ask for information on Resource Centers, certainly not five of the 13 New Castle County teachers. Since the University's Center is more inwardly directed, the inservice teachers are less of a target population than they were four years ago. As of 1974, communication with inservice teachers was virtually non-existent. Without Field Agents, only a scant number will visit the Center.

From a parochial school, in response to "What might induce you to visit a Resource Center?": "AN INVITATION! Please, I'm not being smart. I do not teach in a public school, therefore, it is hard to keep in touch with what is going on, even though I am in Graduate school at the University of Delaware." From Newark: "Don't know what to expect to find. What do you have that would be useful to me? Is it free? Are your services and materials free? Is there a catalogue of your materials? What are your hours of operation?" If a teacher really wants to use a Resource Center, he can make the time. However, if a teacher does not know about the Resource Centers, he obviously will not use and benefit from it.

THE MARCH 7, 1975, QUESTIONNAIRE

The 1975 questionnaire was distributed to a group of teachers participating in a workshop for Inservice Day. The workshop was being held at all three Resource Centers, and was attended by many non-science or mathematics teachers who would have no interest in a Science-Mathematics Resource Center. One hundred eighty-nine people were polled and responded.

PART I: Those who have visited a Del Mod Resource Center. (114 teachers responded to this section)

1) Which Del Mod Resource Centers have you visited? (16 teachers had visited two or three, all others one)

UD: 29; DSC: 22; DTCC: 79.

2) Which Resource Center newsletter do you receive? (At this date there was only one newsletter being sent out: DTCC's)

UD: 12; DSC: 1; DTCC: 78; None: 19.

3) Did the newsletter give you any useful tips?

Yes: 89; No: 6; No answer: 19.

4) Have you ever ordered materials from a Resource Center?

Yes: 65; No: 42; No answer: 7.

5) Have you ever recommended new Science or Mathematics materials to your districts?

Yes: 66; No: 42; No answer: 6.

Were the materials purchased?

Yes: 49; No: 26; No answer: 39.

Did you see the materials at a Center?

Yes: 52; No: 26; No answer: 36.

The most important of these questions is number five. Forty-five percent of the teachers who had visited resource centers had recommended that their districts purchase materials they had seen at a Resource Center. That is quite similar to the forty-seven percent of the 1976 questionnaire.

Question six stated "Please rate the following aspects of Resource Centers." The responses were based on a one to seven (poor to excellent) scale. The mean scores are given below.

	DTCC	DSC	UD	Visited More than one Center
Hours of operation	4.49	4.58	4.33	5.50
Service	5.12	4.58	4.66	5.93
Current materials	5.07	4.75	4.61	5.68
Newsletters	5.12	5.16	4.66	5.56
Convenience	4.57	5.08	4.18	5.00
Number people responding	65	12	21	16

These ratings are more consistent than those in the questionnaire issued in 1976. Comparing the results from the two questionnaires is virtually impossible, however, because of the different forms of responses. Also, the reliability of both questionnaires is somewhat questionable. Only interpretations of "good," "bad," and "better" are really feasible.

Every aspect of the three resource centers was rated above average (average, or no strong opinion either way being 4). There is a difference in intensity of opinions between Centers. The University of Delaware received the lowest score for hours--despite the fact that that Center has the longest and most convenient hours. The service at DTCC is thought to be the best, as are the materials. Although the newsletter is sent from the Georgetown Center, it received its highest rating from the Dover Center users, attesting to the thoroughness of Georgetown's mailing list. Lastly, the Dover and Newark Centers are the most and least convenient Resource Centers to visit, respectively.

All aspects (excepting convenience) of the Resource Centers were rated higher by the people who had visited more than one Resource Center. The reason for that is not readily obvious, but it might have to do with the more dedicated use of Centers by these people.

The Resource Center visitors offered comments and suggestions, which are listed by the Centers they visited:

University of Delaware

Keep it up!

Do something for secondary school.

More of the Centers would be great!

Delaware State College

An inventory or bibliography as you enter the Del State Center. It's rather disorganized.

You probably already know! Del State needs more organization. I hear a lot of positive comments about Georgetown.

Delaware Technical and Community College

From what I have seen, Del Mod is great!

Keep up the good work!

1) I wish the hours were longer and more importantly open on Saturdays. 2) More local in-service days spent at the resource center.

I'd like longer hours on Fridays.

Evening hours?

More field visits to individual schools to see what ideas can be picked up--update needs of schools in the area served.

A longer period of time to have materials out.

More than one Center

Del Mod is a good idea. Keep it up!

Del State Center would be more useful if open at night!

More workshops.

I live in Milford and work in Harrington. Takes one half hour to drive to either the Center in Georgetown or the one at Del State.

The Del Tech Resource Center is excellent, but I cannot use it because of distance from my school. The Dover Center seems to be poorly organized when compared to the one in Georgetown. I have been there when there was no one to help my. I understand that there are more materials available but that they have not yet been cataloged.

PART II: Teachers who have not visited a Resource Center. (Seventy-five teachers responded to this part.)

If you have not visited a Resource Center, please check one or more of the following possible reasons:

	Number
I have never heard of Del Mod Resource Centers.	17
The Centers are too far away from my school or home.	9
The hours at the Center are inconvenient.	16
My school or district has its own Center.	6
I do not teach science or math.	18
Other.	23

Many teachers who responded with "other" elaborated:

Not enough time to fit in my crowded teaching schedule to visit a center.

I've only recently learned about the center and haven't really had time to go to any of the centers.

My eyes do not permit driving evenings and I do not have free time during the days.

In L. D. we spend more time in other areas. Will make use of center in the future.
Simply never taken the time to visit.
Haven't been able to find time to get to the U. of D.
Unfortunately haven't yet made the time to go.
Have not had the opportunity.
I have not as yet had the time to go to Del State but I plan to in the future.
Do not have time or energy.
Have not made one yet.
I feel uninformed; time should be made available on inservice days to acquaint us with the centers.
I am not in a class-room.
Am new in the area and am just finding my way around. Incidently I just heard about them January 22. Very poorly advertised.
I would like to become more familiar with Del Mod, but I have just never taken the time.
Do not know locations--have heard of it via U. of D. science methods.
Environmental lab in our district. First grade science and math.
Where are they?
I am interested in knowing more about Del Mod facilities.
Have not been associated with the organization.
I object to the fact that our district will not allow us to visit the centers on <u>inservice</u> time!

As usual, the most common reason for not visiting a Center is time. The most valid reason was lack of information. That is the fault of the Resource Centers themselves. Since this questionnaire was issued at all three Resource Centers, and none were identified, it is impossible to determine which of the non-visitors are from where. Therefore, these comments are not very informative for any one Resource Center.

1975 FIELD AGENT/RESOURCE CENTER SURVEY

The second survey which was taken 1974-75 was again on the Resource Centers. This time the questions were asked of Del Mod personnel: Field Agents and Resource Center Directors (Librarian/Media Specialists). The conclusions of this survey are presented in a paper entitled "Del Mod Field Agent/Resource Center Interaction Study," by Dr. John R. Bolig and Barbara Westbrook.

The Bolig-Westbrook study will be placed with Del Mod's permanent records at the University. Therefore, only portions of the study will be included here. Because interviews with the Directors are presented in Chapter III, only the Field Agents views will be included. The comments on each Center reflect the aggregate opinion from the six field agents active during the Fiscal Year 1974-75.

Del Tech Resource Center-Field Agent View

1) The features listed most often as the best features of the center were: a) Personnel, b) Atmosphere and c) Updated materials.
2) The lack of space available was considered at the least advantageous feature.
3) Teachers were encouraged by field agents to use the Del Tech Resource Center because of the materials available and the attitude of the personnel.
4) The lack of space for workshops and expansion purposes was given as the primary frustration.
5) Suggested improvements were: a) increase the size of the center for workshops, office and storage areas, b) add a planetarium, and c) have the area and materials available for teachers to come in and look at, with the idea in mind that parents or someone other than teachers would, at a later date, be able to construct usable items for classroom use. This should give the teacher more classroom time and involve concerned parents in school activities.[2]

Del State Resource Center-Field Agents' View

1) Features listed as the most outstanding for Del State are: a) Area, and b) Layout.

2) Features listed as the least advantageous are: a) the services of the librarian/media specialist, b) lack of convenience (i.e. closed from 12:30 to 1:30).
3) Field agents encourage teachers to visit the center only if those field agents plan to be in the center themselves.
4) The frustrations listed most frequently by field agents were: a) personnel, b) kits taken apart, and c) the hours of operation.
5) Suggested improvements were: a) to have someone in the center all day, b) to have someone available to discuss materials or equipment, c) to send out newsletters d) to change hours of operation for teacher convenience, and e) to make updated materials available for previewing.[3]

University of Delaware Resource Center-Field Agent View

1) The best features are: a) the undergraduate materials available, b) the elementary materials available, and c) the A-V equipment.
2) The features considered as least advantageous were: a) knowledgeable personnel were not available, b) updated materials were not available, c) no space has been made available for teachers, and d) the attitude of the personnel could be better.
3) Teachers were encouraged to use the center only if the field agent was certain the materials needed by that teacher would be in the center. Teachers are seldom told to go to the center for new ideas.
4) The frustrations most often listed by field agents were: a) lack of knowledgeable personnel, b) the space and time were not in the best interest of the teacher, c) updated materials were not available, d) materials that had been ordered were not available, e) the materials were too hard to obtain from the center, f) nothing had been established concerning the purchase of new materials, and g) the center was seldom used because of the attitude of the personnel involved.
5) Suggested improvements were: a) update materials, b) train knowledgeable personnel, c) change the attitude of the personnel, d) inform field agents as to the budget standing for ordering needed materials, e) send out newsletters, and f) encourage teachers to use the center, then make space for them.[4]

The opinions of the Field Agents are quite similar to those of the teachers in regard to the Resource Centers, although more critical. There are some slight differences

between the opinions expressed by Field Agents and those of the teachers. For instance, the Field Agents did not mention the inconvenience of the Georgetown Center being closed on Saturdays. Generally, a Field Agent's schedule is hectic Monday to Friday, but he does not work on the weekends. Therefore, he would not be frustrated by the hours.

The most important discovery was the Field Agent opinions of the collection. In Sussex County, the Field Agents strongly recommended use of the Resource Center to teachers. However, in Kent and New Castle counties, the Field Agents recommended the Center only when they would be there to assist. At the University that was explained by the lack of knowledge of the collection by many personnel; at Delaware State College, the Center is often unattended by the Director.

The Resource Centers were intended to be the home base of Field Agents. Therefore, their opinions are important. If a Field Agent is to be attached to a Center it is important that he be included in the Center activities. The Field Agent has a direct line to the teachers, and also has an expertise in his field which can be unique to a resource center. However the Field Agent perspective is different from that of an inservice teacher. Also, if a Center does not operate with any dependence on field agents, field agent opinions might not be of interest.

CHAPTER V

SUMMARY & CONCLUSIONS

SUMMARY OBSERVATIONS

Resource Center Models Chapter I mentioned the concept of a resource center system. This has been demonstrated in the chapters subsequent to that, but still deserves explanation. Within the Del Mod System, no one resource center represents the achievements of the whole system. Throughout it has been stressed that after several years of operation, each resource center functioned as a separate entity, independent of the other centers.

The systems concept is inherent in the Del Mod System. However, the manifestations of the three resource centers supports the claim that resource centers are transportable. The setting in which a center is placed is all-important. The Del Mod Resource Centers hopefully provide guidelines for future resource centers.

> It was fortunate that the Del Mod System had an opportunity to set up a center in primarily a graduate student, preservice teacher setting (Newark), an inservice teacher setting (Georgetown), and a preservice setting (Dover). Most evaluators favored the inservice-teacher-only center model and would therefore like the center established in a 2-year college or intermediate unit setting.[1]

The Newark and Dover Centers provide models for resource centers designed for preservice teacher and graduate student use. The evaluators consistently favored the Georgetown Center as a resource center model. This deserves explanation. Essentially, the Georgetown Center followed the original proposal and operational policy, fulfilling the prescribed function of a Del Mod Resource Center. The Newark and Dover Centers did not. Nevertheless, they did play beneficial roles in their respective institutions. The University's Center particularly has functioned quite well within the College of Education. The evaluators recognized this, and suggested that they too could be models for other colleges and universities.

> Although most evaluators believe the resource centers are most effectively used for inservice teachers, there is little question that the centers were valuable to

> preservice teachers as well. It is quite possible that centers such as the ones in Dover and Newark could be set up equally well in other 4-year colleges and universities.[2]

However, where a resource center designed to serve inservice teachers is housed in an institution training undergraduate teachers, a dichotomy of function inevitably results. There seem to be two logical solutions to resolve this dilemma. One is to eliminate inservice teacher use (not by exclusion, but merely by providing other places devoted to the welfare of teachers) and concentrate on the needs of graduate and undergraduate students. The second, and untested, solution might be to establish a co-directorship. One director could cater to the needs of the institution in which the center is housed; the other director could focus on an outreach program and services for inservice teachers.

The original proposal made a provision for serving undergraduates:

> Each Center which is connected to an institution engaged in the preparation of teachers (University of Delaware, Delaware State College) would provide equal services to the preservice teachers as to the teacher already employed. Since these centers would serve dual purposes, the amount of various materials would, of necessity, be increased.[3]

A reversal of function has occurred at the Newark and Dover Centers. The preservice teachers and graduate students at the University have become the predominant concern in those resource centers. For the purposes of those institutions, that is excellent. The collection at the University has greatly expanded to accommodate preservice needs; the Delaware State College collection has grown very little.

There is a consensus of opinion among the evaluators that the Georgetown Center is, for the purposes of inservice teacher needs, the most transportable.

> This center was not directly associated with a teacher training program and therefore gave its full commitment to inservice teachers....One evaluator...believed the Georgetown model could be moved intact to a community college setting.[4]

The unintentional exclusion of preservice teachers has proved to produce a resource center which is highly effective for inservice needs. Therefore, if a future resource center intends to serve inservice teachers predominantly, it should not place itself in an institution which also trains teachers. Rather, as the evaluators suggest, a community college or like setting should be ideal for an inservice teacher resource center.

A Systems Approach The systems approach in Delaware has been beneficial to the Resource Centers, at least in terms of initiating their operation. The various components and programs of Del Mod have contributed to the outreach task of each Center. If such a coordination of effort exists, by all means, a resource center should utilize that system.

The Del Mod Field Agents have helped advertise the Resource Centers. "The University of Delaware Center...was useful to the inservice teachers through the services of the field agents."[5] If there is a field agent-like person attached to a resource center, his skills and knowledge should be used to the fullest.

> The field agents were able to provide teachers with concrete examples of many instructional and curricular innovations since these materials were readily available in the three resource centers. None of the evaluators ever questioned the value of the centers to the schools, but many felt that the most important aspects of the field agents' work did not involve the resource centers and that if no resource centers were available, the field agents could still operate successfully.[6]

Whether resource centers can operate successfully without field agents is a moot and unanswered point. The resource center Directors feel they can. The two institutions with teacher training do essentially function without field agents, the Dover Center in particular.

However, it is conceivable that a resource center which is established without field agents can adopt an outreach program to compensate for that area of advertising for which the Georgetown Center depends upon field agents.

The other institution which was a help to the resource

centers, at least in the beginning, was the Department of Public Instruction. If it is willing, a Department of Public Instruction can help open the doors of the schools to resource center Directors, in an effort to let the teachers know what is available. A Department of Public Instruction can help contact principals and encourage them to encourage teachers to at least see what the center offers. If the State sends newsletters to teachers, a Department of Public Instruction can help a center by including resource center news. Furthermore, a Department of Public Instruction can encourage districts to use the facilities for inservice programs. A systems approach is not crucial to the survival of a resource center, but it can make the job of a Director that much easier.

Needs Assessment A needs assessment analysis is important to both establishing and maintaining a resource center. One cannot produce an effective resource center based on intuition. The target population should be questioned and tested to determine what would benefit that group best. The Advisory Committee attached to the Resource Centers proved to be a good source of information for needs and solutions. They designed the core collection and helped establish an outreach policy. Such a group could only help a new resource center. Field agents were also a direct line of communication to the teachers and possessed a certain objectivity to interpret what teachers' needs are. In the event that no advisory committee or field agent is connected with a center, the Director must establish and maintain communications with teachers.

Qualities of a Director (Librarian/Media Specialist) The three Del Mod Resource Center Directors disagree slightly on the prerequisites necessary to their positions. Following a formula or job description will not guarantee that the right person will be found to fill the position. Del Mod has learned that certain skills and qualities in a person are more important to the position than others. A Director should have some library training, but not necessarily an in-depth knowledge of the subject matter housed in the center. He should be imaginative and creative. He must enjoy and be willing to work closely with teachers. He must have a sense of fiscal responsibility and be able to make purchases spontaneously, according to the needs of teachers. A Director of any kind of resource center for inservice teachers must be willing and able to provide a vast array of services to those teachers.

The Collection During discussions about the minimum collections that resource centers should have, each center Director in effect recommended maximum collections. Obviously not every district can afford the ideal collection. If money is limited it must be spent with perfect care. To do this, a careful needs assessment of local needs is crucial. Or,

> where initial funds for a resource center are limited a director could collect a variety of materials from several schools and then consolidate the material into a small center. The center could be made larger as more funds became available.[7]

It is impossible to give a detailed recommendation on materials in a collection. The needs in mathematics are radically different from the needs in history. The science needs in New York City probably do not compare to the science needs in rural Utah. The best advice for the collection of an any-discipline-resource-center entails administering a needs assessment and perceptive buying based on those needs.

Outreach Program The second most important feature of a resource center (behind the equally important collection and personality of the Director) is its outreach program. A resource center has to sell itself any way it can. Delaware Technical and Community College's methods of advertising proved to be exceptionally effective, and resulted in attracting teachers to the Center.

The Advisory Committee, Eleanor Sloan, and Ethel Pantis planned a broad advertising scheme involving newspaper ads, radio announcements, meetings in schools, and the newsletters (S.A.Y., Science and You). Later the Del Mod Bags, designed for carrying materials, were developed. Every move initially was calculated to let teachers know what was available, and to back up that promise with service. It was effective.

If districts are more involved with resource centers, more than teacher release time could result. The questionnaires revealed the fact that many teachers first discovered the Resource Centers by attending workshops or inservice day programs held at the Centers. A center would be wise to encourage districts to use the facilities, thus providing ready-made advertising. A field agent can perform the same function if such a program is instituted.

Of all the outreach techniques, the newsletter was the most appreciated by the evaluators. "The newsletter published by the Georgetown Center is (also) a transportable item as viewed by most evaluators."[8]

Manning a Resource Center An unattended resource center is a great source of dissatisfaction and frustration to a teacher. The evaluators commented on this situation at Delaware State College.

> The Center at Delaware State College was least useful to the inservice teachers since it lacked some materials found in the other Centers and was apparently less well organized. The Dover Center librarian has duties outside the center which removed some of the service function found in the other two centers.[9]

Financial constraints have forced the Dover Center Director (librarian) to spend much of his time doing things for the College outside of the Center. Thus, as noted above, the collection is frequently unattended, a poor policy if the major function of the Center is service. It is essential that someone with a knowledge of the collection be available in the resource center at all times.

Location and Hours A resource center, to be used, must be located in an easily accessible place. Not only must it be near to a teacher's school or residence, but it must be convenient to reach. Although the teachers in the 1976 questionnaire did not mention it, parking at the University of Delaware Resource Center is a great encumbrance on a teacher. Newark is simply too congested for an inservice teacher resource center, unless a teacher is already on campus for a graduate course.

For the first years of Del Mod, relatively few Kent County teachers ever got to a Resource Center. An hour's drive to Georgetown or Newark is too far for the teacher who has been teaching all day. Distance is an important factor, even to the most dedicated and industrious teacher.

Resource Center Directors do have lives outside of the Center and should not be expected to work twelve or fourteen hours a day. However, for a center to conveniently serve inservice teachers, a resource center must be open for twelve or fourteen hours a day. Very often teachers do get

release time to use the Resource Centers. However, there are districts which do not let their teachers go during the day. Those teacners need sufficient time after school to visit the facilities. Furthermore, there are teachers who are parents with responsibilities to their own children. For them, using the center after dinner might be most convenient, meaning a center should be open until nine or ten o'clock at night. This involves money; a resource center is expensive. However, considering the amount of money it can save a district, and the contribution it can make to a child's education, the cost of keeping a center open can be well worth the money.

Records Keeping/Evaluation For many reasons, good records of all activities in a resource center should be kept. The most important reason involves self-defense. Whoever is funding a resource center is going to want to know who is using the center, what is borrowed, and the number of visits and assists. People paying money like numbers to prove that there is a marginal return resulting from time, effort, and the marginal cost.

Periodic evaluations, "in-house" and otherwise can be conducted based on the records kept. An evaluation can be beneficial by redirecting a resource center if it has evolved into an institution which is not responding to teachers' needs appropriately. Two of the Resource Centers have all but abandoned their records keeping systems. Consequently, evaluation of the Del Mod System Resource Centers has been hampered.

Flexibility The most important features of the Del Mod Resource Centers, which must be maintained if these centers are to be considered transportable, are flexibility and adaptability. The flexibility involves two aspects of a center: adapting a center to fit the target population, and providing any and all needed services for that particular population.

The adaptability to varying populations has been demonstrated in all three Del Mod Resource Centers: each Center serves different kinds and combinations of populations, ranging from education majors in college to inservice teachers with twenty years of teaching experience.

The services within each Center have responded to the majority of Center users. Newark and Dover Centers might

tend to omit teachers, but (when the Centers are manned) are quite helpful to the preservice teachers.

The Georgetown Center, perhaps, has handled this aspect of adaptability better, or more overtly, than the other two Centers.

> The flexibility component of the Georgetown center is an important attribute. The Center must be able to meet a teacher's needs immediately in order to be highly effective. This includes workshops and inservice programs requested by teachers.[10]

CONCLUSION

The Center at Delaware Technical and Community College is really a model of a Del Mod Resource Center. Delaware Technical and Community College's purpose is service. This Center has almost accidentally achieved what a resource center was intended to, by a combination of the right institution, the right people and the right dedication. Essentially, each Center has achieved the purpose of the individual housing institution. Consequently, the Dover and Newark Centers, successful though they might be in the housing institutions, have not accomplished what they should have for inservice teachers.

The Del Mod System is scheduled to terminate on June 30, 1976. According to the latest reports, the three Resource Centers will continue to operate. The University has absorbed the Del Mod Collection into its Resource Center. Delaware Technical and Community College has received State funding for at least another year. Delaware State College has found that the Resource Center is an asset to the Science Education Program, and is negotiating funding details at this time.

What has been gained from the Resource Center experiment? Many things come to mind, not the least being that it was a worthwhile endeavor, since something was learned. The Resource Center is not a new concept. However, placed in the context of the systems approach to education, the Centers might well be unique.

The Resource Centers, once attached to colleges with preservice users, lost their pivotal characteristics. They were no longer the focal point of the system activities, although they did play a supporting role in Field Agent activities. However, by attaching Resource Centers to institutions with undergraduate populations, Del Mod lost "control" of the Resource Centers. It is a phenomena of which future resource centers should be aware.

If inservice teachers comprise the target population, there seems to be three requirements for a resource center. The first is a collection of resources that responds to the needs of the teachers. The second is a center Director or librarian/media specialist who is exceptionally adept at

communicating with teachers, and is constantly willing to "go that extra mile". Finally, an outreach program is a must if a center is ever going to be used.

Unfortunately, no formula for funding can be offered. Money in education is a constant problem. In five years, nearly three-quarters of a million dollars has been spent to establish and support three resource centers. How the money is spent is a decision of the Director's. Where the money comes from is a more difficult problem. (See Appendix I for Del Mod Resource Center Budget.) Del Mod had the good fortune of receiving Federal funds and being recognized by Delaware industries as being a viable project. Not every program involving resource centers will be as fortunate.

The issue of transportability, and the requisite elements of a resource center were mentioned by one of the Del Mod responsive evaluators:

> As with the field agents, the resource center concept is critical to the overall strategy of Del Mod for improving science and mathematics education. The resource center concept is completely transportable within the limitations of funding. It is important... to realize that the success of resource centers is highly dependent on the competence of the individuals who will develop the resource inventories and strive to make them easily available to educators.
>
> Also, the difference in roles of the resource centers of the Del Mod Project as determined by the function which they have to perform for the institution within which they exist, provides a striking example of the different functions that resource centers can provide.[11]

Dr. Dowling and others have pointed to the dependence of the Del Mod System upon the Resource Centers. What is indeterminable is whether Resource Centers are dependent upon the Del Mod System. Without the support -- financial and moral -- of Del Mod, will the three resource centers still be active in five years? Without an undergraduate population to help justify the expense, will the Delaware Technical and Community College Resource Center still be in existence in five years?

Dr. Edward Johnson, a responsive evaluator for Del Mod, spoke to the impact of the Resource Center on Delaware State College: "Programs come and go, but there always is the nagging question of the extent to which they have a definable and lasting impact on the host institution."[12] The Centers at Delaware State College and the University of Delaware are reported to have had a significant impact on their respective education programs. Moreover, their already independent operations should assure their continuation, post-Del Mod. However, the Resource Center that best serves inservice teachers, Delaware Technical and Community College's, could be headed for trouble. Without a significant increase in State support, financial and moral, termination of the Resource Center might well be part of its near future. If the Del Mod Resource Centers have made a "definable and lasting impact on (its ultimate) host institution", the State of Delaware, then the future could well be bright.

APPENDIX A

A Proposal for the Del Mod System (The Delaware Model: A Systems Approach to Science Education), The Augmented Council of Presidents, State of Delaware, Submitted to The National Science Foundation, a mimeographed document, February 24, 1971, pp. 65-74.

SCIENCE RESOURCE CENTERS

A major problem faced by teachers, administrators, inservice education leaders and supervisors is that of obtaining available materials from which to build programs suitable for their classroom needs. In Delaware, as elsewhere, there are small curriculum centers, often a closet, housing minimal materials. These materials are largely an odd assortment of textbooks collected in a rather haphazard manner and in most cases without the related visual materials. Many districts set aside time, hold summer workshops, have inservice programs for specific purposes only to find that the gain is negated by the paucity of materials available to them. The only center in the State is on the University of Delaware campus and this, too, is textbook-oriented, small and does not adequately serve the needs of preservice student teachers or begin to provide those services needed by the teachers in the more populous areas.

At various times during the year, teachers are asked to order materials and purchase textbooks. Frequently, these materials are contracted for only on information obtained from brochures, word of mouth from other teachers or supervisors, catalogues or brief inspection of limited samples. The old adage, "buying a pig in a poke" seems to typify the manner in which many curriculum materials find their way into classroom usage.

The Del Mod System proposes to set up at strategic locations in the State resource centers for use of all science education personnel. These centers are envisioned as the pivots around which all phases of the Del Mod System revolve and the locus for activities.

The objectives for the resource center component of the Del Mod System are:

1. To establish a resource library for teachers, student teachers, and technicians where they may examine or borrow on a limited basis materials and equipment, textbooks, trade catalogues, films and other audio-visual material,and other items.

2. To make available a physical facility where local district supervisors, teachers, science groups, preservice teachers can meet to develop their own programs surrounded by the materials needed.

3. To provide an operational base for the field agent's activities.

4. To define a locus for conducting inservice education programs, community science groups' meetings,and others.

Four centers will be installed for the Del Mod System as follows:

1. In the present College of Education building on the University of Delaware campus, Newark.

2. At the downtown campus site, Delaware Technical and Community College, Wilmington.

3. In the new Education building on the Delaware State College campus, Dover.

4. In the present facility of Delaware Technical and Community College campus, Georgetown.

Time Table for Opening Centers

Present plans call for furnishing and opening the centers as space (about 900-1200 square feet) at the following sites is provided by the participating institutions:

July, 1971

1. Center at the University of Delaware, Newark.

2. Center at the Delaware Technical and Community College, Georgetown.

July, 1972

1. Center at the Delaware State College, Dover

July, 1973

1. Center at the Delaware Technical and Community College, Wilmington.

Each center will be staffed with a full-time library technician or the equivalent. This technician will be responsible for cataloguing the collection, keeping track of materials, replacing expendable supplies, setting up a system for borrowing materials, acting as an arm of the field agent or inservice instructor in securing materials needed for programs and assisting teachers

in finding specific materials. For the above reasons the library technician will be expected to be familiar with all materials in the particular center and the operation of all equipment.

The library technician will be considered an employee of the housing institution and subject to all benefits, privileges and regulations of each institution.

Each library technician will be assisted by student secretarial help. It is assumed that this will be approximately fifteen hours per week or as deemed feasible by each institution. It is suggested that centers operate from 10 a.m. to 10 p.m. throughout the calendar year, except during the regular vacation periods of the housing institution.

Relationship to Field Agents

One of the obstacles which has made the operation of the previously described junior high school project with the field agent more difficult is that the program has no permanent home and all materials must be transported between their storage area in the Townsend Building in Dover to Delaware State College and Delaware Technical and Community College, Georgetown. Of necessity these materials must be easily packed, relatively light weight and transportable. Fortunately, other than the inconvenience incurred, the type of materials needed for the present program (Junior High School Retraining Project) do lend themselves to the above-mentioned criteria. However, as field agent programs move into high school areas and more agents become operative, such an arrangement may not always be the case. Therefore, for the most expeditious use of the field agent's time, all the materials needed should be housed in the centers.

The center will serve as the physical facility in which the agent carries on his activities when not in a particular building. He may use the center for conducting retraining activities, conferences, curriculum development, microteaching or other teacher improvement practices. He will retain a desk, files, and other pertinent equipment in each center. Likewise, the center from which the agent operates will assume the responsibility of accounting for the agent's whereabouts and as a contact point for him.

It will be the agent's responsibility as part of his activities to inform teachers about the contents of the centers and encourage usage of the centers by teachers on their own, as well as under the agent's tutelage.

Center Activities

1. Inservice Education and Curriculum Activities

The center will be available to local districts, individual building faculties, state supervisors, local district supervisors, University of Delaware, Delaware State College, and Delaware Technical and Community College personnel to hold any formal or informal meetings desirable. For the reasons already mentioned in the introduction, as well as those cited for the field agent, a "place where the things are," a "place of our own," a "place where we can do the things we talk about in faculty meetings" appear to be necessary for maximum benefit from inservice programs. Several chief school officers have cited the need of removing the teacher from the everyday classroom environment to more compatible surroundings as the ideal manner for conducting inservice and curriculum development activities. It is anticipated that with the changes contemplated for many schools, as the one result of our efforts in the junior high school retraining program and the baseline data study, this facet of the resource center activity will be very strongly used.

2. Preservice Activities

Many young student teachers find that when they are involved in their major student teaching experience, the schools do not have all of the materials which are needed to put into practice many of the activities which were presented to them during their pre-student teaching experience. As a result the college, university and the instructor's teaching materials are depleted by the students in their efforts to try their wings and their attempts are thwarted and frustration is the result.

Each center which is connected to an institution engaged in preparation of teachers (University of Delaware,

Delaware State College) would provide equal services to the preservice teacher as to the teacher already employed. Since these centers would serve dual purposes, the amount of various materials would, of necessity, be increased. Delaware Technical and Community College centers will also serve staff and students of the science education technologist program. A secondary activity connected with preservice experiences would be the provision of a place for "bull sessions" between inservice teacher and preservice teacher. Several teachers at the Del Mod Conference on September 18, 1970, expressed the need for a place to talk freely and work freely with their student teachers.

When the procedures for greater utilization of cooperating teachers in the training of technicians and preservice teachers are developed and are also in the developmental stages as a part of the UPSTEP program, the centers will serve as the location for these activities and provide the materials for both individuals to use.

3. Individual Teacher Activities

Many teachers on their own seek new materials and ideas to provide optimum learning experiences for their students. For this group of teachers wet and dry carrels would be provided for viewing and browsing. Duplicating and copying equipment for their use in preparing visuals, tapes, and hand-outs would be provided. Facilities for previewing films and filmstrips would be available since, at specified times, the teachers and technicians served by each center would receive notices of what is available. At the Del Mod Conferences the desire was also expressed for expendable materials from which simple equipment could be constructed or experiments tried out prior to introduction into the classroom. Such items as styrofoam balls, paper cups, wooden dowels, peg board squares, baby food jars, graph paper, etc., were mentioned as examples of this category. Apparently, when the teacher is free this kind of material is unavailable or his classroom is used by another group.

Another service which would be available to this group would be the privilege of borrowing kits, units, simple equipment, etc., for a trial basis in the classroom prior to purchase. Many teachers have been chagrined to find that after delivery of purchased material, several items could have been used or substituted from their regular school supplies. Secondly, they have found that the materials did not meet the purposes for which they were ordered. This comment seems especially true of kitted materials.

It should be noted again that the intent of the center is to provide teaching resources rather than general science reference materials. Should a teacher desire specific references or discrete topics, the technician would secure them through interlibrary loan. Concurrent with this resolve, several teachers recommended that centers be reserved for teacher or student-teacher use and open to students only when accompanied by the teacher.

Materials

The component coordinator in cooperation with the director will compile a list of teaching resources which should be housed in each center. When the basic list is completed, each component coordinator will add any items which are deemed pertinent for the particular needs of that institution. At the same time any items which are already available will be deleted. These available items will then be housed in the center, appropriately marked and considered as an institutional contribution. After the list is compiled the materials will be ordered by each institution through its regular financial procedures. It will thereafter be the responsibility of the component coordinator to recommend new materials and coordinate the center activities.

Sample List

1. Science textbooks, K-12, from major publishing houses such as Harcourt, Brace and Janovich; Rand-McNally; Holt, Rinehart & Winston; McGraw-Hill; Harper and Row; Scott, Foresman and Company.

2. Science kits such as ESS, AAAS, IPS, ESCP, ISCS and others.

3. Materials from all major curriculum projects such as BSCS, IPS, HPP, AAAS and Chem Study including all newsletters, evaluation studies and other data.

4. Trade catalogs such as Welch, Cenco, Wards, McAllister, Science Kit, Hubbard and others including brochures and flyers announcing new projects.

5. Filmloops such as those produced for HPP, BSCS and others.

6. Filmstrips such as those from EBF, Hubbard.

7. Pamphlets and brochures including those published by various state and federal agencies, national societies, private organizations and others.

8. Publications encompassing such journals as The Science Teacher, Journal of Chemical Education, Science Activities, C. & E. News, Science and Children, NASA Facts, Research in Science Teaching and others, including the index for each one.

9. Newsletters from professional societies such as ACS, AAPT, AMS, AAAS.

10. Reprints as requested by teachers.

11. Films will not be housed in the centers because of special requirements for handling and storage; however, catalogues of free films and film rentals will be available. Should teachers desire a film or films to preview programs prior to showing in their classrooms, the center will secure the films and set up preview times.

12. Miscellaneous items such as information on USOE, NSF, Department of Public Instruction and other federal agency programs, ERIC, SEIAC, Microfische, International Clearinghouse.

13. Transparencies which either accompany major projects or are adjuncts to specific disciplines.

14. Science tests which may accompany major curriculum projects or be used for general achievement. These may be sample items from various tests.

15. Federal and State legislation - copies of bills which pertain to science education, science or safety.

16. Collections such as those assembled by the Mineralogy Society, Marine Curriculum Study Project, and others.

17. Equipment - It is not the intent of the centers to house general laboratory equipment for loan purposes but rather include those items for loan which have been specifically developed for curriculum projects. Illustrative items might be the current balance, IPS balance, ESCP hemispheres, ISCS battery.

18. Expendable materials such as styrofoam balls, toothpicks, balloons, marbles, lead strips, paper cups, wooden dowels for construction of simple equipment as called for in various laboratory experiments.

19. Duplicating materials including photocopy paper, transparencies, mimeo-stencils, ditto masters.

20. Display posters - both those produced by agencies as well as those commercially available.

21. Models - some of the more frequently used models for loan purposes.

Indications proffered by teachers, the field agents, supervisors, college/university instructors, seem to point out that many items may need to be duplicated. One set of the more frequently used materials should remain in the center at all times, while the duplicates would be available for borrowing. It is anticipated that multiple kits, texts, trade catalogues, some audio-visual materials would require duplication. From carefully kept center records it will be possible to establish materials usage and decide the quantities of certain materials to be placed in future centers; likewise, it may develop that items of limited usage will be in one center only and available on request to the

other centers. For these reasons it is deemed wise to begin with only two centers serving diverse populations.

Equipment

A concomitant feature of the centers would be the accessibility of duplicating, copying and audiovisual equipment. A sample listing of such materials might be as follows:

1. overhead projector
2. tape recorder
3. mimeograph machine
4. ditto machine
5. Xerox copier
6. film loop projector
7. filmstrips
8. movie projector
9. video tape recorder and monitor (one outfit to be shared by field agents and center)
10. typewriter
11. tapes, stencils, transparencies, etc.

This equipment would be available for use by all persons using the center. It would not be available for loan purposes except under special conditions since it is the intent that the equipment provide a service to be used in conjunction with inservice or developmental activities.

Evaluation of Effectiveness of the Centers

Since the centers are considered to be the core around which the features of the Del Mod System revolve, the following procedures will be used to determine usage:

1. Daily records will be kept of the number of people who use the center and of the times the center is used.

2. Accurate accounts will be maintained on what kinds of material are borrowed and used at the center. In addition, a running tally will be kept of the kind and amount of supplies used. It is imperative that this information be available for planning the third and fourth centers.

3. Records will be established on the number and nature of inservice activities carried on here by district, college, university, state and community personnel. This type of information is currently available at DPI for use as a benchmark.

4. Field agents will file periodic reports on their use of the center.

5. As a result of the baseline data study, details on the kinds of programs conducted in the schools and the materials currently in use will be available. The monitoring system set-up will be able to measure program change in materials. If the changes in programs coincide with the individuals who use the centers, it will be assumed that the change results from exposure to materials and activities within the centers. Another cross-check for this kind of information might be noted on NDEA equipment and materials list.

Evidence of center usage and effectiveness will be submitted to the project director who in turn will incorporate the information in his annual report.

Long Range Plans

After the centers are established and operational the housing institution will assume the cost of staffing and maintaining the centers. Replacement of materials, additions to the collection, expendable materials and any other expenses incurred will be underwritten by the housing institution as part of its operational budget. As a result of the yearly evaluation the approximate maintenance figure will be determined and submitted to each institution head, hopefully after one year of operation.

APPENDIX B

A Proposal for the Del Mod System (The Delaware Model: A Systems Approach to Science Education), The Augmented Council of Presidents, State of Delaware, Submitted to The National Science Foundation, a mimeographed document, February 24, 1971, pp. 267-9.

Del Mod Conference, Holiday Inn, Dover, Delaware, September 18, 1970. Summary of Proceedings. (1970-1971 Proposal, pp. 267-9)

"The conference for the Del Mod System for the Improvement of Science Education in Delaware was held on Friday, September 18, 1970, at the Holiday Inn in Dover. Each school district was represented as well as personnel from the three institutions of higher learning (Delaware Technical and Community College, Delaware State College, University of Delaware), industry (Hercules and DuPont), and the Department of Public Instruction.

"Dr. Billy E. Ross, Chairman of the Ad Hoc Committee appointed by the Augmented Council of Presidents to plan and implement the Del Mod System, opened the conference with an overview for the improvement of Science Education in Delaware. Dr. Ross identified and discussed the rationale and goals of the Del Mod System and emphasized the need for wide participation in the development of the proposal."

Dr. Mishoe (Delaware State College), Dr. Trabant (University of Delaware), Mr. Betze (Delaware Technical and Community College), Governor Peterson, Dr. Cairns (Hercules, Inc.) and Dr. Pratt (DuPont Company) spoke about the support that their institutions planned to give the Del Mod System.

The proposed ingredients of Del Mod were discussed in an effort to determine the forms of the System which would best serve the needs of the state.

Many outstanding individual ideas were offered; however, the following (summary on resource centers) represents consensus ideas from all discussion groups:

In response to the query on the kinds of materials which should be housed in the centers, such materials as texts, packaged materials which accompany texts, resource books, materials for construction of equipment, unipacs, materials and facilities for repair of equipment, films and tapes of master teachers and new programs, audio-visual materials, pamphlets, trade catalogs should be included.

The Centers ideally should be located at Georgetown, Dover Wilmington, and Newark with possible mobile units attached to each.

The kinds of service desired should be:

a) lending service to permit teachers to try out material or units before purchase.
b) a facility in which a school or curriculum committee could meet to develop curriculum or hold inservice meetings.
c) a place where pre-service teachers and inservice teachers

could meet and share ideas.

d) a base from which a field agent could operate, hold inservice meetings or bring in individual teachers. Several expressed the opinion that the field agent would be the key to success.
e) a center for community scientific activities, i.e., lectures, seminars, meetings, etc. for any scientific related group.
f) provisions for construction of equipment with many simple materials on hand.
g) hours convenient to teachers' schedules with odd times for use of pre-service teachers or training of paraprofessionals.
h) provision for construction of audio-visual materials.
i) it is not a place for student activities unless accompanied by a teacher.

Regarding the relationship of each center and pre-service education, inservice education, local districts, and field agents, all groups stressed the need for cooperation and use by all. One group suggested an advisory group for each Center to insure the cooperation and acceptance by the districts.

These suggestions were the foundation of the first Del Mod Annual Proposal to the National Science Foundation. During the 1970-1971 academic year, NSF and DuPont were funding a mini-field agent program, a precursor to the Del Mod System. This program was somewhat of a trial balloon during the planning stages of the System. The Conference in September, 1970, was one of the first major efforts to pull together the growing array of ideas which would eventually become the Del Mod System.

The proposal of February, 1971, relied heavily on the collective brain-work of many of the people gathered at the September, 1970, Mod Conference. The portion of the proposal concerning the Resource Centers can be found in Appendix A.

APPENDIX C

Science Resource Centers Operational Policies,
approved by the Augmented Council of Presidents,
September 20, 1971,
a mimeographed document.

SCIENCE RESOURCE CENTERS
OPERATIONAL POLICIES

Science Resource Centers will be established on the campuses of the University of Delaware, Delaware State College, and Delaware Technical and Community College - Northern and Southern Branches. It is understood that the centers will maintain a common core of operations and accessories. Each center will also be structured and operated on an individual-distinguishing basis to meet institutional procedures and the needs of the schools within the service area. Each center is a part of the Del Mod System; however, the latitude given the component coordinators in establishing and operating the centers is wide and dependent on the ingenuity and expertise of the coordinator. The following procedures are intended as a guide for setting frame-of-reference for the total system and not as a mandate.

Purpose of Centers -

It is the purpose of the Science Resource Centers to

1) house a collection of curriculum materials which are not a part of a normal school library,

2) provide a base of operations for the field agents,

3) provide work space for supervisors, principals, curriculum directors and others to hold inservice meetings, curriculum development meetings, or small group conferences for their district science teachers, and

4) establish a system whereby a teacher, supervisor, curriculum director or others may browse materials for tryout.

Center Management -

The direct responsibility for the science resource centers shall be vested in the component coordinators of the respective institutions. The component coordinators will directly supervise the full-time resident staff, order materials, arrange for special group use. All operations will be carried out within the procedures established by the housing institution.

Selection and Purchase of Materials and Priorities -

While it is understood that the resource centers will provide materials for science teachers from kindergarten through grade 12, it is not possible during the first year of operation to acquire all the materials available at every grade level. Since the field agents will be engaged with middle school/junior high school science teachers, first priority will be acquisition of curriculum materials which complement the programs of the field agents in these areas.

Second priority will attend to the procurement of curriculum materials for other levels (high school and primary school) which have been developed as a result of NSF, USOE, or private support.

Third priority will be the purchase of materials which have been brought about as a result of commercial interests.

Fourth priority will be to obtain films which do not duplicate those in the State Film Library but fall within the category of a teaching tool as opposed to films for enrichment only.

Fifth priority will be purchase of special equipment that is not a part of a major program costing under $100 which might be considered by teachers for incorporation into their programs.

Textbooks - whether those accompanying a major NSF, USOE, private foundation program, or those of commercial origin - will be sought from publishers. Those materials which are purchased may be kits, games, audio-visuals, manipulatives or expendables, provided they fall within the priority categories.

Coordination of Center Materials -

All materials will be purchased through regular institutional channels but designated and so marked "Del Mod System." A list will be prepared as a mutual endeavor by the component coordinators as the core for each center. Beyond the core list, each coordinator is free to supplement the purchases from institutional resources or delete those items already in the possession of institution. At the monthly meetings of the component coordinators with the Director, further decisions will be made concerning additions to the core materials.

Use of Centers -

The centers are primarily for the use of the component project activities, science teachers, field agents, preservice science teachers, and curriculum leaders. In order of priority, use will be

1) for activities of the field agents and project staff,

2) meetings called by the State Science Supervisor,

3) meetings arranged by district science supervisors, curriculum directors, principals, or department chairmen,

4) committee meetings organized by teachers, and

5) adult science or science education groups.

It will be the responsibility of the component coordinators to schedule all groups for the use of the center or adjacent space in accordance with the priorities stipulated above.

The centers will not be utilized by any housing institution as classroom space for any regularly scheduled science education activities.

Hours of Centers -

Establishment of hours will be based on needs of population to be served by the centers.

Borrowing of Materials -

Circulating materials may be borrowed by individuals or groups for a one-week period with the understanding that expendable materials will be replaced. It will be the responsibility of the borrower to return the materials until a courier service can be established.

Courier Service -

Each resource center will use the State courier service operating as the schools demand. This service will be designed to fit the needs of the service area and operate within the institutional restrictions.

School Information Service -

The component coordinator will be responsible for informing the schools in the service area about center activities and materials therein. While it is expected that the field agents will be the major force in encouraging center use, the component coordinators will be accountable for use. The means whereby such information is imparted and use encouraged will be the prerogative of each coordinator.

Cataloging -

All centers will set up a single cataloging system for kits, audio-visual and other center materials. This system may or may not, depending on institution dictates, be a part of a central library system but devised by the component coordinator as the most expedient for the particular center.

Communication Between Centers -

The State telephone network will be used between centers so that should a school in the service area desire an item not stocked by that center, it may be secured from another center. Component coordinators and the resident staff of the centers will also meet periodically and at the call of the Director of the Del Mod System to share ideas, problems, and information. Each center will also maintain a list of the materials housed at the other centers and curriculum centers not a part of district curriculum centers. Such examples of the latter might be the collection at the Milford "Sea Beside Us" estuarine center, ESEA III centers, Delaware Nature Education Center, or other similar repositories.

Reporting of Activities -

Each component coordinator will file a report with the Director at the end of each academic year concerning the activities of the center. This report will include both a statistical and narrative portion. It will also include an evaluation of the center's activities and recommendations for procedures for the following year. These reports will in turn become a part of the Director's annual report to the Augmented Council and the National Science Foundation.

APPENDIX D

University of Delaware, description of a job position: Librarian/Media Specialist, Del Mod Systems Approach, December 23, 1971, a mimeographed document.

UNIVERSITY OF DELAWARE
DEL MOD SYSTEMS APPROACH

POSITION: Librarian/Media Specialist, Del Mod Systems Approach

DEL MOD SYSTEMS APPROACH: The Del Mod Systems Approach is a consortium of the University of Delaware, Delaware Technical and Community College, Delaware State College and the Department of Public Instruction, with the broad goals of producing a scientifically literate society by improving the extent and quality of science education in the schools of Delaware.

The Science Resource Center of the University of Delaware component has as its major purposes to serve as (1) a multi-media library for pre and inservice teachers, (2) a physical facility for local school district personnel to meet for curriculum development activities, (3) a base for field agents, and (4) a location for inservice education and science group meetings.

DUTIES: To acquire, catalog and service materials in the University of Delaware Del Mod Science Resource Center.

SALARY: $9,000 - $10,000

MATERIALS: Will include textbooks and other selected books, curriculum development materials, pamphlets, journals, filmloops, film-strips, audio tapes, cassettes, other audio-visual materials, science kits, equipment and supplies.

EQUIPMENT: Projectors, tape recorders, etc., as required; usual office equipment.

ASSISTANCE: Part-time use of Coordinator's secretary; 40-60 hours of student assistants.

RESPONSIBLE TO: Coordinator, Del Mod Project, University of Delaware

SEARCH COMMITTEE: Coordinator, Del Mod Project; Director, Instructional Resources Center; and Director, University Libraries

The Del Mod Librarian/Media Specialist will be expected to confer with faculty in the project to learn what materials are required and will proceed to acquire the material and devise a simple cataloging scheme to make the materials easily retrievable to faculty, teachers involved in the project, and students at the University of Delaware.

He will assist faculty, teachers and students in the use of all media. He must be innovative, ready to experiment and service-minded.

He will keep necessary records of acquisitions and use and will prepare financial, use and other reports as required by the Coordinator.

The Del Mod Librarian/Media Specialist will be considered an adjunct member of the staff of the University Library and of the Instructional Resources Center.

12/23/71

APPENDIX E

From: Science - Math Resource Center: What Makes It Go, Eleanor F. Sloan, June 1, 1974, a monograph.

From Science-Math Resource Center:
What Makes it Go - Eleanor F. Sloan

June 1, 1974

The Why

As outlined in the original proposal for the Del Mod System resource centers were to be strategically placed in the State as focal points for the science education community. Function of the DTCC Science-Math Resource Center was to:

...make available the latest learning materials of national prominence such as BSCS, ESS, SAPA, and ESCP
...provide a meeting place for workshops, inservice meetings and curriculum planning
...assist field agents
...serve teachers in solving their instructional resource problems

It does not function as a traditional library nor is it a warehouse where schools can obtain materials on an ongoing basis. The center at Del Tech South mainly serves educators within a 35 mile radius of Georgetown, Delaware, where the campus is located.

The baseline data from which the Del Mod System evolved indicated that teachers, especially in the middle schools, needed help with not only resources but also teaching ideas and techniques. The Del Tech South component has taken the direction of amassing a collection of the latest textbooks, kits, equipment, curriculums and audio-visual materials in order that teachers might study and evaluate them and make decisions based on their own needs. District and state inservice sessions have been held at the center. Courses offered by the University of Delaware and the State Department of Public Instruction continue throughout the year. Curriculum planning sessions have been held by teachers as well as administrators in formal and informal situations.

Duties of field agents are like those of county agricultural agents: hired by the Del Mod System they work with teachers of the area to improve teaching methods by offering "hands on" laboratory experiences and individual advisement. Their home base is the resource center which provides the materials, backup, clerical assistance and communications linkage to help them get their jobs done. Telephoning, letter exchange, information gathering and lab preparation are some of the ways the center provides the feedback, communication and personal attention which makes the Del Mod System "go".

Teachers are helped in many ways heretofore unavailable to them. One is to offer them a window to the world of science and math:

the Center has the latest datum which they can look over; they may choose what interests them and take it back to the classroom for trial. If it fits their needs they may obtain all of the ordering information from the center needed by principals for purchasing. Another service is offering all kinds of ideas and techniques for teacher coordination of learning. These ideas have been gleaned from other teachers' newsletters, etc. Still another is a file of resource persons who volunteered their time by offering to visit schools. The State Entomologist, whose hobby is bee keeping, was referred by the Center to 15 schools during February as the result of his inclusion on this resource list. The Center Technician arranges for dry mounting and making of transparencies requested by teachers or suggests other options for visual aids.

Teachers may preview filmloops, filmstrips, slides and movies using the Center's audio-vidual equipment. Opportunity to preview science and math resources prevents waste for public funds because teachers have the information they need before ordering. In the past there have been schools harboring unused materials which gather dust in dark closets because of unwise purchasing.

A Success Story

There are many success stories arising out of two and one-half years of operation. One worthy of relating is the experience of a fourth grade teacher, discouraged because a class of below grade level pupils could not cope with the science that a traditional textbook provided, who came to the Center seeking help. Typically the Center Technician listened and tried to draw the teacher out in an effort to discover what was really wanted and needed. After examining various resources with the teacher the Technician suggested looking at alphabets, arms and legs, the playground area, etc., with some of the Center magnifying glasses. The idea for starting with magnifying glasses was to stimulate interest in eventually using inexpensive microscopes which were also available from the Center for the class to try out. The children were so interested in using the magnifying glasses and the microscopes that they actually wrote several papers for individual booklets which told about their experiences. Their teacher explained that many of these pupils had never seen magnifying glasses before and when they came to use the microscopes a whole new world opened up for them. Needless to say magnifying glasses and inexpensive microscopes are now on order at that school.

Summary

What makes the Center successful? First of all, up-to-date and varied materials are available; if they are not in the center they are ordered as quickly as the need arises. Secondly, the extra mile is traveled in serving clients. Elementary teachers often do not know what they specifically need in order to get the science and math job done. Sometimes at the center they can find a new and different approach for correcting previously unsuccessful lessons: sometimes they receive "hands on" activity ideas to supplement textbook concepts. The third successful facet of the center lies in its ready communication system: a monthly one-page newsletter is distributed to science and math teachers of all levels. It is simple, direct

and easily used. Center hours are early enough in the morning (8 a.m.) to accommodate teacher calls before classes open and late enough in the evening (8 p.m.) to allow teachers easy access to the materials. Using the telephone expedites requests rather than writing letters which is a slow and often uncertain method. The need to know is today, not a week from today, and the Center staff recognizes this.

The Center serves because it offers individualized, person-to-person help. Center personnel are as excited about discovering ways and means to solve a problem as the teachers are in receiving help. The real key to the Del Tech Center success is the enthusiastic caring service provided to everyone who seeks the Center's help.

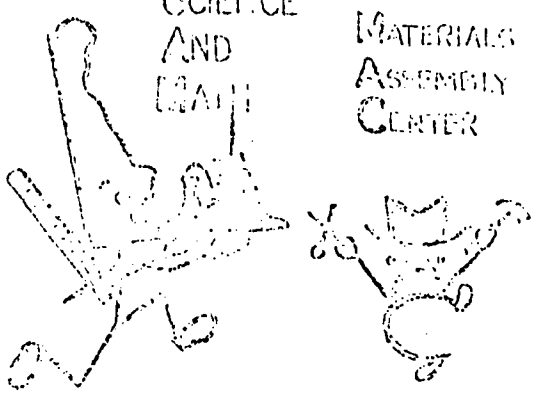
APPENDIX F

Newsletters from the Del Mod System's
Science-Mathematics Resource Centers at
Delaware Technical and Community College
Delaware State College
University of Delaware

April 5, 1976

Compiled by Center staff with support from the National Science Foundation Grant No. C.W. 6703

SCIENCE AND MATH MATERIALS ASSEMBLY CENTER



Volume 4, Number 8

For further information write Science/Math Resource Center, DTCC, Georgetown, DE 19947

If I Had The Time...

April 21-24, 1976
NCTM Annual Meeting
Atlanta

May 15, 1976
Del. Teachers of Science
Spring Meeting
Marine Center, Lewes

Science/Math Resource Center Hours:
Mon.-Thurs: 8 a.m.- 8 p.m.
Friday: 8 a.m.- 4 p.m.
Closed: Friday, April 16

To save you time when requesting giveaways use circled item number.

Giveaways...

(39) Benjamin Franklin Magic Square - JH-HS Math activity.
(40) Physics crossword puzzle - HS.
(41) Packet of approx. 35 soy bean seeds with directions for 5 plant growth activities - K-6.
(42) A pattern for an add-sub slide rule - 1-4.
(43) Bulletin Board idea for spelling and vocabulary development - Elem. and Spec. Ed.

Learning Resources...

Additions to the collection:

Daily Living Skills Program
8 teacher handbooks to help TMR students learn personal skills

Perceptual Skills Curriculum
6 volumes, PSC is a program of tests and learning activities for K-1 children, a support to reading and arithmetic for grades 1-3 and for Spec. Ed. students 1-8.

Here at the Center...

On display from Training Services, Inc. is a long playing card reader called Voxcom. The Audible Graphics System makes it possible to easily record verbal information with the graphic representation. By removing the system you have an ordinary cassette recorder. The sound capability of this tool adds another dimension to visual materials.

Also, added to the collection, two math programs:
Macmillan Mathematics, Series M. 1976 (K-6)
Addison, Investigating School Mathematics. 1976 (K-6)

What Works for Some..

Having students create games is an activity that has been very successful for Mrs. Claire Layton, 5th grade teacher, Rehoboth Elementary School. Designed initially as a math project, the games were expanded to cover other disciplines. All were played and tested in the classroom. Several of these activities are on display in the Center for you to examine. Mrs. Layton tells us two weeks were allotted for the development of the games. She also indicated the highlight of the project was the enthusiasm and motivation shown by the students.

Definition: Place Value - "Stay in your seat, George."

Would you send me the following giveaways: _____

Also information about: _____

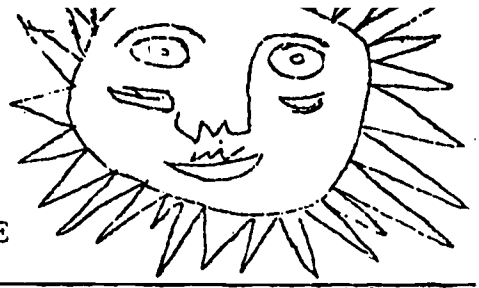
Date needed _____ NAME _____

SCHOOL ADDRESS _____

SCHOOL TELEPHONE _____

& MATH RESOURCE CENTER

DELAWARE STATE COLLEGE



Vol.I No. 1 September, 1975

May we take this opportunity to welcome you back for the school year 1975-76!

The Science Education faculty and staff continues to pledge its support to offer facilities and services in the area of science and mathematics to you and your school. We've gradually updated our Center with materials, textbooks and media that can be used to supplement your instructional program. In addition, if you require any special services from our office, please do not hesitate to confront us.

Our best wishes for a successful and rewarding year.

Ralph Hazelton
Assistant Professor

+ + +

The Science and Mathematics Resource Center at Delaware State College is a curriculum center specifically designed for K-12 science and mathematics. The Center is an intricate part of the Del Mod System, the Department of Education and functions in conjunction with the science and mathematics related departments at Delaware State College.

Science curriculum studies that include resource materials and equipment are housed in the Resource Center. Some of these materials include the following:

ESS - Elementary Science Study
AAAS - To be modified (Now SAPA I and SAPA II)
BSCS - Biological Science Curriculum Study
IPS - Introductory Physical Science
ESCP - Earth Science Curriculum Project
SCIS - Science Curriculum Improvement Study

Materials in the area of mathematics includes classroom sets of the following:

Cuisenaire Rods and Teaching Materials
Geoboards and Activity Cards

Chip Trading Sets
Attribute Blocks and Supplemental Materials
Fraction Bars

Supplemental Materials:

Math Balance
Tangrams
Papy's Mini-computer
Numerous Books and Activity Cards for both Teacher and Student Use

An adequate supply of books, current innovative curricular materials, resources and structured activities are available for use by faculty, in-service teachers, pre-service teachers and Del Mod System field agents. Some of the materials available are audiovisual aids, video tapes, maps, charts, pictures, slides, film loops, filmstrips, recordings, and individualized study teaching units. In addition, facilities and materials are available for preparation of new materials for use at the College and in our public schools.

+ + +

Since there is an apparent need for current innovative curriculum materials, resources and structured activities, the Science and Mathematics Resource Center will offer the following services:

1. availability of instructional materials for examination or loan to pre and in-service teachers, field agents, faculty members and students

2. availability of space for faculty members, Department of Public Instruction and Del Mod System personnel to conduct workshops and to test the adaptability of selected materials for specific classes

3. assist and aid in the evaluation and selection of commercially prepared instructional material for local use.

4. assist in the development of various audiovisual material and aid participants in constructing and designing materials in the classroom

+ + +

The Center opening hours are as follows:

Monday through Thursday:	9:00 a.m.	-	6:00 p.m.
Fridays:	9:00 a.m.	-	4:30 p.m.

Other hours can be arranged by contacting:

Leon F. Gardner, Jr.
Media Specialist/Librarian
DELAWARE STATE COLLEGE
Post Office Box 48
Dover, Delaware 19901

Phone: 678-5232 or 678-5220

For additional information contact:

Ralph Hazelton, Assistant Professor
Science Education
Component Coordinator - Del Mod System
DELAWARE STATE COLLEGE
Post Office Box 49
Dover, Delaware 19901

Phone: 678-5232

+ + +

NOTE: October 4, 1975 - Saturday

DCTM Annual Fall Meeting
Rehoboth Beach, Delaware

###

THE END

RESOURCE CENTER
DEL MOD SYSTEM
COLLEGE OF EDUCATION

University of Delaware · Newark, Delaware 19711 · Tel. 738-1230

Volume 1 February, 1973 Number 3

The College of Education Resource Center contains more new ideas, more activity materials and more educational media. New books, computer terminals, equipment and learning aids for mathematics, language arts, social studies, and physical education are at your disposal. Be a participant! Both you and your school will benefit.

HIGHLIGHTS FROM THE DEL MOD RESOURCE CENTER:

The wonders of the earth will permeate the minds of junior high school students as they work with equipment from the Earth Science Curriculum Project or Inquiry Development Program in Earth Sciences.

The United States Department of Interior, Geological Survey Division, provided a new packet containing topographic maps and printed materials.

Audio-Tutorial kits are available in biology, chemistry, earth science, mathematics and physics.

Two gerbils have established their home in the Del Mod Center after an entire Winterim of perpetual motion. They can't wait to make friends with you.

SHARING:

Teachers are looking for information about minicourses. If you send a list of those offered in your school, we will share it with others. It will help users if you can provide an outline and lists of activities and materials for each minicourse.

SPRING SCHEDULE:

Monday through Thursday 8:00 A.M. to 10:00 P.M.

Friday 8:00 A.M. to 5:00 P.M.

Saturday 9:00 A.M. to 12:00 noon

(March 19-23 8:00 A.M. to 5:00 Closed March 24)

APPENDIX G

From: Protocol for a Science Instrumentation Resource Center, Ethel L. Lantis, June 1, 1974, a monograph.

SCIENCE INSTRUMENTATION REPAIR CENTER

There is one creation of Del Mod's which does not fall into any specific classification within the system: the Science Instrumentation Repair Center. Because the concept merits attention, the author ventures to include it with Resource Centers.

The Science Instrumentation Repair Center was developed during the first year of Del Mod. Field Agents would often report back on the condition of science equipment in the secondary schools. It was apparent that incredible amounts of classroom science equipment lay broken and ignored in closets all over the state.

A survey was taken from 25% of the schools in the State of the kinds and numbers of various science instruments which were broken. On October 10, 1972, with a return of 40% of the survey forms, it was determined that the following pieces of equipment were in need of repair:

405 Microscopes	135 Balances
33 Volt Meters	5 Aquariums
25 Galvenometers	3 Lasers
10 Telescopes	20 Power Suppliers
3 Planetariums	5 Climatoriums
4 Portable Centrifuges	6 Small Motors
12 Electric Heat Sources	4 Incubators
2 Vande Gaff Generators	2 Bioscopes
32 Miscellaneous	

(December 10, 1974, memo from J. Reiher to Chief School Officers)

Quite obviously it is less expensive to repair a piece of equipment than to replace it. Many of the broken instruments had remained in that state because of the high cost of having them repaired by commercial outfits. Del Mod took it upon itself to investigate the possibilities of establishing a repair service for the schools, with no intention of profit. The investigation was successful.

The Instrumentation Repair Center was a service long needed in Delaware. This need was finally realized in light of what Del Mod had been doing. The Del Mod Field Agents were teaching the teachers new kinds of science classroom techniques. Many of the resources needed to implement these techniques were available at the Resource Centers. However, there was little or no working equipment available to utilize more sophisticated techniques.

Thus, the Science Instrumentation Repair Center was established, in lieu of the originally planned Resource Center, at Wilmington's Delaware Technical and Community College Campus. The funding came from the Delaware School Auxiliary Association grant; the work involved in setting up the Center came from Del Mod. At the present time, Del Mod is partially subsidizing the Center. It is hoped that the State of Delaware will provide that

money after Del Mod's termination. (Interview, Charlotte Purnell, 12/11/75)

The 1974 Del Mod monograph series included a monograph on the Instrument Repair Center. More comprehensive than any account, it exemplifies the philosophy of the Center, a philosophy which typifies the aim of both Delaware Technical and Community College and Del Mod. That account is provided below.

> Year after year Delaware educators complained that science equipment was gathering dust for lack of repair. Pupils were being short-changed because teachers lacked the necessary equipment for inquiry techniques. Buried defective learning materials further crippled the schools as costs rose unnecessarily because districts replaced rather than repair.
>
> In September,1972, Del Mod field agents and other personnel sampled about 25% of Delaware's schools to find out what was wrong with how much equipment. Results were staggering: large amounts of NDEA Title III materials purchased in the 60s had broken down; the number and variety of equipment needing repair and maintenance was overwhelming even though almost three-fourths of the schools had not been contacted. Some additional phone calls and reports from throughout the State revealed a need to service audio-visual equipment as well as science equipment.
>
> (From "Protocol for a Science Instrumentation Resource Center" by Ethel L. Lantis, June 1, 1974, pp. 4-9.)

Another reason for the instrumentation repair center developed from inquiries with science based industry. These industries indicated there would be some jobs available for instrumentation technicians who had been trained by these companies in the past. Apparently a minimum number of instrumentation technicians could be absorbed in northern Delaware each year. It was appropriate that Delaware Technical and Community College's Northern Campus institute a program since this was the location which readily could implement a job oriented pilot curriculum for technicians to work in the Wilmington area where the jobs had been identified.

Acting on the evidence, Charlotte H. Purnell, Director of the Del Mod System, convinced the Augmented Council of Presidents, responsible for Del Mod, of the need for action. A private Delaware foundation agreed to fund a center at the Northern Campus. Del Tech agreed to administer the program through its Audio Visual Department in cooperation with its special occupations curriculum which offers pilot projects in cooperative education.

Schools would send their science equipment via a district vehicle to the Center located initially in a College building in the City of Wilmington. Original plans for repair called for the use of Delaware's state-wide courier system used by schools of the State. It was decided, however, that packing problems could be avoided, schedules speeded up and a more responsive relationship

with the Center implemented if each district could bring and take its own equipment. As it has worked out, generally the science coordinator for the district accompanies the vehicle, signs receipt forms and discusses the delivery with the Repair Specialist. The College feels that it is better able to establish rapport with a school district and to understand the repair problems of the district by having this person-to-person discussion. In practice it is believed this procedure gives better control by people who care about the equipment.

As mentioned earlier the equipment is received and returned by each school district on a pre-arranged schedule initiated and monitored by Delaware's Department of Public Instruction, another of the cooperating components of the Del Mod System. During initial planning stages it was decided to change schools only for costs of materials plus a small service charge. Planners also agreed that Del Tech would make the Center and its staff available to train any teacher who might wish to receive instruction in proficient equipment operation and in making very minor repairs.

By early summer of 1973, $25,000 had been made available to open the Center. Purchase orders began their tenuous trek through the processing system. A large classroom was refurbished; repair parts and materials began arriving. The Repair Specialist for the center visited the West Coast for specialized training in optics and other technical know-how. Fliers were distributed and recruitment begun in the summer but not in time to attract the half-dozen candidates planned for the two-year certificate program. Instead, electronic engineering students currently are working in the lab earning while they learn another skill. These students may also earn a certificate in instrumentation repair in addition to their associate in applied science in electronic engineering technology.

The certificate course requires supportive courses in pre-technical reading and writing; Technical Mathematics I; non-engineering physics; Electricity I & II; Electronics I & II. Counselors and instructors now are recruiting students for the coming year. While the College has open admissions it will screen Media Maintenance Technician candidates for mechanical aptitude; the College will also attempt to break down the wall of ignorance about what technicians do by providing schools and the community with appropriate information. A special effort is being made to motivate women who have natural finger dexterity and affinity for detail to consider this role in a non-traditional occupation for women. When the five to eight full-time students begin their study next year they will spend four to four-and-one-half hours in the Center and the remainder of each day completing supportive courses. As they become proficient they will be paid to repair equipment in the lab and/or be placed in internships with industry. At the present time part-time electronic engineering technicians are earning as they repair the science equipment backlog from schools. By the end of this college year half of Delaware's school districts will have been served.

The Center repairs all but the most sophisticated, specially designed electronic equipment. The 1972 survey mentioned earlier revealed that 60% of Delaware's secondary schools were contacted and from this number alone it was discovered that over 800 microscopes were out of commission. Many young people were being deprived of the only piece of sophisticated science equipment that could be used during their school years. Today a considerable number of these microscopes are back in the classroom in full operation.

In the past there had been no place in Delaware where science equipment could be sent for reasonable repair and maintenance. Some districts had no budget at all for this contingency while still other districts with smaller schools received no service from science equipment company representatives. As Del Tech began to implement the repair program it was necessary to contact the equipment companies in order to obtain service manuals and instructions on how to order spare parts. Only one concern seemed to fear competition from the College. After it was explained that only requests from Delaware schools were involved and after further discussion with the company the matter was resolved.

Not only is the Center unique in the State of Delaware and the surrounding counties because it is the only one of its kind, it is also unusual because it is performing a service at one-third the commercial cost. There are no labor charges involved. An estimate of the unit cost of commercial service is $8.50 while the Center's average charge has been $3 per unit. As each piece of equipment is received it is unpacked, tagged, evaluated, parts checked and non-stocked items ordered where necessary. Students repair the equipment under the supervision of the repair specialist receiving a stipend for their efforts. Charges for repair and maintenance are billed to a public school district or individual school and the items returned to the public schools. As the program was first implemented the Department of Public Instruction set up the schools to be served initially on the basis of ready accessibility, degree of need and ease of administering the exchange. Eventually all schools in the State may participate in the program; many will be served during the summer months when some of the backlog of repair work will be undertaken and all of the maintenance items serviced while pupils are away from classes.

Another phase of the program will be initiated in the near future: Center personnel have been working on repair modules which can be used by teachers as well as student technicians. Already there is a kit describing how microscopes can be adjusted and cleaned. Other learning packages are being placed on microfilm (manuals and other references) and tape so that they may be utilized in auto-tutorial learning. Seminars also will be arranged with the cooperation of the Department of Public Instruction and with the Del Mod System so that teachers may come to the Center for discussion and "hands on" lab training.

Enthusiasm for the Center is running high. The one major problem in the project is the amount of time it takes to receive repair parts and every effort is being made to solve it. Center personnel are often unable to complete repairs requiring non-stocked replacement parts within the two to four week time period they have set as their delivery goal because of the time lag.

One of the happier results has been the performance of the student internees whose organized, dedicated attention, reliability and responsiveness have more than justified the conclusion that the community college age level possesses the maturity needed for success which has often been lacking when programs of this nature have been tried in the high schools. The fact that graduates of this certificate program will have a saleable needed skill is another salutary outcome.

Already there has been some feedback that teachers are more able to work with the new science curricula because they have received the functioning equipment to provide students with laboratory experiences. It is anticipated that their increased efficiency should raise their comfort level with the inquiry method. Overall, they should be able to expand what they can do for students.

In the second year of the program Del Tech plans to request funds from the State of Delaware for costs of administering the Center and for student stipends. The College will not enroll more people in the program than it can place in jobs. There has been some indication from industry that companies would like Del Tech to train some of their current employees in maintenance repair technology.

Finally, one of the most tangible outcomes of the Science Instrumentation Resource Center's operation is the 66% saving to the taxpayers of the State for the services performed. The Center anticipates that its charges will sustain the costs of ordering and handling replacement parts. The actual cost of the service performed for the schools and thus for the students may be somewhat difficult to analyze--the value of the service is certainly very easy to measure if current reactions may be used as indicators.

APPENDIX H

1976 Questionnaire on Resource Centers, Sarah Richardson

The Del Mod System is presently in its fifth and final year of operation. In addition to our normal functions, we are spending time this year evaluating what we have done and how Del Mod has been received.

I am writing a history and analysis of the Del Mod Science-Math Resource Centers, located at Delaware Technical and Community College in Georgetown, Delaware State College in Dover, and the University of Delaware in Newark. Above and beyond providing educational resources, the Resource Centers were designed to accommodate workshop and inservice day activities and meetings between inservice teachers and with field agents. Since the Resource Centers were established for the teachers of Delaware, I feel it is important to know what teachers themselves think of the Centers.

I would greatly appreciate it if you would answer the following questions. I want to know what the Resource Centers have done for you as a teacher. I also want to know if they have had no effect on your teaching. Feel free to use the back sides of the pages for any additional comments about your perceptions of or experiences at the Resource Centers. The source of this information will be kept confidential.

Please answer the appropriate sections below and use the State Courier to return this questionnaire to The Del Mod System, ETV Building, Dover, Delaware. Thank you for your time and trouble.

Sarah Richardson
Del Mod Education Technician

Part A

1. What grade level do you teach?

2. Do you teach math or science?

3. How many years have you been teaching in Delaware?

Part B

If you have visited a Del Mod Science-Math Resource Center, please respond to the following. If you have never been to a Center, please go to Part C.

1. Under what circumstances have you visited a Resource Center?
   ___Workshop
   ___Inservice Day
   ___Searching for science or mathematics resources
   ___Meeting with a field agent
   ___Other, please explain

Part B continued

2. Which Center or Centers have you visited and approximately how many times have you been there?
___University of Delaware, Newark
___Delaware State College, Dover
___Delaware Technical and Community College, Georgetown

3. What kind of reception, service, or assistance did you receive?

4. Were your expectations of the types and quality of materials offered in a Resource Center met?

5. Del Mod perceives the Resource Centers as filling a gap in the State's educational resources. Based on your district's resources, do you think this is true? Why or why not?

6. How did you first discover the Centers (field agent, newsletter, word-of-mouth, etc.)?

7. Comment on materials you have borrowed.

8. What materials did your district purchase as a result of your having seen them at a Resource Center?

9. How have you utilized the metric resources from a Center?

10. How have the Centers or materials within them affected your teaching ideas or methods?

11. Indicate how you have utilized any of the Resource Center services.
___Telephone service
___State courier (to and from a Center)
___Newsletter tear-offs
___Other, please explain

12. Evaluate the Center or Centers you have visited (materials, physical facilities, atmosphere, etc.).

Part B continued

13. Are there any changes, modifications or additions you would like to see in the Resource Centers?

14. Do you think the Resource Centers provide locations conducive to group meetings or activities?

15. Describe any evolution, growth or change which has occurred in the Resource Centers over the past several years.

Part C

If you have never visited a Del Mod Science-Math Resource Center, please answer the following.

1. Have you ever heard about the Centers?
   ___No
   ___Yes. If yes, how did you hear about them?

2. What opinions do your peers have of Resource Centers?

3. The Resource Centers were intended to provide educational materials to supplement classroom instruction. Given the materials in your school or district, do you think there is a need for this additional collection? Why or why not?

4. For what reasons have you never visited a Center?
   ___Location
   ___Hours
   ___Parking
   ___Other, please describe.

5. What might induce you to visit a Resource Center?

APPENDIX I

The Cost of Resource Centers,
compiled from the 1971-75 Proposals for the Del Mod System,
National Science Foundation Grant No. G.W. 6703.
Mimeographed documents on file in the Del Mod Office.

1971-76 DEL MOD RESOURCE CENTER BUDGET

	UD	DSC	DTCC	Total
71-2				
NSF	$ 45,660	$	$ 41,660	$
Industry	-0-		-0-	
Component	8,223		-0-	
72-3				
NSF	33,251	49,450	27,865	
Industry	-0-	-0-	-0-	
Component	18,131	34,828	9,700	
73-4				
NSF	30,238	28,523	17,710	
INdustry	-0-	19,000	2,400	
Component	44,267	40,827	11,400	
74-5				
NSF	31,940	24,412	18,860	
Industry	-0-	-0-	-0-	
Component	5,000	34,734	15,180	
75-6				
NSF	30,000	29,308	8,625	
Industry	-0-	-0-	-0-	
Component	27,676	4,734	25,990	
71-76				
NSF	171,089	131,693	114,720	417,502
Industry	-0-	19,000	2,400	21,400
Component	103,297	115,123	62,270	280,690
TOTALS	$274,386	$265,816	$179,390	$719,592

BUDGET EXPLANATION

The figures on the preceding page have been taken from the annual proposals. There are several aspects of this budget that need explanation.

First, since these figures were really the proposed figures, they are an approximation of the actual grant amounts. For instance, the total five year requested grant amount was $417,502. The actual grant amount was $418,574. The breakdown by Resource Center is as follows:

	Requested	Granted
University of Delaware	$171,089	$174,341
Delaware State College	131,693	130,313
Delaware Technical and Community College	114,720	113,920

These figures indicate that the annual amounts listed on the previous page are not accurate to the penny. The numbers do, however, provide a close approximation of the great cost of resource centers.

The second comment involves the components' contributions to the Resource Centers. In the proposals, the three components housing resource centers listed their annual contribution. For the most part, these amounts actually represent material, not money, support. The components supplied science and mathematics kits, programs, and texts, furniture, shelves, and assorted office equipment. There has been some monetary support in the form of partial salaries for some of the staff in the Resource Centers.

FOOTNOTES

CHAPTER I

[1]Charlotte H. Purnell, Interview, December 11, 1975.

[2]Purnell, Interview, December 11, 1975.

[3]Burt C. Pratt, "Science Teaching Center for Delaware," memorandum, January 28, 1970.

[4]Purnell, Interview, December 11, 1975.

[5]Purnell, Interview, December 11, 1975.

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