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In 1965, a 3-year developmental program was begun to determine the desirability of modular scheduling for comprehensive and vocational schools and to investigate the impact of such scheduling on 18 secondary schools. During this time more than 15,000,000 data were provided by the schools. The Stanford School Scheduling System, a computer program for schedule construction based on course design and student course selection, was developed. Over 250 modular schedules have been produced by this program. Some of the findings were: (1) Courses were substantially modified as a result of alternatives provided by modular scheduling. (2) The use of team teaching and large and small group instruction increased. (3) The use of student performance criteria as the basis for advancement increased. (4) Space utilization was different but more space was not required. (5) Disciplinary problems increased and later subsided while attendance problems increased. (6) There was increased interaction between students and school personnel in all schools except one. (7) Staff utilization patterns changed to increased responsibilities but involved less after hours work, and (8) Most students and teachers would prefer not to return to traditional scheduling. Descriptive information for the schools, data tables, and data collection forms are included. (EM)

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FLEXIBILITY FOR VOCATIONAL EDUCATION THROUGH COMPUTER SCHEDULING

September 1968

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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FLEXIBILITY FOR VOCATIONAL EDUCATION THROUGH COMPUTER SCHEDULING

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Stanford, California

30 September 1968

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U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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GENERAL SUMMARY AND CONCLUSIONS

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GENERAL SUMMARY, AND CONCLUSIONS

Background

In 1965, the School of Education of Stanford University undertook a three year developmental program to introduce flexibility in vocational education programs through computer generation of modular schedules. The project, funded by the United States Office of Education in accordance with the provisions of 4(c) Public Law 88-210, was designed to determine the desirability of modular scheduling for comprehensive and vocational schools and to investigate the impact of such programs on participating schools.

The first phase covered the first year of the project, and, in effect, was a pilot study. The feasibility of implementing modular scheduling in vocational programs was investigated, and means were devised for attempting similar programs in other schools. Data collection instruments for measuring changes and effects were tested in modularly scheduled schools while comparative information was collected in traditionally scheduled schools. The second phase covered the second and third years of the project, at which time additional schools joined the project.

In the course of the three years, 18 schools participated in the project. Seven were using computer-generated modular schedules at the time the project began, four implemented the schedules during the second year, and three during the third year. The other four schools provided comparative data. These schools adopted some of the recommended features such as performance criteria but continued with traditional schedules.

Participating schools, representing a balance of rural, urban, and suburban populations, were distributed throughout the United States and their student populations ranged from as few as 100 to more than 3,500 students. Seventeen were high schools and one was a junior high school. Three of the schools entering the project during its second year were specifically selected because of the vocational orientation of a major part of their curriculum.

Project directors included Profs. Dwight W. Allen, Robert N. Bush, Norman J. Boyan, and Robert V. Oakford of Stanford University, all of whom played key roles in designing and developing the Stanford School Scheduling System. The project staff also included full time research associates experienced in educational research and modular scheduling. Research assistants from the graduate schools at Stanford performed consulting, programming, and evaluation functions for varying periods of time during the course of the project.

General objectives included:

1. Introduction of greater flexibility into vocational curriculums and of pre-vocational or vocationally-oriented dimensions into non-vocational curriculums through the use of computer-based scheduling technology (the Stanford School Scheduling System);

2. Demonstrating that the SSSS could be used appropriately and economically by large numbers of secondary schools to revise vocational and pre-vocational programs;

3. Expanding and implementing the use of performance criteria for vocational education with the resulting shift of emphasis of instruction toward the individual;

4. Developing guidelines for introducing a greater variety of vocational experiences into the curriculum of comprehensive high schools with otherwise limited vocational programs;

5. Encouraging the establishment of local advisory committees to aid schools in implementing their vocational and general education programs;

6. Encouraging more effective articulation between general and vocational curricular areas; and,

7. Wide dissemination of evaluated findings and results.

To accomplish these general objectives, the project staff was recruited, specific procedures and methods were explored and decided upon, an advisory committee was appointed, timetables were established, and specific research hypotheses were formulated. Instruments to obtain data on a "before" and "after" modular scheduling basis were constructed and submitted to the Office of Education for review and approval, and data collection in project schools then started in the Fall of 1965. During the course of the three years, more than 15,000,000 items were provided on the data collection forms by participating schools.

Stanford School Scheduling System (SSSS)

The schedules provided for participating schools were generated on computers at the Stanford University Computation Center. Developed under the direction of Prof. Robert V. Oakford, the Stanford School Scheduling System is a system of programs for directing computers to handle the mechanics of schedule construction on the basis of course designs and student course selection. There is no established design for any subject or school program; each school has the freedom to determine for itself the length of each period or "module," the total number of modules for the school day, and the number of modules for each type of instructional activity for each course. Seldom will a school's schedule be exactly like that of any other school, and seldom do teachers or departments design course structures similarly from one year to the next. It is thus possible to design educational experiences based on the interests and talents of individual students, utilizing the strengths, experiences, and talents of individual teachers. As a result, there is neither a standard "flexible schedule" for all schools nor one that remains the same in any school in subsequent years.

While not specifically part of this study, it might be noted that SSSS was first used to generate schedules implemented in four schools during the 1963-64 school year. Twelve schools were scheduled the following year, 26 during the 1965-66 school year, 55 during the 1966-67 school year, and 102 schools during the 1967-68 school year. In addition to high schools, several elementary and junior high schools currently are using SSSS to generate modular schedules. Five secondary schools from as far away as Japan operate with SSSS generated schedules.

Increasing utilization of SSSS thus supports one general objective of the project in that it demonstrates the economic feasibility of computer-based modular scheduling. Over 250 schedules have been generated for schools over a six year period, and have been financed by the using schools.

Vocational Education

The distinction between "vocational" and "general" education, never particularly appropriate, has been an arbitrary one based on tradition. It was <u>not</u> a purpose of this project to further enforce this dichotomy or to attempt to distinguish what might be considered a vocational offering in any of the participating schools. Rather was it hoped that the work of consultants with staff members of participating schools would minimize the distinction between arbitrary subject matter differences and that this would occur as a direct consequence of emphasis on the individual as the major focus of learning. While it is necessary to distinguish between "vocation," so-called "academic" and "other" subjects to insure clarity of interpretation of evaluation results, it should be reiterated that this distinction does not reflect the views of the project staff.

Results and Findings

1. Instructional Opportunities

Analysis of data revealed that course structures were substantially modified in some of the project schools as a result of alternatives provided by modular scheduling. There were wide differences in course structures not only between schools but within given schools and between departments.

Implementation of modular scheduling did not automatically lead to increases in the number or variety of courses offered in any subject matter area. Some schools increased their offereings in vocational areas and other schools increased offerings in academic and elective areas, but there were no consistent trends for project schools as a group. Two schools made statistically significant increases in the number of courses designed to prepare terminal students for employment. Increases were noted in other schools, but these were not at a level of statistical significance. Interestingly enough, a school with one of the strongest vocational programs was the only school to make a significant increase in the number of courses classified as college preparatory.

There were large increases in the formation and utilization of teaching teams in most of the schools. Use of large group instruction in both vocational and academic courses increased significantly in all five schools for which traditional to modular data were available. Small group instruction, generally considered to be one of the most important alternatives made possible by modular scheduling, not only was widely used but was consistently reported by students to be very favorably received. Independent study was made a requirement in some courses and was permitted as an alternative in others. Some schools made provisions for differentiated requirements in formal instructional time for students of different abilities, but there were no significant increases in similar provisions based upon student interest.

The most important accomplishment of the entire project might well be the impetus given to development and utilization of performance criteria.

Results provided by the instrument designed to measure the performance orientation of particular courses in project schools indicated that ten of twelve schools reporting had made impressive headway in introducing performance criteria in their vocational offerings. Eight of the schools had over one-fifth of their vocational offerings performance oriented, and one school had three out of every five courses designed with performance rather than time spent in class as the measure of achievement. While the development of performance criteria is not an inevitable consequence of modular scheduling, modular scheduling does provide an environment that encourages performance criteria development.

The emphasis of a performance curriculum is on criteria of performance rather than time. It attempts to replace something called "3 years of Typing" or "2 years of Spanish" with criteria that are measurable behavioral outcomes. It encourages students to learn at their own rates and following whatever strategy is most appropriate to their own needs. In a performance curriculum instructional objectives must clearly specify what it is that the student is expected to be able to do, the conditions under which he will do it, the extent to which this achievement must be demonstrated, and the means whereby such achievement can be demonstrated for purposes of evaluation. Through pre-testing, appropriate placement, and post-testing, the performance curriculum is aimed at genuinely individualized instruction.

2. Student Behavior and Performance

Provisions for between 30 and 50 percent unscheduled time for students makes obvious the necessity for independent study facilities. Project schools made significant changes in the use to which they put existing facilities. Resource centers, laboratories, multiple class teaching spaces and student carrels became quite common. Schools learned that modular scheduling did not demand more space, but that it did require different utilization of existing space. There was a need to re-conceptualize the utilization of school facilities, and most schools accomplished this very commendably. Evidence indicated increasing utilization of spaces for independent study by students and an improvement in attitudes toward the responsibilities provided them.

The evaluation suggests that introduction of modular scheduling initially results in an increase in the number of disciplinary problems faced by school officials, but that after a period of transition, disciplinary conferences generally are fewer than under traditional scheduling. In comparing attendance before and after the shift from traditional to modular scheduling, attendance problems appeared to increase in number. However, the relative frequency of conferences for all other types of discipline tended to go down after the initial period of transition.

On the basis of information provided by students in all of the project schools, it was possible to make specific before and after comparisons of students' attitudes toward modular scheduling. In seven schools students expressed an increasing interest in school as a consequence of modular scheduling. Students in eight schools rated teacher performance more favorably under modular scheduling than under traditional scheduling. Again, in seven of the schools reporting, students felt they were assuming more responsibility for their own education, and in five of these they felt that they were using their time better.

These attitudinal changes all refer only to changes that were statistically significant. The same changes were noted in other project schools but not at a level of statistical significance. It is important to note that for each of the nine factors that were evaluated, there was at most only one school that reported a decrease in its average score on student attitudes.

The results suggest general improvement in the attitude of students in project schools, whether they were in modularly scheduled schools during both years of the survey or whether they were making the transition from traditional to modular scheduling. The most dramatic change toward more positive attitudes about school occurred among students surveyed first under a traditional schedule and then under a modular schedule.

3. Educator-Student Interaction

If we accept the assumption that educator-student interaction outside of the formal program of instruction enhances educational opportunity, then it may be inferred that such opportunity increased as a result of modular scheduling. The project hypothesis that modular scheduling would provide substantially more unassigned time that would be used for extended individual contact between students and faculty members was substantiated with an appreciable degree of significance. There were notable increases in the number of interactions between students, teachers, counselors, and administrators in all of the project schools except one, when comparisons were made between years in which the schools were on a traditional schedule and those in which they were on a modular schedule. The results also suggest that teachers increasingly are assuming counseling functions for which they previously lacked the time. This result was also supported by the interviews with teachers who generally were appreciative of this change in their role.

The vast majority of conferences with teachers were requested by individuals rather than groups of students. Academic work was most often cited as the reason for a conference, and conferences were usually requested by the student rather than the teacher.

It might be thus concluded that modular scheduling is functionally related to patterns of educator-student interaction in that it provides more unassigned time for extended individual contact. Results of the evaluation clearly indicate that students do use some of this time for student-initiated conferences with educators.

4. Staff Utilization

Evidence indicates that patterns of staff utilization changed markedly under modular scheduling. There were significant increases in numbers of teaching teams organized and in teacher involvement in cooperative planning. Changes were significant, consistent, and apparent in over twenty categories evaluated. Teachers reported a dramatic increase in the amount of time they were able to spend in unassigned contact with students, and they also indicated that they were accomplishing more at school and taking less work home with them. The number of hours devoted to assigned activities other than classroom teaching tended to increase, while the hours per week spent doing school work outside of the school consistently decreased. Teachers also reported that there were increases in the total number of their responsibilities, but said that these increases were not unreasonable.

There were also increases in utilization of individual teacher interests and competencies in teaching assignments. Teachers reported planning lessons for presentation by other teachers and presenting lessons which others had helped to plan. They also reported an appreciable increase in involvement in planning the aims and objectives of the courses offered in project schools. There was also a noticeable shift toward teacher involvement in systematic observation of the classroom performance of colleagues.

That changes in roles and responsibilities are appreciated by teachers is readily inferred from reactions obtained in interviews. These new roles and responsibilities are seemingly among the major reasons that most teachers do not wish to return to traditional schools after having experienced teaching under a modular schedule.

5. Other Findings and Observations

Students are generally enthusiastic about the changes that have occurred as a result of modular scheduling. Despite initial problems in acceptance of responsibility for large amounts of unscheduled time, few students indicate that they would prefer to return to a traditional schedule. They are especially enthusiastic about experiences in small groups, and are increasingly critical of poorly prepared lectures and demonstrations in large group instruction. They have indicated on attitude survey forms as well as in interviews an increasing interest in and appreciation for their schools.

Students generally appreciate the opportunity to work in resource centers and open laboratories on projects of special interest to them. They feel that their unscheduled time provides a very significant opportunity for learning. They seem to be increasingly conscious of themselves as learners rather than "attenders." They appreciate some of the changes in teaching roles in modularly scheduled schools and the opportunity to conference with instructors on an individual and personal basis.

Teachers are aware of the change in the nature of their professional responsibilities, and they are reassessing subject matter content as well as the effectiveness of formal modes of instruction. They are beginning to use textual materials differently, and many teachers are writing and organizing their own materials. The use of performance oriented materials is beginning to increase in academic as well as vocational areas.

Teachers are also critical of the nature and quality of the preparation they received for teaching. They are critical of schools of education and other teacher training institutions. They are asking for inservice programs that will help them with their new roles in modularly scheduled schools and are recommending adoption of inservice programs utilizing micro-teaching techniques and colleague supervision.

Administrators have noted a need for improvement of public relations and information programs that might better communicate the objectives of programs such as modular scheduling to parents and community members. They are also concerned with the inability of some teachers to adjust to new responsibilities necessitated by modular scheduling. They are aware of resistance from some teachers over implementation of any innovation and feel that in far too many cases not much change in teaching actually has occurred. They are concerned increasingly about the superficial nature of attempts at differentiation of instruction, despite the opportunity provided by modular scheduling to make differentiation significant for individual learning.

Member of the project staff made numerous observations of various programs throughout the three years over which the project extended. They have noted many changes and improvements, but are also aware of serious deficiencies in many areas. They stress the need for progressively finer distinctions between what must be presented in formal modes of instruction and what should be the responsibility of the student. They deplore the fact that articulation between vocational education and other curricular areas is still highly inadequate. They have noted the successful utilization of performance criteria in many programs, but are also aware that they are largely ignored in too many other areas of the curriculum.

In summary, results of the formal as well as the informal evaluations indicate that the project was quite successful. Improvements have been made, and the range of alternatives for further improvements has been widely expanded. The final success of the project will be limited only by the vision and imagination of those who staff the schools.

Conclusions

Modular scheduling itself does not necessarily represent a significant change. It is, however, a base line from which curriculum revisions are possible. Thus, even in schools where significant change has not taken place, there still is a greater potential for change than before. In providing new opportunities for constructive alternatives in the curriculum modular scheduling also provides a basis for seeking equally constructive alternatives in staff organization and utilization of facilities.

Modular scheduling and performance criteria represent only the first steps toward the larger goal of individualized education. Too often the schedule has been looked upon as an end in itself. In many project schools the technology for flexibility is present, but teachers and administrators are not yet psychologically geared to implement the full potential. Only people can make the modular schedule a flexible schedule.

Thus, though the project has been a formal success insofar as it has persuaded schools to adopt new schedules, success falls far short of the ultimate goal of interesting schools in curriculum change. When the shift to modular scheduling is not accompanied by a recognition that the curriculum and school organization are not adequate to the demands of contemporary education, it can be worse than a failure if it only entrenches a new orthodoxy. Where the staffs of project schools are deeply committed to new educational objectives, these schools stand on the threshold of significant progress. It would be safe to say that even in these schools, however, 99 percent of the possible alternatives permitted by modular scheduling have yet to be tried.

Admittedly, there has been greater organizational change than educational change in project schools. To some extent the naive assumption still persists that curricular change automatically results from organizational change. Even so, it is significant that at this point in several project schools, curriculum revision of the kind needed in education today is being investigated and in some instances implemented. Even where this is not the case, the inadequacies and inhibiting effect of traditional patterns of organization have been exposed. It is in the revelation of existing shortcomings in the curriculum, instructional methods, assignment of teaching staff, administrative organization, and facility and resource utilization that modular scheduling has made its greatest contribution.

The attempt to effect a more relevant articulation between general education and vocational education remains a major but largely unrealized objective. Efforts dedicated to accomplishing this scarcely extend beyond discovering the magnitude of the problem. It was made apparent in this project, however, that the academic disciplines seem more committed to tradition as far as curriculum change is concerned. Even where changes are occurring, they are not occurring in a way that integrates with or significantly helps the vocational curriculum.

In the vocational area, on the other hand, there appears to be greater inclination to revise the curriculum through performance curriculum development. Still, the tendency toward empire building even in vocational education restricted significant attempts made during this project to work with teachers in other areas. This problem will remain unsolved until both the will and the means to better communication come into play between these areas. Representatives from the academic and vocational disciplines have yet to learn how to state their problems in other than mutually exclusive terms.

Traditions are not easily changed but some perspectives on teaching and learning have changed as a result of the project. That in itself is a major accomplishment. For teachers as well as students the thought of returning to a traditional schedule was soundly rejected.

Section 2

BACKGROUND

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BACKGROUND

INTRODUCTION

On March 1, 1965, the School of Education of Stanford University submitted to the United States Commissioner of Education under provisions of 4 (c) Public Law 88-210 a proposal for a three-year developmental pilot program entitled Flexibility for Vocational Education Through Computer Scheduling. Upon the recommendation of the United States Office of Education, the program outlined in this proposal was divided into two phases, with the first phase to be funded through June of 1966. The first phase was established to test the feasibility of applying computer generated scheduling techniques to vocational education.

At the conclusion of the first phase, during which the feasibility of computer scheduling as an enabling device for introducing innovation in vocational education was demonstrated, a proposal for the second phase, which was of two years duration, was submitted to and approved by the Office of Education. This phase, scheduled to run from May 1, 1966 through April 30, 1968, was intended to implement computer scheduling on an even broader scale and to involve more schools and more educational programs than were involved during the first year of the project. Its purpose was to apply experience gained in the first year to further establishing the validity of flexible scheduling in vocational and comprehensive school applications. At the same time it intended to investigate the impact of computer scheduling upon these schools, upon curriculum organization and content, and upon traditions and attitudes that have served to inhibit sustained and significant educational change.

The second phase of this project, which was extended to September 30, 1968 to permit end-year data collection and evaluation for the 1967-68 school year, is the principal subject of this report.

THE SCHOOL SCHEDULE

In all but the very exceptional case, a school's program is contained, directed, and carried forward within a yearly master schedule. In the sense that the educational program must remain within the limits defined by the schedule, and can move forward only for such time as the schedule allows, school schedules are a major barrier to individualized education.

The intricacy of the master schedule and the complexity of the relationship of its part in performing their function condemn it to imperfection even in its most finished form. To schedule courses, pupils, teachers, and facilities in a coherent pattern that also takes into account student needs and student preferences, teaching preferences and teaching capabilities, and the appropriateness as well as the availability of space presents a problem of structuring alternatives just barely within the capacity of unaided human effort. The degree of innovation that can be introduced into the process of manual scheduling without toppling the structure entirely is minimal. As it is, complex, time-consuming adjustments are required to accommodate last-minute changes that inevitably occur just before a traditional schedule is put into operation. Accommodation is about all that can be expected of the manually made schedule, and flexibility, in all but the most unusual instances, is a practical impossibility. The desire to innovate has usually had to give way to the need to improvise.

Computer scheduling, for all it does, does not reform a school curriculum any more than flexible schoolrooms reform inflexible teachers. Computers do not improvise. Computer scheduling does tend to free the imagination of the administrator by removing many of the restrictions imposed by manual scheduling.

At the same time, computer scheduling allows educators to survey a much greater number of alternatives than would otherwise be possible. The computer's capacity to handle a mountainous volume of data and to be programmed to handle it in a significant manner at lightning speed largely accounts for the advanced state of scheduling technology today. The computer based scheduling system presents administrators in each school with an opportunity to solve their own unique problems according to their own best judgment.

THE PURPOSE OF FLEXIBILITY

Excellence in education and the means to implement educational decisions, policies, and designs directed toward excellence describe the purpose for which the Stanford School Scheduling System (SSSS) was created under the direction of Robert V. Oakford. Where excellence has not been achieved or even pursued by existing programs, computer scheduling of such programs offers only the limited byproduct advantages of speed and convenience. The most important advantages of the SSSS system derive from the opportunity it offers for curriculum experimentation and improvement.

Curriculum improvement to what end? Stanford curriculum planners Robert N. Bush and Dwight W. Allen in their book, A New Design for High School Education: Assuming a Flexible Schedule,[1] stress the need to reexamine the goals of education. Traditional curriculums tread the path of predetermined course of study along which accomplishment is measured by the passage of time. This education by endurance, measured in hours, is rewarded by an arbitrary system of units or credits. Instead, they say, the curriculum should be so designed as to lead to proficiency and accomplishment measured by some predetermined logical criteria, and furthermore, should provide a broad liberal education without any gaps. To their minds, "three years of French," for example, should be replaced as an educational goal by some measurable degree of fluency in French.

The means for more meaningful transmission of existing curriculum content do not appear to exist in traditional course-structure patterns. Five periods per week per course for thirty pupils under one teacher in the blockhouse buildings of yester-year may have seemed appropriate in less subtle times, but today this pattern is an anomaly. The fact that the traditional schedule persists even where architectural blockhouses have given way to flexible new facilities merely points up the strength, not the rectitude, of tradition. Differences in course content, student interest and capability, and teacher competence are ignored by traditional course structures in deference to the ogre of time viewed as a predetermined absolute. Time is, in fact, neither an ogre nor an absolute but a valuable educational resource, particularly when flexibly scheduled using a computer.

Many of the new goals of education are not new at all. Some represent such an obvious need that they have long since become cliches without ever having become widespread realities. Individualized instruction and individualized learning through increased independent study are two examples. Optimum assignment of teachers according to individual competence and talent is another. Dr. Bush and Dr. Allen point out that with the means at hand for scheduling innovation, an effort should now be made to take into account such pressing educational needs as:

Curriculum task organization that reflects predetermined achievement levels and goals.

Flexible course structures that provide room for the growing volume of course content.

More efficient assignment of teaching and administrative staff responsibilities.

Teacher teams that make best use of combined skills.

Course sequencing which allows students to build and maintain skills by studying in each major curriculum area each year for amounts of time and in class situations compatible with individual interests and abilities.

Teaching strategies adapted to the demands of specific subject material.

Class meetings of a duration appropriate to their specific purpose..

Student groups discreetly tailored to the aims of a given instructional session.

Division of course content into elements to be transmitted at once to the entire course enrollment, to identifiable alternative groups, and to individuals.

More effective use of technological teaching aids represented by the new electronic media.

Advisory relationships between teachers and pupils based on educational rather than administrative or organizational considerations.

Fulfilling even a few of the objectives listed above requires curriculum planning and experimentation of a high order and planning well in advance of master scheduling. With the means of scheduling now available, however, the objectives of such planning become real possibilities where before they had only been theoretically possible.

THE PROBLEM IN VOCATIONAL EDUCATION

Recent legislation for the support of vocational education offers schools the opportunity to redesign their vocational and pre-vocational training programs. In the past, tradition and available scheduling techniques have contributed to a typically uniform pattern of grouping students. Relaxing traditional uniformity should encourage schools to improve their programs of vocational education on three fronts.

First, schools should be able to provide better balance in the total program for vocational students in comprehensive or in specialized vocational schools. Second, they should be able to provide more pre-vocational and vocationally oriented experiences for pupils enrolled in non-vocational curriculums. Third, they should be able to introduce flexibility in course design which takes into account unique student abilities and interests, teacher talent, and course content through variation in class size, duration of class meetings, number of class meetings per week, and teacher assignments.

The restriction on opportunities for vocational pupils to pursue a balanced program showed itself in a 1965 analysis of thirteen curriculums offered in the public secondary schools of Philadelphia.(2) The design of the several curriculums revealed that pupils enrolled in the vocationally oriented curriculums in the comprehensive high schools (e. g., commercial, clerical, homemaking, trade preparatory) enjoyed the least opportunity to elect courses which could contribute to a broad, comprehensive educational experience. The courses required by their vocational choice and by a uniform but limited general education requirement virtually exhausted all of the pupil time available. The three basic curriculums in the vocational schools (technical, vocational, and trade) were almost completely prescribed. In general, pupils in the vocational curriculums -- whether lodged in comprehensive high schools or in specialized vocational schools -- were permitted only the choice of one elective (two periods per week) each semester for the six semesters of high school. In several of the vocational curriculums, the choice of an elective minor was reduced to only one elective (one period per week) in two out of six semesters.

Analysis of programs actually completed by a sample of Philadelphia secondary school graduates and the relationship of these programs to post high school careers also revealed that a significant proportion of those who had enrolled in college preparatory curriculums entered the world of work immediately after graduation. Most of them, and also the pupils enrolled in so-called "general" courses, entered the job market with little understanding of the territory and without marketable skills. Our concern for vocational education, then, transcended the limits of vocational schools and vocational curriculums in comprehensive high schools. It reached into the opportunities for vocational experiences of pupils in non-vocational curriculums.

In general, vocational curriculums typically have consisted of two basic elements: first, shop work and related "theory" courses; second, general education requirements. Often a third element, work experience, was included. Prior to the Vocational Education Act of 1963, government regulations required the scheduling of shop work and related courses for a one-half day block in programs which qualified for state and federal assistance. General education requirements varied according to state and local regulations; but an illustrative pattern for grades 9-12 would consist of three or four years of English, two or three years of social studies, one year of mathematics, one or two years of science, and four years of physical education. The related "theory" courses typically included some work in mathematics and science specifically relevant to the vocational field for which the pupil was receiving his preparation.

Instructors attempted to differentiate within vocational courses according to the ability and performance of individual students. Indeed, the performance charts of progress which many vocational shop teachers used as standard practice represented significant progress in individualizing instruction. Yet, the way time was allocated for their courses tended to encourage them to set tasks in a pattern and sequence which permitted the average student to start and to finish a given activity only in the time specifically scheduled for doing so. What the average student could do in this period of time, the more able could do in less time and the less able could not complete.

A brief example of how a school could substitute a "performance" criterion for a "time" criterion will illustrate the way in which flexibility in course design can accommodate variations in student ability and interest. At the beginning of the year, the instructor and each pupil specify the projects which they agree the pupil should undertake. The appropriateness of the project is specifically related to the aim of the course. The instructor and the pupil together establish the worth of each project in terms of school units. The pupil earns these units when he and the instructor agree that he has completed the project satisfactorily -- whether the pupil does the job in one day, one month, one semester, or one year.

Variation in length of time to complete the project is related, of course, to pupil ability and interest. Variation is also related to accessibility of shops and laboratories. The school would designate each of its shops and laboratories as "closed" for certain periods of the day -- preferably a minimal amount of time -- and "open" for other periods of the day. The schedule is posted for pupil reference. He can then go to an "open" shop during time which is provided for independent or individual study.

The connection between open shops or laboratories and time provided to pupils for independent or individual study is clear. Unless pupils have some time in their schedules reserved for independent or individual study, there will be no one available to use shops or laboratories on an open basis.

The notion of course design based on performance does not depend solely on the availability of open shops or laboratories. Teachers and pupils can "contract" for completion of tasks or projects within periods of conventional length in closed shops or laboratories. It is clear from observation, however, that the open shop or laboratory have materially advanced accommodation of variation in student ability and interest. Also, teachers who previously met conventionally scheduled classes (set number of pupils at set times for periods of set length) report not only marked satisfaction with combinations of closed and open shops and laboratories, but also marked improvement in their ability to help a larger number of pupils to perform at a high level.

The foregoing analysis raised three strategic questions about the improvement of vocational education. First, "Can vocational schools and comprehensive secondary schools which offer vocational curriculums provide richer and more balanced general education programs for vocational pupils?" Second, "Can comprehensive secondary schools provide more opportunities for pupils enrolled in non-vocational curriculums to participate in desirable prevocational or vocationally oriented experiences?" Third, "Can vocational educators and their colleagues conceptualize and implement alternative ways for the more profitable and productive use of time, student abilities and interests, teacher talent, and school facilities?"

PROJECT OBJECTIVES

The objectives proposed for the project were outlined at its inception and remained in effect throughout its duration. These objectives were divided into a general and a specific category, the latter being stated as hypothetical results that might be expected to accur as a result of flexible scheduling applications. The objectives were as follows:

General Objectives

A major objective was to demonstrate that it is feasible to introduce greater flexibility into vocational curriculums and into the pre-vocational dimensions of non-vocational curriculums. It was believed that the availability and use of SSSS would encourage and permit educators to design vocational courses which use staff, time, facilities, and grouping of students in new and different ways.

A secondary objective was to demonstrate that SSSS can be used appropriately and economically by large numbers of secondary schools. One of our goals was to place SSSS in the public domain as soon as possible, so that it would be generally available to schools throughout the nation. Initial steps have been taken to achieve this goal along two fronts -- first, continuous refinement and improvement in the system to convert it to a production model free from dependence on a small group of inventor-developers and technologists based at Stanford, and second, establishment of liaison and working relationships with strategically located computer and data processing centers. Such centers will serve schools in their own geographic area. Use of SSSS does not require a school or school system to rent or purchase its own computer and associated data processing equipment.

The actual costs of generating schedules for over 100 schools indicate the ultimate economic feasibility of widespread adoption of the basic technology. However, experimental scheduling and associated developmental activities which have characterized operations to date are substantially more expensive to undertake than scheduling on a production basis. More representative cost data will be collected, and SSSS will be converted to a production system during the period of demonstration. Both factors will work to the ultimate benefit of schools which intend or hope to use the system.

Central to the proposal for widespread use and dissemination of SSSS is the benefit to school administrators and other professional personnel in the form of relief from the tedium and restrictions of conventional schedule construction. This relief and freedom can prompt and help them to seek ways to use the enabling technology for improving the quality of education in their total programs.

Specific Objectives

As a result of employing SSSS as an enabling techology:

1. The economic feasibility of SSSS as an enabling technology for vocational and technical education will be demonstrated. Large numbers of schools will be able to take advantage of SSSS, originally through Stanford and later through other centers to which the technology will be disseminated.

2. There will be an increase in the number and variety of courses offered to pupils in both vocational and non-vocational curriculums. There will also be an increase in the number of students receiving pre-vocational educational experiences.

3. There will be changes in course design which reflect an increase in variability in instructional settings - specifically in the increased use of large-group and small-group instruction, in the differentiated and varied use of shops and laboratories, and in opportunities for independent and individual study. Achievement criteria will be based upon performance rather than time, and students will enter the world of work more adequately prepared than at present.

4. There will be changes in course design which are specifically related to uniqueness of the subjects involved. For example, the amount and spacing of large-group and small-group instruction in shorthand and typing will vary from the amount and spacing of large-group and small-group instruction in mechanical drawing or metal shop.

5. The differentiation in the content of parallel courses within a subject field for students of different abilities and interests will be increased. For example, automobile shop pupils who have the ability and interest to do so will be able to study more difficult related mathematics and science materials than will automobile shop pupils who are less able in mathematics or more interested in practical application. Related course content may be used in one course to develop skills in general education. For example, a student may learn a shop procedure and then be asked, as a part of English competence, to write a description of that procedure for inclusion in a shop manual. His competence may be tested when another student attempts to follow that procedure.

6. Students will be provided more opportunity for and will assume more responsibility for their own learning and behavior. For example, each pupil's schedule will include time reserved for independent and individual study which he may undertake in the library, specific subject resource centers, "open" shops or laboratories, or in consultation with guidance counselors, teachers, and peers. The idea of the "open" laboratory or shop is that the student can go to the laboratory or shop during his independent study time to work on either assigned or optional tasks.

7. Students' programs will reflect increased recognition of variation in their abilities and interests. For example, within the total group of pupils who elect a given vocational curriculum the amount of time pupils are assigned to specific elements will vary according to levels of performance and individual work patterns rather than being uniform for all.

8. Teachers' and pupils' schedules will provide substantially more open or unassigned time for extended individual contact.

9. Teacher assignments will reflect increased differentiation, specifically related to professional preparation and special teaching competence. Instructors who have a flair for large-group instruction will be able to concentrate their efforts in such a setting, while instructors who are especially competent in small-group or individual conferences will be able to concentrate on these phases of the total program.

10. Teacher performance will reflect increased and extended staff cooperation. Cooperative professional planning of total curriculum patterns, of specific courses and their design, of division of labor according to teacher talent and interest, and of joint teaching of different groups of pupils will flow from and be required by employment of SSSS and the schedules it can generate.

11. Administrator participation in schedule construction will emphasize increased attention to professional decisions as contrasted with the clerical and routine details involved in manual construction of a schedule model.

12. The findings of the Stanford Project will be disseminated to all interested educators. The dissemination effort will encompass two major phases. First, the SSSS technology will be disseminated to subcenters requesting the system, and second, information will be disseminated through conferences and a published report.

PARTICIPATING SCHOOLS

The following is a list of schools participating in this project. All schools participated to some extent in the curriculum innovation encouraged by the project, particularly in working toward a performance goal orientation, including those schools which never adopted flexible scheduling. However, the greatest change has taken place in the schools in which flexible scheduling has been introduced and the list is divided here to point up the extent, though by no means the quality, of their experience with flexible scheduling technology. This breakdown also has special relevance to the before and after evaluation of individual school experiences discussed later in this report. The list includes a few schools that joined and later dropped out of the project.

Schools with flexible schedules when they entered the project:

Canyon High School, Castro Valley, California
Julian High School, Julian, California
Kennedy High School, Fremont, California
Marshall High School, Portland, Oregon
Poway High School, Poway, California
Roy High School, Roy, Utah
Valley High School, Las Vegas, Nevada
Virgin Valley High School, Mesquite, Nevada

Schools that introduced flexible scheduling in the second year of the project:

Ceres High School, Ceres, California
Golden High School, Golden, Colorado
Wheat Ridge Jr. High School, Wheat Ridge, Colorado

Schools that introduced flexible scheduling in the third year of the project:

Alliance High School, Alliance, Nebraska
North Miami High School, Miami, Florida
South High School, Omaha, Nebraska

Schools that did not adopt flexible scheduling:

Benson Poly-Tech High School, Portland, Oregon
Findlay High School, Findlay, Ohio
Girls Poly-Tech High School, Portland, Oregon
Southern Nevada Vocational Technical Center, Las Vegas, Nevada

PROJECT PERSONNEL

Principal investigators in this project were Professors Dwight W. Allen, Robert N. Bush, Norman J. Boyan, and Robert V. Oakford of Stanford University.

Professors Bush and Allen developed the concepts of curriculum reform that computer scheduling was developed to implement. These concepts are described at length in their book, A New Design for High School Education: Assuming a Flexible Schedule.[1] Professor Allen, who served as Project Director, left the project during the final months to become Dean of the School of Education at the University of Massachusetts. He did, however, return periodically to offer direction and guidance as necessary up to the time the project concluded. Professor Oakford, formerly a Co-Director, assumed the responsibilities of Project Director upon Professor Allen's departure.

The concept of the SSSS computer programs originated with Professor Oakford and he subsequently directed its development. He was greatly assisted in this effort by Lynne A. Chatterton, also of Stanford.

Professor Boyan, the other principal investigator, was responsible for the evaluation phase of the project here reported and it was under his direction that most of the evaluation instruments used in the project were developed. Mr. Boyan took leave from Stanford and the project shortly after the first year pilot phase had been completed to work with the U. S. Office of Education in Washington, D. C.

In addition to the foregoing, the project staff also included three full-time research associates with considerable experience in educational research in general and in computer based flexible scheduling in particular. Several research assistants from the graduate school at Stanford with similar, if not as extensive, experience worked with them on a half-time basis as project investigators, as consultants and as liaison personnel between Stanford and the project schools. A complete list of these additional personnel and the years during which they participated follows:

Research Associates:

Donald DeLay
(first and second year)
Raymond Johnson
(second and third year)
Franklin Keller
(first year)
Jack D. McLeod
(third year)

Research Assistants:

Arthur Coombs, Jr.
(three years)
John Easter
(second and third year)
John Karpoff
(third year)
Robert Kessler
(three years)
Olan Knight
(second and third year)
Erika Lueders
(third year)
Robert Lundgren
(third year)
Jack D. McLeod
(first and second year)
Edward Mendell
(second year)
Paul Preising
(first year)
Donald Sharpes
(second year)
David Standard
(first and second year)
Atilano Valencia
(three years)

Secretaries:
Diane Birch
(second and third year)
Dorothy Hurley
(three years)

Programmers:

Stephen Brophy
(first and second year)
Lynne Chatterton
(three years)
John Hauser
(second and third years)
J. Roger Hamilton
(second and third year)
Arturo Salazar
(second and third year)

Statistician:

Thomas Stroud

Data Coordinator:

Gilbert Hernandez
(second and third year)

Writer:

Robert Bergquist
(second and third year)

Data Processors:

Mary Jane Burdis
(second and third year)
Thomas Kremen
(first and second year)
Lindsay Parker
(second and third year)
Sharon Wilson
(second and third year)

Keypunch Operators:

Carole Rhoades
Anne S. Summerhill
Alex Tseng

ADVISORY COMMITTEE MEMBERS

The ten distinguished educators who joined the Advisory Committee of the Stanford Project to advise and help guide the Stanford effort were:

Melvin L. Barlow,
Professor of Education and
Director of the Division of Vocational Education,
University of California, Los Angeles, California

Joseph Bellenger,
Director of Vocational Education,
San Jose Unified School District
San Jose, California

Nathan H. Boortz,
Director of Technical Education,
Foothill College,
Los Altos, California

Lawrence Meier,
Director of Vocational Education
Jefferson County Schools
Lakewood, Colorado

Leon Minear,
Formerly State Superintendent of Schools,
State of Oregon

Clair O'Brien,
Bureau of Vocational Education
California State Department of Education
Sacramento, California

James O'Gara,
Director of Vocational Education
Portland, Oregon

C. W. Patrick,
President,
San Diego Junior College,
San Diego, California

Raymond Sturm,
Director of Adult and Vocational-Technical Education
Clark County School District,
Las Vegas, Nevada

J. Chester Swanson,
Department of Educational Administration,
University of California
Berkeley, California

LOCAL ADVISORY COMMITTEE FUNCTIONS

To fully exploit the potential which schedule flexibility might provide for vocational elements in the project school curriculums, local vocational advisory committees made up of representatives from industry and the community were formed to:

1. Advise the school administration of the types of vocational courses that should be organized to satisfy the training needs of the community.

2. Carry on occupational surveys, determine the data to be gathered, support the studies, and gain the best community reaction to such studies.

3. Periodically evaluate vocational training to see that it fits the needs of the world of work.

4. Set up standards for entrance into vocational courses.

5. Help schools to seek and to use financial assistance to establish or expand programs.

6. Influence state and federal legislation related to vocational education.

7. Serve as a public relations and information vehicle.

8. Assist in providing part-time employment as well as unpaid vocational experiences for high school pupils in work-study programs.

9. Visit schools and make possible the visits of high school pupils to industry.

REFERENCES

1. Bush, Robert N.; and Allen, Dwight W.; A New Design for High School Education: Assuming a Flexible Schedule. New York: McGraw-Hill Book Company, 1964. p. 197.

2. Odell, William R.; and the Survey Staff. Educational Survey Report for the Philadelphia Board of Public Education. Philadelphia: The Board of Education, School District of Philadelphia, 1965. p. 389.

Section 3

GENERAL PROCEDURES AND METHODOLOGY

Contents

GENERAL PROCEDURES AND METHODOLOGY

PILOT STUDIES

The overall premise upon which the project was based was that the use of a computer-based scheduling technology would contribute to the improvement of vocational education by helping schools to introduce flexibility in course design. By flexibility in course design, we mean planned variation in the assignments of teachers, the grouping of students, and the use of time and space to fit the instructional needs of individual courses. It was believed that introducing flexibility in course design could help vocational educators to provide more balance in the total program of vocational pupils and to provide more pre-vocational and vocationally-oriented experiences for pupils enrolled in non-vocational curriculums.

The demonstration was carried out through four sets of developmental pilot schools using the Stanford School Scheduling System described earlier.

The first set of pilot studies was made in schools which had already demonstrated an interest in significant modification of course design and in which a majority of pupils do not continue their education beyond high school. Schools were selected from the group which have been associated with the Stanford Flexible Scheduling and Curriculum Study during the years of development and field test of SSSS. These schools (all comprehensive schools) served as centers for demonstrating the feasibility of employing SSSS (1) to introduce changes in vocational courses, (2) to provide richer and broader general educational experiences for vocationally-oriented pupils, and (3) to provide more opportunities for non-vocationally oriented pupils to participate in appropriate and profitable pre-vocational or vocationally-oriented experiences.

The second set of pilot studies was made in schools (both specialized vocational and comprehensive) where the professional personnel had signified an intent to remain with conventional scheduling patterns but had indicated an interest in employing computer technology to generate their schedules. We justified the inclusion of this set of schools because of our prediction that the administrators in these schools would be more receptive to consideration of alternative course designs as they found themselves relieved of the operational details of schedule construction. During the pilot study period, the personnel of these schools were systematically exposed to the capabilities and limitations of computer-based scheduling for realizing alternative curriculum decisions as well as to the economic feasibility of computer-based construction of both coventional and flexible schedules.

The third set of pilot studies was made in schools (both specialized vocational and comprehensive) in which the professional personnel were already interested in introducing changes aimed at improving the effectiveness of vocational education but which required the enabling technology of SSSS to implement the improvements.

The fourth set of pilot studies was made in schools selected for testing the applicability to vocational education of the full set of assumptions developed by Bush and Allen. Central among these is that students with specialized interests, vocational or otherwise, will have the opportunity to develop genuine competence by pursuing their field in depth over a period of several years. Bush and Allen also recommended that:

1. All pupils should have continuous study in all years of secondary school in all basic subject matter fields, including the arts, languages (English and foreign), mathematics, natural sciences, physical education and health, social sciences, and guidance.

2. In each subject field, several groups of pupils whose abilities and interests are sufficiently distinct to require a discrete program of studies can be identified.

3. A subject, for its proper instruction, may require as many as four basic settings: independent and individual study, small-group instruction, laboratory instruction, and large-group instruction.

4. Adequate instruction in each subject matter field typically requires senior teachers who are both well trained in their fields and highly skilled in teaching and who are assisted by less highly trained members of the instructional staff.

5. Class size, length of class meeting, and the number and spacing of classes should vary according to the nature of the subject, the type of instruction, and the level of ability and interests of pupils.

Work experience, vocational training, and a broader general education can be provided in a program so conceived.

The propositions advanced by Bush and Allen encompass complex and intricate variables representing pupils, instructors, facilities, and course patterns. The structural variables are explicit. The variable of course content is implicit. The evidence from schools across the country which have attempted to incorporate several of these and similar innovative proposals into their total programs is that an enabling scheduling technology is needed to permit them to handle the variables involved in constructing their master schedules.

DESCRIPTION OF THE STANFORD SCHOOL SCHEDULING SYSTEM

The SSSS comprises 9 major computer programs and several supplementary programs written in FORTRAN IV for use on the IBM 360-40 or larger computer. The following are sketches of the major components of the system:

1. Data collection. The data collection component of the system, defined in detail in the School Manual, Stanford School Scheduling System (1968), provides forms for recording a school's policy decisions as they are reflected by course structure specifications and the students' course requests. The data from these forms are punched in IBM cards which serve as input to the SSSS system.

2. INCA, "INput Card Audit". The INCA program reads the punched cards and records the card image in a magnetic file. The program checks the card records for detectable errors and logical inconsistencies. A message is written for each error or inconsistency detected. The program can update the magnetic tape to reflect insertions, deletions, or changes in the file. Such corrections would be specified via punched cards after the error messages have been studied.

When the detectable errors and inconsistencies have been eliminated from the data, the INCA program prepares a tape that serves as input to the SSP (School Scheduling Program). The INCA program assigns a code number to each course, course phase, section, teacher, room, and student. Within SSSS these entities are identified by code number only.

The tape prepared by the INCA for the SSP contains a sequence of data packets. For each course phase there is one data packet containing the essential elements that describe the structure of that course phase and its interphase dependencies. The packets are ordered basically according to the potential value of scheduling a section of the course phase, where the value of scheduling a section is defined in terms of the total student periods of class time per section. There are exceptions that are observed in ordering the data packets. For example, all course phases for which meeting times are prespecified in the data are placed at the head of the sequence. Furthermore, the educator can arbitrarily specify changes in the ordering.

3. SSP, "School Scheduling Program." The SSP actually constructs the schedule of class meetings by processing the sequence of course phase data packets prepared in INCA. The objective of the SSP is to schedule classes so as to maximize the number of student course requests that are accommodated.

When a section of a course phase is scheduled, the following events occur:

a. The teaching assignments for the course phase are observed, and a teacher (or teaching team) is selected.
b. The meetings-per-week and periods-per-meeting specifications for the course phase are observed. A time pattern is generated at which the teacher (or teaching team) is available. The time pattern is a combination of periods that satisfies the meetings-per-week and the periods-per-meeting specifications and further provides that no two meetings of this section will fall on the same day.
c. If a room assignment is specified, a test is made to determine whether or not the assigned room is available. If not, a new time pattern is generated at event (b).
d. The list of students eligible to be scheduled into this section is observed, and the students from this list who are available at this time pattern are identified. To be on the list, a student must have requested the course to which the current course phase belongs. However, the list may be further restricted by an interphase student grouping restriction. If an adequate number of students is available, a section is scheduled, and the teacher and room availability records are updated to reflect this action. Otherwise, a new time pattern is generated at event (b).
e. The number of sections to which the teacher (team) is assignable is observed. When the teacher has been assigned the specified number of sections or when all time patterns at which the teacher is available have been considered, the next teacher (team) in the assignment list is identified at event (a), and the foregoing process is repeated.

f. When all sections of the course phase have been scheduled, or when it becomes apparent that no more can be scheduled, the students are assigned to sections in a way that balances section sizes insofar as student availability permits. The student availability records are updated to reflect the scheduling of students to sections.

The foregoing process is repeated for successive course phases. In the scheduling of individual sections, exhaustive searching will be performed to find a time pattern at which the teacher and room assignments can be honored and at which an adequate number of students are available. Furthermore, extensive but not exhaustive searching is performed in an attempt to schedule as many eligible students as possible, given the scheduling decisions that have been made previously. To this extent the SSP tends to satisfy as many student requests as it is possible to satisfy. However, the SSP does not provide for descheduling and rescheduling of sections, nor does it provide for descheduling or rescheduling of students. In this respect it departs from the scheduling theory.

The results of the SSP consist of class lists for individual sections. Each class list specifies the teacher (team), the room (if any), the students scheduled in the section, and the times at which the class is to meet. The class lists are recorded in a magnetic file.

4. UDL/PTWS, "UpDate Lists/Program to Write Schedules." The PTWS section of UDL performs a large-scale sorting operation to convert the class lists prepared by SSP into teacher, room, and student schedules. A schedule as prepared by PTWS is actually a list of the code numbers of the sections into which the resource has been scheduled as reflected by its appearance on the class list of that section. The results of the PTWS program are recorded in a magnetic file.

Any student whose course requests have not been completely satisfied by the SSP scheduling are identified as status 1 students.

5. UDAMC, "UpDate After Manual Changes." We have found that the school administrator may want to specify certain changes in a schedule generated by SSP even though he regards the schedule as acceptable. Sometimes these changes do not affect the schedule

of classes or the schedules of resources. For example, it may be necessary to correct the spelling of, or change the name of, a teacher or a room. Frequently the changes may affect the schedule of classes and/or the schedules of resources. For example, changes in teacher assignments or room assignments occur. Sometimes the administrator may even reschedule or modify the scheduled meeting times of one or more sections.

6. UDCREQ, "UpDate Course Requests." We have found that changes in course requests are inevitable. The plans of returning students sometimes change; new students register in the school after the schedule is fixed; some students do not return to school. The UDCREQ program provides for modification of SSSS records to reflect these changes. Whenever a student's course-request list is modified, his existing schedule is automatically invalidated and he becomes a status 1 student.

7. SAP, "Student Assignment Program." The SAP is used after the class schedule has been fixed for scheduling a status 1 student into sections of courses that he has requested. It provides for consideration of alternative courses specified by the student in his course-request form in the event he cannot be scheduled satisfactorily into all the courses requested. In making substitutions, the SAP considers the preference of the individual as indicated by his course-request list and tries to avoid substitutions for those courses for which the student has indicated a high preference.

8. RAP, "Room Assignment Program." We have learned from experience that better schedules result when a priori room assignments are restricted to classes requiring special-purpose rooms. We have also learned that there is not general agreement among school administrators as to the preferences that should be observed in assigning rooms. Some administrators prefer to make the room assignments manually after the schedule is fixed because they can, thereby, best satisfy the individual preferences and needs of that school's faculty.

The RAP provides for automatic assignment of rooms after the schedule is fixed. It requires the school to work out a classification of rooms; the class of room (or the classified room) required by each course phase must be identified; the room preferences for each teacher must be specified; and, finally, the faculty must be ranked to indicate the individual teacher priority for having his preferences observed in making room assignments. The net effect is that teachers with high priority will have their preferences honored, whereas those with low priority may not do so well.

9. UDL/UDCL, "UpDate Lists/UpDate Class Lists."
As a consequence of the changes in student schedules that result from execution of the SAP program, the class lists prepared by SSP become obsolete. The UDCL section of the UDL program performs a sorting job that prepares new class lists based on the existing schedules of students.

10. TRANSLATE. The TRANSLATE program provides for decoding class lists and teacher, room, and student schedules and printing them in a form that is directly usable by the school. In the process of preparing a student's schedule, it makes lunch-period assignments for the individual student. It also prepares a master schedule for the school. For each section offered, there is a line in the master schedule that identifies the course, the phase, the section, the teacher, the room, the meeting times, and the number of students enrolled.

There are 9 more programs in the SSSS. Most of these are used primarily for diagnostic purposes and will not be discussed. The SHUFFLE program allows the user to specify the order in which courses will be processed for scheduling.

SCHEDULE CONSTRUCTION USING THE SSSS

Each school that has been scheduled by SSSS has been assigned a consultant from the Stanford School of Education. In this project members of the staff functioned as schedule consultants. The consultant performs important functions: explaining to the educator the technical requirements of SSSS; helping the educator formulate course structures that will achieve desired educational objectives; and working out compromises that are necessary to achieve an acceptable schedule.

We found from experience that schedule construction using the SSSS usually fits into four phases, which can be described briefly as follows:

1. Data Preparation. The SSSS consultant played the very important role of explaining to the faculty of the school the capabilities of SSSS. Typically, he helped the teacher design course structures directed toward the achievement of the teacher's particular educational objectives. He guided the school in the collection of data and the preparation of the SSSS forms.

When the data were submitted to the SSSS project on punched cards, they were processed by the INCA program. The huge amount of data needed to describe a school's requirements inevitably contained some errors or logical inconsistencies. When necessary, the consultant assisted the school in defining corrections that eliminated the errors and inconsistencies found by the INCA program. The corrections were submitted for processing by INCA. If errors or inconsistencies recurred, further corrections were made and processed by INCA. When the errors were all eliminated, computation of a schedule was initiated.

2. Preparation and analysis of the schedule. Phase 2 typically used the SSP, PTWS, and the TRANSLATE components of SSSS. A schedule of classes was generated by SSP. Teacher, room, and student schedules were prepared by PTWS. The master schedule and the teacher and room schedules were prepared by TRANSLATE.

These data, together with summary statistics, were analyzed by the SSSS consultant and the school's faculty. The summary statistics included the fraction of total course requests satisfied, the number of students with incomplete schedules, and the number of unscheduled sections. In some cases the first schedule generated proved to be highly satisfactory to the faculty and satisfied over 99 percent of the total course requests. In many cases, particularly when the school was experimenting with new course structures, the first schedule was not satisfactory.

When a school decided that a schedule was not acceptable, it was necessary for the school faculty to state its objections specifically; then the SSSS consultant would try to suggest ways that the school's specifications could be revised to improve schedulability without seriously compromising the teacher's educational objectives. A revision in basic data would necessitate processing of the revisions by the INCA program; therefore, Phase 1 of the schedule construction had to be re-entered. Phases 1 and 2 were repeated until an acceptable schedule was obtained.

3. Modifications to an accepted schedule. This phase typically used the UDAMC, SAP, RAP, UDL, and TRANSLATE programs. Some schools elected to eliminate RAP, make room assignments manually, and introduce them to SSSS via the UDAMC program.

At the end of this phase, a school typically requested a master schedule, a complete set of class lists, and complete sets of teachers, room, and student schedules. A school that anticipated an appreciable change in the composition of its student body because of withdrawals or new registration might wait until Phase 4 was completed before requiring class lists and student schedules.

4. Changes in course requests. This phase used the UDCREQ, SAP, UDL, and TRANSLATE programs, and it was executed on or about the opening day of school to provide for the changes in the students' course requests that accumulated since the completion of Phase 3.

The UDCREQ program updated the SSSS records to reflect the specified changes in students' programs. Each student whose program was changed became a status 1 student. The SAP program scheduled the status 1 students into sections of the requested courses. The UDL program was used to update the class lists. The TRANSLATE program prepared the class lists and student schedules that were required by the school.

SSSS emphasizes throughout the priority of educational decisions over computer decisions. Wherever possible, choices of optimum fulfillment of pupil requests fall to the professional personnel rather than to the impersonal machinery of computer programs and the computer itself.

Again, SSSS serves three different functions. First, it is an enabling technology. Second, it requires precise definition of the design of each course offered [illegible] the school program, as well as the overall program design [illegible], it encourages professional personnel to explore in det[illegible] [illegible] propriateness of different arrangements of time, cla[illegible] pupil grouping, and use of staff and facilities. Experi[illegible] with SSSS prompts the school staff to raise their sights about viable alternatives and to request expansion in variability of curriculums and courses.

PROJECT SETTING AND POPULATION

The variety of schools included in the project fell into the four categories mentioned earlier. The first consisted of schools which have pioneered programs of course revision through the use of SSSS as an aid in the generation of conventional schedules. The second group consisted of specialized vocational and comprehensive schools where professional personnel had signified an intent to remain with conventional scheduling patterns but had indicated an interest in employing computer technology to generate their schedules. The third group consisted of schools that wished to introduce more flexibility in their educational programs but needed the assistance of the SSSS enabling technology and the SSSS consultants. The fourth group consisted of two schools which indicated a willingness to undertake drastic and extended course reconstruction, pupil grouping, and staff utilization based on the proposals advanced by Bush and Allen. (1)

Selection of schools involved the following criteria:

1. Balance of rural, suburban, and urban schools, with special emphasis on schools in which the student population pursues or required extensive and intensive vocational education;
2. Variety in school type -- comprehensive and specialized vocational schools;
3. Variety in grade organization -- junior high schools, junior-senior high schools, senior high schools, post-grade 12 technical and vocational schools;
4. Variety in enrollment -- from 100 to over 3,500 pupils.

During the first year of the project it became evident that the majority of the project's comprehensive secondary schools possessed only a modicum of vocational programs within their total curriculum. The minimal occupational programs that were available in most schools were frequently on the periphery of the total curriculum and were poorly articulated, if at all, with the overall educational program.

Since these deficiencies were present in the eight project comprehensive schools, the consensus of the project staff and the advisory committee was to identify and to add comprehensive high schools with strong vocational programs. Through suggestions from members of the Advisory Committee and recommendations from several State Directors of Vocational Education, nine schools were contacted by telephone and the possibility of their joining the project was discussed. All of these schools evidenced a willingness to have the project coordinator visit their school and to further explain project objectives.

From these nine schools, six were selected to be visited by the project coordinator. These schools seemed to possess curriculums that most nearly matched the qualifications established by the advisory committee. As a result of these on-site visits, each of the six schools agreed to participate in the project. It is rather dramatic evidence of the extent of dissatisfaction with present educational limitations throughout the entire instructional program that the staffs of these schools agreed to consider the radical changes advocated by the project. It is also significant that they were willing to make a decision on the basis of the limited information gained from the telephone conversation and the personal contact.

Three of the six schools maintained their project association. These schools are: North Miami High School, Miami, Florida; South High School, Omaha, Nebraska, and Alliance High School, Alliance, Nebraska. The other three schools, which will be referred to here as schools X, Y, and Z, at various stages terminated their relationship with the project.

School X, located in a midwestern industrial center, withdrew shortly after the on-site visit when their superintendent's ill health caused him to resign in mid-year. They felt they would be unwise to assume a new project without continuing district leadership.

School Y, located on the eastern seaboard, sent an administrator to attend a conference of project schools at Stanford University. Subsequently, the school conducted a poll of the staff. Approximately one-third of the teachers voted to maintain the status quo and so the school withdrew. However, since two-thirds of the faculty agreed to further explore the benefits of flexible scheduling, it would appear that the administration in this school was unwilling to undertake any risk the project might involve.

School Z, located in the midwest, was with the project for almost a year. The staff redesigned the structure of their courses and analyzed their instructional practices. Several vocational teachers, under the supervision of the district vocational director, switched the criterion of their courses from time to performance and designed performance criteria to enable students to adapt the instruction to their individual learning style. However, when it came time to assume the flexible schedule, a series of confrontations between the principal and the staff resulted in the faculty voting not to go on the new program as long as the principal remained at the school. With this internal stalemate, it was mutually agreed by the district and the project staff that the chances for a successful implementation of the new program would be drastically curtailed. Therefore, project affiliation with School Z was also terminated.

The staffs of School Z, North Miami, Omaha South, and Alliance had only a minimal amount of knowledge concerning flexible scheduling, performance criteria, and the related issues prior to joining the project. Ideally, a project staff member should have been assigned full-time to each school for at least a half-year. However, conditions were such that it was impossible to provide these resources on such a scale. As a result, only limited intervention was made with these faculties. Therefore, the process of change was not as rapid nor was the extent of change as great as it might have been. Still, the impetus for change imposed by generating a master schedule produced drastic and widespread revisions in existing educational practices even in these schools.

As a result of obtaining their cooperation and working with these additional schools, we became aware that there is a significant difference in effecting change between schools that ask themselves to participate in innovation and those that the project had to ask. Schools that are ready to change and seek alternatives to ongoing practices seem much more amenable to suggestion. Schools that are sought out and are persuaded to institute change appear to be more defensive of existing practices and resistant to changes suggested from outside.

PROJECT STAFF CONSULTING ACTIVITY

The procedures followed in working with the several project schools shared certain aspects in common but also included certain specific differences. In all schools consultants assisted at three strategic points: first, with decisions concerning the design of courses which the school would offer; second, in recording input data according to SSSS specifications on the SSSS coordinated forms; third, with analysis of input data, the master schedule, course lists, pupil lists, teacher lists, and room lists. These stages did not consist of one-time consultations but merged together in a continuous flow of working relationships as school and SSSS personnel made decisions regarding course designs, reduced specifications to writing, examined the schedules which the computer generated for them, and received feedback from the schools.

The use of SSSS requires that every course in a school be specifically identified as to size, length of meeting time, number of meetings per week, and type of instructional setting (large-group, small-group, etc.). Each and every course can be designed to accommodate the purposes sought by the professional personnel of the school. The consultants helped the faculty to focus not only on what is known by the faculty to be feasible but also on alternatives which the faculty might not have considered.

The preparation of input data is an intricate process, but it is basically a clerical operation. The function of the SSSS consultant here was to acquaint the users with the forms and procedures,and to stress the importance of accuracy and avoidance of logical error in reducing decisions on course design to appropriate data processing messages.

Analysis of the resulting schedule data was extremely critical. The computer system produced class lists; teacher, room, and students' schedules; and a master schedule. It also signaled explicitly the individuals for whom all course requests had not been filled. The proportion of fulfilled requests is an index of scheduling effectiveness. When it was unsatisfactory, improvement in the index of effectiveness required consultation between SSSS personnel and school users to determine what modifications in the original course specifications could be made to reduce the proportion of unfulfilled requests.

The singular difference in the process of working with some schools over that of working with others related to the source of course specification. In some instances the local school staff prepared its own specifications with the assistance and guidance of SSSS consultants. In others, specifications were derived from adapting the Bush and Allen proposals for a new design. The relevance of the Bush and Allen proposals to vocational education is two-fold. For the pupil enrolled in the vocational curriculums, the design reserves time in his schedule for continuous study in a broadened area of general education and in guidance. For the pupil enrolled in non-vocational courses, the design reserves time for continuous study in the fine and practical arts which encompass opportunities in pre-vocational and vocationally oriented course work and in guidance.

ADVISORY COMMITTEE ACTIVITY

It is already an established and necessary custom to include an industrial advisory committee in the planning and implementation of vocational education programs. Among other functions, advisory committees assist educators with evaluation, establishing standards, and equipping vocational education facilities. This project used advisory committees at two levels: to advise the university staff and to assist in establishing courses in the individual project schools. The following paragraphs explain some of the particular benefits of the advisory committees and give suggestions on how committees might be used more effectively.

An advisory committee composed of prominent vocational educators was formed to assist the university staff. This committee was useful in informing the staff of the past and present state of vocational education in this country. The committee also provided contacts that led to the involvement of individual secondary schools in the project. It is felt that the effectiveness of the advisory committee would have been increased if members had been kept better informed of the unique goals of this project. Contributions of members, in some cases, were limited because they did not have a complete understanding of the concepts and changes proposed. It would have been beneficial had such information been made available to prospective members before they decided to serve on the committee, and thereby have permitted them to determine the individual contributions they might make.

As the project progressed, the emphasis on information needed from an outside advisory committee turned from vocational education to performance criteria. Here a different type of advisor was needed, one familiar with the psychological and educational dimensions of behavioral terminology. It would have been advantageous, at this point, to create another advisory committee made up of experts who could help develop performance criteria.

Advisory committees are formed for specific purposes. The members should be able to address themselves to those purposes. If, however, divergent and numerous tasks are set up for a group, it becomes necessary to select members with widely different backgrounds. This situation has ~~the~~ potential of causing disagreement among members to the detriment of the committee's goals. It is better to form separate committees rather than make one group take on divergent tasks. If the tasks for a committee are carefully outlined, it becomes possible to determine when their job is complete. The committee can then be disbanded if it is no longer useful.

In the individual project schools, vocational education teachers were required to establish advisory committees before setting up new programs. In this regard, a notable function of the local committee was to determine if proposed programs were feasible and if students completing the program could find employment. One school, through close cooperation with its advisory committee, enabled graduates of its vocational program to enter apprenticeships at an advanced stage with credit given for high school work.

The advisory committees at the local school level are made up of representatives of employers, unions, and the school. Such a committee functions most effectively if set up to stay together for an extended period of time. Committees were most commonly set up according to occupational area; this rather narrow focus enables the committee to function continuously as programs are planned, implemented and changed, and students placed in jobs.

In conclusion, since this project was set up to investigate vocational education and then apply innovations to existing programs, the services of two different groups -- people familiar with vocational education and others familiar with innovative educational techniques -- might have more effectively handled project advisory committee functions. At the individual school level, on the other hand, a single advisory committee formed to carry out the tasks particular to a certain job classification in the school and surrounding community is perhaps the most effective.

CONFERENCE ACTIVITY

During the course of the project, several conferences brought together the project and advisory committee members, staff members of the project schools, and resource persons with expertise in the field of general and vocational education. Two of these conferences were devoted to the development of performance criteria within the modular scheduling framework. The first was designed to acquaint teachers in the schools with the concept and objectives of performance criteria. At the second conference, teachers who had spent a year using performance packages reported on their experiences and observations. They discussed problems they had encountered as well as their successes. Materials produced by teachers were subjected to criticism and review.

The first of the two "General Education Conferences" was held at Marshall High School in Portland, Oregon, in February of 1967, and was devoted to a study of modes of articulation between vocational education and the language arts. The second, held at Golden High School in Denver, Colorado, in April of 1967, reviewed similar problems relating to the social sciences.

We had hoped that the conferences would result in much closer cooperation in planning for courses appropriate for students in vocational education courses. Unfortunately, we grossly underestimated the problem. The conferences revealed a profound lack of communication between individuals in both curricular areas. Participants seemed unable to confront their problems in other than their own context and frame of reference. Representatives of vocational education elaborated the problems faced by vocational educators, but seemed to lack perception of practical ways in which the language arts and social science instructors could help them. English teachers wanted to discuss issues such as the importance of literature for terminal students, while vocational educators wanted to discuss programs they had found successful in vocational areas; neither faction could make the issue one of defining and trying to implement programs in skills of communication appropriate for such students.

We regarded the performance criteria conferences as highly successful, but the general education courses were deemed failures. While the objectives of exploring and attempting to improve the relationship between general and vocational education remain as important as ever, our efforts at doing so through interdisciplinary conferences proved futile. Each discipline was far too concerned with its own structure and traditions, and had formed an almost impenetrable orthodoxy. The problem is as large as ever, but our efforts to penetrate the empires created within the disciplines were unsuccessful.

DATA EVALUATION

To determine whether the objectives stated for the project were being accomplished as a result of implementation of modular scheduling, instruments were developed to collect base line data on activities within participating schools. Instruments were designed primarily to provide data which could be compared on a "before" and "after" modular scheduling basis in each participating school.

The initial instruments designed for this purpose were duplicated and field-tested in September of 1965 at three project schools. Results were critically analyzed and instruments were then modified and improved. Two research specialists from the Stanford Center for Research and Development in Teaching were consulted for independent evaluation of the forms, and their critiques were instrumental in formulation of plans for data collection and evaluation. Instruments used included the following:

Designation	Instrument Title
A1	School Specifications
A2	Course Data
B1	Independent Study Interview Guide
B1a	Student Use of Independent Study Facilities
B2	School Library Interview Guide
B3	Attendance Data
B4	Student Control
C1	Teacher-Student Conference Profile
C2	Administrator/Counselor Student Conference Profile
D1	Faculty Profile Questionnaire
E1	Task/Time Administrator Interview
E2	Scheduling Questionnaire
Q1	Student and Teacher Questionnaire
Q2	Student and Teacher Questionnaire
(unnumbered)	Student Survey Interview Guide
(unnumbered)	Performance Criteria

Copies of the foregoing data collection instruments are included in Appendixes G through L.

The data collection instruments were reviewed a second time after obtaining reactions from school personnel at five project and two non-project schools. After approval by the Office of Education, the instruments and data collection procedures were explained to staff members of project schools by consultants.

It became apparent at the conclusion of the second year that many important comparisons could not be made unless data collection continued through the end of the third year of the project. Therefore, a request was submitted to the Office of Education to extend the project for three additional months (through September 30, 1968) for completion of the evaluation and preparation of the final report. Formal approval of this request was obtained in February of 1968, but uncertainty of funding by Congress hampered efforts to plan the final procedures for evaluation. As a result, collection and processing of data proceeded at a rate consistent with the assured funding. Incremental funding was finally assured in June, but insufficient time then remained for complete processing and evaluation of all data that had been collected. As a result of priorities used in coding and keypunching of data from February through June, information obtained from some schools on some forms is not included. "Before" and "after" comparisons for all areas have been included, however, and for some instruments complete data from all schools is reported.

The evaluation results in the appendices are coded for consistency to permit readers to follow particular schools through all reported phases of the evaluation. School "A", for example, represents the same school wherever it is mentioned. Identifying codes are not furnished, however, as a matter of policy.

Section 4

PERFORMANCE ORIENTED CURRICULA

Contents

PERFORMANCE ORIENTED CURRICULA

BACKGROUND

During the first year of the project the problem of building curriculum elements based upon performance rather than time criteria became both apparent and critical. The opportunity for obtaining flexibility in the school schedule inevitably introduced the question -- as it so often has in the past -- "Flexibility for What?" Simply considering the possibility of changing traditional student meeting period and grouping patterns, with or without the assistance of computer scheduling, made the instructional objectives and the criteria for evaluating them an issue. The tradition of time-oriented instruction, once tested against the need for the performance achievement orientation demanded by even preliminary movement toward individualizing instruction, was patently inadequate.

The development and implementation of performance criteria began at the start of the second year of the project. At that time, project staff began visiting the vocational departments of the project schools to enlist the help of individual teachers who expressed an interest in developing and implementing performance criteria within their individual subject areas. It soon became apparent that the background information and education relative to the development and implementation of performance oriented courses had not been provided to the individual schools. As a first step in rectifying this situation, a conference was held November 25-26, 1966. The conference focused upon the role of the vocational teacher in identifying and developing performance criteria with which individual student progress could be measured and to which individualized instruction could be keyed.

The administrators in each project school were asked to suggest the names of vocational teachers who could best profit from attending the conference and who would serve as effective catalysts in follow-up activities within their vocational education departments. From these lists the conference planners selected two teachers from each school who demonstrated outstanding ability and an openness to innovation. Collectively, the teachers selected from the project schools represented a broad spectrum of vocational areas. Each of these teachers expressed the degree of professional commitment required to engage in developing a performance curriculum.

The initial performance criteria conference was also attended by representatives from state departments of education from several states, by members of the project Advisory Committee, and by leaders in the vocational education and curriculum development fields acting as advisors and resource persons. Among the latter were included:

Dwight W. Allen, Principal Project Investigator and Associate Professor at Stanford University.

Philip Kapfer, Director of Research at Valley High School, Las Vegas, Nevada, and Research Coordinator for the Kettering Foundation's I.D.E.A. Project.

Lorry Sedgewick, Coordinator for American Industries Project and Associate Professor of Education at Stout State University.

Melvin L. Barlow, Professor of Education and Director of the Division of Vocational Education at the University of California in Los Angeles.

Thorwald Esbensen, Assistant Superintendent of the Duluth Public Schools.

Robert Mager, Director of Learning Methods and Materials, Project PLAN, American Institute for Research.

The conference goals were threefold: (1) to emphasize the need in vocational education for criteria to evaluate student achievement by performance of specified observable tasks rather than by the prevailing criterion of time; (2) to identify the component elements of criteria for measuring achievement and establish a common frame of reference; and (3) to develop procedures that attending teachers might begin to apply in producing performance oriented instructional materials.

At the conclusion of this conference it was established that a second Performance Criteria Conference would be held in November of the following year, 1967, to review and discuss initial attempts at applying performance objectives and evaluating criteria applied in curriculum building.

Following the November 1966 conference and the guidelines established in the course of it, individual teachers from schools participating in this project began to write performance criteria. Attempts were made to arrive at criteria which would measure achievement over a wide range of individual student differences, and teachers were encouraged to establish their own procedural and curricular format in carrying out this task. This approach encouraged a variety of responses to the problem of developing these criteria. Individual teachers in the project schools were given financial assistance to develop performance curricula during the 1966-67 school year and summer 1967 so that these could be implemented and evaluated during the third and final year of the project. Members of the project staff at Stanford periodically visited the schools to evaluate the progress being made and to assist in the development of procedures and in writing performance criteria. When specific situations called for additional consulting services, such services were extended.

PERFORMANCE CURRICULUM

The concept of a performance curriculum perhaps is best described in addresses delivered at a conference at Stanford in 1966, and in papers written by persons participating directly in the project.

It would not be appropriate or practical to reproduce examples of performance criteria packages in this report. Examples are not only quite lengthy, but also are constantly being revised and perfected. They are designed to satisfy the unique demands of the student and schools in which they have been developed and with the pre ablished intent of changing them to meet new interests and expectations of students. We are thus reproducing a speech and material from articles descriptive of the performance curriculum concept and of project activity in this area.

The article by Philip G. Kapfer appeared in the Phi Delta Kappan, and was based on an address delivered by Dr. Kapfer at Stanford. The report by Max Lane and Ray O'Dell (see Appendix A) implies the wider implications of performance curriculum development carried out in this project. The inseparability of performance oriented instructional goals and other innovational steps toward individualizing instruction are represented by Stanford's project CRAM.

"The Necessity of Educational Objectives," an address to the November, 1966, Performance Criteria Conference by Dr. Robert Mager, Director of Learning Methods and Materials, Project PLAN, American Institute for Research, and Advisory Committee Member.

"An Instructional Management Strategy for Continuous Pupil Progress," Philip G. Kapfer, Director of Research, Valley High School, Las Vegas, Nevada, and Research Coordinator for the Kettering Foundations' I. D. E. A. Project, extracts reprinted from Phi Delta Kappan, January, 1968. Copyright by Phi Delta Kappa, Inc., Bloomington, Indiana.

"Performance Criteria: Achieving the Expected" by Roger Tunks, Teacher, Marshall High School, Portland, Oregon, reprinted from School Shop, April, 1968. Copyright by School Shop, Ann Arbor, Michigan.

"Project CRAM and Performance Curriculum, A Pilot Study in First Year Algebra" by Max Lane and Ray O'Dell, teachers at Marshall High School, Portland, Oregon, (Unpublished), (see Appendix A).

THE NECESSITY OF EDUCATIONAL OBJECTIVES*

Dr. Robert Mager

The title of the topic put on the schedule had something to do with the importance of developing performance objectives. What I'd like to do is tell you a few stories aimed at making just two points. The first story happened here in Palo Alto about five years ago when I prepared a program on the reading of electrical meters.

The girls on our production line were trained for anywhere between two and five days in the art of reading complex meter faces. When the women who tested our program took the criterion examination afterwards, we found that they were able to perform at a very high level after only an hour and a half to two hours of going through the program. Now this is quite an astonishing improvement in a structural class. Here we have reduced training time from two to five days, down to an hour and a half. The examination was not a paper and pencil test. There was an actual machine that had on it four meters and range switches and gave an examination consisting of fifty items. The girls performed at approximately 85% accuracy which is equivalent to engineers, physicists, and technicians. Most experiments would have ended here with the conclusion that the program had accomplished success.

Just by chance I was doing an experiment in the room next door, at the same time, using a technique that we refer to as learner control instruction. This is a laboratory technique and I don't recommend its use in the classroom. It would probably destroy you. This is a technique whereby a single student is given complete control of a single instructor. The student turns the instructor on and off at will.

The instructor's job is to behave like a responsive mechanism and follow that student. Now if you think you know something about teaching, you just try that. The use we make of this has nothing to do with formal teaching. We use this technique to find out how to sequence the instructional material in a way that is meaningful for the student, because, when we say, "I know the subject matter," and "I know the order in which it should be taught," we are whistling in the breeze; it just isn't true. If you are interested in sequencing subject matter in a way in which the student finds it meaningful, you use a student as a tool for discovering the sequence. So, here we were doing this experiment, using the meter reading material as a vehicle.

*Speech to first Performance Criteria Conference by Dr. Robert Mager, member of the project Advisory Committee.

These women from the neighborhood would come in , one at a time, and turn me on and off. I would show them how the machine worked with a few problems, or tried to, and then they would ask me some questions. They would say, "Well, I don't understand about this," or, "Tell me about that," or "Give me an example," or, "Show me." When they were finished, they asked for the criterion test. It suddenly dawned on me one day that these women who were turning me on and off, one at a time, were taking the criterion test, and making an average of 90 to 95% on it after an average of only 20 minutes of instruction. No female took more than 50 minutes, and one of them had the nerve to turn me off after only 7 minutes! I didn't have a chance to tell her nearly everything that she needed to know in order to perform on that criteria test!

Had you been watching this process, you would have said to yourself, "This is complete chaos because people haven't been taught either by ourselves or by other teachers how to intelligently make inquiries, how to gather information, how to learn." We teach them now to behave like intelligent sponges. These women would ask questions that wouldn't seem to have any order whatsoever. In spite of that, they were performing better in one third of the time than they did when they took my other program.

What was there about the other program that was getting in the way of the students? The answer was, by the time I had gone through the excruciating efforts to develop the objectives of the program, I had the overwhelming urge to stuff the program with absolutely all of the information that I knew about meter reading and related to the achievement of these objectives. But the worst crime that I committed was that I forced each and every student through the whole day sequence. Everyone of them had to go through all of it because in typical education terms, what we do is we assume that the student knows nothing until we teach him otherwise. I submit to you that one of the best ways of improving effectiveness of instruction is to assume that the student know everything until we teach him otherwise, or until he demonstrates otherwise.

Well, just about this time, we had another opportunity to see the effect of objectives in practice. Over at Varian Corporation we had a course for new graduate engineers that lasted approximately six months. The first three months of the course was standard lecture. The second three months was an arrangement whereby each student was assigned to an expert, either an engineer or a production supervisor and would spend one to five days at each of many stations. It was as closely individualized instruction as you could get. One student had one teacher.

The man who was in charge of all of this wanted to make some improvements. We got together and we decided to try to test the power of using objectives. He developed a page and a half of statements describing what an individual must be able to do in order to be considered qualified for permanent assignment on the job.

We gave the next half dozen students this page and a half; we gave them two tours around the plant and said, "These are your facilities, this is your school. You can go to any of these individuals and ask them whatever you want." We told the instructor to sit in his office and speak when spoken to. We cancelled all of the assignments, all of the lectures, and let the students go.

The result was that the students in this experimental group were all assigned to their permanent job three months after they began, which was a time reduction of something like 50%. The program did not employ television, nor the computer; there's nothing but hard work on the part of the chief instructor, and treating the students as though they might be people.

The following year, another six students came in, and instead of a page and a half, they were handed something like 24 pages of statements describing the terminal performance that was expected. Now these objectives had one unique feature, they were written down. As a result of the second cycle and the 24 pages of objectives, the students were all assigned their permanent jobs within seven weeks, averaging six to eight weeks of time in training. Here was a 65% reduction from the original training time.

Several years ago there was a course for maintenance men who were expected to repair atomic weapons. The 32-week course, consisted of a week of mathematics, followed by 12 weeks of basic electronics theory and 21 weeks of work on the actual equipment itself. The students would graduate and would be sent out around the country and around the world to operate and maintain these instruments. The math instructors, the basic electronic people, and the acquisition, track and the computer people all complained that they needed more time to teach what they needed to teach. But they made these claims because they didn't really know what it was that the man was expected to do as a result of all of this training. When it was found out through task analysis what he was expected to do, much of this training became completely irrelevant to the job itself, and the 32-week course fell apart into something like 26 weeks and the sequencing was entirely changed.

On pre-requisite was that a man had to have normal color vision, because the electronic components are color coded. We sent any number of students all the way through the course who were completely color blind and it didn't make any difference. The wires that are color coded have the color melted off after a few months of operation, especially down on the desert, so it's just sort of one gray strip. There also was a strong conviction on the part of the faculty that it wasn't necessary to include a small block of instruction on soldering. They said a man couldn't possibly get through this course without learning how to solder except that 55% of them did. And at the end of the course, on a criterion exam, we found that only 45% of them could solder a joint of any kind. Now there is one of the reasons for knowing precisely what it is that you want in the way of performance. In the absence of this, what we tend to do as instructors is to spend more and more time teaching those things which are difficult to teach, which sounds reasonable, except that many of those things which are difficult to teach are terribly unimportant to teach. And, on the other end of that spectrum, there are some things which are terribly simple to teach and which may take only a few seconds to teach but which are critical skills that the student must have in order to perform at all.

I'll give you an example from the same course. One of the things that we ask the students to do on the performance test was to locate certain items in the radar van itself; there is an old saying in the electronics business, "You can't fix it if you can't find it." We wanted to watch him adjust a particular gadget that consumes a cubic yard of space in the radar van and we gave them ten minutes time limit. More than 40% of them couldn't find it in ten minutes after 32 weeks of instruction. This wasn't identified and written down as a critical and necessary skill, that a man must be able to actually go and put his finger on something, because it is just too simple and beneath our dignity to teach in a classroom. This is something that may have taken up to two minutes a day or maybe three minutes a week to teach, but very critical; this is one of the reasons why performance objectives are useful in improving the effectiveness and the efficiency of our instruction.

Back to the meter reading experiment. I told you that the girls who completed the program performed about 80% of the criteria and the girls who were turning me on and off performed about 90% of the criteria, but I didn't tell you how the girls on the production line with months of experience were performing. They were performing at 40% proficiency after months or years of experience at reading meters at the end of the production line. Why was their performance at 40%? Simply because experience is no teacher. Experience is not a teacher unless there is feedback regarding the quality of the response. Unless a man finds out right now about the quality of the responses he just made, experience is no reason for him to change his performance.

We built up a series of samples with actual pieces of steel for which we knew the smoothness and we got 32 experts to make judgments about whether or not each sample was a 63 or smoother. Again, we had a control group; women off the street who knew nothing at all about surface smoothness. We gave them the criteria examination and showed them one sample of 63 and said, "Judge all of these others," and their performance was exactly the same as that of the 32 experts to the decimal. In other words, experts are not always.

Paper grading is something that tends to get handed down from generation to generation like glass blowing. About four years ago, an English company discovered that the family doing their paper grading was dying out, so they commissioned a group of industrial consultants who happened to be quite skilled in modern technology to develop a test with which they could locate and select another family that had the same skills potentially. After performing a task analysis they were most astonished at what they discovered; back in their office they prepared a small case of paper programmed instruction with which they went out in the street and were able to teach this skill of paper grading, in an hour and a half, to the average individual walking down the boulevard. Their only mistake was that they took this to the client and said, "Look at this marvelous thing that we have done, you don't have to worry about selecting another family because we can train just about anybody to do this in an hour and a half, at the most, two hours." The management said, "Don't bother us with that, we have already made up our minds. We want you to go out and develop a test with which we can select another family." They're not about to change on the basis of information such as this. How about you?

A fellow at the University of Tennessee, Homer Milton, heads up the Psychology Department. He takes two groups of students. One of them is given his ordinary course; he is the instructor, they go through the course, take all of the lectures, come in for all the examinations, and they are given all of the assignments. The other group gets all the assignments, and they come in for all of the examinations, but they're not allowed to attend class for that semester. There's never any difference in the performance of the groups. Homer Milton says the students that didn't come to class performed just as well as those who did, but you could look at that from the other end of the pipe; the instructor added nothing significant to the performance of the student.

Students are better than we give them credit for, and experts sometimes aren't quite as good as we give them credit for. One of the ways of making big improvements in instruction is to get out of the way of the student. We have to organize to get out of the way of the student by specifying what we want in the way of terminal performance from the student. We generate instant criteria tests, performance tests, by which we can find out whether we have been successful in causing the student to perform in the way that we want him to perform. Our third tool is that of individualized instruction.

We can improve instruction if we want to, but the reason we don't find ourselves too successful, is that there are some principles involved having to do with how people act, react and behave. If you want to do a good job of behavioral engineering, you simply have to know what some of these are.

AN INSTRUCTIONAL MANAGEMENT STRATEGY *

Philip G. Kapfer

An instructional management strategy developed at Valley High School, Las Vegas, Nevada, is potentially effective for any school whose staff is attempting to individualize instruction, regardless of the type of schedule being used. To be genuinely effective in the school for which it was designed, however, the strategy was developed within the context of the four phases of instruction which have been advocated by innovators such as Bush, Allen, and Trump. These phases include large-group instruction, small-group instruction, laboratory instruction, and independent study.

Educators should cease to be concerned primarily with the technical problems of team teaching and flexible scheduling. Rather, they should get to the heart of the matter - the opportunities to individualize instruction provided by these innovations.

Assumptions

If a strategy for individualizing instruction is to be effective, it should begin with the currently existing program as perceived by teachers and pupils. In devising the strategy used at Valley High School, several assumptions were made concerning the perceptions of teachers and pupils, and concerning the schedule.

The first assumption, that the pupil's responsibility is to learn and the teacher's responsibility is to make available to the pupil that which is to be learned, places responsibility for the teaching-learning process where it belongs. The teacher does not cover a course, but rather uncovers it; he does not need to cover - or talk about - everything that is to be learned by the pupil.

A second assumption concerns the individuality of the pupil. The subject matter of a course must be appropriate to the learner with reference to 1) the pace of instruction, 2) the level of difficulty of the instructional material, 3) the relevance of the instructional material to reality as perceived by the pupil, 4) the pupil's level of interest, and 5) the individual learning style of the pupil.

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*Extracted from an article written for the January 1968 issue of Phi Delta Kappan. Mr. Kapfer was curriculum and research director, Valley High School, Las Vegas, Nevada. Copyright information on page 4.5 of this report.

Both the common and the individualized experiences of the pupil result from a third assumption which is related to the schedule: The size of a group, the composition of a group, and the time allotted to a group should be appropriate to the purposes of the group. The common experiences which every pupil in a given course should have are primarily a function of large-group instruction. Pupil-centered discussion of large-group presentations may occur in scheduled small-group instruction. Individualized, self-paced, quantity- and quality-monitored learning (that is, the use of learning packages with built-in self-correcting mechanisms) may occur in the laboratory phase of the course. In addition, the laboratory phase should include opportunities for student interaction and should provide directly for the independent study phase of the individualized instructional program.

A fourth assumption of the instructional management strategy is that before truly individualized instruction can become a reality, learning packages are needed which will provide for self-paced rather than group-paced instruction.

<u>The Strategy</u>

The instructional management strategy is based on, but does not adhere strictly to, the principles of Program Evaluation and Review Techniques (PERT). In a PERT network diagram, an activity is a time-consuming element of a project which is represented on a network as a line between two events.

An event is a specific, definable accomplishment in the project plan, which is recognizable as a particular point in time when activities start and/or finish. An activity cannot be started until the event preceding it has been accomplished. A succeeding event cannot be accomplished until all activities preceding it are complete.[1]

The strategy is presented as a network diagram in Figure 1, p. 262. The network is designed to show a sequence in which the pupil will attain an adequate background so that he is able to perceive problems and ask questions. The result of his questioning will be internal generation of a problematic confrontation. Through study and

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[1] <u>PERT Time Fundamentals</u>, Las Vegas, Nevada: Edgerton, Germeshausen & Grier, Inc., undated, p. 3.

research the pupil will achieve resolution of the problem which he chose for investigation. Thus the sequence in the network is from achievement of background to problem confrontation to problem resolution.

Recycling, for some pupils and for some instructional objectives, may occur at various stages as indicated by arrows in the network. Thus, although the instructional management strategy may be thought of as a design for concept attainment through discovery or problem solving, it is not restricted to this interpretation. In the discovery interpretation of the strategy, the pupil might not be given a statement of the concept under study; rather, he would discover it for himself. In the presentation interpretation, a statement of the concept may be given to the pupil at the beginning of the learning package. In either case, the activities and events following Event 3 (see Figure 1) represent an inquiry approach. The activities surrounding Events 4 and 5, those involving minor and major quest, give the pupil the opportunity to become a researcher, and in the process of resolving problems the pupil learns information-seeking techniques. When the decision is made to proceed to a sequential learning package, options similar to those just outlined are available to the pupil.

Preparing Learning Packages

Learning packages usually include the following eight ingredients for individualizing instruction:

1. Concepts are abstractions which organize the world of objects, events, processes, structures, or qualities into a smaller number of categories.

2. Instructional objectives tell the pupil what he will have to be able to do when he is evaluated, the important conditions under which he will have to perform, and the lower limit or quality of performance expected of him.[2]

3. Multi-dimensional learning materials of varying difficulty are cited from commercial sources, whenever possible, and include a variety of media which require use of as many different senses as possible.

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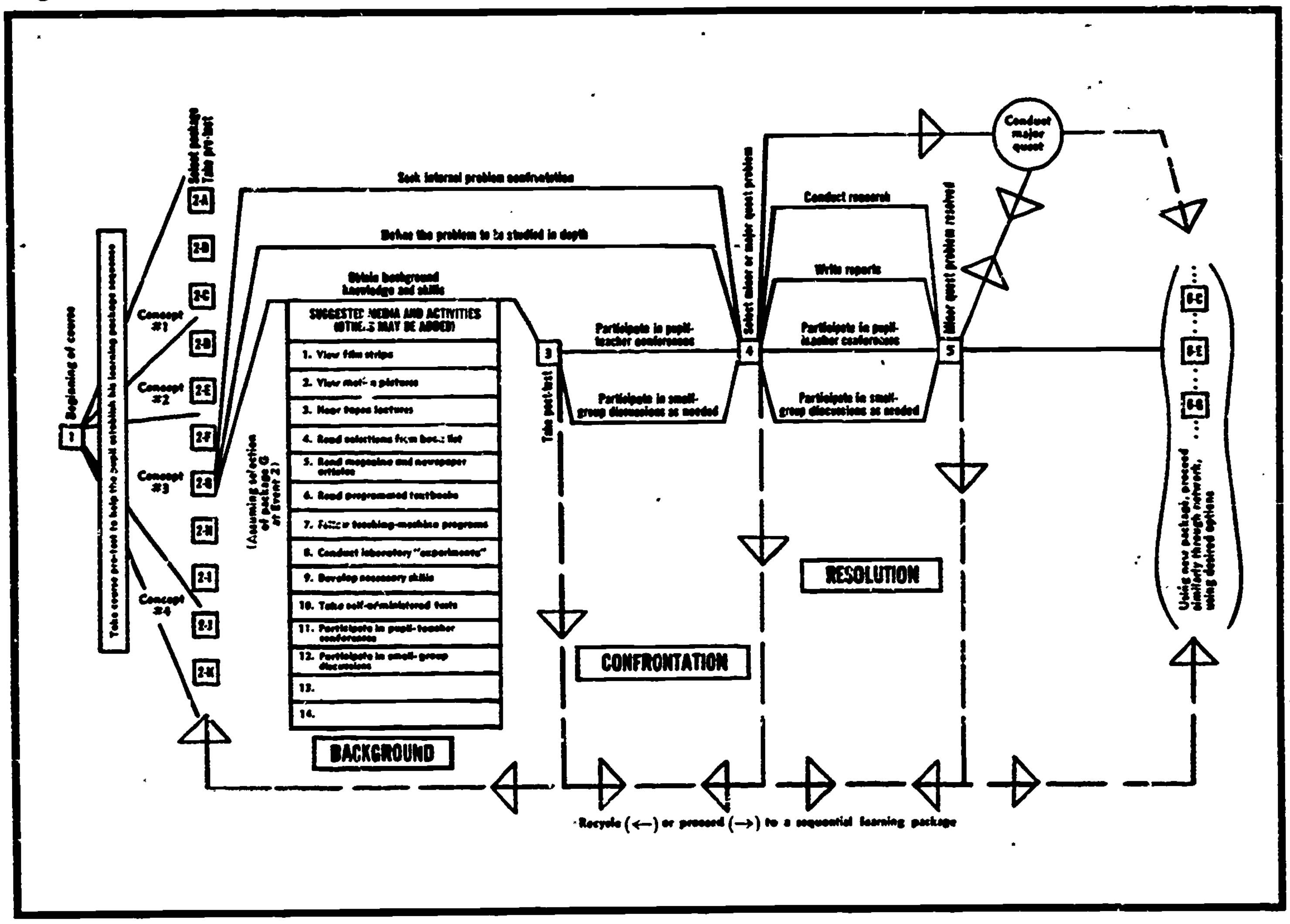
[2]Robert F. Mager, Preparing Instructional Objectives. Palo Alto, California: Fearon Publishers, 1962, p. 52.

Fig. 1. The Instructional Management Strategy Network Diagram for Self-Paced Learning



4. Diversified learning activities provide alternative approaches for achieving the instructional objectives, and include such activities as large group and small group instruction, field trips, model building, drama productions, games, laboratory experiments, role playing, pupil-teacher conferences, reflective thinking, and the like.

5. Pre-evaluation is designed to assess the extent to which the pupil has already achieved the instructional objectives as a result of his earlier learning experiences. Pre-evaluation enables the pupil to invest his time wisely in areas in which he is weak.

6. Self-evaluation is designed to assist the pupil in determining his own progress toward achieving the instructional objectives. Self-evaluation, the results of which indicate the pupil's readiness for post-evaluation, occurs after the pupil has used the multi-dimensional learning materials and participated in diversified learning activities.

7. Post-evaluation is designed to assess the extent to which the pupil has achieved the instructional objectives as a result of his learning experiences.

8. Quest includes problem confrontation, delimitation, research, and resolution. Quest is a pupil-initiated and self-directed learning activity.

Integration of the above eight curricular elements in the form of learning packages can serve as an important advancement in providing for self-paced learning through individualized instruction.

<u>Evaluating Instructional Packages</u>

The following list of questions is proposed as a <u>partial guide</u> for evaluating instructional packages.

Learning Process

1. Do the learning activities provide for a steady, cumulative sequence of successful behavior?

2. Is reward (reinforcement) provided almost immediately after the desired behavior, and is provision made so that the reward is clearly connected with that behavior in the mind of the learner?

Motivation

1. Are opportunities for fresh, novel, stimulating experiences provided through variation in the senses which are used and in the media or materials which are used?

2. Are intrinsic rewards emphasized through such devices as pupil self-evaluation procedures?

3. Are the learning activities designed so that they fall within the range of challenge where success seems quite possible to the pupil, but not certain?

4. Are mechanisms provided so that the pupil can learn to set his own goals so as to bring maximum satisfaction and learning?

Evaluation

1. Is the concept to be taught stated specifically enough so that its understanding will result in measurable outcomes in pupil behavior?

2. Are behavioral goals -- what the learner must do and under what circumstances-- stated (a) at the learner's level of understanding and possible attainment, (b) in terms of behavior outcomes, and (c) with sufficient variation to allow for the diversity of the learner's capabilities?

3. Is there a discrepancy between the real objectives of the course and the tests used to measure achievement, thus causing the latter to become the main influence upon choice of subject matter and method?

PERFORMANCE CRITERIA: ACHIEVING THE EXPECTED*

Roger Tunks

For years teachers have taught under the "illusion" that in order for learning to take place they are obligated to impart large quantities of information to heterogeneous groups of youngsters. Knowledge is presented, the child performs, and evaluation takes place. One fallacy is evident in this technique. At some point, the assumption is made that all the youngsters in the classroom are ready for the information being presented. While some students may be ready to learn, it is likely that others are bored and uninterested. Perhaps they don't have the background, or they already know the material being presented, or their interests may be directed in other areas. The point is that a curriculum is needed that will recognize the differences in a youngster's ability, knowledge, and interests.

Before describing individualized instruction, it may be in order to describe what it is not. It is not a pattern of learning where a student is shut away in a study cubicle to pursue knowledge in sterile isolation from classmates. It is not a plan allowing students to aimlessly wander about and learn what and when they please. It is not a track system with ability groups as commonly understood. It is not a textbook-oriented program which dehumanizes learning.

PERFORMANCE CURRICULUM

Performance curriculum oncontinuous progress, is a student-centered model which recognizes the individual's needs and facilitates the teaching-learning process. Emphasis is placed on what is to be learned, how to learn, and when the acceptable level of performance is achieved. Opportunities are provided for the student to proceed at his own rate, commensurate with ability, interest, and motivation. Advancement through the curriculum is based on achievement at a given level of performance. Time in a class no longer becomes a standard for promotion. If a student is asked, "How well can you operate an engine lathe?" the answer is no longer, "I've had two years of shop," but is now, "I can cut threads, knurl, spindle, turn, face, etc." Time spent in class is less important, with performance and the application of knowledge the centerpoint.

An article written by Roger Tunks for publication in the April, 1968, issue of School Shop. Mr. Tunks is a teacher at Marshall High School, Portland, Oregon, and the experience he describes here typifies the contribution made by teachers in project schools to performance curriculum development. Copyright information on page 4.5 of this report.

INSTRUCTIONAL PACKAGE

The heart of performance curriculum is a series of instructional packages which provide the student with the teaching-learning materials for a given concept. The length of a package may be one to ten pages depending on the concept to be learned. A course may be 20 packages or 100 depending on its length and depth. A given coursemay have varying numbers of packages, depending on knowledge, skill and background of the students. For one student it may be 30 packages and for another it may be 35.

At the beginning of a course, it is necessary to evaluate the knowledge and skill of each student to determine the instructional program for him. The concepts in which a student exhibits mastery would be omitted and the unknowns would become the area for concentration of learning. It is pointless for students to spend time studying material they already know or material that is beyond their comprehension.

An instructional package contains the following items:

1. Concept to be learned. For the student's use, this is a short, concise statement. It may even be the title of the package.

2. Performance Objective. This is usually divided into two categories: (a) items to know and apply, (b) skill development. It is important that these be written as behavioral objectives as described later.

3. How to learn. It must be recognized that youngsters learn in different ways and at varying rates. What may be an easy method for learning for one youngster may be difficult to another. Because of this the learning opportunities should be as diversified as possible for each behavioral objective.

The following is a list of some possible learning activities:

a. Audio tapes
b. Flip charts
c. Film loops
d. Slides
e. Charts
f. Bulletin boards
g. Experiments
h. Construction activities
i. Exercises
j. Records
k. Reference materials
l. Texts
m. Small group discussions

4. Sample test question or self-test. To avoid the game of testing, it is only fair to the students to give them an opportunity to assess their own progress. A self-test may be taken and scored by the students. In taking this test a student is only competing against himself to determine his strengths and weaknesses in a given package. When a youngster feels confident in his preparedness in meeting the demands of the objectives, a post-test can be administered by the teacher or someone teacher directed.

If the student can perform and pass the test at the acceptable level of performance, he is advanced to the next package. If an acceptable score is not achieved, the areas for concentration are outlined for further study. It is important that the teacher not discourage the student by telling him to review the entire package, but rather only those objectives where a higher level of performance is needed. Again, why should the student restudy the items he already knows?

BEHAVIORAL OBJECTIVE

The most important part of every instructional package is the behavioral objective. Unless it is specified under what conditions and to what extent a given performance is expected, the student is still playing the game of "What does the instructor want me to learn?" Every performance objective should say three things: It should tell the student what he is expected to do; indicate the conditions under which he must operate, and set the acceptable level of performance.

The following is a sample behavioral objective:

Given a new piece of tool steel and a center guage, be able to grind a tool for cutting N.C. threads. The angles on the tool must be accurate as checked by a center gauge. The tool must not be overheated as indicated by discoloration. All faces are to be smooth, single grinds.

If a student were given the above objective, he would know the following:

1. What to do
   Grind tool steel to cut N. C. threads.

2. Conditions
   a. Not overheat
   b. Have smooth grinds
   c. Correct angle of grinds

3. Testing
   a. Check angles of grinds to fit center gauge.
   b. Check overheating by color.
   c. Check number of grinds on each face.

Along with the objectives, the student would receive a list of learning activities. These might include:

1.	Flim-loop	5.	Teacher aids
2.	Teacher demonstration	6.	Models
3.	Text	7.	16 mm film
4.	Wall chart	8.	Practice exercise on mild steel

Anyone proposing to write behavioral objectives should read Robert Mager's book, Preparing Instructional Objectives, Fearon Publishers.

TEACHER'S ROLE

In an individualized program, the role of the teacher is changed from a lecturing, omnipotent source of knowledge, to an "instructional manager." A teacher can function as a manager of learning resources or he can become an operator of resources. Under this program, a teacher must become a manager. The selection of learning activities and their administration becomes very important, since a student needs guidance and direction while advancing through the program. This does not mean that a teacher never offers help or assistance to a student in solving a problem, but time is usually spent in planning, organizing, leading and controlling learning activities.

EVALUATION OF STUDENT PROGRESS

As a student advances through instructional packages, performance checks become necessary for teacher control of learning activities. A typical wall chart with a bar graph for each student is convenient for both teacher and student in assessment of progress. Grade scores are no longer important since each behavioral objective indicates the acceptable level of performance. If a student can perform each objective as indicated in a package, the square on the graph would be shaded in or marked indicating its completion at the acceptable level. This procedure stops the social promotion of a youngster from class to class for being a "good boy." Advancement can only occur when a youngster can demonstrate successful completion of course material. The grade becomes pass or fail. With our current grading system, this may be A or F and still be within college entrance requirements. The number of credits earned becomes the yardstick for knowledge and skills acquired. The emphasis is taken away from "What kind of a grade am I going to get?" and put where it belongs on "How much am I going to learn?"

When a student has completed the pre-determined number of packages, he is given a unit of credit. This may occur at any time during the school year. For example, if a student completes Drafting 1-2 in February, he is given the grade A and one unit of credit. The student now has four options from which he may select: (1) Begin Drafting 3-4 and possibly earn an additional 1/2 or one unit of credit, (2) become a teacher's aide or assistant, (3) enroll in another department such as science, reading, art, etc., for credit. While completing Drafting 1-2, the student may have discovered a need for more math and as a result, motivation is shifted and increased in a new area.

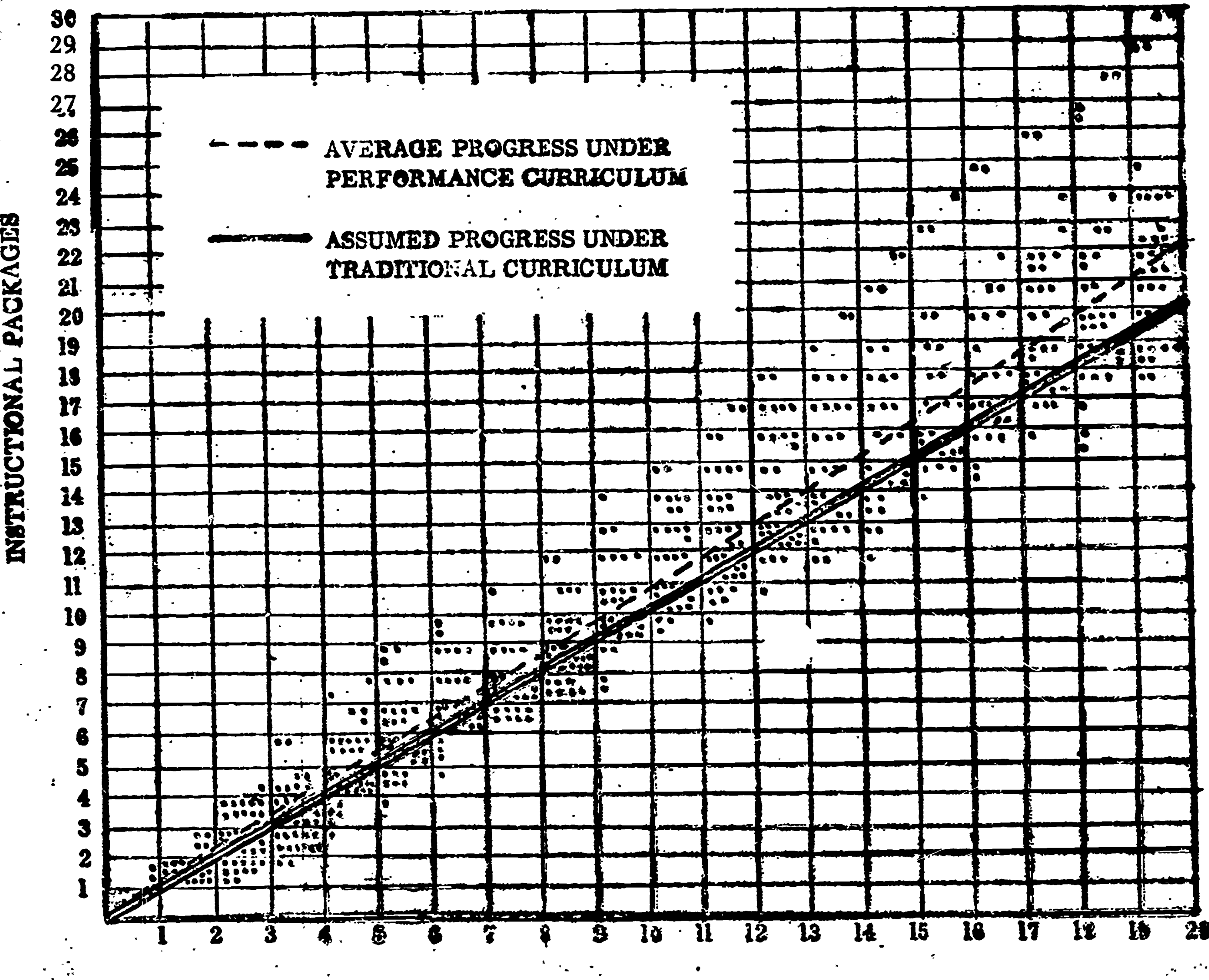
With this form of grading and advancement, a youngster may earn 1/2, 1, 1-1/2, or 2 units of credit in a year's time. Whatever the credit earned, it's at the A or pass level. In courses that continue from year to year, a student begins the new year where he left off the previous year. June is no longer the stopping point, but only a vacation between packages.

RESULTS OF CURRENT PROGRAMS.

The above approach to learning may sound like "all theory" and "impractical to implement," but these programs described are in operation. John Marshall High School in Portland, Oregon, has such a program in electronics which has been in operation for two years. Recently a survey course in drafting and electronics for ninth graders has been established. The results of the individualized programs speak for themselves. The scatter gram in Figure 1 indicates the progress of students enrolled in first year electronics. Each dot represents the week a boy completes a package. All of the dots above the solid line indicate work completed ahead of the material normally presented in a teacher-led class. From this it can be seen that many boys are capable of working much faster and to a higher degree of success when they are allowed to progress at their own rate with behavioral objectives. While boys below the solid line are not advancing as fast as they would be in a traditional situation, two important factors are evident: (1) The level of the work completed is much higher because students are not forced to go on to the next unit of work without adequate preparation and with sub-standard progress scores of D or F. Advancement can only occur when the performance level of each package is met; (2) Since many boys have exhibited their ability to work ahead, the instructor's time can be directed to helping the students with problems individually or in small groups.

The dotted line represents a learning curve for the first 20 weeks of class progress. It is interesting to note that the line gets further from the traditional schedule as the weeks pass. This occurs because students with less ability and interest are not holding back the more motivated. Instruction is no longer aimed at the average student, but at each one individually. The importance of the learning curve is that from year to year, assessment of the program can be made and the effects of curriculum changes can be identified not just hypothesized.

After designing, implementing and observing a program of individualized instruction, I have become more convinced of its merits in our nation's schools. Students are able to learn at a faster rate as well as apply it to problem solving situations. It combines the luxury of private tutors as needed with the practicality of lower cost mass edducation.



AVERAGE PROGRESS UNDER PERFORMANCE CURRICULUM
ASSUMED PROGRESS UNDER TRADITIONAL CURRICULUM
INSTRUCTIONAL PACKAGES
WEEKS OF SCHOOL

FIG. 1

PERFORMANCE CURRICULUM EVALUATION

AT SECOND CONFERENCE

At the second Performance Criteria Conference in November, 1967, which was also attended by project staff, Advisory Committee members, and project consultants, the teachers who had participated in the initial conference arrived with a massive amount of curriculum materials representing the performance criteria packages they had developed and were in the process of implementing. This working conference was organized and conducted to emphasize small group sessions established around general categories of subject area interest.

At the second conference, teachers met in small groups to compare and discuss their problems and experiences, to evaluate their performance packages, and to investigate new avenues for improvement in the criteria, specifically, and in the vocational education programs in general. Small group work sessions covering specific subject areas were supplemented with general discussion periods during which presentations were made by individual teachers, consultants, and members of the Advisory Committee.

A new sense of enthusiasm and excitement among the teachers from the participating schools was apparent at this conference. Open scheduling and performance criteria development had released a range of teacher interest and talent which, if not unsuspected, had been encouraged by the traditional framework of vocational education. In exchanging experiences and ideas, the teachers made it obvious that despite the magnitude of the problem a momentum for constructive change had begun at a level where it counts most, at the point of contact between pupil and teacher. They also made it clear that if not all, at least in a promising number of instances, this enthusiasm and interest had been communicated to many students who had previously only rarely been moved by the learning experience. None of the teachers seemed to feel they had arrived at the conference with ultimate answers. However, all participants seemed to feel they had embarked on the road to viable alternatives to current failures in traditional teaching strategies.

An electronics curriculum in its second year at Marshall High School in Portland, Oregon, exemplifies some of the objectives being sought through performance criteria and also the project activity reported upon during the conference. The course was described and performance oriented instructional packages actually used in the course were distributed. The first year of this electronics course (which is an elective) begins with a nine-week survey in which students become acquainted with the several areas in electronics. Instructional packages for the course had been developed to emphasize three aspects of learning: knowledge acquisition, comprehension, and skills development. Each instructional package was accompanied by a pre-test and a post-test which students take before beginning with one package or proceeding to another.

The opportunities which are featured in the course include the following: Students work independently in small groups and in open labs completing the instructional packages at their own pace. During the first year, some students completed all the instructional packages covering that school year between September and March. Nor must students necessarily encounter these packages in the sequence recommended. They can complete any package which they can demonstrate some competence for handling. If students demonstrate a sophistication in electronics beyond what is covered in the first year, they can begin with the second year, which marks electronics as a field of major interest rather than an elective.

Finally, credit in this electronics course is awarded on the basis of the number of packages completed. Grades are either "A" or "F;" that is, if the student completes a package satisfactorily he gets an A. If he doesn't, he fails, but still has the opportunity to stick with it until he succeeds. The student's transcript of credit for this course can be and is changed to reflect the units of instruction he has completed whenever he completes them. Of the 23 students who took the first year of this course as an elective, 17 went on into the second year to make electronics a field of major interest.

In the electronics program at Marshall, the instructor sees himself as an instructional manager arranging instructional experiences, and helping individuals on an "as needed" basis. A board chart indicates which students are working on which packages, and the students themselves decide when they are ready to take the test which will allow them to move on to the next instructional package. The instructor makes a point of immediately evaluating a test and returning it to the student. If the student repeatedly fails a test, an attempt is made to find some alternative way for the student to satisfy the achievement criteria for which the package was developed.

In terms of the focus on problems of the individual students and the pacing and sequencing appropriate to individual student learning styles, this electronics program, described here as one example among many, has already gone far beyond traditional methods current in either general or vocational education. The teachers involved do not see it as a static answer for electronics instruction but as a dynamic approach to meeting new student and material needs. At the moment, for example, an attempt is being made to reduce from 5 to 1 the number of objectives included in each instructional package. There was a general feeling among the teachers attending the conference that if performance oriented instruction becomes static and highly formalized it will lose its effectiveness.

A data processing course based on performance oriented instructional packages provides another example. Students take this course either to qualify as keypunch operators or as a prerequisite to computer programming. Two-thirds of this course is built around skill demonstration. As a consequence, it has encouraged some students in this field who would patently not have survived a straight lecture course. Now in the first year of implementation, this course already has created enough student interest to demand after school instruction in computer programming.

In still another school a program to develop major vocational emphasis on marine engines is underway. Students complete instructional packages in this course as in the previous examples reported, on a contract basis. An attempt is being made to orient all the other shops in this school (wood work, drafting, etc.) toward marine or maritime vocations. Students are also made responsible for handling all the administrative detail involved in conducting the course.

These sketchy examples can only imply the scope of the activity carried out in the project schools. In some, performance critiria have met with astonishing success. In others they appear to have been less successful, expecially where teachers have only refined conventional practices. If the participation of the teachers at the conrerence is any indication, however, and we must assume it is, even the failures have been significant learning experiences. Even where performance packages have been weak, students are responding to the active teacher interest.

The performance curriculum building activity in the participating schools can also be described in terms of the educational issues with which teachers have been actually grappling for the first time. Following are some of the issues which came up in the small group discussions between conference participants:

> The difference between the diagnostic aims of the pre-test a student takes before embarking on a new package and the aims of the measure of gain test he takes on completing might be better defined. Possibly pre-tests ought to be limited to a few questions scaled so as to make it obvious from the earliest question that a certain range of students are not ready (e.g., a crude question about simple addition makes it obvious that a student who fails it need proceed no further to demonstrate lack of readiness for calculus). A student is discouraged by a lengthy pre-test that forces him through a long mistake making process.
>
> Perhaps in some instances unit performance packages for a course ought to be sequenced to encourage student interest and understanding rather than to reflect the structure of the course content.
>
> Open laboratories are an effective gauge of whether instructional packages are relevant to student needs. Attendance drops drastically where they are not.

Greater effort is still needed to bring about interdisciplinary involvement. One suggestion is that vocational education instructors might experiment with writing performance packages for other courses, e.g., for English courses.

Although science, math, engineering, and humanities are being brought together in some schools on a voluntary basis, some effort is needed to encourage this kind of activity as departmental policy.

It is easy to demonstrate success for a performance curriculum if you pick only students who are low achievers, but who have high learning ability, and completely bypass low achievers who are also low in intelligence. This has the effect of defeating the true objective of performance oriented curricula and reducing them to the status of one more gimmick.

There is considerable evidence that the process of students helping other students creates a highly motivated learning situation. This has been demonstrated where students who have proceeded quickly through a number of instructional packages pause to help others having difficulty.

Four types of instructional package contracts defined during one small group session were as follows: 1) teacher made and teacher assigned, 2) teacher made and student assigned to get at scope and sequencing problems, 3) student made and student assigned to give credence to the student's perception of his own weaknesses, and 4) student made and student assigned to give reign to the student's own sense of preference.

One teacher in a small group session recommended experiment with learning games, both structured and of the role playing variety. He cited a simulation game designed for college students that was successfully played by 6th graders, a game in which participants learn to make decisions on the basis of facts.

The importance of emphasizing versatility in instructional packages by having them include alternate routes for students with different kinds of abilities to arrive at the same learning experience became evident.

One approach to promoting better articulation between vocational and general education occurs in a school where social studies and English teachers spend a week observing activity in the shops and then attempt to write performance objectives that would be relevant for the vocational technical students in their classes.

The effects and social relevance of world technology was suggested as a potential beginning for relating the vocational student's experience more closely to his social studies curriculum.

Greater attention to and credit for results in the affective domain must be included in performance curriculum experiments. In some cases cognitive achievement may be of relatively minor importance as compared with success in establishing a new and positive attitude toward school and learning in general.

Some attempt is being made to let students "try their hand," as it were, by auditing a course and subsequently giving them credit where they meet instructional package objectives successfully.

Although there was not sufficient time during the second Performance Criteria Conference for the project Advisory Committee to immediately review all the materials brought to the conference (since they were also actively participating in all the small group and general sessions) the members of this committee did go over these materials briefly and discussed them during the general sessions of the conference. All of the material, they concluded, took a positive step in the direction of individualization. They singled out the following areas for improvement, however:

Some of the curricula were still too teacher oriented rather than student centered in their objectives.

Levels of performance within stated objectives need to be better defined.

More interdisciplinary content is needed in instructional packages.

Packages must keep up with current technology; e.g., avoid limiting references to old text books.

Some packages still exhibited overemphasis on theory at the expense of practical lab experience.

In certain areas objectives might be directed more closely to employer needs.

More attention must be given to building rationale for sequencing materials.

More account must be taken of individual learning styles.

Test questions do not always ask for relevant answers; more performance tests as opposed to written tests are needed.

Too many questions emphasize recall rather than comprehension.

Packages often needed improvement in quality of grammar and clarity of writing.

Many of these points had already been taken up and discussed at length in small group sessions, and many, of course, reflect failings common in the instructional directives of traditional programs. Despite these shortcomings, and they were by no means universal throughout the material reviewed, the Advisory Committee was most impressed by the fact that performance curriculum development had made an impressive impact.

Section 5

GENERAL EVALUATION

Contents

GENERAL EVALUATION

BACKGROUND

Data collection instruments that had been developed during the first year of the project were used during the second and third years to obtain detailed information for analysis and evaluation, and to ascertain the effects of implementation of a Modular Schedule. Evaluation and feedback on some of the data were made available to schools in the Fall of 1967, but final analysis and evaluation had to await completion of data collection in June of 1968. Statisticians and data processing specialists were consulted and employed in designing evaluation procedures and computational processes.

Copies of each instrument, with a description of the sampling procedures followed, research hypotheses applied, statistical procedures used for evaluations, and tables and graphs from which the results were derived are included in Appendixes C through M. The general evaluation section includes inferences drawn from the data collected. It is supplemented with subjective evaluations obtained from interviews, summarized in the last eleven pages of this section.

It became readily apparent to members of the project staff that the total effects of the project could not be adequately measured by statistical evaluation alone. The mere fact that modular schedules were successfully implemented in project schools, and that they are being continued is regarded as a major accomplishment. Statistics are unable to account for all of the results of any large undertaking, however, and the results should be evaluated with additional considerations in mind. Other considerations include the following:

1. The technology of scheduling with the assistance of a computer permits great variation in choice of many alternatives relating to curriculum, staff organization, and every aspect of school organization and structure. As a result, the many decisions required prior to implementation of a schedule present a major challenge in themselves.

2. During the initial stages of implementation of a modular schedule, mastering the technology of scheduling itself is likely to dominate the variety and degree of change in other aspects of school life.

3. There are stages of psychological readiness as well as technological competence that exert influence on creative change within a school. It would be naive to assume that changing a schedule automatically would force a change in curriculum or methods of teaching.

4. As a result of participation in the project, there is momentum toward educational change within project schools. Programs and

course structures have changed drastically from year to year, and are explained as a constant search for even better solutions to the problems associated with individualization of instruction.

It was apparent at the end of the project that more telling observations might have resulted had it been possible to provide more teachers and administrators more time for reporting on the data collected in the instruments. Significant change beyond the mastery of the scheduling technology could have been measured more adequately and provisions for data coordinators in each school been assigned to work with and relieve teachers of these extra responsibilities.

The volume and breadth of the data which was collected, however, indicates that many of the changes hypothesized have taken place. Evidence of new patterns of organization and curriculum revison are plentiful. In terms of meeting the stated objective of the project, the evidence indicates outstanding success, as illustrated in the following summaries of the evaluation findings. Detailed statistical information, in addition to charts, graphs and tables, are contained in Appendixes C through L. Readers are invited to these appendixes for additional inferences and conclusions.

EVALUATION RESULTS

A. Instructional Opportunity

Analysis of data reported on Form A 2 (Appendix C) reveals substantial modification of course structures in some of the project schools. Changes are not interpreted as a direct consequence of modular scheduling but are indicative of the creation of conditions for alternative approaches normally not feasible under traditional scheduling. As the results indicate, some schools were willing to examine many of the alternatives permitted by modular scheduling, while others remained relatively traditional in their approach to structuring subject-matter offerings.

It may be inferred from the data that implementation of a modular schedule does not automatically lead to an increase in the number or variety of courses offered in either vocational or non-vocational subjects. Yet, there are rather interesting changes noted among the five schools for which comparisons from traditional to modular scheduling were possible. One school increased the number of academic courses offered to 9th graders and also the number of vocational courses offered 12th graders. Another school significantly increased the number of elective courses not considered either vocational or non-vocational for 11th and 12th graders, and yet had significantly decreased the number of vocational offerings for these same grade levels. Other increases were observed but were not considered significant at the .05 level.

Two schools significantly increased the number and variety of courses designed to prepare terminal students for immediate employment, which might be interpreted as an increasing concern regarding the adequacy of preparation those students had received in traditional programs. There were also notable increases in the number of courses designed to prepare students for occupations that required additional training beyond high school, and significant increases in numbers of courses exploring possible future occupations. Only one school noted a significant increase in the percentage of courses classified as college preparatory; it is of interest that this particular school was one of the most vocationally-oriented of all of the project schools.

As would also be expected, course designs varied widely from school to school hopefully as a result of better utilization of the strengths and interests of staff members. Three of the five schools significantly increased the number of academic courses taught by teams of teachers. The use of large group instruction in vocational offerings increased significantly in all five schools, and was increasingly applied in academic courses in four of the five schools. Only one school noted a significant increase in the use of large group instruction in "other" courses, but the nature of courses in this category (Band, Chorus, Art, Physical Education, etc.) possibly influenced deicsions on the desirability of this mode of instruction.

The use of small group instruction, one of the most desirable alternatives permitted by modular scheduling, increased significantly in both vocational and academic courses in four of the five schools and its use increased in the "other" courses category in two of the schools. The popularity of this mode of instruction is in evidence in the comments of students as well as teachers. Small group instruction is being widely used in all modularly scheduled schools.

Independent study in project schools was required in some courses and optional in others. Three schools reported a significant increase in providing more independent study time in vocational courses. One school with a strong vocational program revealed a significant decrease in the percentage of independent study programs in which students could complete course work on a voluntary basis, and a significant increase in the percentage of independent study programs in which students were required to complete work on their own. Responsibility for learning is assumed to be placed squarely on the shoulders of the student in the latter situation.

Student ability is also a consideration in planning time requirements for formal instruction in modularly scheduled schools. There were statistically significant increases in four of the five schools in the percentage of academic courses in which time patterns were varied to accomodate differing individual abilities. In two schools the same type of increase was noted for vocational and "other" courses. No definite trends were noted regarding the amount of time required in formal instruction to accomodate the variety of student interests, however.

Additional information on course structure data may be found in Appendix C.

As indicated in Section 4, the development and use of performance criteria was a major effort of the project. Appendix K contains information about measurement procedures designed to determine whether the performance criteria packages developed by teachers were actually being utilized in courses. Tables and figures containing the results of the evaluation indicate that all twelve of the schools evaluated during the third year of the project have made considerable progress in developing and using performance criteria. Surprisingly, two of the schools had no performance oriented courses in vocational subjects but several performance oriented academic courses. In one of the project schools a remarkable 60 percent of the vocational courses were conducted with performance rather than time as the criteria for achievement. Eight of the schools had over 20 percent of their vocational courses structured with a performance orientation, and one school had 39 percent of its academic courses so structured.

Although it is apparent that performance criteria development and implementation represent one of the major successes of the project, this success must be qualified by the following observations:

The development of performance curricula is not an inevitable consequence of modular scheduling. Although it is apparent that performance curriculum development is a result of total project effort rather than of modular scheduling alone, it is our opinion that results taken one year hence would show a much greater use of performance criteria than now.

Teachers are increasingly enthusiastic about their early experiences with performance criteria and are reportedly expanding their efforts to develop them for additional courses.

Although a traditional schedule does not automatically preclude performance criteria development, it does not provide an environment that is likely to encourage it.

B. Student Behavior and Performance

Use of Independent Study Facilities

Project schools on modular schedules made significant changes in the use to which they put their facilities. Resource centers, open laboratories, multiple class teaching spaces, student carrels in classrooms and similar additions or adjustments in facility utilization represent the response to new demands placed upon school spaces by an open schedule. Modular scheduling does not demand more space but different utilization of existing space.

In making schools' spaces available for more purposes, modular scheduling has significantly increased the density of use of school facilities and seemingly has resulted in more efficiency in their use. Under traditional scheduling rigid schedule blocks unfortunately place severe limitations on use of facilities.

Independent study time has made apparent the need to reconceptualize the utilization of most school facilities. Laboratories designed for the traditional class size of 30 students, for example, should accommodate 75 or more students in an open laboratory where students work on different projects and use instructors as resource persons.

The major variable governing how students use the facilities available during their unassigned time is not the modular schedule but the ingenuity of school officials in designing new uses for existing facilities.

The change potential offered by modular scheduling was evidenced by the volatility of change in the use of facilities for unassigned time from school to school. In one school, student centers were closed for lack of attendance; in another, attendance in the student center increased significantly. Differentiation in utilization of facilities in individual schools suggests little danger of new orthodoxies having developed.

In one school, 17 to 20 percent of the 500 students on unassigned time during any given module spent this time in the library. The average occupancy rate was 100 students per module throughout the school day. In another school, a student spent an average of two modules in the library every day without having been directed to do so, a significant change from traditional scheduling.

Unfortunately, teachers in most schools still appear to be rigidly oriented to time rather than performance. Comments such as, "I gave those kids free time, and the other teachers had them work on their projects instead of ours," are far too frequent. Teachers with a performance orientation would more likely say, "I gave them time and a projected outcome, but they did not accomplish it." Such an expression would be more acceptable to students; they invariably state that they have enough time, regardless of what teachers have stated.[1]

Appendix D contains additional information on facility utilization, including use of unscheduled time in resource centers, laboratories, etc.

Student Control

Using the "Student Control" form an attempt was made to determine the extent to which students were assuming responsibility for their own learning. Number and types of referrals for disciplinary action during the second and third years of the project were thus obtained and evaluated. The sample size, sampling procedure, and processes followed in the evaluation of data obtained on this instrument are contained in Appendix E.

The evaluation suggests that introduction of modular scheduling initially results in a significant increase in the number of student control conferences for all reasons, including both classroom and school and campus violations. After the initial transition period, however, disciplinary conferences in some schools are fewer than under traditional scheduling, but greater in number in other schools. Although unscheduled time gives students greater latitude for violating school rules, it is also evident the kinds of violations for which students are conferenced vary greatly from school to school and are greatly affected by the attitudes and reactions of the administration and staff.

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[1] A.A.F.C.S., 1968

In schools which were sampled only during years in which they were on a modular schedule, the results were inconclusive. Four reported a steady decrease in conferences for student violations and three schools reported a steady increase. This may be accounted for by the difference in criteria applied to define violations from school to school, and perhaps also by the fact that some schools seem to make a better initial adjustment than others.

It should be noted that among the three schools reporting a steady increase in the number of conferences for student violations, one returned to a traditional schedule in the middle of project year three. In another, a major turnover in the administration between the second and third year of the project was followed by a marked increase in student violations; this school had four different principals during the three years of the project.

The over-all number of conferences for disciplinary reasons tends to decrease in project schools between year two and year three with a reduction in total disciplinary actions. The number of conferences related to problems in attendance, however, rose significantly between year two and year three.

Evidence also suggests a tendency for discipline problems to move from the classroom to other areas of the school. This is true even in schools where student discipline problems show over-all increases.

The variety in the schedule structure seemingly encourages irregularity in attendance, both accidental and contrived. Some schools report that students will cut classes which do not interest them in order to attend others in which they are interested but not enrolled.

Discipline might best be summarized by stating that the total number of violations decreased and that administrators are handling more of the violations and teachers less. Attendance problems increase, but the relative frequency of conferences for all other types of disciplinary conferences tends to go down after the initial period of transition.

Additional information on student control may be found in Appendix E. Appendix F contains information on educator-student conferences, which supplements discipline information.

Attendance

No significant trends were apparent in attendance data. One school noted a decrease in average daily attendance with absence rates going from 4-1/2% to 6%. Lack of standardization in attendance accounting procedures from one year to the next makes it difficult to draw conclusions. One school, for instance, accounted for students every hour when they were on a traditional schedule. They now use a random counting procedure which estimates the total number of students available during a given module. The procedure is statistically sound, but it makes comparisons difficult.

Appendix D contains information on how attendance figures were obtained.

Work Preparation

One of the hypotheses for the project concerned preparation of students for the world of work. It was felt that curricular changes in vocational and pre-vocational courses that emphasized performance as the measure of achievement would more adequately provide for student preparation. The results of the survey, however, were inconclusive.

Details may be found in Appendix J.

Library Resources and Utilization

Appendix D contains comparisons on library resources and utilization relating to traditional vs. modularly scheduled years. There were large increases in the number of volumes in the library in all three of the schools for which comparisons could be made and increases also in total expenditures for library materials. Circulation doubled in one school despite creation of five other areas for independent study. Circulation decreased in the other two schools, but these schools were unable to provide curiculation figures for library materials utilized in other independent study areas.

In comparing library resources and utilization in schools which were on a modular schedule during all three years of the project, large increases in the number of volumes in each library occur each year.

Inasmuch as circulation and budget figures for resource centers and other independent study areas are not included in library reports in some schools, it is impossible to draw conclusions from the data obtained. The data is charted in the appendix, however, to permit readers to draw such inferences as may seem appropriate.

Student Attitudes

Using the survey form in Appendix I, information on student attitudes was obtained in each of the project schools during the second and third years of the project. It was thus possible to provide comparative information from three schools on traditional and modular years, and to obtain opinions from students in nine schools with two or more years of experience in modularly scheduled schools. With the possible exception of attitudes toward school spirit and cleanliness of the school, where five schools noted increases and five noted decreases, there was no real tendency for decrease in average scores on the other eight factors for any of the schools.

Seven schools indicated significant increases with respect to factor one, liking school better under modular rather than traditional scheduling. Eight schools showed significant increase with respect to factor two, viewing teacher performance in a more favorable way under modular scheduling than under traditional scheduling. Seven schools showed significant increases with respect to factor five, assuming more responsibility for their own education under modular scheduling. Five schools noted significant increases with respect to factor seven, feeling that they use their time better under modular scheduling. Four showed significant increases with respect to factor eight, receiving more responsibility than under traditional scheduling. For each of these factors, there was at most one school that showed a decrease in average score.

The results suggest a general improvement in the attitude of students toward school between years two and three in the schools studied. This is particularly true of the three schools that were traditionally scheduled during year two and modularly scheduled during year three. Students generally felt more positive in their attitudes toward liking school, their perception of teacher performance, their assumption of responsibility for their own education, their use of time, and in receiving responsibility.

C. EDUCATOR — STUDENT INTERACTION

Educator-conference profiles were completed for five schools. Teacher-student conferences ranged from 1290 to 2540 per week and averaged from 3.58 to 5.97 per teacher per day in these five schools during their first year of modular scheduling. All schools except one showed a notable increase in number of conferences over traditionally scheduled years. The average number of minutes per conference ranged from 10.90 to 17.71, a notable increase from traditional years for 3 of the 5 schools compared. Students in these 5 schools spent on the average from 12 to 20 minutes per week in a conference with a teacher.

The total number of administrator-student conferences per week were quite small when compared with teacher-student conferences, ranging from 23 to 76 per week. In only one school was there a significant increase during the modularly scheduled year in number of conferences per student week. The average length of conferences ranged from 10.5 to 15.3 minutes, which is relatively similar to those of teacher-student conferences.

Discipline and attendance were the primary reasons for administrator-student conferences.

Counselor-student conferences ranged from 8.56 to 22.09 per counselor per day, a significant increase in each school. From 11.3% to 25% of the students in the 5 comparison schools would meet with a counselor each week, if it could be assumed that the reported conferences were uniformly distributed among students.

The overall project hypothesis that modular schedules would provide substantially more open or unassigned time for extended individual contact between students and staff was substantiated by data reported on this instrument with an appreciable degree of significance. An increase in the number of academic conferences in all but one of the schools reporting and a general decrease in the time devoted to each conference would seem to infer that teachers do use unscheduled time for increased contact with students.

The evidence not only reveals an increase in teacher-student conferences, but suggests that teachers increasingly are assuming counseling functions formerly restricted to guidance personnel. Informal interviews with teachers support this inference, and it might be noted that teachers interviewed seemed uniformly appreciative of the opportunities for such relationships fostered by modular scheduling.

The vast majority of teacher-student conferences are with individuals rather than groups of students. Academic work is most often cited as the reason for the conference, and conferences were usually requested by the student.

There was also an appreciable increase in the relative frequency of conferences held during school hours.

It should be noted that vocational departments showed a significant increase in only one school, and significant decreases in two schools, in regard to teacher-student conferences. It has been noted by several instructors in vocational subjects utilizing performance criteria that there are numerous opportunities for individual conferences within scheduled instructional time. It would have been of interest to examine conference patterns with performance criteria as a variable, but this aspect was not anticipated when the forms were designed.

If we accept the assumption that educator-student interaction outside of the formal program of instruction enhances a student's educational opportunity, it may be safely inferred that educational opportunity increased as a result of modular scheduling in the schools evaluated. The modular schedule is functionally related to patterns of interaction in that it has provided substantially more open or unassigned time for extended individual contact. Results of the evaluation clearly indicate that students do use time for student-initiated conferences with teachers, counselors, and administrators.

D. STAFF UTILIZATION

Evidence indicates that petterns of staff utilization changed markedly under modular scheduling when compared with traditional scheduling. There were significant increases in number of teaching teams and involvement in cooperative planning. The nature of teaching responsibilities changed quite drastically, as noted by significant, consistent, and apparent changes in over twenty categories measured on the Faculty Profile Questionnaire.

There was a dramatic increase in the amount of time spent by teachers in unassigned contact with students, and a decrease in out-of-school time for such contact. This suggests that teachers as well as students are accomplishing more at school and taking less work home with them. Teachers report spending an average of about 30 hours per week working in other than scheduled class activities. This compares with an average of about nine hours for similar responsibilities under traditional scheduling, indicating not only a change in teaching roles but accomplishment of more tasks within the context of the school day.

The number of hours devoted to assigned activities other than classroom activities tends to increase, while the hours per week outside of school hours consistently decreased.

Teachers estimate that they spend approximately 20 hours per week outside of school hours in regularly assigned activities.

There has been a dramatic shift toward team teaching in project schools reporting. With the exception of one school, the majority of teachers from all schools reported participating in team teaching during the second year of scheduling. These same teachers reported that although their team teaching work load had increased it had not increased unreasonably.

Teachers in schools reporting indicated that although their work load overall had increased, this increase, too, was not unreasonable.

Teachers also indicated that their teaching assignments utilized their special interests and whatever special competence they might have as individuals with most answers to such questions ranging from "considerably" to "fully".

Although bachelors degrees were predominant within the faculties of schools reporting, in three schools there was a noticeable increase in the number of faculty with masters degrees following the change to flexible scheduling.

During the year in which modular scheduling was introduced, there was an appreciable increase in the responses "frequently" and "always" in reply to questions which referred to planning lessons taught by others, teaching lessons in which others participated in planning, and to teaching lessons planned by others at a higher level.

Faculties in project schools reported an appreciable increase in involvement in planning the aims and objectives of courses under modular scheduling.

Other areas in which increasing involvement by teachers was reported under modular scheduling were in planning the organization of courses, in selecting course content, in selecting materials to be used in courses, and in selecting the process for evaluating student achievement.

There was a noticeable shift in teacher involvement in systematically observing the classroom performance of colleagues when the reporting schools switched to modular schedule.

Inaccuracies and inconsistencies in reporting invalidated the data concerning task time of administrators devoted to scheduling and clerical details. From the information that was obtained a few general trends might be mentioned, but they should not be interpreted as representative or conclusive.

Administrative roles seemed to change but with no consistent patterns. Administrators in some schools reported more frequent meetings with individual teachers and less with departments and sub-groups. Others spent less time with individuals, less time with the full faculties, and more time with small groups of teachers.

Administrators noted no major change in the number of nights per week spent on school business, but some noted increases in calls from parents at night regarding school work.

In general, it appears that administrators spend as much time out of school doing school work as under a traditional schedule. They also tend to spend more time working with individual faculty members, probably a result of an increase in availability of teachers because of unscheduled time.

INTERVIEWS WITH PARTICIPANTS

As part of the evaluation of modular scheduling in the project schools, a series of unstructured interviews were conducted in nine schools near the end of the final year of the project. In each of the nine schools groups of teachers, students, and administrators were interviewed separately. Members of the student and teacher groups were selected at random immediately prior to the interviews, with five to ten persons selected for each group. Students and teachers were encouraged to speak openly about any aspect of their school program. Names of the interviewees were not recorded, and participants were informed in advance of the interviews that the tape recordings would not be heard by anyone at their school. It was hoped that the interviews would thus provide information of a descriptive nature that might supplement the data obtained from the other instruments.

Interviews were conducted at Valley, South, Golden, Poway, Ceres, Alliance, Kennedy, Virgin Valley, and Julian high schools.

A. INTERVIEWS WITH STUDENTS

Students who were interviewed indicated general approval of the modular scheduled programs in their schools. Even those students who noted many criticisms of their programs were emphatic in stating that they would not want to attend school under a traditional schedule again. One student noted that his education had become "more of a thinking than a reacting process, which it had largely been under the old schedule." Another student felt that he was learning more from conversations with teachers and counselors than from attending classes. Another felt that he had "learned more" under the modular program than he had in any other year. Almost all of the students interviewed felt that the increase in personal responsibility as a result of flexible scheduling had helped them to mature.

Students were especially enthusiastic about their experiences in small group instruction. Some noted that they were able to relate personally to teachers for the first time. Others indicated that the opportunity to participate in discussions was helping them overcome being shy. Other comments included: "small groups help keep my curiosity alive;" "you can get a subject out in the open where you can deal with it;" and, "when you bring a problem to the small group you can usually stick with it until it is solved."

In all of the interviews, at least one student commented on the increase in the number and variety of course offerings that resulted from implementation of a modular schedule. A student in one of the smaller schools noted that the variety was so great and the freedom of choice so open that the problem became one of keeping eager students from taking more courses than they could manage. In general, the increase in course offerings was noted to have resulted in greater interest in school.

Utilization of unscheduled time was a topic that received much emphasis in the interviews. Students were by no means uncritical of modular scheduling or of their particular schools, but most of their concerns were related to the advantages and disadvantages of having large percentages of their time unscheduled. Some students appreciated the opportunity to complete all projects and assignments at school and indicated that this was a major factor in motivation. Others commented on the advantages of being able to work in resource centers where materials and assistance were readily available; some saw their particular advantage as being places to work and study without interruption from members of one's family. Another student commented on how pleased she was to have time to study some of the documents that had been discussed in history, an interest she had had for some time but had been unable to find time for in previous years.

In general, students indicated that their unscheduled time possibly provided the most significant opportunity for learning. Some felt that it would be a big help in preparing them for college; others felt that it was great preparation for the responsibilities of their future occupations. But, all students also considered their first experience with unscheduled time "a great shock," and admitted that, with rare exceptions, they did not use their time well. Considered with the interchange of ideas and opinions in small groups, access to teachers and resource materials, and the opportunity to pursue individual interests and projects, students felt convinced that unscheduled time was essential in providing for individualization of instruction and that they were receiving much more individual attention than ever before.

Students also gave the impression that they were becoming aware of themselves as learning individuals to a greater degree and as members of a grade or a class to a lesser degree. They were frequently critical of restrictions placed upon their new interests by limited facilities that had been designed for traditional school programs. Shops, laboratories, and other special purpose facilities were no longer considered adequate for the increased utilization permitted and encouraged by modular scheduling.

The students also noted the need for longer blocks of unscheduled time and indicated that short blocks scattered throughout the day did not allow enough time to complete certain projects and experiments. They also were concerned about distractions from students who wasted their unscheduled time and seemed to favor policies that granted unscheduled time on the basis of "demonstrated responsibility". They felt that younger students should be introduced to unscheduled time gradually, in hopes that they would learn to accept increased responsibility as they matured. They noted that many students originally reacted to unscheduled time as an opportunity to "goof off" but felt that most such students eventually were able to assume full responsibility for their progress and subsequently wasted little of their time.

In one school, performance criteria had been introduced in the Business and English departments. One student commented that performance criteria gave students "something to strive for, the chance to work for a grade without the busy work." Other students went beyond this to urge doing away with grades in favor of performance achievement credits.

Students also were conscious of increased demands upon teachers in modularly scheduled schools. They felt that teachers "had to work harder" and that they "have to care." They criticized large group instruction more than any other aspect of the school program, and noted that many teachers either do not have the time or the ability to prepare properly for effective large group presentations.

Students also indicated that there would be benefits from provisions for continuous help and counseling in helping students adjust to new programs such as modular scheduling. They indicated that they knew that teachers were available to help them, but needed a better method of knowing where teachers would be at certain modules. Students also felt there would be benefits in having lounges or "socializing areas;" they would not only help serious students to relax and enjoy themselves occasionally, but would provide places for non-serious students to "goof off" without interfering with projects in resource and study centers. Students interviewed felt that "goof-offs" have little status in the eyes of most students, and consequently, few students wanted to be in this category.

One student remarked that the "benefits of modular scheduling for his school were obvious," but that flexibility within the school varied from department to department and from teacher to teacher. He contended that more flexibility was needed within the school. While such is well within the capacity of the programs that generate modular schedules, it seems apparent that flexibility is not guaranteed by the process but rests with those who implement it.

B. INTERVIEWS WITH TEACHERS

The teachers who were interviewed almost universally looked upon their experience with modular scheduling as having profound implications beyond the schedule itself. Individual teachers repeatedly referenced this with statements suggesting that implementation of a modular schedule forced them to make a new definition of what they considered education to be. One considered modular scheduling to involve "an entirely different philosophy of education," and another phrased her experience as moving from "teaching a subject to teaching people." All perceived their role as professionals to have changed significantly, nothing that whether the change is for better or for worse depends entirely on the individual teacher's capacity and talent to accept the additional responsibilities a modular schedule demands.

Teachers also felt that modular scheduling had forced a reassessment of subject matter as well as of teaching roles. Many found that the text materials formerly used were too closely tailored to traditional modes of instruction to be effective in a modular approach. Teachers thus felt some compulsion to write and organize their own materials. While they generally have more time for planning than under a traditional schedule, few felt that enough time was provided. They supported this position with reference to requirements for team planning as compared with those required for individual planning. The teachers also repeatedly insisted that new teachers should be forewarned of the nature of their responsibilities under a modular program in order to prevent what most regarded as a traumatic transition.

It is significant that teachers rarely referred to the mechanics of scheduling as the major problem associated with the transition from a traditional to a modular schedule. Most indicated that their major difficulties were related with the change in their role and that this was rather uncomfortable at first. Most were overwhelmingly sympathetic to the more intimate relationships they had been able to establish with students. They also felt that many of their experiences in teacher training programs had been wholly inadequate as preparation for teaching in a modularly scheduled school. Several had been through various types of "sensitivity training" programs and recommended this experience as having been valuable in helping them assume their new responsibilities as "guides," learning counselors, and resource persons.

Teachers also noted changes in roles and responsibilities of students. One teacher commented that "it is the teacher's duty to make the students realize their responsibility for their own learning." Teachers also noted increased interest by students as a result of changes in modes of instruction. One science teacher stated that thirty percent of the students receiving a grade of "A" in his classes were getting that grade for the first time in their lives. One teacher noted that students who were in classes meeting for thirty minutes daily, with subsequent access to the typing room for as little or as much time as they wished, had rapidly surpassed those students who met for sixty minutes daily in traditional classes. Another teacher reported that students in his print shop classes which he conducted following a performance approach with only one hour of formal class time per week were completing the equivalent of a year's training in sixty percent of the time allocated under a traditional schedule. Another teacher commented that some students were completing in two days curriculum packages designed for a week. Other teachers offered similar examples to illustrate changes in the accomplishments as well as in the expectations of their students.

Disciplinary problems also were frequently noted by teachers. Problems have not disappeared but have seemingly shifted from classrooms and laboratories into lounges and other areas designated for relaxation. Discipline has not generally become less of a problem for the school, but it interferes less with formal instruction. Some teachers noted that some students with poor disciplinary records seemingly had become quite well-behaved when given the opportunity to determine for themselves exactly what to do with their unscheduled time. (Similar observations were made by several students in their interviews, and especially when the subject of attitude toward school was introduced.)

Several teachers also indicated that some teachers are severely threatened by the new roles and requirements demanded by modular scheduling. Practices such as team teaching, open classrooms, and sharing of the same students within a particular subject apparently reveal teaching weaknesses as well as weak teachers. Teachers interviewed seemed to feel that such cynicism regarding the new programs as existed among other teachers could be attributed to insecurity modular scheduling aroused in them.

Several of the teachers interviewed commented on reorganization of roles and responsibilities for teachers, counselors, and administrators. But few felt that faculties in general were adequately financed and staffed to successfully adopt massive differentiation unless additional resources were available. Some were quite enthusiastic about staff differentiation proposals and hoped they would have the opportunity to prepare for and become part of such a staff. Almost all persons interviewed felt that they had become more directly involved in formulation of policies for their school, but one group indicated that administrative control in their school prohibited the degree of participation that most teachers would have desired.

Teachers also stressed the need for increased coordination and understanding between various departments within their schools. Some teachers seemed to feel that competition for the time and interests of students had become major problems, which further highlights the need for coordination between departments.

In the course of the interviews it seemed apparent that introduction of modular scheduling does not create flexibility by itself. Some teachers noted examples of a tendency toward developing a new orthodoxy in their schools, and others indicated that they felt there had been a regression toward attitudes and habits more compatible with a traditional schedule. But it was also apparent that, in most cases, modular scheduling had at least brought teachers to the threshold of significant changes that theoretically should follow from the application of modular scheduling. For both teachers and students, the thought of returning to a traditional schedule was overwhelmingly rejected.

Teachers also talked about the alternatives that modular scheduling had permitted in their instruction. One teacher felt that a major benefit was the opportunity for him to build and use "learning packages;" he found satisfaction not only in the increase in responsiveness of his students, but also in the degree of "professionalism" it permitted him to exercise. Despite what were termed "terrible mistakes" during the first year of implementation, most teachers were optimistic about the potential for future years.

Teacher criticisms supported those of students concerning inadequacy of facilities in many cases and lack of financial resources for additional materials. They also cited the need for additional in-service training and help from professional consultants as highly desirable prior to and during implementation of a modular schedule. A major problem area also related to communication with parents and school patrons, with teachers repeatedly commenting on the difficulty of getting parents to attempt to understand what the purposes and assumptions underlying modular scheduling were.

But, despite the problems faced by many teachers and the uncertainty and confusion accompanied by a radical departure from traditional responsibilities, teachers were encouraged by their experiences with modular scheduling. Those interviewed indicated that they were having to work harder than in previous years and were facing more frustrations, but they were gratified by the fact that the frustrations they were now experiencing were a result of having to resolve issues that were much more professional in character than the kinds of problems that had confronted them before change was introduced. None of the teachers expressed a desire to return to a traditional schedule.

C. INTERVIEWS WITH ADMINISTRATORS

The interviews conducted with administrators and counselors corroborated the fact that modular scheduling has a tremendous potential as an educational device for enabling change, but that the degree of flexibility and amount of individualization of instruction derived from its application is in the final analysis dependent upon the intelligence and imagination of those who make the overall as well as the day-to-day educational decisions governing its use.

One administrative staff interviewed felt that the increase in the work load brought about by the change to modular scheduling was somewhat detrimental to the goals and even the morale of the teaching staff, and that to return to the work load under the traditional schedule the staff would have to be doubled. A counselor complained that she spent too much time punishing students for cutting class and did not have enough time left over for counseling. Even here, however, the administration admitted that teachers have considerably more opportunity to be creative in their teaching than under the traditional schedule.

The fact that they had not been as creative over-all as had been hoped was attributed largely to the fact that a good number of their best teachers had left just prior to the time modular scheduling was implemented.

More work and more responsibility for all was a repeated refrain in these interviews. This refrain was not stated in objection of modular scheduling but merely to take into account the fact that in first and second year of implementation the process of change itself tends to create problems. They seemed to agree that many of the most significant educational advantages would be realized once procedural problems had been put out of the way.

Even in the schools that appeared to be having a particularly difficult time with the process of change itself the general reaction on the part of administrators and counselors was to make constructive suggestions for improvement. Paramount among these was recognition of the need for more preparation of the staff, both administrative and teaching, and, where possible, the students, for entering into flexible programs. A common suggestion was that recommending a thoroughgoing in-service training program for the staff during the summer preceding the opening of the school under a modular schedule. One administrative group recommended that an in-service program using micro-teaching techniques similar to those applied in teacher training at Stanford would be valuable.

Some felt that the tendency of modular scheduling to expose the weaknesses and at times simple laziness of some teachers would have great bearing on the differentiation of staff assignment and perhaps even on standards of teacher hiring and licensing in the future.

In these interviews, administrators reiterated the complaint of students and teachers regarding the inadequacy of facilities and resources to meet the demands of a modular schedule innovatively applied. The open laboratory concept, popular as it is with students, calls for laboratories that are larger than those usually in existence and laboratories designed to accomodate the greater variety of individual student activity that occurs during independent study time. They feel that to maintain the motivation of students that a successfully operating modular schedule must be supported by adequate resources and imaginative application of new media.

In discussing the reaction of students to the new programs, the administrators expressed the conviction that although it is too soon to say that student achievement has increased measurably, it is obvious as far as they are concerned that great strides have been made in the effective domain. One group went so far as to suggest that experience in their school shows that much more attention is going to have to be given to establishing goals for students that lie in the affective rather than the cognitive domain than ever before.

Admitting that they see little of the students who are above average and working well under the new system, many of the administrators expressed extreme concern for those students who were not doing well or who were actually doing worse. It is worth noting that just as an open schedule directed toward achieving flexibility exposes the problems of teachers and educational functions formerly the traditional school structure, so does it expose the problem of students. The point has to be made that the fact that these problems are becoming acute under a modular schedule is a positive sign, especially considering that some of them are the same problems that have been too long ignored under the rigid pattern of traditional education. These problems, the administrators admit, are not yet being adequately dealt with but on the other hand that they are at last being confronted.

Counselors complain that their counseling functions often are superceded by administrative demands the modular schedule seems to place upon them. One, for example, said attendance monitoring consumed most of her time. It is apparent from these interviews, however, that the increased intimacy of the contact between teachers and students is placing more counseling responsibility upon the teachers than previously was the case. Whether this is good or bad from a professional standpoint has yet to be determined and acted upon.

Administrators noted that the problem in assigning responsibility generally is more complex under the modular schedule, and indicated that parallel conflicts arise in achieving balance in assigning teaching loads. As a consequence, in one school, some teachers may be assigned as many as several hundred students in various grouping configurations while others may be responsible for as few as sixty. Still, they recognize these to be problems that must and can ultimately be worked out and that do not necessarily reflect upon the greater educational potential of the modular schedule.

Teachers, the administrators agree, do need more experience and training in the special skills demanded of the small group and large group configurations. The consequence of this need is that there is not as much change in the modes of instruction that such configurations both imply and demand. Still, many of the administrators interviewed credited the teachers with having taken this problem in hand and with having made great strides as individuals. Thus, a significant number of individuals, they say, are individualizing their instruction and writing performance curricula and performance package instructional units that they very likely would not have been able or perhaps inclined to write before modular scheduling was introduced. The increase in work that modular scheduling has imposed upon teachers (which one administrator estimated as an increase of from thirty to fifty percent) generally is being expended in the area of improvement of instruction.

Since administrators are more directly responsible to the community and most directly in contact with it, they were especially concerned with and aware of the effect that the new instructional program is having upon school and community relations. The relationship between school and community can make or break the move toward innovation and change, and in one project school it specifically broke it. Though much of the comment of administrators in these interviews dealt with the effects of the change on students and teachers, and such comment was more often favorable than not, the most important fact to be learned from the interviews with administrators is that the lines of communication between the school administration and teachers and between the administration and the community must be kept open if innovation is to progress or even to survive.

In the school mentioned as a case in point, the community ultimately elected a majority to the local school board on the promise that their election would result in abolishing with modular scheduling in their school. The administrators interviewed in this school confessed that the community had not been informed of the objectives of flexible scheduling nor warned of the initial problems that such a major change would entail. Combined with the lack of experience on the part of teachers (a factor that had to be taken for granted during the first year of implementation), the resulting antagonism from the community may have placed this school further away from progressive change than it was before it joined the project.

Administrators, teachers, and students in particular all reported that they have a difficult time explaining independent study time, a concept without which the schedule cannot be made flexible, to parents. Parents to whom it is not clearly explained think of independent study time as "free" time and since they do not observe the students who are making increasingly better use of it, they tend to characterize the effectiveness of the school with a modular schedule on the basis of the number of students apparently not in class. A survey of students in the halls of one school showed that all but a few of the students were there for some legitimate purpose; they were on their way to a scheduled group meeting or on the way to a resource center, and were not in fact loitering as uninformed parents are inclined to suppose.

Fortunately, the administrators discussing the consequence of failures in communication between themselves and their staff or between themselves and the community recognized these failures as their own. Where these failures have not occurred, the administrators felt modular scheduling has provided much greater opportunity for meaningful communication between themselves, teachers, and students. All of those interviewed seemed aware that the effect of failure to communicate can stop or bring about major setbacks in their programs.

CONCLUSIONS

Modular scheduling provided a valuable and important tool for permitting alternatives in curriculum, instruction, and supervision in project schools. Not only have significant changes occurred in the schools as a result of its use, but the methodology for even greater change has been mastered. It has provided a base for continuous change and improvement. Teachers, administrators, and counselors who participated in the project are technologically geared for change, and are increasingly becoming psychologically geared for it. They are beginning to realize that modular scheduling permits many alternatives that were impossible under traditional scheduling, and also to realize that 99 percent of the alternatives still are to be tried.

The vast majority of students as well as teachers prefer modular scheduling to traditional scheduling, even after as little as one year's experience with it. Students seemingly adapt more readily to modular scheduling than teachers, although initial experiences with unscheduled time cause much uncertainty. Few teachers or students wish to return to a traditional schedule in spite of difficulties encountered in the transition.

We were naive in assuming that the traditional structural organization was the stumbling block that hampered every effort in curriculum change, however. Getting rid of the restrictions imposed by traditional scheduling permitted and encouraged many changes, as evidenced by the detailed evaluations in this section and in the appendices, but it also exposed other weaknesses. Many changes could not occur until the structure and organization of the school changed, but it did not necessarily follow that major changes occurred just because the structure was changed. Most of the changes that could have occurred have not.

Thus, in terms of formal obligations and objectives, the project was a resounding success. But it was a hollow victory, a formal success rather than a real one. We were quite successful in getting schools to adopt modular scheduling, but not always successful in convincing them that we were not primarily interested in the schedule itself. The schedule is a vehicle for change and improvement, but the major changes and improvements are yet to come. Traditions are not easily changed, but some perspectives on teaching and learning have changed as a result of the project. That in itself might be the most important accomplishment.

A P P E N D I C E S

APPENDIX A

PROJECT CRAM and PERFORMANCE CURRICULUM

By Max Lane and Ray O'Dell
Marshall High School, Portland, Oregon

THE BEGINNING

During the Spring of 1967, Dr. Don DeLay of the Stanford Education Center invited John Marshall High School of Portland, Oregon, to participate in one phase of Project CRAM. The Stanford University research staff offered financial support for (1) the writing of performance curriculum based on learning packages (2) preparation of a set of comprehensive parallel achievement tests, (3) consulting assistance and sampling design, and (4) clerical assistance. D- Gaynor Petrequin, Principal of John Marshall High School, chose ... t year course in algebra, with an enrollment of more than tw... d students, for the study. Two teachers, Max Lane and Ray O'Dell, ... cted since they were familiar with the preparation of behavioral obje... s and performance criteria. Mr. William Gorth, a research assistant at Stanford, visited Marshall High School in May. He explained in detail the design and purpose of the Project CRAM and established the lines of communication between Marshall and Stanford.

THE ESSENCE OF PROJECT CRAM

Comprehensive Random Achievement Monitoring, or Project CRAM, is a new concept of evaluation conceived by Dr. Dwight Allen and Dr. Don DeLay at Stanford University School of Education. It provides for a continuous monitoring of individual student performance, course content, and method of instruction. There are two main concepts combined effectively to measure these items: (1) random sampling of achievement, and (2) monitoring in terms of overall expected criteria rather than unit criteria now commonly in use.

Random sampling means that parallel achievement tests will be administered at predetermined intervals throughout the year to randomly selected samples of students. A student may have four tests the first four weeks of school while another student may have only one. However, the sampling procedure is designed so that, by the end of the year, each member of the class will experience a similar amount of monitoring time.

In contrast to the traditional measures of classroom achievement, which evaluate one unit at a time, Project CRAM uses a battery of comprehensive tests which are based on the final behavioral objectives set for a particular course. Each student is given one of the test forms the first week of school as a diagnostic device to determine how well he is prepared for the entire course.

By using the monitor data received from Stanford, a learning curve may be constructed for each class member, starting with the initial test and progressing through the year. Naturally, this curve will vary; however, it is anticipated that there will be at least a gradual rate of improvement for all concerned. Each student may break down the data received to determine where the various weaknesses or strong points occur and the amount of learning retention from week to week. This learning profile will also enable the teacher to spot the individual students who may fall outside of the normal range of expectation.

Specific instructional objectives must be developed for each course by the individual teacher. The requirements of Project CRAM neither mold nor limit in any way the choice of objectives. The teacher is free to formulate the objectives of the course according to his own convictions. The Project requires that the objectives be transformed into measurable aspects of student behavior and that the levels of proficiency, performance criteria, desired at the end of the course be carefully enumerated.

PERFORMANCE CURRICULUM

It has always been apparent that not all students in a group learn and progress at the same rate, that there is a wide diversity of backgrounds and abilities and that interest and industry vary greatly. Creative teachers have experimented with a wide variety of techniques to attempt to come closer to meeting these individual differences. They have found that the job of satisfying these differences by using traditional structure is almost impossible in the conventional class of thirty or thirty-five.

Performance curriculum or continuous progress is a model designed to facilitate the task of the classroom teacher in providing for individualized instruction and learning. It offers an opportunity for each student to proceed at his own rate of speed, commensurate with ability, interest, and motivation. The heart of the program is the learning unit or package which is a self-contained set of teaching-learning materials designed to teach a single concept and structured for individual and independent use. The ingredients of each learning package make performance curriculum much different from programmed booklets or workbooks. Each package contains at least six major parts: the main concept, the behavioral objectives, methodology, self evaluation, a post-test, and opportunity for depth study.

Teachers who are interested in building, organizing, and implementing performance curriculum first of all need to become proficient in the development of learning packages. Information regarding the ingredients of a unit of learning and the philosophy behind continuous progress may be obtained by contacting Gardner Swenson, Materials Dissemination Center, 27965 Cabot Road, South Laguana, California. The research staff at Stanford University also has recently composed a teacher's guide for preparing educational objectives, performance criteria and the evaluation instruments.

Before actual work begins, there are many facets of the program that should be considered. These include the following: (1) parameters of instruction, group size, length of period, and frequency of meeting; (2) provisions for a variety of teaching methods, materials, and media of instruction; (3) measurements of performance; (4) quality standards in terms of final criteria; (5) mechanics for charting student progress; (6) grouping plans which will permit a variation of group size; and (7) provisions for feedback to the pupils. In comparison to the traditional method of teaching, performance curriculum demands many more hours of preparation and organization. To achieve this, teachers need to be given released time or financial incentive.

The rewards justify the amount of time spent in preparation. Students seem to become more excited about learning since the objectives clearly state what they are to do, and they are evaluated in terms of the stated objectives. There is more opportunity for pupil self-evaluation and self-direction. Interaction between student and teacher is magnified greatly.

THE BUILDING OF THE CURRICULUM

Certainly the first step was to formulate the broad concepts of the course in writing so that the students would know exactly what we as teachers would expect of them during the year. It was decided to build a sequence of thirty-five different concepts, each to be labeled a "learning package." Each package would be a self contained unit based upon the major concept.

These units needed to be organized so that the student could progress through each at his own rate of speed. This progress would depend on the individual differences of each student, how rapidly he would absorb the material, the amount of time he wished to devote to the course, and how he would adjust to individualized instruction and self-direction. Since the learning package would be developed in sequence (that is, the student must complete package one before proceeding to package two), it was necessary to include all the skills in package one that were required for the next package.

Each of the thirty-five instructional packages contain the following items:

(A) The major concept.

(B) A set of behavioral objectives which indicate:

(1) The terminal behavior expected of the student.
(2) The conditions under which that behavior can be performed.
(3) The minimal acceptable performance.

(C) A learning methodology to develop the competencies in the behavioral objectives.

(D) A self-test as the student's personal method of determining his achievement of the stated behavioral objectives.

(E) A post-test to determine the students progress in meeting the stated behavioral objectives, to be corrected by the teacher.

(F) Independent study performances, entitled "Quest", as possible supplementary activities to enhance the student's performance of the stated behavioral objectives.

THE ORGANIZATION OF THE COURSE

Since John Marshall High School has operated for a number of years on a flexible schedule which includes team teaching and independent study, performance curriculum could be readily adopted and most effectively used.

A two-man teaching team was formed for the anticipated two hundred students pre-enrolled in first year algebra. It was decided to structure one large group meeting of three modules and four medium group lab sessions of two modules per week per teacher. A module at John Marshall is a twenty minute time unit; there are twenty-one modules in the school day. To eliminate the duplication of filing space and facilities and to provide room for the necessary "hardware" a large group station (capacity 70) was chosen for the performance curriculum headquarters. All of the medium groups meet at this station and in the majority of cases they meet "back-to-back". With this structure it is possible to form groups within a group since there are two instructors available.

One meeting per week the students report to a large group station that has a seating capacity of 120. This room is equipped with an overhead projector, tape recorder, turntable, and speaker system combined into one teaching console. Movie and film-strip projectors are also readily accessible. During this time the large group presentations are geared to the average of the group, with the rate of progress anticipated to be a completion of one package per week. These students who are far beyond the average of the group are given the option of attending large group or working in the mathematics resource center. Usually they elect to attend the large group presentation.

The basic text selected for the course was Modern Algebra by Dolciani, Berman, and Freilich, published by Houghton Mifflin Company. The content of the book as well as the availability of the accompanying volumes of overlays and programmed learning booklets appealed to both instructors. Both of the programmed learning booklets and the overlays were purchased during the summer along with a set of film strips. The programmed learning booklets are used by the student if he fails to pass the post-tests, and the particular section in the programmed learning book must be completed before retaking the test. They are also available at all times for optional activity. Students may use the individual film strip projectors at any time in the medium groups or during non-scheduled study time.

Since each package contains a minimal acceptable performance, an entirely different evaluation system was adopted with the consent of the administration. To obtain a full one year credit in first year algebra a student must satisfactorily complete all of the thirty-five learning packages.

If he is unable to complete this number of packages, he will receive only a 1/2 credit but may finish the required amount the following year. A transfer student may begin the program at a point designated by the instructor. If a member of the class is able to finish all of the thirty-five packages in one semester, he will receive a full credit and have the option of starting an advanced algebra course or enrolling in an entirely different subject. Those who complete the last package in the middle of the second semester may continue on into advanced algebra, or receive enrichment credit by functioning as student assistants.

In order to place more emphasis on learning and relieve the students of some of the pressures of grading, it was decided to make available only two grades, an A or a B. After completing the learning activities in a learning unit, the student shows the instructor the work completed, places the material in an individual file and is eligible to proceed to the self-test. This test has no effect on the grade but is used by both the student and the instructor to determine the achievement of the stated behavioral objectives in the package. A great deal of learning takes place at this point, as the student corrects his own test and discovers any apparent weaknesses. If the student does not achieve at the minimum level, he is instructed to study the specific objectives where he displays these weaknesses and seek help as it is needed. He may take the self-test as many times as he desires.

When the student feels he is ready to take the post-test he informs the instructor and receives the test and an answer sheet which indicates the point value of each question. If he passes the post-test with a score of 95 points or better, he receives an A for that particular package. If he scores between 80 and 94 points he will have a B. An achievement below 80% means he has failed the unit. It is mandatory that he successfully pass the post test before proceeding to the next package.

At the end of the first nine week grading period, the average paced student should complete package eight or nine. This student will earn either an A or B, and theoretically 1/4 credit. The student with two finished packages will earn an A or B but only 1/16 of a credit. This system places the responsibility directly on the student as to the grade to select and the amount of material to be covered. To depart from the traditional evaluation symbols of A or B, a color code was devised, blue for A and red for B. Yellow indicates that the student has failed the post-test one or more times. As the student completes each package, he colors the appropriate space on a progress chart on display in the performance curriculum center. As each grading period nears, the student needs only to glance at the chart to determine the particular grade that will appear on his report card: majority of blue, an A; majority of red or yellow, a B.

THE DEVELOPMENT OF THE CRAM MONITORS

After completion of the thirty-five "learning packages," work began on thirteen parallel achievement tests, designed to evaluate the final performance objectives of the course. To obtain reasonable, reliable and valid monitors, three questions were prepared for each behavioral objective in each package totalling approximately seven hundred items. These items were then transformed onto computer sheets using the appropriate computer symbols. This task was rather difficult since many of the mathematical symbols were not included in the computer language. It was necessary, therefore, to devise a method of coding to handle special problems. This proved to be very valuable in preparing the final form of each test. Each of the thirteen forms contain thirty test questions with five multiple choice answers.

THE IMPLEMENTATION OF THE CURRICULUM

During the first week of school it was necessary to devote a considerable amount of time explaining performance curriculum, the CRAM Project, and the general mechanics of the course. Since the majority of the students were freshmen, it was anticipated that this entirely different organization would pose many problems. However, after the first package was explained and completed step-by-step, the students experienced no particular difficulties. The few sophomores enrolled in first year algebra found it much harder to acclimate to the independent work since they were more accustomed to traditional learning. The freshmen accepted the course with the philosophy that it was part of the whole new experience of attending high school.

The transition from the traditonal to a continuous progress method of teaching was extremely difficult for the teachers, as the emphasis changed from group instruction to a one-to-one relationship between teacher and pupil. The usual simple daily pattern of correcting daily work, explaining the next assignment and devoting class time for completing this assignment no longer existed. Instead, the teacher became surrounded by students all desiring different materials, tests, and explanations of problems. The instructor's role under this arrangement had changed radically from the well-ordered lecture routine to one of supervision. To eliminate the confusion prevalent at the beginning of each small group session, certain ground rules were drawn so that the teacher would at least have time to take attendance, and more students could be assisted in a more efficient manner.

It soon became apparent that the filing system was inadequate and needed immediate revision, as too much time was being wasted digging for desired material. The standard filing cabinets were replaced with open vertical slots so that a particular package or post test could be spotted immediately. An efficient filing system is absolutely essential for a smoothly functioning program.

It was also soon learned that the students wished to have the post tests corrected immediately so that they would not have to wait until the following day to begin work on the next package. This presented quite a problem during the early weeks of the course when the students were all working near the same place in the program and the packages contained easier material. But as the packages have become more difficult and the students' progress has spread rapidly, the task of correcting tests has eased considerably. Student aids from the advanced algebra sections, who volunteered their services, recently have contributed greatly to the job of correcting tests and helping with individualized instruction.

A weakness of performance curriculum that concerns the instructors at this time is the possibility that many students will miss many of the insights, mechanics, and techniques made available only by the teacher. There is not sufficient teacher time to give, on a one-to-one basis, the groundwork for proficiency in all the manipulations and technical skills. This groundwork must now be presented in a large group of a hundred or more students, and in contrast to the previous program, not all of the students will be concentrating on that particular area of the large group presentation. To partially remedy the situation, it has been decided to set aside one medium group session per week as a question-answer period; the teacher working at the board and encouraging class discussion. In addition, the flexibility of the scheduled back-to-back medium groups offers the splitting of groups for those interested in extra help.

STUDENT MOTIVATION

It is apparent that there are many tangible aspects prevalent in performance curriculum which excites students to learn, and there are also many effective things that are difficult to enumerate. Perhaps the most important attribute is that the student has a definite and clear goal to pursue. When this goal is reached, the student will have completed all requirements for the course with no strings attached, and will be free to participate in some other learning activity. This certainly is a contrast to the common practice of teaching, where the students are not aware of any particular aim of the course, and have only to look forward to the end of the year as the goal.

The student finds also in performance curriculum that learning becomes more personal, that he is free to work at his own rate and obtain information from the instructor only when it is needed. The instructor no longer dominates the scene but instead serves in the capacity of a helpful resource to learning.

After the first nine weeks of school, it is evident that the number of pupils utilizing their free time has greatly increased over last year. In fact, the demand for individual instruction and the special requests for packages and materials during the non-scheduled modules has kept the instructor constantly alert. It is also surprising to receive the many student requests for additional assigned lab time which will insure a meeting with the teacher. The instructors feel that the creation of this enthusiasm may be partially credited to the many methods and different materials designed during the summer which are part of the learning packages.

Each student has a profile sheet which indicates the results of the CRAM tests and the number of packages completed. A large wall poster attractively color-coded shows the progress of each student as he completes each package. This enables each pupil to check his rate of progress in relation to the other members of the class. The results of each CRAM test are posted with a list of the objectives that have been mastered.

SUMMARY

Granted there are some apparent weaknesses in the performance curriculum now in operation at John Marshall High School, but these can be remedied.

It appears that this type of program will have some influence in the development of new approaches to learning in the future. One very strong point in its favor is the presence of the behavioral objectives and measurable criteria. In the past, educational objectives or goals have been written in a vague, meaningless manner. They certainly did not trigger the students' desire to learn and were devoid of any means of evaluation. A behavioral objective tells the student exactly what the teacher expects him to learn, and how this learning will be measured. This seems to be a step in the right direction.

Another strong point in favor of continuous progress is the emphasis on learning for all, the accelerated as well as the slow. It seems that a slower student should not be deprived of the opportunity for success in any subject. If it requires a longer period of time to learn, then we should not set up limits in terms of grading periods. One should allow this student ample time to perform. Likewise, the accelerated student should not be forced to be idle and wait for the less able to catch up.

Grading should not have precedence over learning. The minimal acceptance performance prevalent in a continuous progress program will place demands for a change in the "ageless" practice of the pre-determined grading categories of A, B, C, D, and F. Now, the pupils formerly destined for the C, D, or F slots on the "Bell" curve have been relieved of this distinction. The grading pressure has been released, since only an A or B performance is accepted before progression to the next learning package.

The instructors feel confident this new program will benefit all of the two hundred students in first year algebra at John Marshall High School.

APPENDIX B

CASE STUDY: GOLDEN HIGH SCHOOL
GOLDEN, COLORADO

In an attempt to present a detailed picture of the many considerations involved in planning for, implementing, and evaluating the effects of a modular schedule, Golden High School prepared a pamphlet entitled, "Operation Individualized Instruction 1968." Golden High School participated in the project all three years. The pamphlet resulted from the efforts of Principal Dudley Solomon, Assistant Principal Gerald Difford, Title III ESEA Director Sam Clifton, and was prepared by members of the faculty and staff of the school.

Permission to reproduce contents of the pamphlet for inclusion in this report has been granted by Golden High School and the Jefferson County Public Schools to the Educational Research Information Center (ERIC) and to the organization operating under contract with the Office of Education to reproduce ERIC documents by means of microfiche or facsimile hard copy, but this right is not conferred to any user of ERIC materials. Reproduction by users of any copyrighted material contained in documents disseminated through the ERIC system requires permission of the copyright owner.

JEFFERSON COUNTY PUBLIC SCHOOLS

When statehood was granted to Colorado in 1867 the boundaries of Jefferson County were drawn to include the mountainous forests and fertile farm land. It encompasses an area two-thirds as large as the state of Rhode Island and possesses a landscape that rises from residential areas to evergreen forests and the majestic Colorado Rockies. Today, more than half of Jefferson County's 791 square miles are covered by the forests and mountains of the Pike, Arapahoe, and Roosevelt National Forests. The elevation ranges from 5,300 feet in the east to 10,000 feet in the western sections.

Jefferson County abuts the western edge of the City and County of Denver. The eastern portion is comparatively flat; the western portion, mountainous. It is estimated that about 80 percent of the population lives in the valley and foothills just west of Denver, now comprising a vast suburban area of metropolitan Denver.

In 1951 thirty-nine separate school systems were merged, by vote of the citizens, into one, and the new district's boundaries became the same as the county's. As a result the Jefferson County Public Schools, District R-1, now serves mountain, rural, and urban communities. Because the school district is the only major commonly shared organized unit in the county, it assumes great importance in the total community life.

From the enrollment of 10,000 students in September, 1950, the district has grown to an enrollment of 57,100 in September, 1967. A student population of more than 62,000 is estimated for 1970. Non-public schools in Jefferson County enroll slightly more than 2800 students.

Total assessed valuation in Jefferson County for 1967 is $399,830,600. A total mill levy of 55.1 has been approved for the 1967 budget of Jefferson County School District No. R-1.

The phenomenal growth of the Jefferson County Schools has been accompanied by varied innovations, all of it carried out to fulfill a promise made at the time the merger took place; that educational opportunities in every part of the county would be equalized, and that no child, whether in the mountains or in the suburbs, would be deprived of new material or improved teaching techniques.

To serve the present student population, the district employs more than 2,900 certified personnel on the teaching and administrative staffs. In addition to personnel with administrative duties, the centralized school district staff includes specialists in research, technical and vocational education, adult education, language arts, social studies, health and physical education, music, mathematics, special education and child study services, guidance and counseling, foreign language, elementary education, junior high school education, senior high education, outdoor education, curriculum, safety education, planning, library science, art, instructional aids, personnel, science, data processing, architecture, engineering, finance, accounting, and purchasing.

As of September, 1967, the Jefferson County School District educates youth through use of 119 schools in the following categories:

- 89 Elementary and Cottage (Primary unit) Schools
- 2 Kindergarten-Grade Nine Schools
- 18 Junior High Schools
- 1 Junior-Senior High School
- 8 Senior High Schools
- 1 Special Education School

The district's Planetarium serves students from grade 3 through the senior high school level on an organized basis using a curriculum plan directly related to the on-going learning program at each grade level.

Formerly a 555-acre mountain ranch, the district's Outdoor Education Laboratory School, located in a valley near the Continental Divide, serves every sixth grader. These elementary school students attend the Laboratory School for an entire week, experiencing a planned program related to topics suitable for study in such a locale and their regular classroom curriculum.

The school district also has a stadium, service center, instructional materials center, and an administration building.

GOLDEN HIGH

Golden High School serves the city of Golden and the surrounding suburban and mountain areas. The school population has grown in recent years to 900 students and it is expected to reach 1300 or more by 1970. The present facility, a campus-style arrangement, was opened in 1957-58. An additional building was opened in the fall of 1965 and further additions are in the planning stage at present.

Golden High School students come from all levels of socio-economic backgrounds; but predominantly from middle and upper-middle class families.

Students are drawn from three junior high schools, one of which is on a flexible-type schedule.

Golden offers a comprehensive high school education for its students. Approximately 50% of each graduating class attends college. The annual drop-out rate from our high school is about 4%.

Description of Golden High School, November 1, 1967

ENROLLMENT: Grade 10 - 347 Grade 11 - 260 Grade 12 - 383 Total: 890

FACILITIES:

25 General Classrooms	1 Photo Lab
4 Science Classrooms	1 Student Center
1 Instrumental Music Room	3 Counselor's Offices
1 Vocal Music Room	1 Ass't. Principal's Office
1 Library and listening Center	1 Student Council Room
1 Industrial Arts Shop	1 Clinic
1 shop office	1 Attendance Office
1 finish room	1 Homemaking Room
1 Auditorium	6 Resource Centers
1 Kitchen (4 serving lines)	3 Gymnasium Areas
1 Architectural Drawing Room	1 Computer Room

Complete tract, baseball field, tennis courts, football field and soft ball diamonds.

STAFF: A staff of 49 direct the education program. This includes 43 classroom teachers, a librarian, 3 counselors, 1 assistant principal and a principal.

There are 4 secretaries, 6 lay assistants, and 5 custodians. There are seven cafeteria ladies to furnish over 750 hot lunches each day.

As a group the professional staff has ---
- - taught for 454 years
- - attended college or universities for 269 years.
- - 32 bachelor degrees
- - 23 master degrees
- - attended 91 different college and universities in 42 different states and foreign countries.

GOLDEN HIGH SCHOOL EDUCATIONAL OPPORTUNITIES:

English - Speech, Drama, Journalism
Social Studies - World, American, Electives
Mathematics - Algebra, Geometry, Trig-Math Analysis, General Mathematics
Science - Biology, Physics, Chemistry
Foreign Language - Latin, French, Spanish, German, Russian
Business Education - Introduction to Business, Typing, Bookkeeping, Shorthand, Clerical Record-keeping, Touch Shorthand, Office Occupations, Notehand, Data Proc., Work Experience, Distributive Education
Industrial Arts - Wood, Drafting, Architectural Drawing, Upholstery
Home Economics
Music - Bank, Orchestra, Chorus, Choir, Music theory
Art
Physical Education - boys and girls
Miscellaneous - Driver educ., Office Asst., Library Asst., Audio-Visual, Year-book
Athletics - Football, Cross-Country, Tennis, Basketball, Wrestling, Gymnastics, Baseball, Track, Golf.
Activities - (Clubs) Pep, "G", Speech, A.F.S., French, Spanish, Math, Honor Society, F.B.L.A., F.T.A., Key Club, D.E.C.A.

WHAT IS THE GOLDEN PLAN

Golden High School's Educational program is designed to provide students maximum individualized learning experiences.

Basically, the four R's are emphasized. Reading, 'riting, 'rithmatic, and responsibility. The skills, attitudes and appreciations for these areas form the nucleous of the curriculum for a comprehensive high school.

How is the Golden Plan different from other educational programs?

The main difference is the organizational structure of the program; for example, students may meet

1. in large groups for lecture presentations,
2. in small groups for discussions of basic concepts,
3. in laboratory groups for individual research, and
4. in resource centers for independent-directed study.

How was the program defined?

The program was defined by the Golden faculty after concentrated study and evolution from the Ford Foundation Study (1957-1959) at Golden High to the Stanford School Scheduling Project (1965-1968).

This is NOT an experimental program. Although the program is new at Golden, other schools have sucessfully used this plan.

What learning experiences take place in various sized groups?

Large groups - classes (up to 175 students) receive dynamic presentation from well-prepared teachers. Basic facts, concepts, and principles are presented in large groups. Maximum utilization of teaching aids such as overhead projectors, slides, and films is made in these groups.

Small groups - (10 to 20 students) discuss the various concepts and principles presented in the larger classes. They are encouraged to exchange ideas and points of view. By putting concepts in his own frame of reference, the student gains a greater depth of understanding and application is more likely to occur.

Laboratory instruction - students in laboratory groups perform experiments, complete assigned projects, and solve assigned problems. Students are under direct supervision in laboratory learning groups. The size of the group may vary from 15 to 25 or as many as 50 with two teachers available.

Individual directed study - students work on individual or group assigned projects with a teacher or teaching team. Students have the opportunity to expand their knowledge in breadth and depth. Students who need ... ıdual attention receive personalized assistance from the teacher.

How are the classes scheduled?

After the teachers define the course structures of optimum learning opportunities, the Stanford University 8010-370 computer is used to generate the Master student schedule.

The advantages are:

1. Students are given a greater responsibility for learning. They learn to make wise decisions under supervision.
2. Teachers have more time for planning and preparation resulting in improved instruction.
3. Teachers are more readily accessible for individual student assistance.
4. Greater utilization of the school facilities.
5. Students and teachers make greater use of existing resource materials.
6. Students are given the opportunity to take more than the traditional five "solids".
7. Students profit from increased utilization of professional talents of teachers.
8. Students learn ıow to study" more effectively and efficiently.

The disadvantages are:

1. Schedule is still fairly rigid because it is on a five-day cycle for 180 days.
2. Hard to change structures once Master schedule has been set.
3. Cannot change teaching patterns after schedule is once set for 180 days.
4. New students or changes have to be scheduled by hand, no updating of schedule is provided.
5. School has to wait for schedules as long as six to eight weeks.

DECISION MAKING

It is difficult-if not impossible-to pinpoint all factors leading to the successful implementation of flexible scheduling at Golden, but the following are several factors generally agreed to have had profound influence.

1. A relatively stable faculty deeply dedicated to professionalism and inter-departmental cooperation.
2. Earlier implementation of experimental concepts involved in the Trump plan through Ford Foundation Funds at Golden from 1957 through 1959.
3. Use of Block Scheduling from 1962 to 1965.
4. The 1965-1966 school year spent in planning modular scheduling and developing appropriate inservice for teachers.
5. A community, for the most part, willing to accept change in the educational program.
6. Administrative leadership dedicated to improving education through democratic decision-making involving all members of the educational staff.
7. Involvement of key personnel in a special summer school session of the Jefferson County Schools patterned somewhat after summer school programs at Harvard University. These summer programs implement concepts central to the philosophy of Stanford Flexible Scheduling Program.
8. Selection by Stanford University of Golden High School as a pilot school in the Flexible Scheduling Project and the resulting financial support for scheduling and visitation.
9. Visitation by key personnel to schools operating in the framework of flexible scheduling.
10. Visits to Golden by consultants thoroughly familiar with the philosophy and concept of flexible scheduling.
11. A decision-making process which gave each teacher and each department the responsibility for choosing their own program within the framework of school-wide parameters. The following basic parameters were agreed upon first.
    a. 20-minute modules of time.
    b. 20 modules per day.
    c. 5-day cycle.
    d. students are scheduled in most courses 55% to 70% of the traditional amount of time. Sophomores are scheduled a higher percentage of time than Juniors or Seniors.
12. Subsequently, each department was asked to formulate course descriptions and course structures (meeting patterns). The following items were taken into consideration:
    a. Group size-large, medium, small and provisions for individual student-teacher contact. Size of group appropriate to the process.
    b. Frequency of group meeting per week.
    c. Length of class meeting.
    d. Room utilization.
    e. Use of open labs.
    f. Function of departmental resource centers. Size of resource center depending upon purpose.
    g. Assignment of teachers to classes.

In addition teachers were asked to select materials which would become available in resource centers to individualize their instruction and provide ample opportunity for independent study. Representatives of various educational media were asked to meetings to aquaint teachers with resources available in each subject area.

This process of decision making for the 1967-1968 school year began in early November, 1966, and did not end until the first of August, 1967.

COURSE STRUCTURES

Comparative course structures for both the first and second years of modular scheduling at Golden High School are presented on the following tables.

Key to abbreviations:

M/M	mods per meeting (1 mod-20 minutes)
M/W	mods per week
%STR	Percent of structured time
%INDP. STUDY	Percent of independent study time
LARGE GROUP.	41 to 200 students
MEDIUM GROUP	21 to 40 students
SMALL GROUP	2 to 20 students

COURSE TITLE	TEAM TAUGHT	1966-67 PATTERNS LARGE GROUP M/M	LARGE GROUP M/W	MEDIUM GROUP M/M	MEDIUM GROUP M/W	SMALL GROUP M/M	SMALL GROUP M/W	% STR	% INDP STDY	TEAM TAUGHT	1967-68 PATTERNS LARGE GROUP M/M	LARGE GROUP M/W	MEDIUM GROUP M/M	MEDIUM GROUP M/W	SMALL GROUP M/M	SMALL GROUP M/W	% STR	% INDP STDY
104 ENGLISH II	YES	2 / 4	1 / 1			2	2	67	33	YES	3	1			2	4	73	27
105 ENGLISH III	YES	2 / 4	1 / 1			2	2	67	33	YES	2	1			2	3	53	47
106 ENGLISH IV	YES	2 / 4	1 / 1			2	2	67	33	YES	3	1			2	3	60	40
145 SPEECH I	NO	2	1	3	1			33	67	NO	2	1			3	1	33	67
146 SPEECH II	NO			5	2			67	33	NO			4	3			80	20
154 JOURNALISM	NO			2	2	2	1	40	60	NO			2	1	2	3	53	47
163 DRAMA	NO			3	3			60	40	NO			3	3			60	40
224 AMER. HIST.	YES	3	1			2	3	60	40	YES	3	1			2	4	73	27
234 WORLD HIST.	YES	3	1			2	3	60	40	YES	3	1			2	4	73	27
208 SR SOC.STUDY	YES			3 / 2	1 / 3			60	40	NO			2	1	2	2	40	60
205 AM. GOV.	NO			3	5			100		NO			3	1	2	3	60	40
321 BIOLOGY	YES	2	1	5	1			47	53	YES	3	1	5	1			53	47
323 BIOLOGY II	YES					3	1	20	80	YES					3	1	20	80
331 CHEMISTRY	NO	3	1	5	1	1	1	60	40	NO	3	1	2 / 3	1 / 1	1	1	60	40
341 PHYSICS	NO			3 / 5	1 / 2					NO	3	1	3	1	4	1	67	33
342 PHYSICAL SCI	NOT OFFERED									NO			3	2	4	1	67	33
409 SR HIGH MATH	NO			4 / 2	2 / 2			67	33	NO			2	5			67	33
410 ALG PT 2	YES			4 / 2	2 / 1			67	33	YES	2	5					67	33
411 ALG I	YES			2	1			67	33	YES	2	5					67	33
421 GEOMETRY	YES	4 / 2	2 / 1	4	2			67	33	YES	3	2	4 / 2	1 / 2			67	33
423 ACC GEOM.				4 / 2	2 / 1			67	33	NO			3	2			67	33
413 ALGEBRA II				2	1			67	33	YES			3 / 2	2 / 2			67	33
441 ALG TRIG						4 / 2	2 / 1	67	33	NO					3	3	60	40

COURSE TITLE	TEAM TAUGHT	1966-67 PATTERNS LARGE GROUP M/M	LARGE GROUP M/W	MEDIUM GROUP M/M	MEDIUM GROUP M/W	SMALL GROUP M/M	SMALL GROUP M/W	% STR.	% INDP STDY	TEAM TAUGHT	1967-68 PATTERNS LARGE GROUP M/M	LARGE GROUP M/W	MEDIUM GROUP M/M	MEDIUM GROUP M/W	SMALL GROUP M/M	SMALL GROUP M/W	% STR	% INDP STDY
445 TRIG MATH ANAL	No			4 / 2	2 / 1	4	2	67	33	No			4 / 3	1 / 2			67	33
451 MATH ANALYSIS	No					2	1	67	33	No					3	3	60	40
504 FRENCH I	No			2	4			53	47	No			2	4			53	47
505 FRENCH II	No			2	5			67	33	No			2 / 3	4 / 2			53	47
506 FRENCH III	No			3	4			80	20	No			2 / 3	2 / 1			67	33
507 FRENCH IV	No			3	3			60	40	No			2	2			67	33
514 GERMAN I	No			2	4			53	47	No			2	4			53	47
515 GERMAN II	No			2	4			53	47	No			2 / 3	4 / 2			53	47
516 GERMAN III	NOT OFFERED AS A SEPARATE COURSE									No			2	2			67	33
544RUSSIAN I	No			2	5			67	33	No			2	4			53	47
545 RUSSIAN II	No			2	4			53	47	No			2 / 3	4 / 2			53	47
546 RUSSIAN III	No			3	3			60	40	No			2	2			67	33
554 SPANISH I	No			2	4			53	47	No			2	4			53	47
555 SPANISH II	No			2	5			67	37	No			2 / 3	4 / 2			53	47
556 SPANISH III	No			3	4			80	20	No			2 / 3	2 / 2			67	33
557 SPANISH IV	No			3	3			60	40	No			2	2			67	33
533 LATIN I	No			3	4			80	20	No			3	5			100	
534 LATIN COMB	No			3	4			80	20	No			3	5			100	
600 INT TO BUS.	No			3	1	1	4	47	53	No			3 / 2	1 / 1	2	2	60	40
630 BOOKKEEPING	Yes	2	2	1	3			47	53	No	3	1			2	3	60	40
635 REC.KEEPING	NOT OFFERED UNTIL 2ND SEMESTER									No	3	1	2	2	1	2	60	40
640 BUS. TYPE	Yes	2	1	1 / 3	3 / 1			53	47	No	2	2	1	2			40	60

BUS. TYP ALSO OFFERED WITH ONE MORE MEDIUM GROUP MEETING PER WEEK FOR LESS ADEPT STUDENTS DURING 1967-68

COURSE TITLE	TEAM TAUGHT	1966-67 PATTERNS LARGE GROUP M/M	M/W	MEDIUM GROUP M/M	M/W	SMALL GROUP M/M	M/W	% STR.	% INDP STDY	TEAM TAUGHT	1967-68 PATTERNS LARGE GROUP M/M	M/W	MEDIUM GROUP M/M	M/W	SMALL GROUP M/M	M/W	% STR	% INDP STDY
644 OFF. OCCUP.	No			2/3	1/1	2	2	60	40	No	3	1	2/2	1/3			53	47
654 OFF. OCCUP II	NOT OFFERED									No	3	1	2/2	1/3			53	47
650 STENO I	No			2/3	5/1			67	33	No			2/3	4/2			73	27
651 STENO II	No			1	3			40	60	No			1	1			47	53
652 TOUCH TRANS.	NOT OFFERED AS A SEPARATE COURSE									No					2	5	67	33
653 TYPE NTHND	No	3	1	2	4			73	27	No	3	1	2/3	4/1			73	27
990 DIST.EDUC. I	No			3	1	2	3	60	40	No			2/2	7/1			60	40
991 DIST.EDUC. II	No			3/4	2/1	3	2	80	20	No	3	1	3-/3	1/1	2	2	60	40
671 DATA PROCESS	Yes			2	2			53	47	Yes			2	2			47	53
745 INST. ENSEMBLE	No			2	4			53	47	No			3/2	1/3			60	40
724 MUSIC THEORY	NOT OFFERED									Yes			3	3			60	40
744 ORCHESTRA	No	4	1	2	5			67	33	No	4	1	2	4			53	47
742 BAND	No	3	2	3	2			100		No	3	3	2	1			100	
734 MIXED CHORUS	No	2	2	2	2			53	47	No	2	3					40	60
735 CON CHOIR	No	3	2	2	2+			67	33	No	3	3	2	2			87	13
736 CENT. SINGERS	No					3	3	60	40	No	3	3			3	2	100	
732 MEN CHORUS	No					4	1	27	73	NOT OFFERED								
755 BOYS PE II	Yes	2	1	3	2			53	47	Yes	3	1	3	3			80	20
758 BOYS PE III	No	3	2					40	60	No			3	3			60	40
759 BOYS PE IV	No	3	2					40	60	No			3	3			60	40
749 SpPE APP.	NOT OFFERED DURING SCHOOL DAY									No			3	4			80	20
765 GIRLS PE II	No			3/5	1/2			87	13	No			4	3			80	20
769 ADV.GIRLS PE	No			3/5	1/2			87	13	No			4	3			80	20

COURSE TITLE	TEAM TAUGHT	1966-67 PATTERNS LARGE GROUP M/M	M/W	MEDIUM GROUP M/M	M/W	SMALL GROUP M/M	M/W	% STR.	% INDP STDY	TEAM TAUGHT	1967-68 PATTERNS LARGE GROUP M/M	M/W	MEDIUM GROUP M/M	M/W	SMALL GROUP M/M	M/W	% STR	% INDP STDY
702 ART I	No			2	1			13	87	No			3	4	4		80	20
703 ART II	No			2	1			13	87	No			3	3			60	40
704 ART III	No			2	1			13	87	No			3	3			60	40
710 ARTS & CRAFTS	No			2	1			13	87	No					3	4	80	20
714 COMM ART	No			2	1			13	87	No					3	4	80	20
770 DRIVER ED.	YES	2	3					40	60	Yes	2	4					53	47
984 BOYS HOME EC	NOT OFFERED			2	1					No			2/4	3/1			40	60
980 FOOD-MANAGE.	NO			4/2	2/1			67	33	No			2/4	2/1			53	47
982. CLOTH-HOME FURN	No			4	2			67	33	No			2	2			53	47
985 FAMILY LIVING	NOT OFFERED AS A SEPARATE COURSE									No			2	3			40	60
821 INT TO WOODWRK	No									No			2	1	4	2/1	67	33
822 WOODWRKING II	No			2	1	4	2	67	33	No			2	1	3	2	80	20
823 WOODWRKING III	No			2	1	4	1	40	60	No			2	1	3	3	73	27
824 WOODWRKING IV	No					2/2	1/1	13	87	No			2	1	3	3	73	27
903 UPHOLSTERY I	No					4	2	67	33	No			2	1	3	3	73	27
904 UPHOLSTERY II	NOT OFFERED									No					5	1	33	67
814 DRAFTING I	No	2	1			4	1	40	60	No	2	1			3/2	2/1	53	47
815 DRAFTING II	No					2	1	13	87	No					3/2	2/1	53	47
817 ARCH DRAWING	No					2	1	13	87	No					3	2	53	47

LEARNING AIDS

After reviewing many of the available materials, teachers by departments, selected items which they felt would best fit into the individualized learning process. These materials are available in the departmental resource centers for student use during their unscheduled time. Included here are some of the major materials selected by each department.

BUSINESS DEPARTMENT

1. Typewriters
2. Adding machines
3. Transcribing machines
4. Reference books on various topics in Business Education
5. Magazine subscriptions relating to Business

MATHEMATICS DEPARTMENT

1. Filmstrips and individual viewers
2. Programmed materials
3. Monographs on math topics.
4. General mathematics reference materials - paperbacks
5. Calculators
6. Transparencies

ENGLISH DEPARTMENT

1. Filmstrips and individual viewers
2. Prerecorded tapes and tape recorders
3. Programmed materials
4. Numerous copies of paperbacks
5. Periodicals

FOREIGN LANGUAGE

1. Prerecorded and blank recording tapes
2. Tape recorders and phonographs
3. Filmstrips
4. Graded readers

HOME ECONOMICS DEPARTMENT

1. Reference materials - books paperbacks
2. Sewing machines

SCIENCE DEPARTMENT

1. Single concept 8 mm film loops and projectors
2. Slide projector
3. Calculator
4. Filmstrips and projector
5. Reference material - books, paperbacks
6. Periodicals
7. Overhead projector and transparencies

MUSIC DEPARTMENT

1. Tape recorder
2. Head phones
3. Reference material

INDUSTRIAL ARTS DEPARTMENT

1. Slide projector
2. Filmstrips and individual viewers
3. Reference material - books and paperbacks
4. Overhead projector and transparencies
5. Drafting equipment

ART DEPARTMENT

1. Reference materials
2. Overhead projector and transparencies
3. Materials, equipment and supplies for student use during open labs

SOCIAL STUDIES DEPARTMENT

1. Rear projection screen
2. Tape recorder
3. Record player and records
4. Filmstrips and viewers
5. Slide projector
6. Movie projector
7. Numerous types of reference materials - paperbacks, books, atlas, pamphlets and periodicals

PHYSICAL EDUCATION DEPARTMENT

1. Filmstrips
2. Record player
3. Periodicals and magazines
4. Equipment for student use during open labs

LISTENING CENTER - (Library)

1. Foreign Language listening lab
   a. 25 listening stations
   b. 6 listening and recording stations
2. F.M. Transmitter
   a. 4 channel capacity
   b. 15 portable student receivers
3. Individual student filmstrip and slide viewers

STUDENT CHOICES

Students are given the responsibility for selecting various activities for their unscheduled time.

These activities include:

1. Working in any one of the 6 departmental resource centers.

	Room Number	Student Capacity
a. Math - Science Resource Center	B-5	15
b. Social Studies Resource Center	C-4	45
c. English Resource Center	C-1	40
d. Business Resource Center	B-7	30
e. Arts Resource Center	Library	25 plus
f. Listening Center	Library	40 plus

2. Open labs - rooms available in the following subject matter areas with a teacher available.

   a. Art
   b. Physical Education
   c. Woodworking
   d. Drafting
   e. Home Economics
   f. Upholstery
   g. Typing, shorthand, and bookkeeping
   h. Math
   i. Biology
   j. Chemistry
   k. Physics
   l. English
   m. Social Studies

3. Attend special presentations in other classes.

4. Reference work and leisure reading in the library.

5. Counselor services.

6. Individual teacher assistance and counseling.

7. Work off campus either morning or afternoon.

8. Library, office and audio-visual assistants.

9. Lunch served from 10:40 a.m. until 12:30 p.m. Students are not scheduled into a lunch period.

10. Student Center provided for students to sit and talk with each other or just to relax. It is recommended that students spend no more than 2 mods per day in the student center.

11. Supervised study area.

STUDENT CENTER USE AND CONTROL

The student center was designed to handle those students who wanted or needed a short break from their everyday routine. The attendance in the student center ranges from 25 to 100 students during any mod of the day. With a few exceptions, we feel that if students are consistantly spending more than two mods a day in the student center, their school work will probably show a need for improvement. Those students who do not use the resource centers, and spend excessive time in the student center readily identify themselves. These students are scheduled into supervised study areas during their unscheduled time.

Of major importance during the past two years has been the physical condition of the student center. We, at Golden High, feel that it should be appropriately furnished to fit the intent of its use. Through the financial efforts of the student body, teachers and school district matching funds, the student center has been carpeted and furnished this fall. With this improved atmosphere we feel that students will be encouraged to develop greater self-discipline in our student center.

SPECIAL PROGRAM FOR NON-PERFORMING STUDENTS

A small percentage of students have proven themselves incapable of using unstructured time in any meaningful way. At the beginning of second semester, 1967, a special program was initiated for 30 such students, primarily sophomores.

The students were in structured classes in one room during the morning with different teachers coming to the room for instruction. In the afternoon, students had three alternatives. They could obtain work experience, attend regular classes by permission of the teacher, or remain for supervised study.

The curriculum being developed was of high interest, low ability materials and practical content. Approximately 23 teachers shared the responsibility for the instructional program under the direction of a Special Education teacher. The school psychologist and social worker each spent one half day per week in counseling sessions with small groups of these students.

Due to the success of the program during the first year, a second phase called Occupational Work Experience has been initiated this year for returning sophomores and selected juniors and seniors. Students in O.W.E. attend regular classes in the morning plus an occupations class designed to help them in preparing for employment. These students then spend each afternoon away from school with on-the-job training and experience through actual employment in a business establishment. Each student works under direct supervision of a store sponsor. Each receives high school credit and the going rate of pay.

Approximately 30 incoming sophomores this year were identified by their junior high counselors as students who would potentially have difficulty in adjusting to Golden's flexible schedule. These students are beginning the first phase of our special program. They are in structured classes during the day with teachers coming to the student's classroom for instruction. The curriculum this year is being adjusted as it was last year - high interest, low ability materials with practical content. It is possible for students to obtain employment and be released from school during the last hour of the school day.

It is anticipated that these sophomores in phase I of our program will enter phase II, the Occupational Work Experience, their junior year of high school.

In addition to Jefferson County, there are three other sources of financial support. These are:

1. Title I ESEA
   a. Provides funds for the salary of the educational program coordinator

2. Colorado State Board of Vocational Education
   a. Provides funds for the salary of the O.W.E. coordinator

3. Title III E.S.E.A. Individualized Instruction Project
   a. Provides funds for special instructional materials necessary for the operation of this program.

GUIDANCE AND COUNSELING SERVICES

Flexible scheduling at Golden High School has provided students with more time and opportunities to utilize the guidance and counseling services. There are three counselors, one for each grade level. Each counselor starts with a class of sophomores and stays with that class until graduation.

The counseling staff has the services of a full time secretary to assist them in accomplishing the additional clerical tasks associated with this type of scheduling.

There are four basic ways a student can receive individual assistance from the counselors. These are:

1. Students can come to the counselors' office during unscheduled time.
2. Counselors can request students to see them - usually during the student's unscheduled time.
3. Teacher referral
4. Counselor or teacher observation of a student's use of unscheduled time.

A vocational guidance information program has been implemented using the library and resource centers as a means for disseminating vocational information.

Large group guidance and testing is handled through the large group English, History and Driver Education classes. Speakers from business and industry and other areas are often presented to these large group sessions.

In the spring counselors assist the sophomores and juniors in class selection and registration for the next school year on an individual basis. It is now possible with flexible scheduling for students to sit in on class sessions for courses they might take next year.

FINANCIAL SUPPORT

Flexible scheduling has required changes in expenditures patterns. Varying class sizes has necessitated change in physical plant such as removal of permanent walls and replacement by flexible ones to create combination large-small group meeting areas. Individualizing instructional materials has created greater demand for technological aids and multiple sources of materials to meet varied learning levels and make use of learning sources other than textbooks. The use of departmental resource centers has required additional expenditures for clerical help to expedite student use of new materials and media. Team teaching within a flexible schedule framework provides a greater ability to cope with short-term teacher absences and continue the instructional program. Computer generation of schedules requires expenditures for computer time but frees administrative and counseling personnel from tedious hours of hand scheduling. Greater utilization of instructional resources by students results in a greater replacement cost for these resources. More detailed efforts by teachers to meet individual differences result in increased demand for commonplace instructional supplies such as paper, ditto masters, etc. More independent study by students require the availability of individual study areas such as carrels, work rooms, individual lab spaces, etc.

The financial support for these changes at Golden High has come from several sources:

1. Stanford University - Vocational Education Project
2. Title III ESEA - Individualized Instruction Project
3. Title I ESEA - Upward Bound Program
4. Colorado State Board of Vocational Education
5. Jefferson County Public Schools

On September 15, 1966, Jefferson County Public Schools received a Title III E.S.E.A. grant for a project entitled: Individualized Instruction Through

Exemplary Support of Exemplary Programs. There are three schools involved in the project:

1. Welchester Elementary School
2. Oberon Junior High School
3. Golden High School

At Golden High School the "how" of individualized instruction is answered by the flexible scheduling provided by the Stanford School Scheduling System. Computer scheduling is concerned with the student as an individual and not as a lock step class or section. By having the students in scheduled classes approximately 60% of the time, it makes possible independent study for the other 40% of the school day. During this unscheduled time the students can choose any of the 12 activities for study purposes listed previously.

During the school year 1966-67, the Title III ESEA Project expended approximately $30.00 per pupil in providing students with instructional materials that best fit the individualized learning process. These materials are used by individuals and small groups of students in the six resource centers and in open labs.

In 1967-68 the individualized instruction project will provide about $4.00 per student to provide additional materials and supplies. Efforts are being made to determine how these instructional materials are best suited to the educational program at Golden High School by having students complete data cards each time they leave a Resource Center.

Six lay assistants are being provided to work in each of the six resource centers. Their duty is to assist students in locating materials and provide teachers with clerical help. They are paid $1.50 hour and work 7 hours per school day.

To assist teachers with the program on individualized instruction at Golden High School, the Title III ESEA program provides the following:

1. Consultant services to help implement and evaluate the program.
2. Travel expenses for teachers to keep abreast of new developments in education that might have implications for our school.
3. Workshop pay for teachers for continous program development and evaluation.

COMMUNITY INVOLVEMENT IN INTRODUCING A NEW PROGRAM

November, 1965	½ day released time for faculty discussion and decision-making
December, 1965	Students released from classes for orientation and registration 1. Modular Flexible Scheduling - Golden High School
October, 1966	Schools in Change ½ hour T.V. program Channel 9, General Electric - sponsor
January, 1966	Visitations at Junior Highs for orientation and registration
March, 1966	Special PTA meeting to explain purposes of new program.
August, 1966	Article on front page of local paper describing flexible scheduling
August, 1966	Individual student schedules mailed home upon receipt of fees. 2. Student schedules
October, 1966	Failure notices sent home for first grading period
October, 1966	Back-to-school Night -- teacher explanation of objectives
November, 1966	First period report cards sent home - phone calls!
November, 1966	Parent-teacher conference day
January, 1967	Adjustments made in program for students having extreme difficulties
February, 1967	PTA question and answer session on flexible scheduling
February, 1967	Parent visitation program started 3. Letter of invitation to 30 parents each Wednesday 4. Individualized Instruction Title III ESEA 5. Map of School 6. Tape-filmstrip presentation 7. Parent reactionnaire
March, 1967	Orientation meeting for parents of incoming 9th graders
April, 1967	School board election controversy
May, 1967	9th grade students visitation during school day
August, 1967	Series of articles will be carried in local paper

INFORMATION DISSEMINATION - Education Profession

A. Twice-weekly professional visitation days

8. Visitation letter
9. Flexible Scheduling Midterm Summary
10. Visitor evaluation
11-12. 90 day follow-up letter and questionnaire

B. Professional publications

Colorado Department of Education Research papers

13. I.D.E.A. Publications

C. Professional conferences

Stanford University - flexible scheduling conferences

Cherry Creek Schools - innovative practices conference

1. Sources of Evaluation

   A. Staff at Golden High and the R-1 Research Department - Dr. Jim Mortensen

   B. Stanford University

   C. Title III ESEA project on Individualized Instruction at Golden High. Evaluation coordinated by Colorado State College - Dr. Bea Heimerl with Mr. Tom Sullivan and Mr. Vern Harkness, doctoral students during the school year 1966-67. Dr. Al Roark, University of Colorado, will coordinate the evaluation during this school year.

   D. North Central Association and the Colorado State Department of Education.

   E. Parent visitation program.

   F. College and High School Teacher visitation from outside the county.

   G. Distributive Education student's employers.

II. Description of evaluation procedures

   A. The Title III ESEA project on Individualized Instruction is seeking information concerning:

      1. Social interaction of students.

      2. Uses of materials in the departmental resource centers.

      3. Independent study skills developed by the students.

      4. Instructional gains.

      5. Problem solving techniques developed by the students.

      The project uses the following methods to secure data:

      1. Questionnaires

      2. Structured interviews

      3. Anecdotal records

      4. Consultant observation

   B. The staff at Golden High under the direction of the R-1 Research Department is using standardized tests as one method of evaluation.

      1. The 1966-1967 11th graders were given the Iowa Test of Educational Development (ITED) in the fall of 1966 and in spring of 1967.

      2. During the school year 1967-68 all 10th and 11th graders will be given the ITED.

3. During the school year 1968-69 all students will be pretested and post-tested with the Test of Academic Progress (TAP) as approved by the Jefferson County Schools.

C. The North Central High School Accrediting Association will conduct an extensive one-week evaluation during April, 1968. Dr. Hazlett Wubben will be in charge of this evaluation.

D. The Colorado State Department of Education has had many of its staff visiting periodically during the school year. They have been instrumental in directing other high schools in the State of Colorado to visit Golden High and its Modular Scheduling Program.

E. Golden High has recently instituted a Parent Visitation Program. The first year a random sample of parents were invited with the understanding that any interested parents may attend. This year, all parents will be invited during the school year.

F. Since October, 1966, over 800 visitors have observed the program at Golden High. These visitors have included teachers, principals, students, college professors, college students, superintendents, and boards of education from schools considering modular scheduling.

G. Stanford University's evaluation is seeking data concerning:

1. Changes in patterns of discipline problems.

2. School administrators' and counselors' conferences with students in various group settings.

3. Pupil-teacher contact outside regularly scheduled classes.

4. Student use of independent study facilities.

FINAL GRADES

Distribution by Department

1966 and 1967

		ENG.	S.S.	MATH	SCI.	LANG.	P.E.	BUS.	I.A.	MUSIC
A	1966	14%	14%	9%	12%	26%	26%	11%	14%	40%
	1967	9%	17%	11%	15%	24%	28%	20%	21%	48%
B	1966	28%	28%	25%	27%	38%	45%	27%	32%	37%
	1967	24%	29%	24%	32%	33%	43%	28%	28%	27%
C	1966	33%	31%	29%	26%	24%	24%	37%	33%	13%
	1967	43%	31%	27%	29%	23%	[illegible]	27%	29%	15%
D	1966	21%	24%	22%	27%	8%	3%	17%	[illegible]	8%
	1967	21%	19%	21%	16%	16%	9%	16%	12%	7%
F	1966	3%	3%	15%	8%	4%	2%	8%	4%	9%
	1967	3%	4%	17%	8%	4%	5%	9%	10%	3%

A FIRST YEAR PROGRESS REPORT
ACADEMIC ACHIEVEMENT
FLEXIBLE SCHEDULED SCHOOLS

by Dr. James B. Mortensen.
Department of Research and Evaluation
Jefferson County Schools

GOLDEN SENIOR HIGH SCHOOL

In October, 1966, the Iowa Test of Educational Development was administered to all eleventh grade students. The mean Colorado T-score for the composite test was calculated to be 67.48 as compared with the national norm of 65.0. In May, 1967, the test was readministered to 247 eleventh grade students and the mean was found to be 67.84. The test again indicated that the mean scores for the two tests were not significantly different. Therefore, one could tentatively conclude that normal academic growth did occur.

A random sample of sixth students was drawn from the total population. After proper checks were made to determine that the sample was representative of the total population this pre and post-test by stanine interval, scores were entered on a two way frequency table (Table 7).

Examination of this table again reveals a positive relationship between the two measures of academic growth. Thirty-three of the sixty students made normal growth, seventeen students exceeded expectation, and ten did not meet expectation. The computed correlation was found to be .923 with a significance of beyond the .01 level.

The evidence would indicate that the conclusion of normal growth was justified. It should be noted that the movement, although not statistically significant, was in the positive direction.

TABLE 7
GOLDEN SENIOR HIGH SCHOOL
ELEVENTH GRADE ACHIEVEMENT

October, 1966 to May, 1967

Composite Test

X = Stanine Distribution on ITED - October, 1966

Y = Stanine Distribution on ITED - May, 1967

	1	2	3	4	5	6	7	8	9	Total
9							1	1	2	4
8							7	4		11
7						1	9			10
6					3	5		1		9
5				1	7	2				10
4			3	2	6					11
3			2							2
2		2	1							3
1										0
Total	0	2	6	3	16	8	17	6	2	60

$r = .923$
$p < .01$

GOLDEN HIGH SCHOOL EVALUATION TEAM'S OBSERVATION
Title III ESEA Evaluation 1966-67

By: Dr. B. Heimerl, Evaluation Coordinator, Colorado State College
Dr. Vern Harkness, Project Evaluator, Colorado State College
Dr. Tom Sullivan, Project Evaluator, Colorado State College

The evaluation team became first acquainted with Golden High School in December of 1966. The first impression with the Golden Plan was very favorable and remained so throughout the entire period of evaluation. The favorable impression was the result of a number of things but mainly it could be attributed to the quality of leadership, the quality of staff, and the effective communications which existed within the building.

It was apparent at Golden High School that considerable time and effort had been spent with the staff and the principal to create a thorough knowledge and understanding of modular scheduling. Consequently, many of the problems, and the negative attitudes, that might have arisen were avoided. It should be pointed out at this time, however, that there has been some serious problems or difficulties, such as the group of slow learners, but due to the capable leadership and staff, these situations were quickly recognized and the necessary adjustments in the program were made to cope with the situation.

The evaluation team's impression, as mentioned above, was favorable on its first visit in December. In discussion with the Title III Director, the Administration, and the Staff, we received the impression that they were enthusiastic, but somewhat apprehensive about the Individualized Instruction Project. The staff seemed to feel, however, that with the additional lay personnel, the resource centers, and the additional instructional materials made available through the Project that modular scheduling would be more effective than it had been in the last year. The findings of the Evaluation Team tended to be validated with each additional visitation.

Finally, throughout the six month period in which the Evaluation Team worked in Golden High School it was not difficult to recognize the change, growth, understanding, and general acceptance of the modular scheduling and especially the new aspects of the program due to the Title III Project. This change was recognized in both the faculty and students alike. As revealed in the findings of the questionnaires and the interviews there were some areas of concern and difficulty, but for the most part both the faculty and students almost unanimously said that they would rather remain with the modular scheduling organizational pattern than return to the conventional organizational pattern.

In summary, the success of the Individualized Instruction and modular scheduling may be attributed to the following items. First, the leadership at Golden High School appears to be excellent. The administration has a sound understanding and acceptance of the purposes of the program, and has the ability to create a favorable climate for growth and acceptance on the part of the faculty.

On the other hand, the staff has been included in the planning and has had precious experience in programs that were similar. Consequently, the change in organizational pattern was readily accepted by them. The acceptance by staff and administration, and the staff's favorable attitude toward the program, were in the feeling of the Evaluation Team,the two factors that contributed the most to the success of the program.

CONCLUSIONS

1. Staff orientation and participation in the planning of the total program is essential to the success of the program.
2. Time is an essential ingredient in the success of the individualized instruction program. Teachers need to have more time that is not scheduled in the conventional manner in order to converse, counsel, and assist students on a one-to-one basis.
3. That the findings of the questionnaires and interviews indicate that both students and teachers accept and desire to continue the modular scheduling program.
4. The resource centers, the lay assistants, and the instructional materials housed in the resource centers, purchased under Title III, are essential factors in the success of the flexible scheduling program.
5. Effective lines of communication, both formal and informal, are necessary to attain the goals of the program.
6. Where staff personnel were included in the formulation and planning of the programs, the programs appeared to be the most successful.
7. The individualized instruction program, financed under Title III, has contributed toward a positive change in the feelings, attitudes, and interest of students and staff personnel.
8. The process of evaluation, that is the involvement of teachers in the evaluation process, has led to greater understanding, acceptance, and involvement in the program.
9. The findings indicate that the project entitled: Individualized Instruction Through Exemplary Support of Exemplary Programs financed under Title III did accomplish or fulfill the objectives as set forth in the proposal for the project, and as described in the methodology section of the Introduction of this report.

GOLDEN HIGH SCHOOL STUDENT QUESTIONNAIRE

Please check class: Sophomore _____ Junior _____ Senior _____

Directions: The following questions are about modular scheduling and your feelings concerning it at this time. Read the question and then circle either "yes" or "no" You do not have to put your name on the paper. You may write comments on the back of the sheet.

CLASS RESULTS FOR FEB. 24, 1967

		Nov. 9, 1966			Feb. 24, 1967		
		YES	NO	UD	YES	NO	UD
1. Do you feel that varying class sizes (large, small, etc. groups) help you learn better than you did last year?	Srs.				75.5%	23%	.5%
	Jrs.				71.5%	28%	.5%
	Sophs.				82%	18%	0%
	Ave.	73%	27%		76%	23%	1%
2. Is the budgeting of time as serious a problem now as it was at the beginning of the second nine week period?	Srs.				14.5%	85%	.5%
	Jrs.				13.5%	86%	.5%
	Sophs.				11.5%	87.5%	1%
	Ave.	22%	78%		13%	86%	1%
3. Does the Student Center serve a worthwhile purpose for you?	Sr.s				22%	77%	1%
	Jrs.				30%	69.5%	.5%
	Soph.				37%	60%	3%
	Ave.	49%	51%		30%	69%	1%
4. Do you feel that there is an adequate supply of different types of printed materials in the resource center?	Srs.				88%	10.5%	1.5%
	Jrs.				86%	13%	1%
	Sophs.				86%	14%	0%
	Ave.	85%	15%		87%	12.5%	.5%
5. Are the counselors more available for you to see this year?	Srs.				79%	18%	3%
	Jrs.				70%	29.5%	.5%
	Sophs.				76.5%	23%	.5%
	Ave.	73%	27%		75%	23.5%	1.5%
6. Do you feel that High School students are capable of budgeting unscheduled time efficiently?	Srs.				78%	19%	3%
	Jrs.				79.5%	16.5%	4%
	Sophs.				86%	13%	1%
	Ave.	81%	19%		81%	16%	3%
7. Have the teachers usually been available to work with you individually during your unscheduled time?	Srs.				81%	18%	1%
	Jrs.				78%	21%	1%
	Sophs.				81.5%	17%	1.5%
	Ave.	76%	24%		80%	19%	1%
8. Has the use of open labs and resource centers made it possible for you to do more homework at school?	Srs.				93%	6%	1%
	Jrs.				93.5%	5.5%	1%
	Sophs.				97%	30%	0%
	Ave.	91%	9%		94.5%	5%	.5%
9. Is it difficult to locate materials you need in the resource center?	Srs.				14%	82%	4%
	Jrs.				17.5%	82%	.5%
	Sophs.				15.5%	83%	1.5%
	Ave.	20%	80%		16%	82%	2%

Question	Class	Nov. 9, 1966 YES	NO	UD	Feb. 24, 1967 YES	NO	UD
10. Has there usually been work space available when you needed it in the resource centers?	Srs.				83.5%	13.5%	3%
	Jrs.				85.5%	13.5%	1%
	Sophs.				86.5%	12%	1.5%
	Ave.	84%	16%		85%	13%	2%
11. Do you feel the individual use of audio-visual equipment such as tape recorders, filmstrip viewers, 8mm loop projectors, etc., makes learning easier for you?	Srs.				68%	25.5%	6.5%
	Jrs.				76%	22%	2%
	Sophs.				80%	19%	1%
	Ave.	72%	28%		75%	22%	3%
12. Do you feel that you are learning more under modular scheduling?	Srs.				47%	49%	4%
	Jrs.				58.5%	37%	4.5%
	Sophs.				72%	25%	3%
	Ave.	59%	41%		59%	37%	4%
13. Have you had more work to take home this year than last?	Srs.				15%	82%	3%
	Jrs.				25%	73.5%	1.5%
	Sophs.				20%	78.5%	1.5%
	Ave.	34%	66%		20%	78%	2%
14. Do you usually do work in the resource centers that you did in the library last year?	Srs.				75%	23%	2%
	Jrs.				76%	23.5%	.5%
	Sophs.				81.5%	17.5%	1%
	Ave.	78%	22%		77.5%	21.1%	1.5%
15. Have you been able to visit or attend special presentations in other courses during your unscheduled time?	Srs.				58%	40%	2%
	Jrs.				52.5%	47%	.5%
	Sophs.				55%	44%	1%
	Ave.	46%	54%		55%	44%	1%
16. Would you like to see Golden High School continue modular scheduling next year?	Srs.				81%	13.5%	5.5%
	Jrs.				87%	12%	1%
	Sophs.				90%	9%	1%
	Ave.				86%	11.5%	2.5%
17. Do you feel the resource centers and materials help you to develop your study skills?	Srs.				77%	19%	4%
	Jrs.				88%	10%	2%
	Sophs.				91%	9%	0%
	Ave.				85%	13%	2%
18. Do you feel that the resource center and materials help you to work by yourself?	Srs.				85%	14%	1%
	Jrs.				87.5%	12%	5%
	Sophs.				91%	8%	1%
	Ave.				88%	11%	1%
19. Do the resource centers and additional materials make it easier for you to do your school work?	Srs.				82%	15.5%	2.5%
	Jrs.				91.5%	8%	.5%
	Sophs.				95%	4.5%	.5%
	Ave.				89.5%	9%	1.5%
20. Do you feel you have a responsibility for your own education?	Srs.				95%	4.5%	5%
	Jrs.				97%	3%	0%
	Sophs.				97.5%	2.5%	0%
	Ave.				96%	3%	1%

		Nov. 9, 1966			Feb. 24, 1967		
		YES	NO	UD	YES	NO	UD
21. Do you think we should have resource centers next year?	Srs.				95%	4%	1%
	Jrs.				98%	1.5%	.5%
	Sophs.				97.5%	2.5%	0%
	Ave.				97%	3%	0%
22. Do you feel you are learning "how to study" better than last year?	Srs.				74%	24%	2%
	Jrs.				78.5%	18.5%	3%
	Sophs.				91%	9%	0%
	Ave.				81%	17%	2%
23. Do you feel that you are more successful this year in school than you were last year?	Srs.				54%	43%	3%
	Jrs.				60%	34%	6%
	Sophs.				68%	31%	1%
	Ave.				61%	36%	3%
24. Do you have more interests in school this year?	Srs.				47%	50%	3%
	Jrs.				63%	33%	4%
	Sophs.				80%	19.5%	.5%
	Ave.				63%	34%	3%
25. Has there usually been work space available in the open labs when you need it?	Srs.				92%	7%	1%
	Jrs.				89%	7.5%	3.5%
	Sophs.				91%	8%	1%
	Ave.	84%	16%		91%	7.5%	1.5%

APPENDIX C

COURSE DATA

Form A-2 was designed to provide the following: (1) information on the number of courses offered; (2) the number and types of instructional settings provided; (3) the extent of variability in course structure within and between subject fields; and (4) the extent of variations in course content for different groupings of students.

One form was completed for each course offered in each of the project schools during each year of the project. The intent was to provide detailed information about changes in course structure by noting changes that occurred after implementation of a modular schedule.

During the first year of the project, stacks of forms were simply mailed to project schools and teachers were asked to complete one form for each course offered. The number of returns was less than expected, so procedures were revised to insure that complete information on every course was obtained during the second and third years. We were able to secure the missing data for year one, but its reliability is subject to question since it was completed during the Fall of year two. In some instances, teachers were no longer with the schools and new teachers completed the forms on the basis of what they were able to learn from students, administrators, and other teachers.

Year one information on the extent of variations in course content was obtained on the basis of interviews and recorded on a separate form. To obtain more reliable information during years two and three, Form A-2 was expanded to include all those questions which had previously been asked in the interviews. Data that was considered spurious was not processed for evaluation. For the other data, frequencies of response were calculated. Then, percentages for each of these frequencies were calculated based on total responses tabulated. Percentages have been reported for the three categories: (1) academic courses; (2) vocational courses; and (3) other courses. Academic courses include all courses in the English, Social Studies, Mathematics, Foreign Language, and Science departments. Vocational courses are all courses in the Industrial Arts, Business, Home Economics, and Vocational departments. Other courses are those remaining courses in the school's curriculum, including Art, Music, and Physical Education.

A determination was then made of whether the difference in percentage for each question between years one, two, and three was significant. A nomograph developed by Dr. Richard Johnson, Stanford University, was used to make this determination. The nomograph allows a two tailed test of significance to be conducted; a copy of this appears in Table C2 of this appendix. The null hypothesis that there would be no change in percentage between either year one and year two, between year two and year three, or between year one and year three was then tested. Any difference in percentage which met the .05 level of significance was accepted as not being due to chance.

As with other evaluations reported in this study, variance in course structure should not be interpreted as a cause and effect relationship. Implementation of a modular schedule creates the conditions for alternative approaches, but does not guarantee that alternatives will be tried. As the results indicate, some schools were willing to examine many of the alternatives permitted by modular scheduling, while others remained relatively traditional in their approach to course structures.

RESULTS

It may be inferred that implementation of a modular schedule does not automatically lead to an increase in the number or variety of courses offered, either in vocational or non-vocational subjects. For the five schools in which comparisons from traditional to modular scheduling may be made, school D reveals a significant increase in academic courses offered to 9th graders. School B significantly increased the number of vocational courses for 11th and 12th graders, while school A had a significant decrease in the same area. In other courses, school A had a significant increase in courses for 11th and 12th graders, and school D had a similar increase for 12th graders. While there were increases in other schools, they were not significant at the .05 level.

In courses designed to prepare terminal students for immediate employment, schools B and C noted significant increases in academic courses; school B also increased its other courses, but noted a decrease in its vocational offerings. Changes in the other schools in this category did not meet the level of significance.

In preparation of students for occupations that require additional training, schools E and B note increases in vocational courses and school C in academic courses. Courses which explore possible future occupations significantly increased in schools B and C for all three categories. Only school A had a significant increase in the percentage of its courses which prepare students for college, however.

As would be expected, course designs varied widely from school to school. Schools B , D, and E indicate significant increases in the number of academic courses taught by teams of teachers, and school B also had a similar increase in other courses. Large group instruction increased significantly in academic courses in all five comparison schools, and in all but school A for academic courses. Only school B noted an increase in other courses, but when the nature of courses included in this category is reviewed (Band, Chorus, Art, Physical Education, etc.), the appropriateness of such a mode of instruction obviously depends on other factors.

Small group instruction increased significantly in vocational courses in all schools except D, and in academic courses in all schools except A, which noted a significant decrease. Schools B and C have significant increases in small group instruction for other courses.

Schools A and B reveal significant increases in percentage of courses in which independent study is required. In percentage of courses in which students are offered independent study although it is not required, schools E, B, and C had significant increases in vocational subjects, school C in academic subjects, and school B in other subjects. There was a decrease in vocational subjects for this mode of instruction in school A, and in other subjects in school D.

In other aspects of course design, schools B, C, D, and E record smaller percentages of academic courses meeting for only one semester. Significantly larger percentages of academic courses meeting for two semesters are found in schools C, D, and E. Whether this extension of time resulted for instructional purposes or simply for convenience in planning the schedule for an entire year is not known.

Student ability is also a consideration in planning for time requirements for formal instruction in some of the schools. Variance in time for individuals of different abilities significantly increased in vocational and other courses in schools B and C, and in all schools except E for academic courses. There were no clear trends on the amount of time required in formal instruction as related to the interest of the student.

A sample of Form A-2 may be found in Table 1, and it is followed by tables and figures relating to specific questions on the form.

TABLE C1

Stanford University,
School of Education

Voc.Ed. - Flex.Sched.
(Form A 2)
Project Year 2-3

Course Name ____________________

Name of School ____________________

Date ____________________

COURSE DATA

This form is to be completed for each course offered by the school.

1. Respondent's Name ____________________

2. Course code number ____________________

3. This course meets for:

1 1 semester   2 2 semesters

3 other (please specify)

4. This course is offered primarily to students in

____ grade 7   ____ all or several grade levels

____ grade 8   ____ other (please specify

____ grade 9

____ grade 10

____ grade 11

____ grade 12

0 = No Response
1 = Checked Response

5. This course is taken:

1 primarily by boys

2 primarily by girls

3 by both boys and girls

6. For whom is this course required?

______ Specifically required of all students for high school graduation

______ Not specifically required for graduation but taken to fulfill a general graduation requirement

______ Not required for graduation

0 = No Response
1 = Checked Response

7. For what purpose is this course designed?

______ to prepare students for entry into a specific occupation immediately upon high school graduation

______ To prepare students for an occupation which will require more training after leaving high school

______ To explore a possible future occupation

______ To prepare students for college

0 = No Response
1 = Checked Response

8. What is the general post-graduation intent of students who take this course?

______ Enroll in a post-high school program of vocational or technical education (including those in a junior college)

______ Enroll in a four-year college or university (including via a junior college)

______ Immediately seek gainful employment including apprenticeship

0 = No Response
1 = Checked Response

9a. Does the amount of time students are required to attend formal classroom instruction vary with the ability of the students?

__1__ Yes __2__ No

9b. Does the amount of time students are required to attend formal classroom instruction vary with the interest of the students?

__1__ Yes __2__ No

9c. If the amount of time required of students does vary, please describe the variations which exist.

Categories which were developed from responses:

Accelerated Performance and Achievement by Student - Released from Formal Class Meetings.
Different Requirements for Differentiated Credits
High Ability Spends More Time in Independent Study
Interested Students Work Additional Time in Areas of Interest
Material Covered in Class
Open Labs Available for Work by Interested Students
Scheduling Conflicts
Slow Achievement Poorer Students Required to Spend More Formal Time with Instructors.

10 a. Is team or cooperative teaching used in this course?

__1__ Yes __2__ No

b. How many teachers are on the teaching team? ______

c. How is the team organized?

Categories which were developed from responses:

Team Chairman
Shared Planning
No Chairman
Specialized Subject Matter Responsibilities
Sharing of Ideas
Shared Subject Matter Responsibilities
Specialized Structural Responsibilities
Shared Structural Responsibilities
Separate Common Structural Responsibilities
Individual Planning

11a. Do secretaries, clerks, lay readers, instructional assistants etc. assist you in connection with this course?

__1__ Yes __2__ No

b. What are the responsibilities of these people?

______ Supervision of classes or labs

______ Correcting exams

______ General clerical work (typing, duplicating etc.)

______ Attendance taking

______ Other - Please Specify

The Category "Instruction" appeared in the "Other" responses frequently enough to develop it as a separate category.

12a. Is large group instruction provided in this course?

__1__ Yes __2__ No

b. What are the activities of this mode of instruction?

______ Audio-Visual presentations

______ Demonstrations

______ Guest Speakers

______ Lectures

______ Make Assignments

______ Practice and Rehearsal

______ Tests

______ Other - Please Specify

0 = No Response
1 = Checked Response

13a. Is small group instruction provided in this course?

__1__ Yes __2__ No

b. What are the activities of this mode of instruction?

______ Demonstrations

______ Discussion

______ Individual Help

______ Lectures

______ Practice and Drill

______ Problem Solving

______ Projects

______ Reading

______ Review

______ Testing

______ Writing

______ Other - Please Specify

0 = No Response
1 = Checked Response

14a. Is laboratory instruction provided in this course?

__1__ Yes   __2__ No

b. What are the activities of this mode of instruction?

______ Demonstration

______ Drills and Practice

______ Experimentation

______ Individual Help and Study

______ Problem Solving

______ Projects

______ Other - Please Specify

0 = No Response
1 = Checked Response

15a. Is independent study required in this course?

__1__ Yes   __2__ No

b. Do students pursue independent study in this course if it is not required?

__1__ Yes   __2__ No

c. What things do the students do during independent study for this course?

______ Consult teachers

______ Field trips

______ Lab experiments

______ Practice and Drill

______ Prepare for Exams

______ Projects

______ Reading

______ Research papers

______ Solve Problems

______ Take tests

______ Use audio-visual materials

______ Work experience

______ Other - Please Specify

0 = No Response
1= Checked Response

15 d. What kind of assignments are given for independent study?

_____ Course Assignments

_____ Extra Credit Assignments

_____ Make-up Assignments

_____ Pursue Independent Interests

_____ No Assignments

0 = No Response

1 = Checked Response

e. Is the amount of independent study participation the same for all students?

__1__ Yes __2__ No

f. Does the amount of independent study participation depend on the student's ability?

__1__ Yes __2__ No

g. Does the amount of independent study participation depend on the student's interest?

__1__ Yes __2__ No

16. What is your weekly course structure?

Please write answer in appropriate cell

	Large Group	Small Group	Class-size of Approx. 30	Scheduled Laboratory	Open Laboratory	Independent Study	SOUST by machine or hand
Meetings Per Week							
Periods Per Meeting (Modules)							
Minutes Per Period (Module)							
Mean Size of Group (If open lab, estimate number of students using lab per period) (Module)							

COMMENTS: ______________________________

17. Is there more than one section of this course?

1 Yes 2 No

18. How many sections are there? ____________

19. What are the specific criteria for grouping students into these different sections?
Categories which were developed from the responses:

Ability
Achievement
Interest
Subject Matter Content

20 a. Are the course objectives different for these different sections?

1 Yes 2 No

b. If "Yes,", please explain.
Categories which were developed from the responses:

Individual Needs of Student
Content of Subject Matter

21. Are different courses of study used for these different sections?

1 Yes 2 No

22 a. Are different teaching methods used with each section?

1 Yes 2 No

b. If "Yes," please explain what these different methods are.

23 a. Are different <u>textbooks</u> used with each section?

__1__ Yes __2__ No

b. If "Yes," what criteria are used to select different texts?

____

____

____

____

24a. Is there a difference among sections in the kind of <u>instructional materials</u> which are used? (Other than textbooks)

__1__ Yes __2__ No

b. If "Yes," what criteria are used to select these materials.

____

____

____

25 a Are different evaluation procedures used for each section?

__1__ Yes __2__ No

b. If "Yes," please explain.

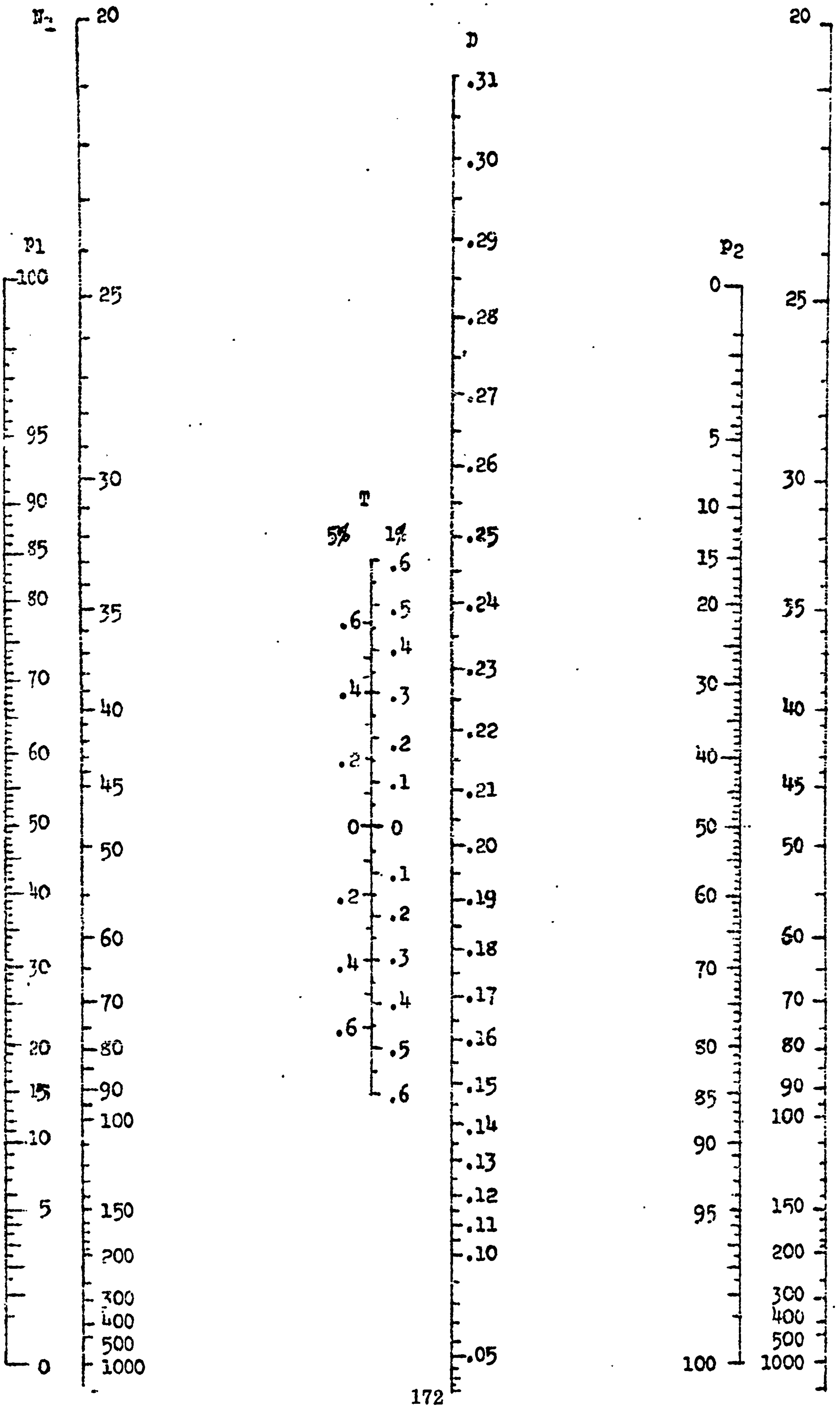
____

____

____

____

TABLE C2



To test the difference of the percent (p_1) based on N_1 cases with the percent (p_2) based on N_2 cases:
Connect N_1 and N_2 with a straight edge. Note where it crosses D. Connect p_1 and p_2 with a straight edge.
Note where it crosses T. If α = .05, reject null hypothesis if T ≥ D on 5% side. If α = .01, reject if T ≥ D on 1% side.

TABLE C 3

Stanford University,
School of Education

Date ____________________

Voc.Ed. - Flex.Sched.
(Form A 2)

Project Year 1

Name of School ____________________

COURSE DATA

This form is to be completed for each course offered by the school.

1. Course name (e.g., World History) ____________________

2. Course code (if available) ____________________

3. This course meets for:

 1 1 semester
 2 2 semesters
 3 other (please specify)

4. This course is offered primarily to students in

 ____ grade 7
 ____ grade 8
 ____ grade 9
 ____ grade 10
 ____ grade 11
 ____ grade 12

0 = No Response
1 = Checked Response

 ____ all or several grade levels
 ____ other (please specify

____

____

____

____

5. This course is taken:

 1 primarily by boys
 2 primarily by girls
 3 by both boys and girls

6. Course objectives (check those items that apply):

_____ This course is required of all students for High School graduation

_____ This course is not required for graduation but is considered to be part of the General Education curriculum of the school

_____ Students who take this course ordinarily intend to continue education beyond High School

_____ Students who take this course ordinarily intend to enroll in a post-High School program of vocational or technical education

_____ Students who take this course ordinarily intend to enroll in a four-year College

_____ Students who take this course ordinarily do not intend to continue education beyond High School

_____ This course is designed as part of a program to prepare students for entry into a specific occupation immediately upon High School graduation

_____ This course is designed to prepare students for a specific occupation, but more training beyond High School will be required before the student is prepared for entry

_____ Other (please specify)

These Categories were developed from the other responses:

Not Required for Graduation
To Explore A Possible Future Occupation

Immediately Seek Gainful Employment Including Apprenticeship

7. The amount of time students are required to attend classroom instruction in this course:

__2__ is the same for all students

__1__ varies with the interest and/or abilities of the students

0 = No Response 1 = Checked Response

If the instruction does vary, give two or three examples of this variation

Categories which were developed from the responses:

Accelerated Student Achievers Released from Formal Class Meetings

Different Requirements for Differentiated Credits
High Ability Spends More Time in I.S.
Interested Students Work Additional Time in Interest Areas
Material Covered in Class
Open Labs Available for Work by Interested Students
Scheduling Conflicts
More Formal Time for Slow Achievers

8. Team or cooperative teaching is used in this course:

__1__ Yes __2__ No

If the answer is "Yes", please describe how the team is organized, and state how many teachers are on the teaching team:

Categories which were developed from the responses:

Specialized Structural Responsibilities
Shared Structural Responsibilities
Separate Common Structure Responsibilities
Individual Planning
Team Chairman
No Chairman
Specialized Subject Matter Responsibilities
Shared Subject Matter Responsibilities
Shared Planning
Sharing of Ideas

9. Clerks, lay readers, instructional assistants, etc. are used in connection with this course:

__1__ Yes __2__ No

If the answer is "Yes", please explain:

Categories which were developed from the responses:
Supervision of Classes or Labs
Correcting Exams
General Clerical Work
Attendance Taking
Instruction
Other

10. Is there more than one section of this course?

__1__ Yes __2__ No

11. If "Yes", are there specific arrangements for grouping students into the different sections?

__1__ Yes __2__ No

(If "Yes", see Form A 3)

The remaining items need not be completed by schools which are presently using a schedule generated by S S S S

12. This course meets ______ periods per meeting,

_______ meetings per week.

13. Large-group instruction is provided in this course:

__1__ Yes __2__ No

If the answer is "Yes", please indicate the group size and then describe how often the large group meets, and the purposes of this type of instruction:

Categories which were developed from these responses:

Purposes:

Audio-Visual Presentations	Make Assignments
Demonstrations	Practice and Rehearsal
Guest Speakers	Tests
Lectures	Other

14. Small-group instruction is provided in this course:

__1__ Yes __2__ No

If the answer is "Yes", please indicate the size of the group(s) and then describe how often small-group meetings occur, and the purposes of this type of instruction:

Categories which were developed from these responses:

Purposes:

Demonstrations	Lectures	Projects	Testing
Discussions	Practice and Drill	Reading	Writing
Individual Help	Problem Solving	Review	Other

15. Laboratory instruction is provided in this course:

__1__ Yes __2__ No

If the answer is "Yes," please describe how often the laboratory instruction is given, and the purposes of this type of instruction:

Categories which were developed from these responses:

Purposes:

Demonstration	Problem Solving
Drills and Practice	Projects
Experimentation	Other
Individual Help and Study	

16. Some form of "independent study" is provided in this course:

__1__ Yes __2__ No

If the answer is "Yes," please describe the nature, extent, and purposes of the independent study program:

Categories which were developed from these responses:

Purposes:

Consult Teachers	Reading
Field Trips	Research Papers
Lab Experiments	Solve Problems
Practice and Drill	Take Tests
Prepare for Exams	Use Audio-Visual Materials
Projects	Work Experience
	Other

Kind of Assignments:

Course Assignments	Pursue Independent Interests
Extra Credit Assignments	No Assignments
Make-Up Assignments	

FIGURE C 1
COURSES FOR 9th GRADE STUDENTS

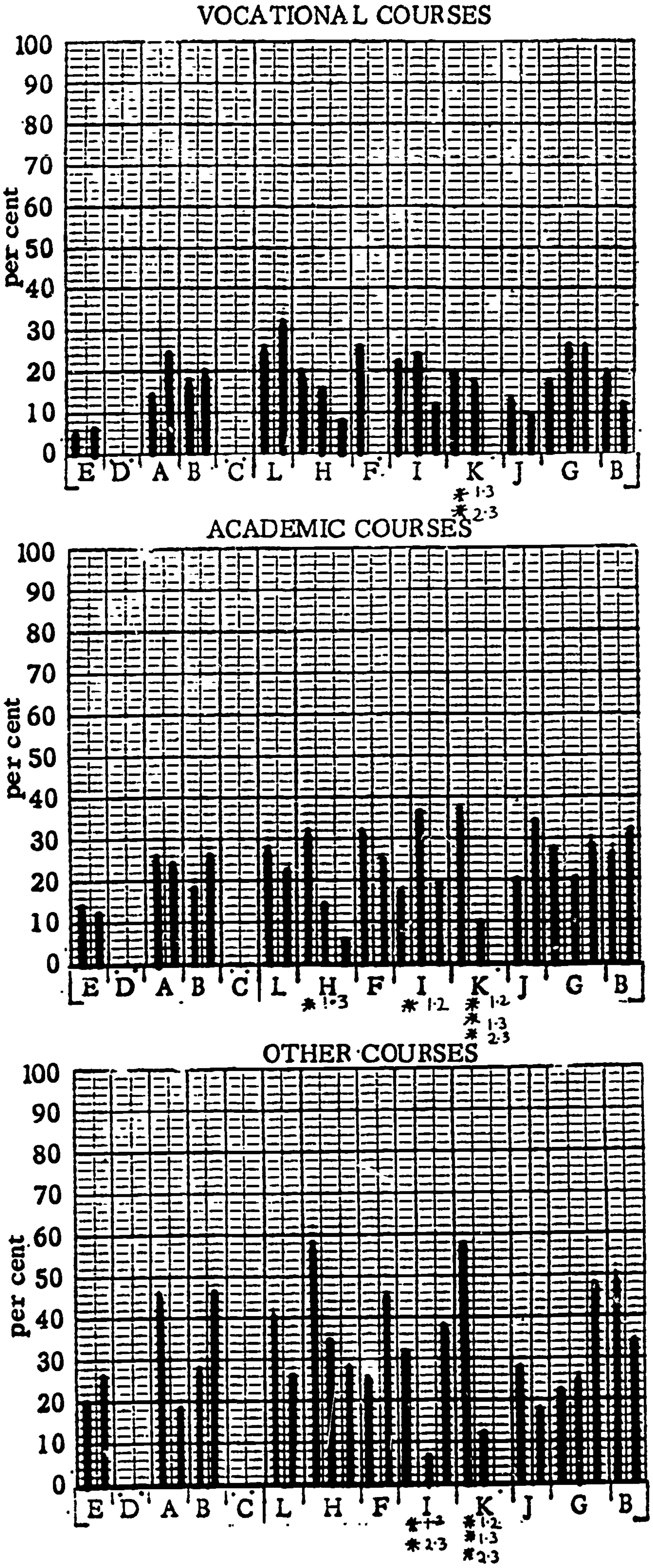
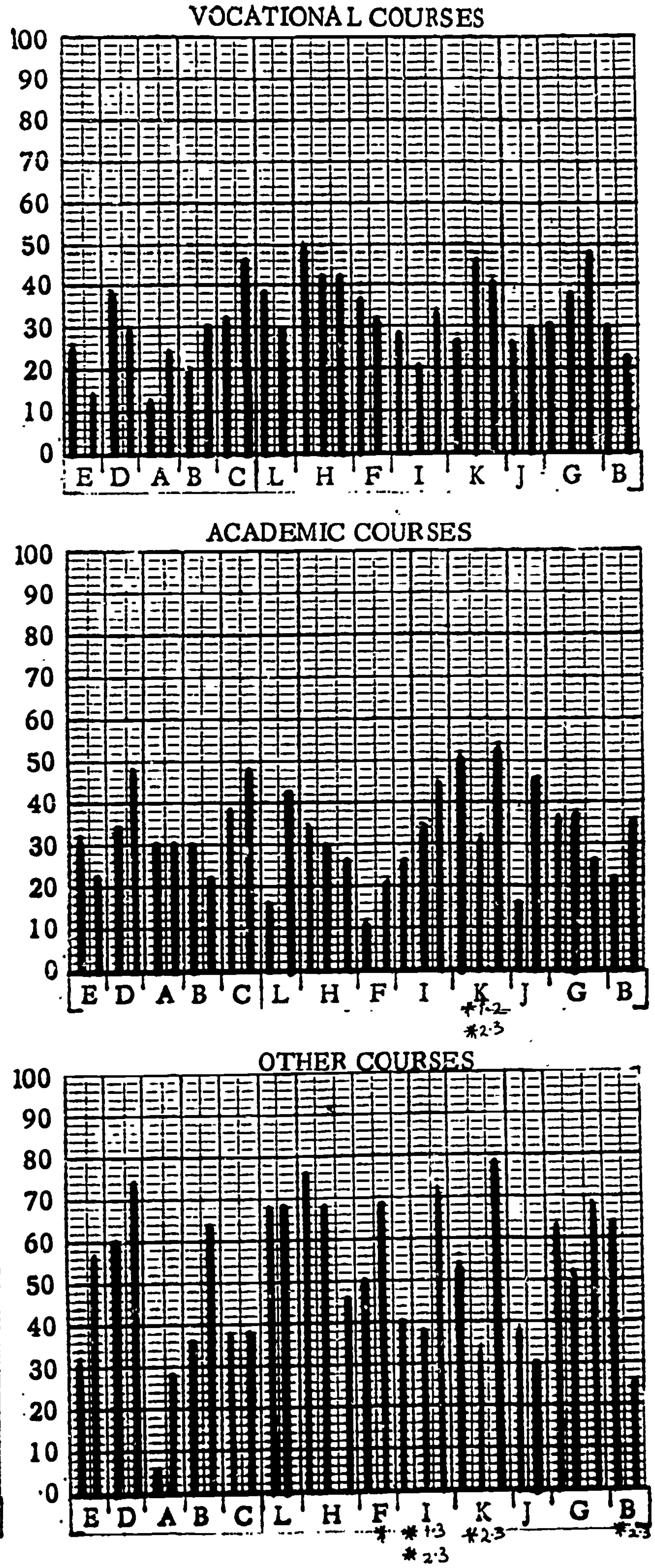


FIGURE C 2
COURSES FOR 10th GRADE STUDENTS



* Significant at .05 level; otherwise non-significant

FIGURE C 3

COURSES FOR 11th GRADE STUDENTS

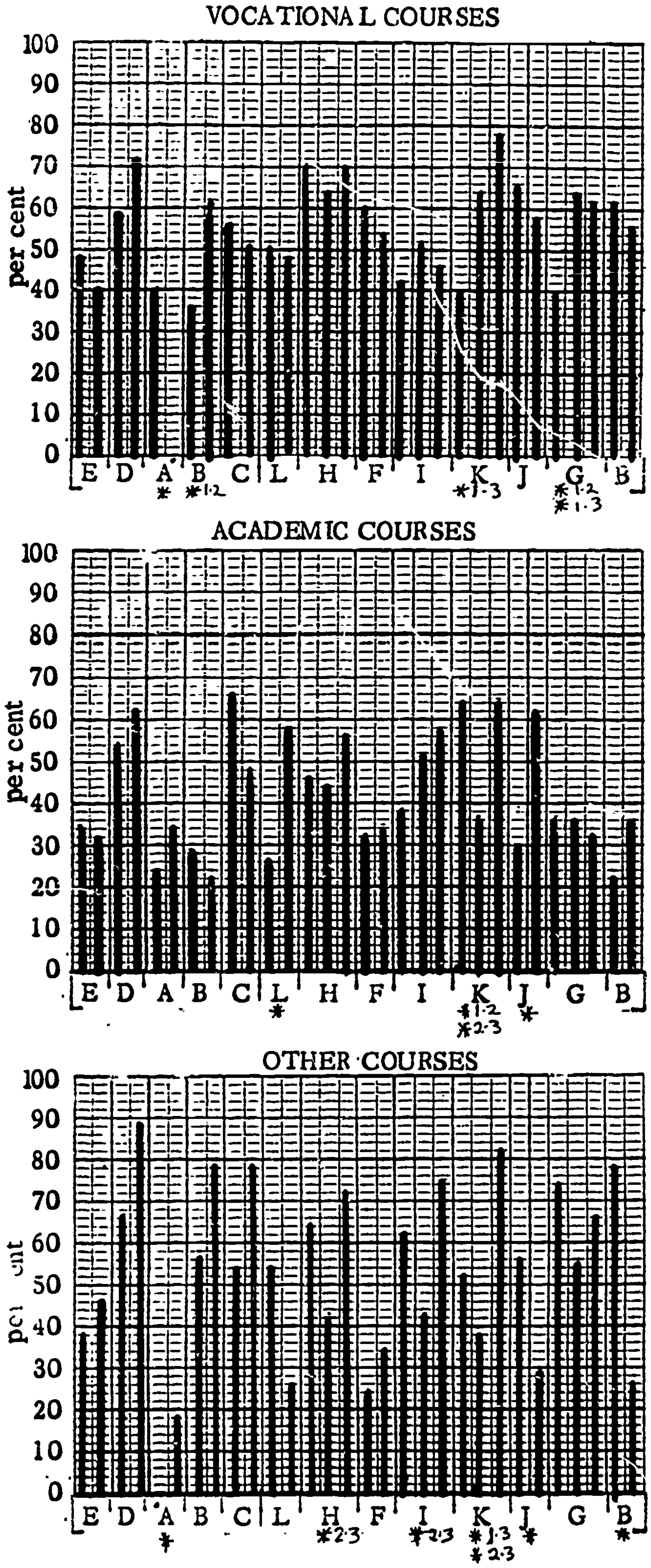
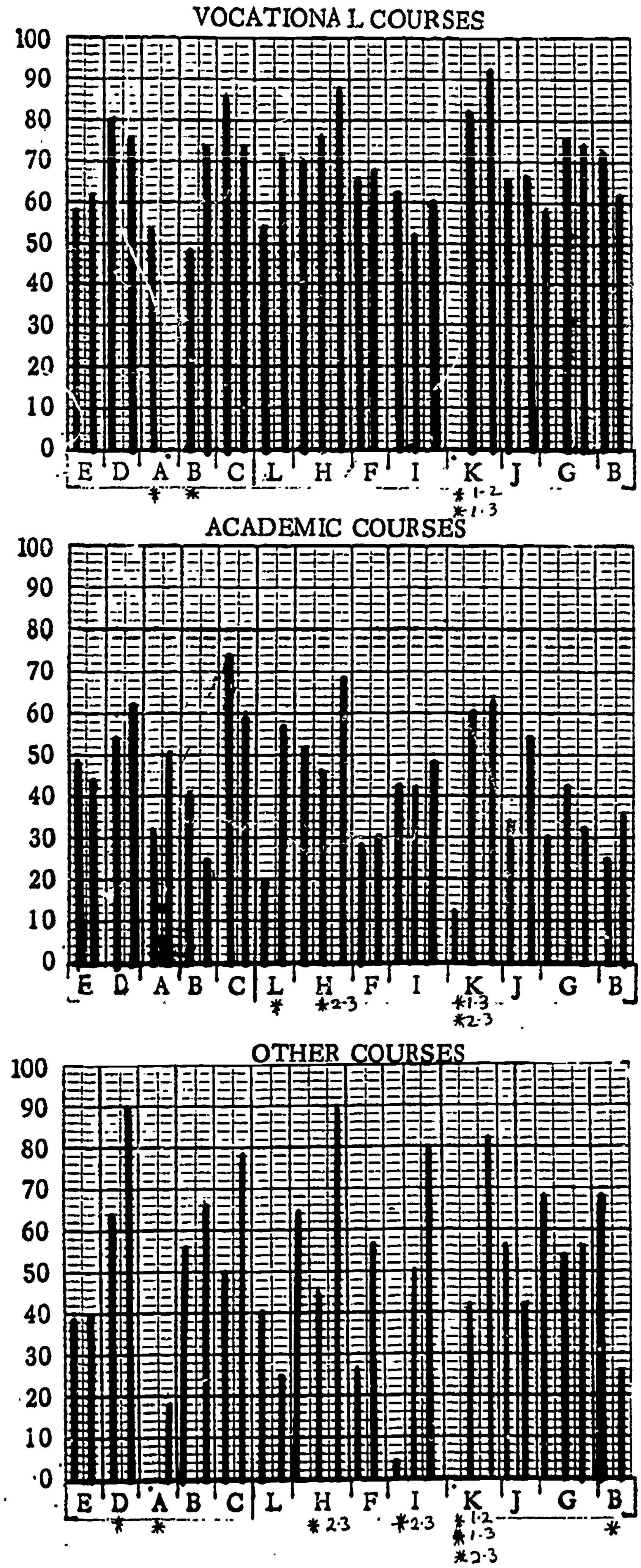


FIGURE C 4

COURSES FOR 12th GRADE STUDENTS



* Significant at .05 level; otherwise non-significant

FIGURE C 5

COURSES TAKEN BY BOYS

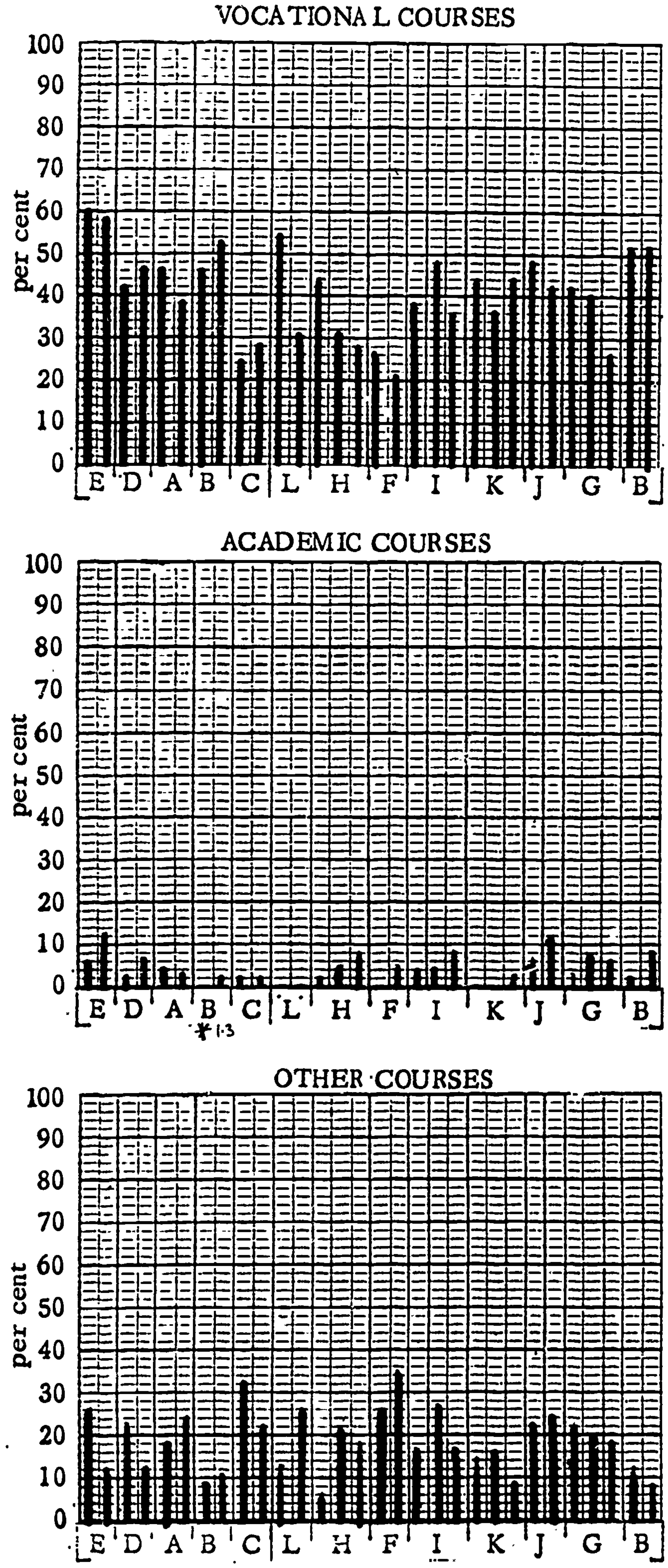
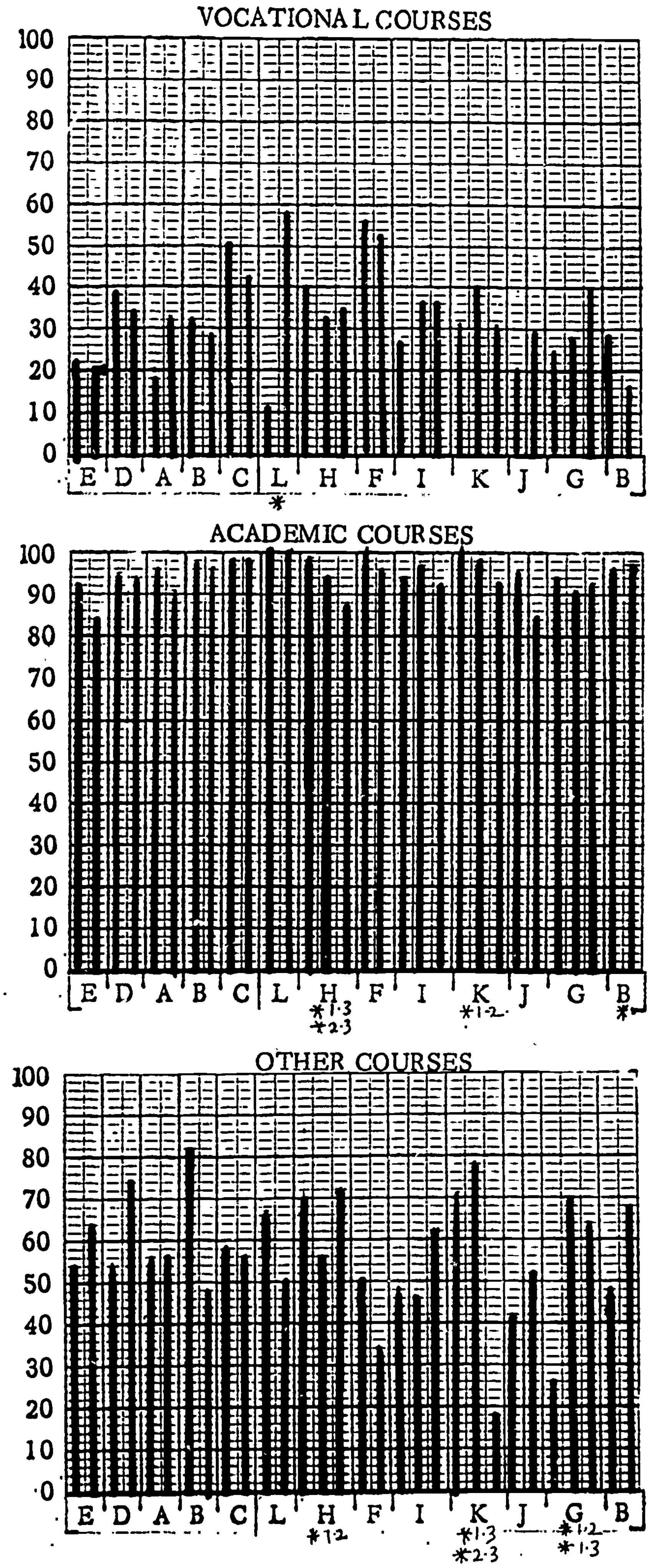


FIGURE C 6

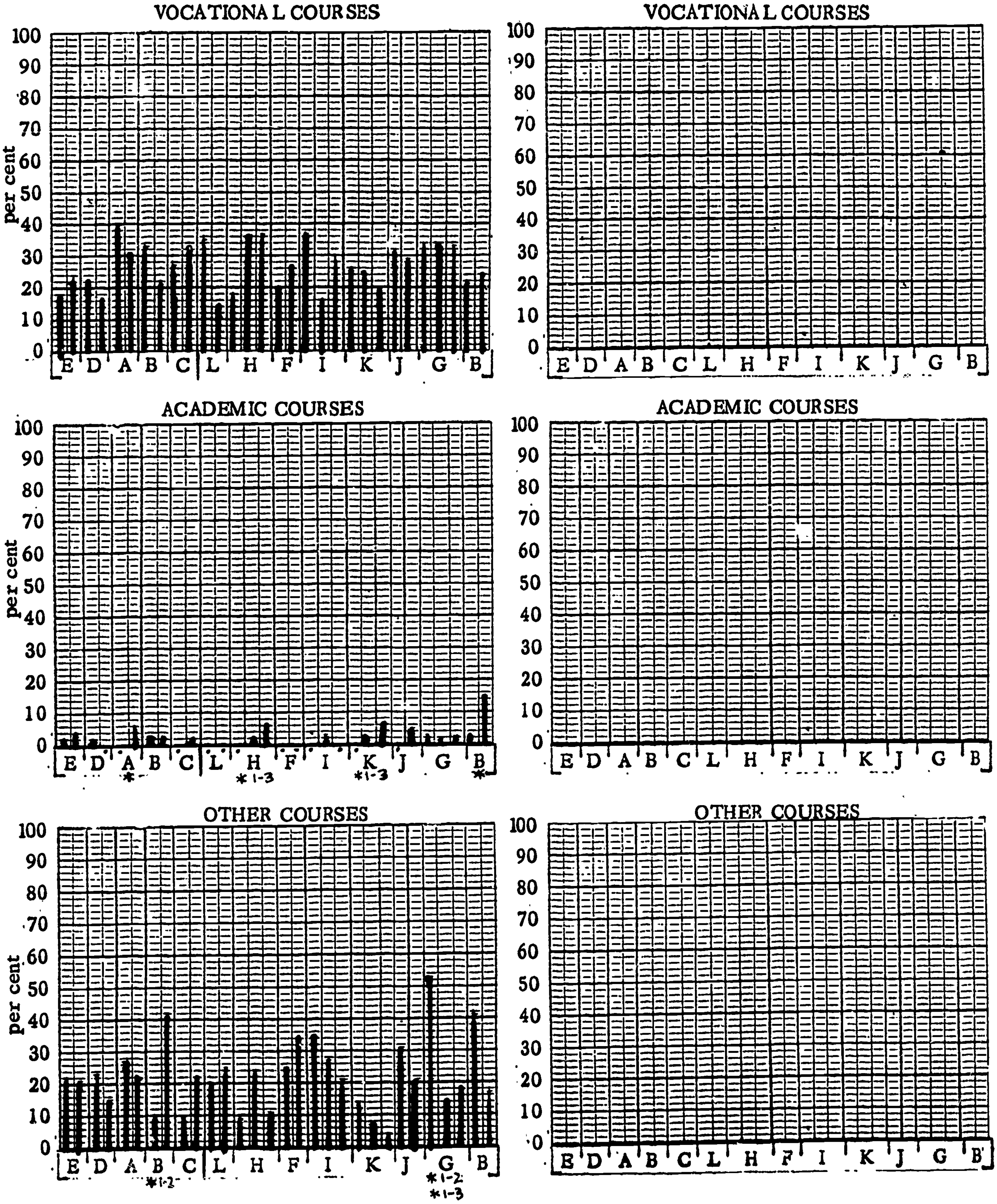
COURSES TAKEN BY BOTH BOYS AND GIRLS



* Significant at .05 level; otherwise non-significant

FIGURE C 7

COURSES TAKEN BY GIRLS



* Significant at .05 level; otherwise non-significant

FIGURE C 8

COURSE PREPARES STUDENTS FOR IMMEDIATE EMPLOYMENT

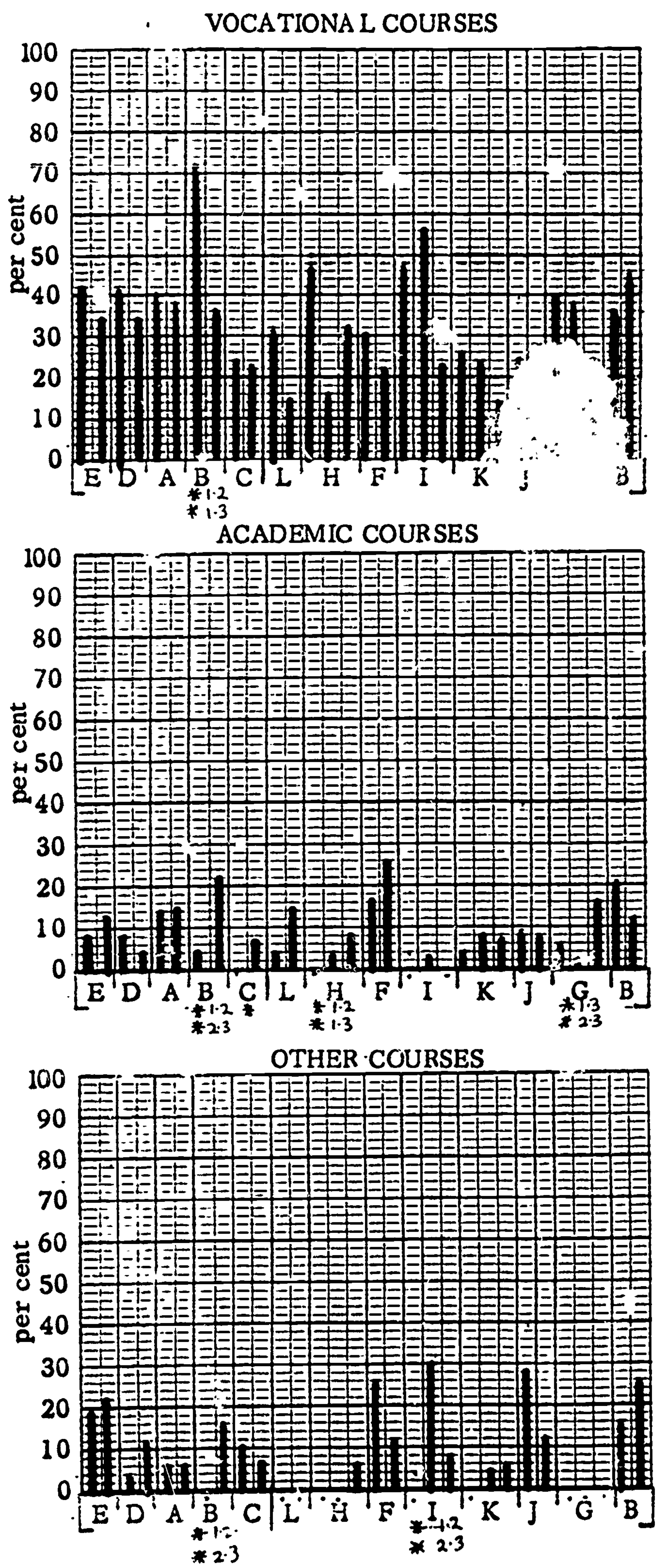
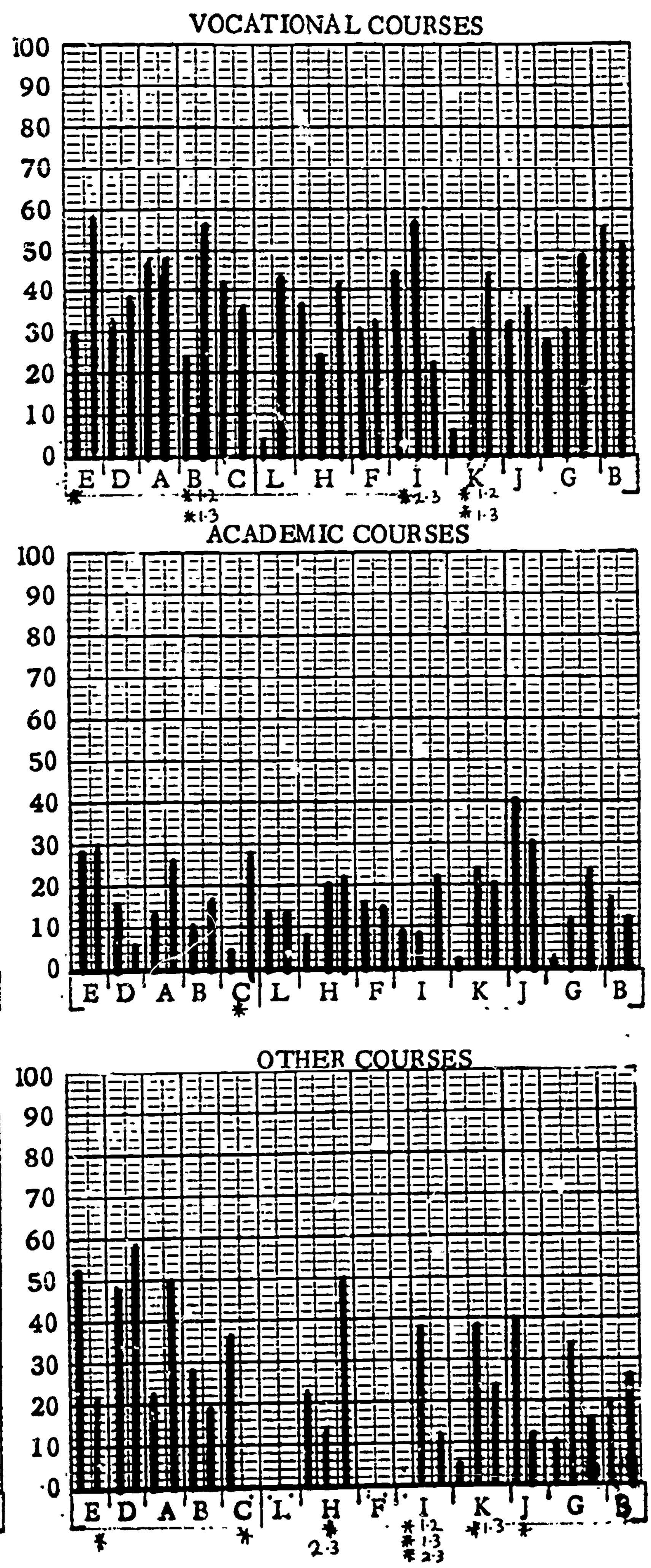


FIGURE C 9

COURSE PREPARES STUDENTS FOR AN OCCUPATION REQUIRING MORE TRAINING



* Significant at .05 level; otherwise non-significant

FIGURE C 10
COURSE EXPLORES A POSSIBLE FUTURE OCCUPATION

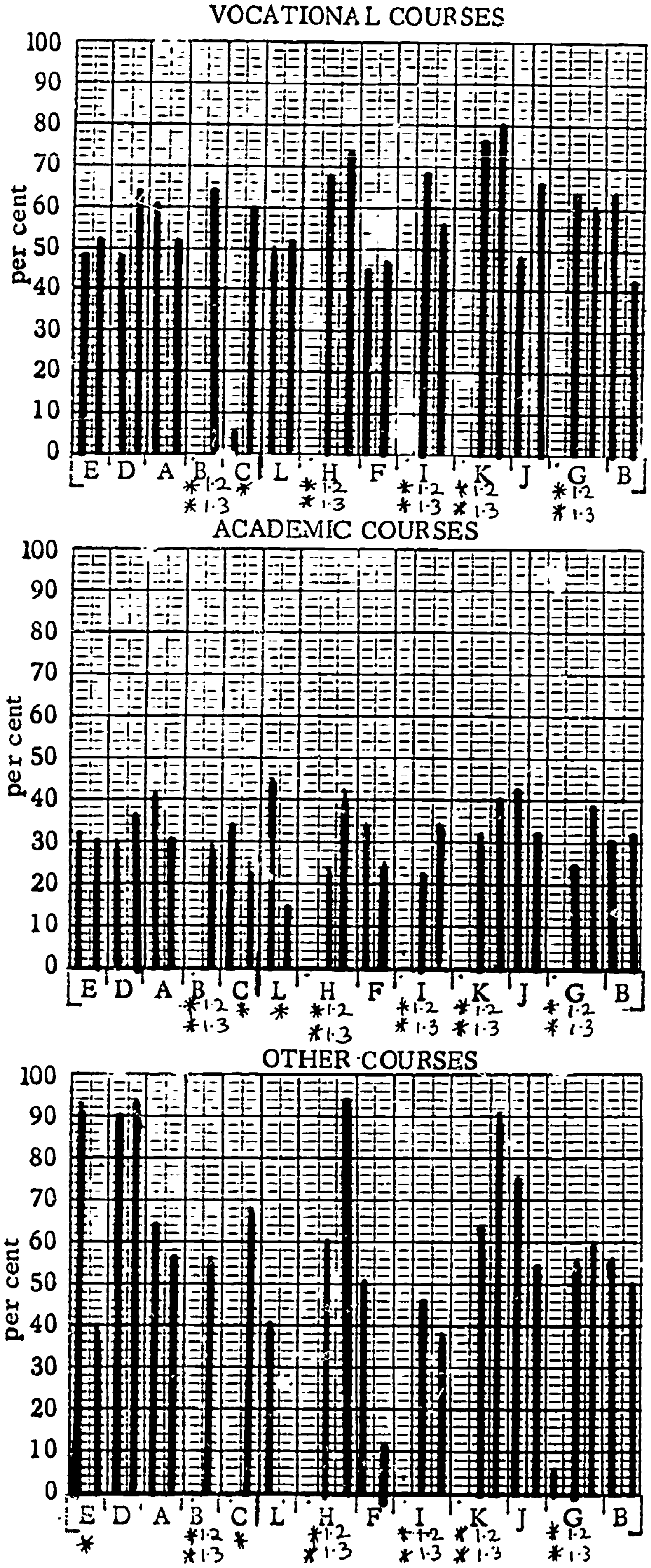
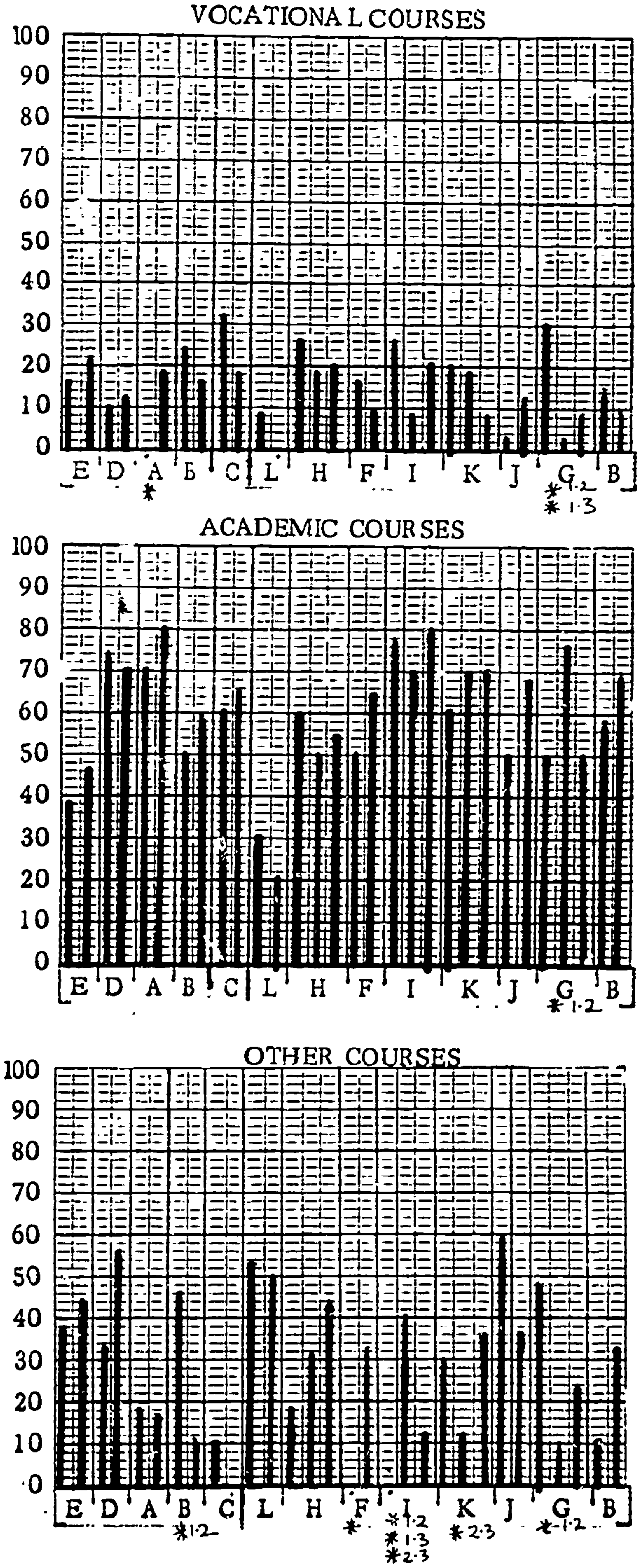


FIGURE C 11
COURSE PREPARES STUDENTS FOR COLLEGE



* Significant at .05 level; otherwise non-significant

FIGURE C 12

FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL ENROLL FOR MORE TECHNICAL OR VOCATIONAL EDUCATION

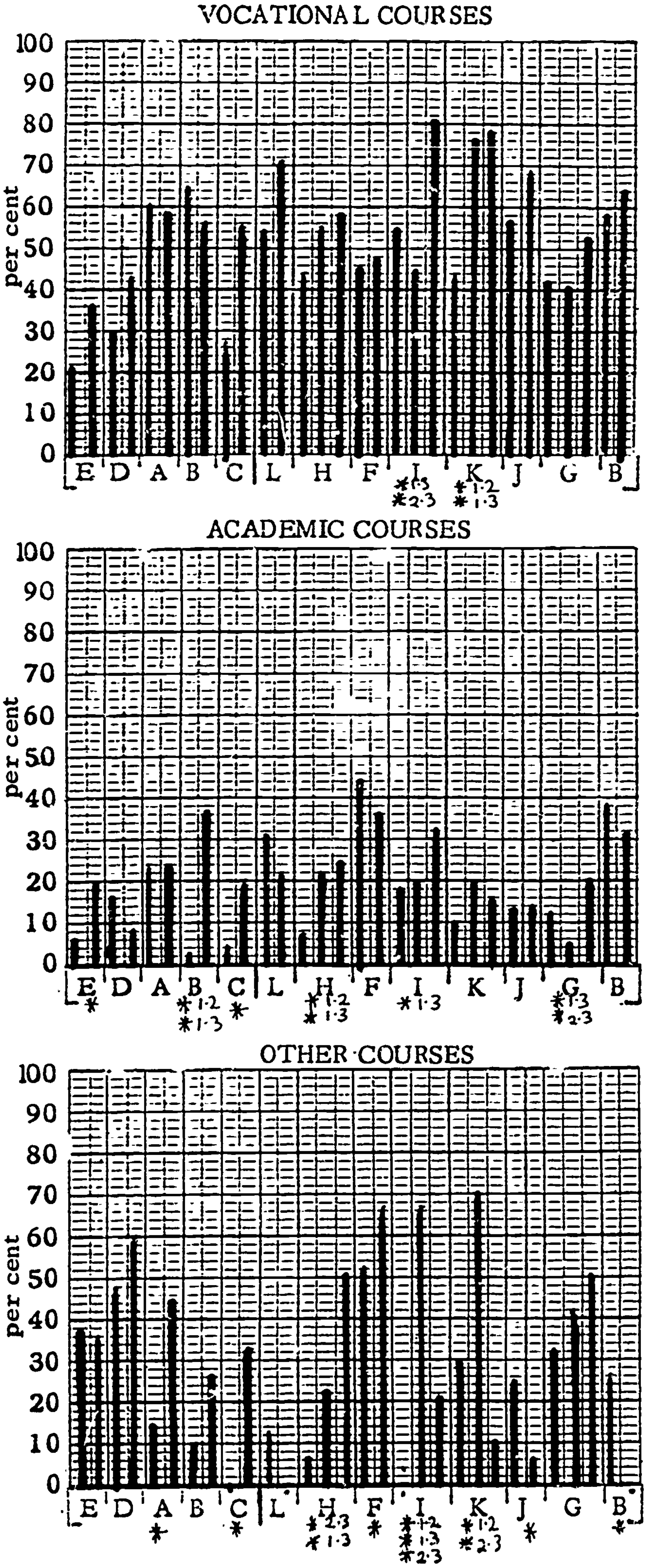
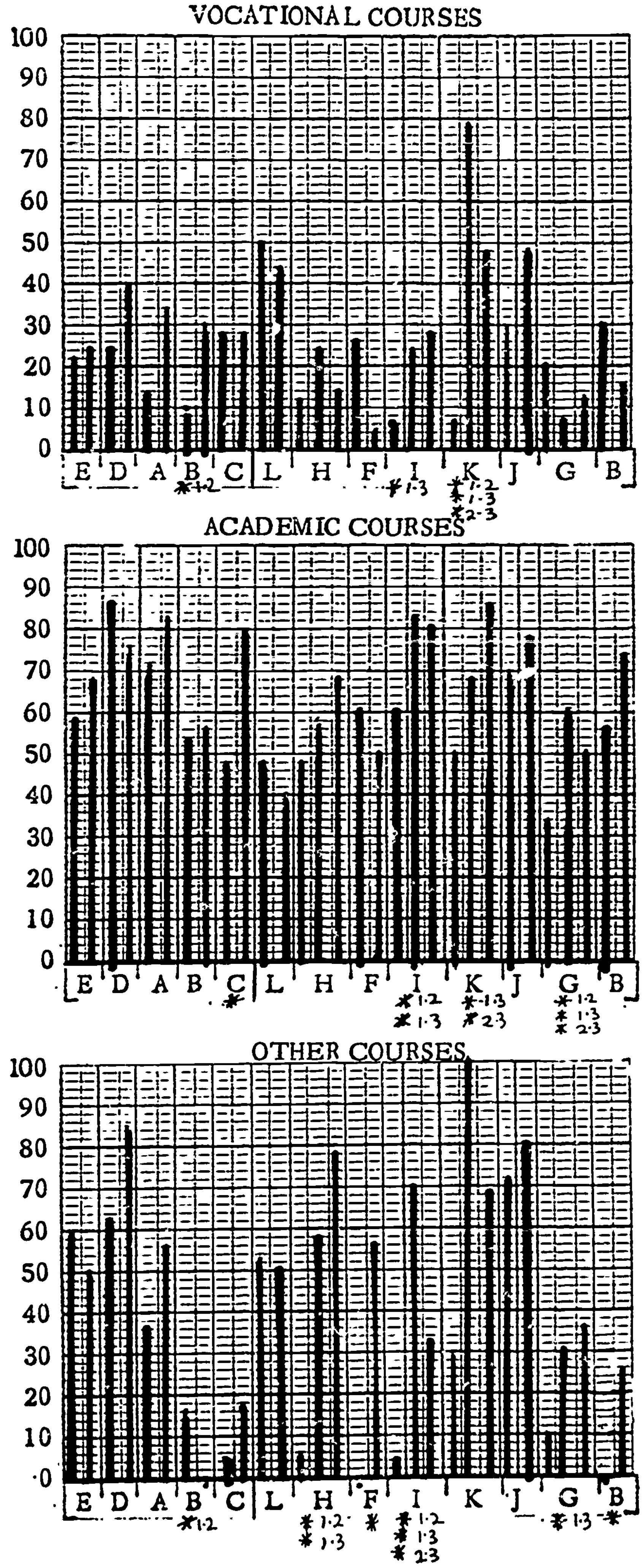


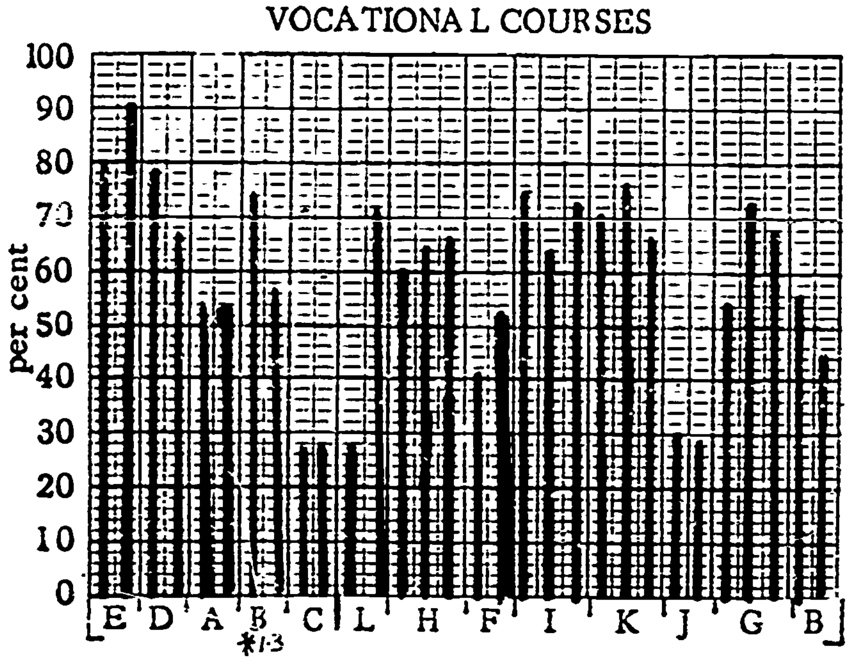
FIGURE C 13

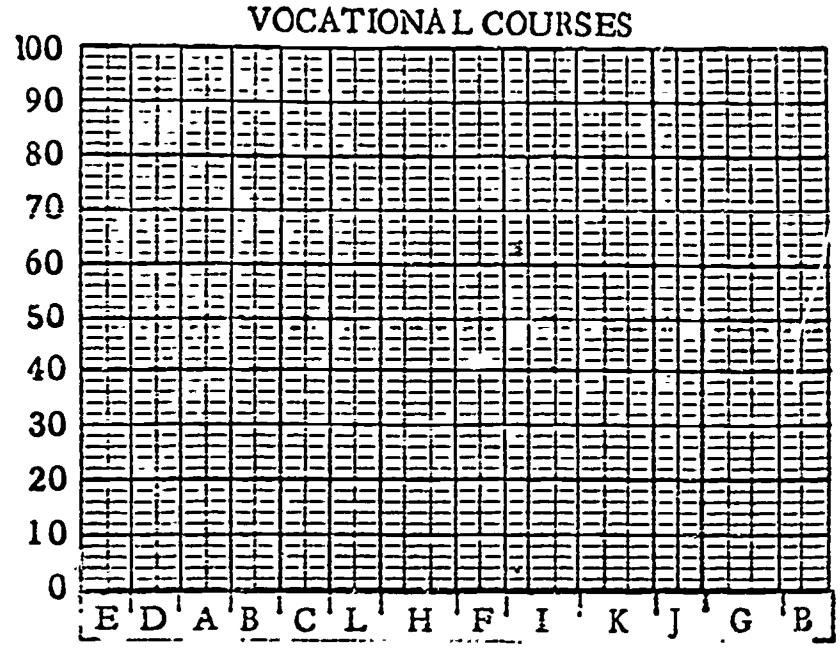
FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL ENROLL IN A COLLEGE OR UNIVERSITY

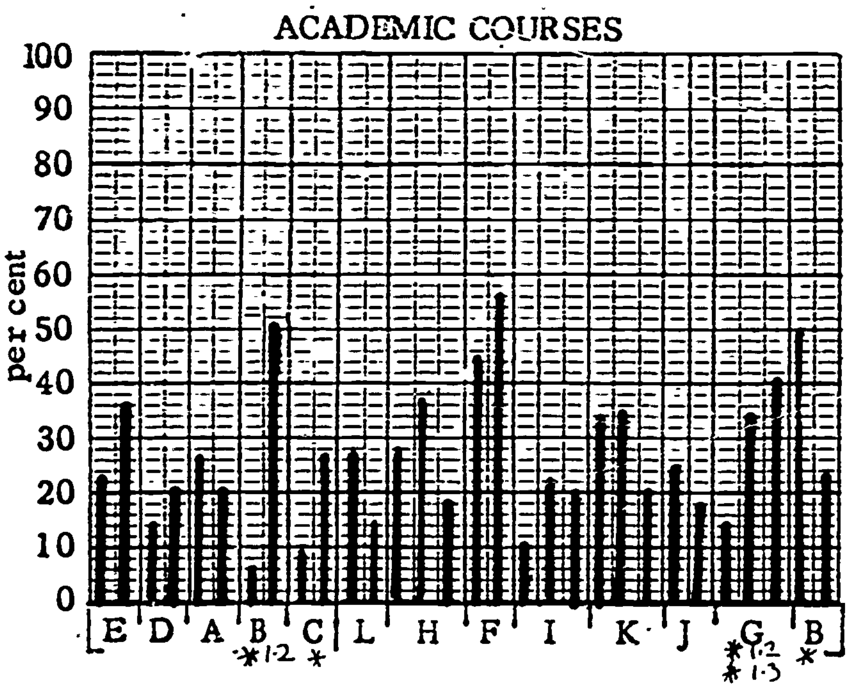


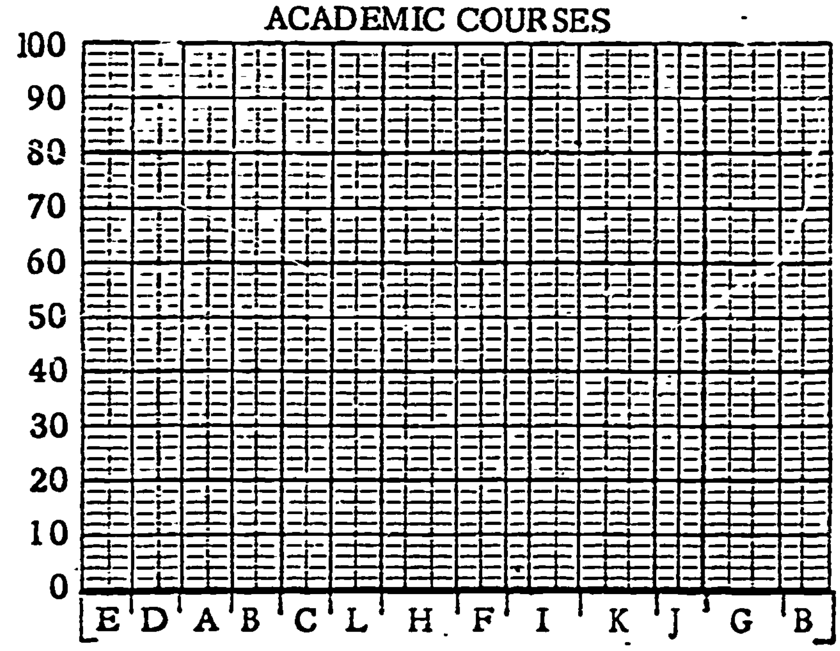
* Significant at .05 level; otherwise non-significant

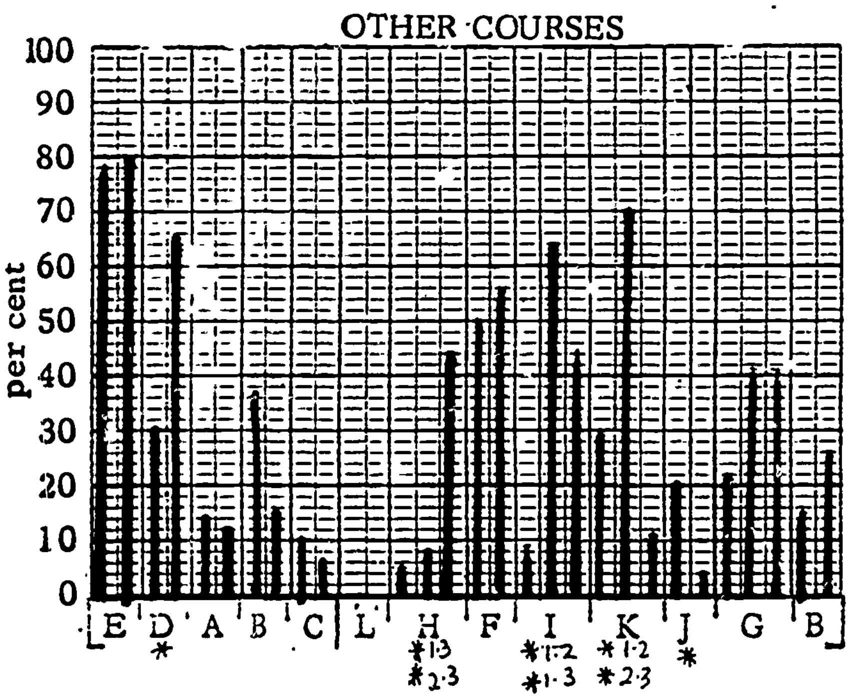
FIGURE C 14
FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL SEEK GAINFUL EMPLOYMENT

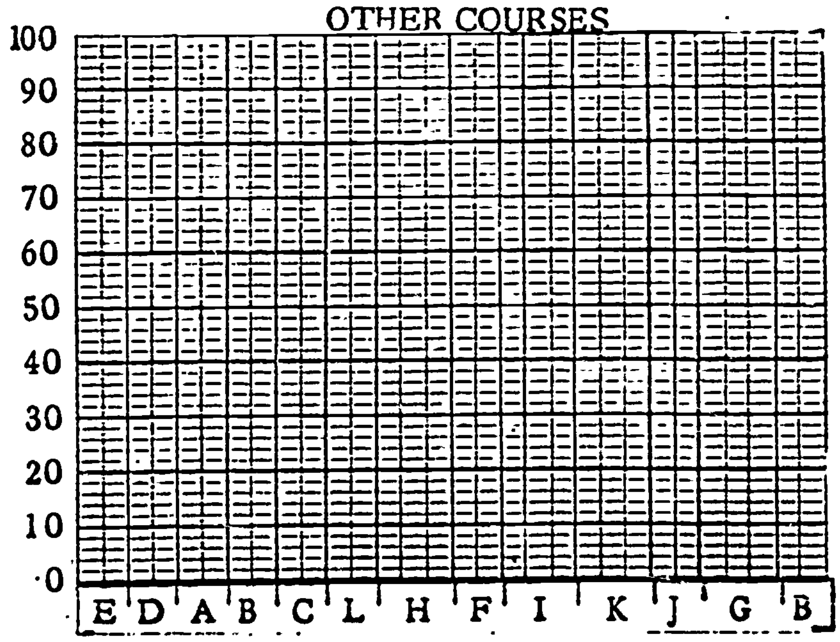












* Significant at .05 level; otherwise non-significant

TABLE C 3

COURSES FOR 9TH GRADE STUDENTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, A, B D, C	E, D, A, B C
T-M 2							B	B	B
Modular 1 - 2		I			H, K	I, K	H, I, K, G	G	H, G
1 - 3				K	H, K	K	H, I, G	I, G	H, I, G
2 - 3			I	K	K	K	L, H, F, I, J, G, B	L, H, F, I, J, G, B	L, H, F, J, G, B

TABLE C 4

COURSES FOR 10TH GRADE STUDENTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B, C	E, D, A, B, C
T-M 2							B	B	B
Modular 1 - 2					K		H, I, K, G	H, I, G	H, I, K G
1 - 3			I				H, I, K, G	H, I, K, G	H, K G
2 - 3		K	F, I, K			B	L, H, I, K, F, G, B, J	L, H, I, G, F, B, J	L, H, G, J

TABLE C 5

COURSES FOR 11TH GRADE STUDENTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B		A	A			E, D, C	E, D, A, B, C	E, D, B, C
T-M 2							B	B	B
Modular 1 - 2	G				K		H, I, K	H, I, G	H, I, K, G
1 - 3	K, G		K				H, I	H, I, K, G	H, I, G
2 - 3		L, K, J	H, I, K			J, B	L, H, F, I, K, J, G, B	H, F, I, G, B	L, F, G

TABLE C 6

COURSES FOR 12TH GRADE STUDENTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B		D, A	A			E, D, C	E, D, A, B, C	E, B, C
T-M 2							B	B	B
Modular 1 - 2	K	K	K				H, I, G	H, I, G	H, I, G
1 - 3	K	K	K				H, I, G	H, I, G	H, I, G
2 - 3		L, H	H, I, K			B	L, H, F, I, K, J, G, B	F, I, K, J, G, B	L, F, J, G

TABLE C 7

COURSE TAKEN BY GIRLS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		A	B				E, D, A, B, C	E, D, B, C	E, D, A, C
T-M 2							B	B	B
Modular 1 - 2						G	H, I, K, G	H, I, K, G	H, I, K
1 - 3		H, K				G	H, I, K, G	I, G	H, I, K
2 - 3		B					L, H, F, I, K, J, G, B	L, H, F. I, K, J, G	L, H, F, I, K, J, G, B

TABLE C 8

COURSE TAKEN BY BOYS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B, C	E, D, A, B, C
T-M 2		B					B		B
Modular 1 - 2							H, I, K, G	H, I, K, G	H, I, K, G
1 - 3							H, I, K, G	H, I, K, G	H, I, K, G
2 - 3							L, H, F, I, K, J, G, B	L, H, F, I, K, J, G, B	L, H, F, I, K, J, G, B

TABLE C 9

COURSE TAKEN BY BOTH BOYS AND GIRLS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B, C	E, D, A, B, C
T-M 2		B					B		B
Modular 1 - 2			G		H	H	H, I, K, G	I, K, G	I, K
1 - 3			G		H, K	K	H, I, K, G	I, G	H, I
2 - 3	L				B	K	H, F, I, K, J, G, B	H, F, I, K, J, L, G	H, F, I, J, L, G, B

TABLE C 10

COURSE PREPARES STUDENTS FOR IMMEDIATE EMPLOYMENT

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		B, C	B	B			E, D, A, C	E, D, A	E, D, A, C
T-M 2			B	B				B	
Modular 1 - 2		H	I	H			K, I, G	K, I, G	K, H, G
1 - 3		H, G		I			K, H, G	K, I,	K, H, I, G
2 - 3		G		I		I	L, F, J, B, K, H, G	L, F, J, B, K, I, H	L, F, J, B, K, H, G

TABLE C 11

COURSE PREPARES STUDENTS FOR AN OCCUPATION REQUIRING MORE TRAINING

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	E, B	C				E, C	D, A, C	E, D, A, B	D, A, B
T-M 2	B							B	B
Modular 1 - 2	K	H, K	I				H, I, G	I, G	H, K, G
1 - 3	K	H, K, G	I, K				H, I, G	I	H, G
2 - 3		I	H	I		I, J	L, H, F, K, J, G, B	L, H, F, K, J, G, B	L, F, K, G, B

TABLE C 12

COURSE EXPLORES A POSSIBLE FUTURE OCCUPATION

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B, C	B	B, C		C	E	E, D, A	E, D, A	D, A
T-M 2	B	B	B						
Modular 1 - 2	H, I, K, G	H, I, K, G	H, I, K, G						
1 - 3	H, I, K, G	H, I, K, G	H, I, K, G						
2 - 3			H, K		L	L, F	L, H, F, I, K, J, G, B	H, F, I, K, J, G, B	I, J, G, B

TABLE C 13

COURSE PREPARES STUDENTS FOR COLLEGE

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	A					B	E, D, C, B	E, D, A, C, B	E, D, A, C
T-M 2							B	B	B
Modular 1 - 2		G	I	G		G	H, I, K	H, I, K	H, K
1 - 3			I	G			H, I, K	H, I, K, G	H, K, G
2 - 3			F, K			I	L, H, F, I, K, J, G, B	L, H, F, I, K, J, G, B	L, H, G, J, B

TABLE C 14

FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL ENROLL FOR MORE TECHNICAL OR VOCATIONAL EDUCATION

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		E, B, C	A, C				E, D, A, B, C	D, A	E, D, B
T-M 2		B					B		B
Modular 1 - 2	K	H	I, K				H, I, G	I, K, G	H, G
1 - 3	I, K	H, I, G	H, I				H, G	K	G, K
2 - 3	I	G	H, F			I, K, J, B	L, H, F, J, G, B K	L, H, F, I, K, J, B	L, G

TABLE C 15

FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL ENROLL IN A COLLEGE OR UNIVERSITY

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B	C				B	E, D, A, C	E, D, A, B	E, D, A, C
T-M 2	B							B	B
Modular 1 - 2	K	I, G	H, I, K				H, I, G	H, K	G
1 - 3	I, K	I, KG	H, I, K				H, G	H	G
2 - 3		K	F, B	K	G	K, I	L, H, F, I, J, G, B	L, H, F, I, J, B	L, H, J, G

TABLE C 16

FOLLOWING GRADUATION MOST STUDENTS IN THIS COURSE WILL SEEK GAINFUL EMPLOYMENT

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		B, C	D	B			E, D, A, C	E, D, A, C	E, A, B, C
T-M 2				B				B	B
Modular 1 - 2		G	I, K				H, I, K, G	H, I, K	H, G
1 - 3		G	H, I				H, I, K, G	H, I, K	K, G
2 - 3			H		B	K, J	L, H, F, I, K, J, G, B	L, H, F, I, K, J, G	L, F, I, G, B

FIGURE C 15

TEAM TEACHING IS USED

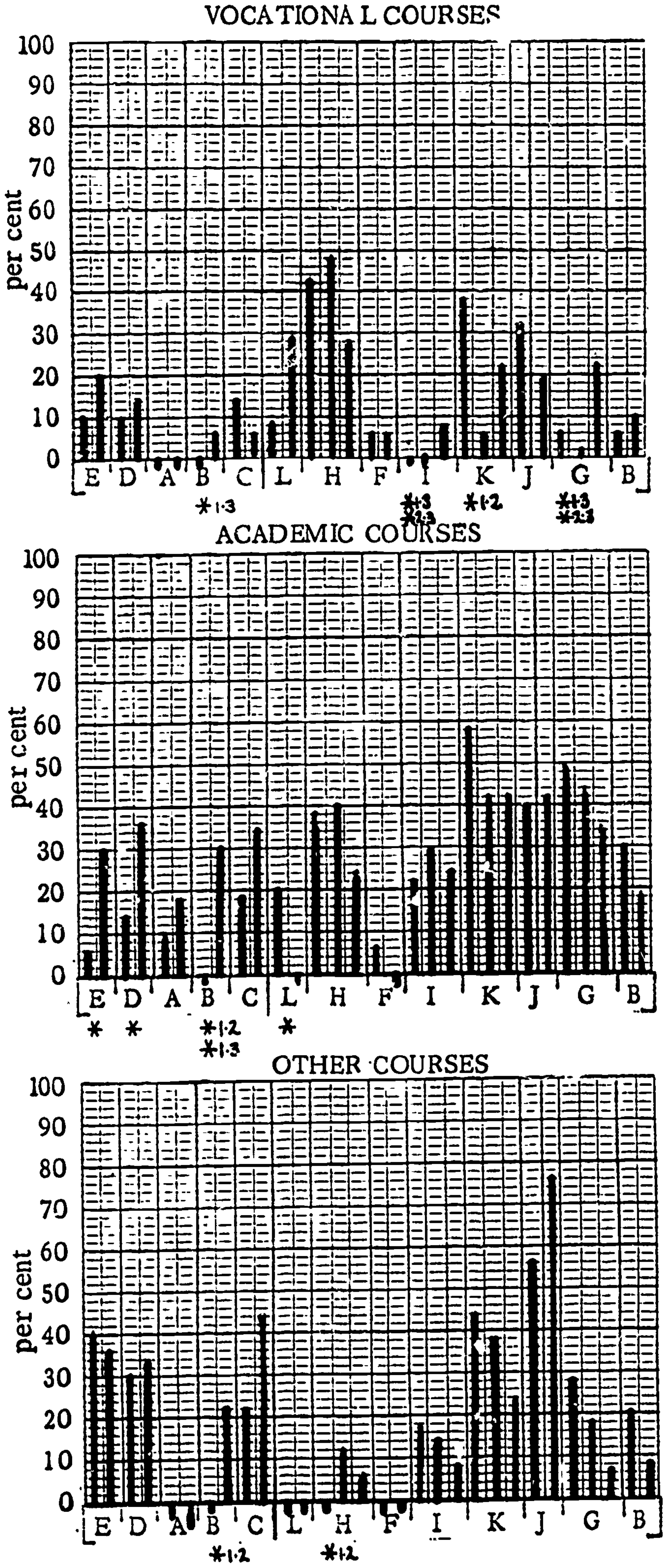
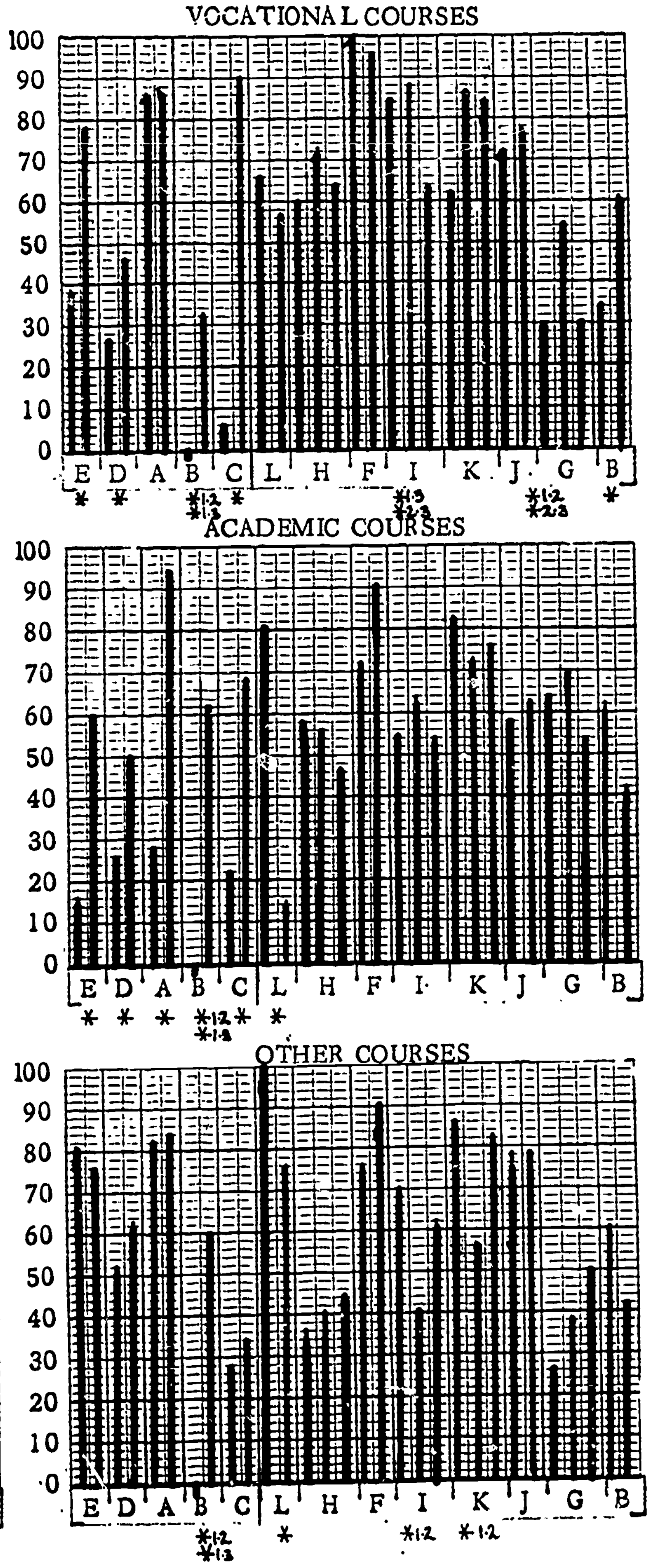


FIGURE C 16

LARGE GROUP INSTRUCTION PROVIDED



* Significant at .05 level; otherwise non-significant

FIGURE C 17

SMALL GROUP INSTRUCTION PROVIDED

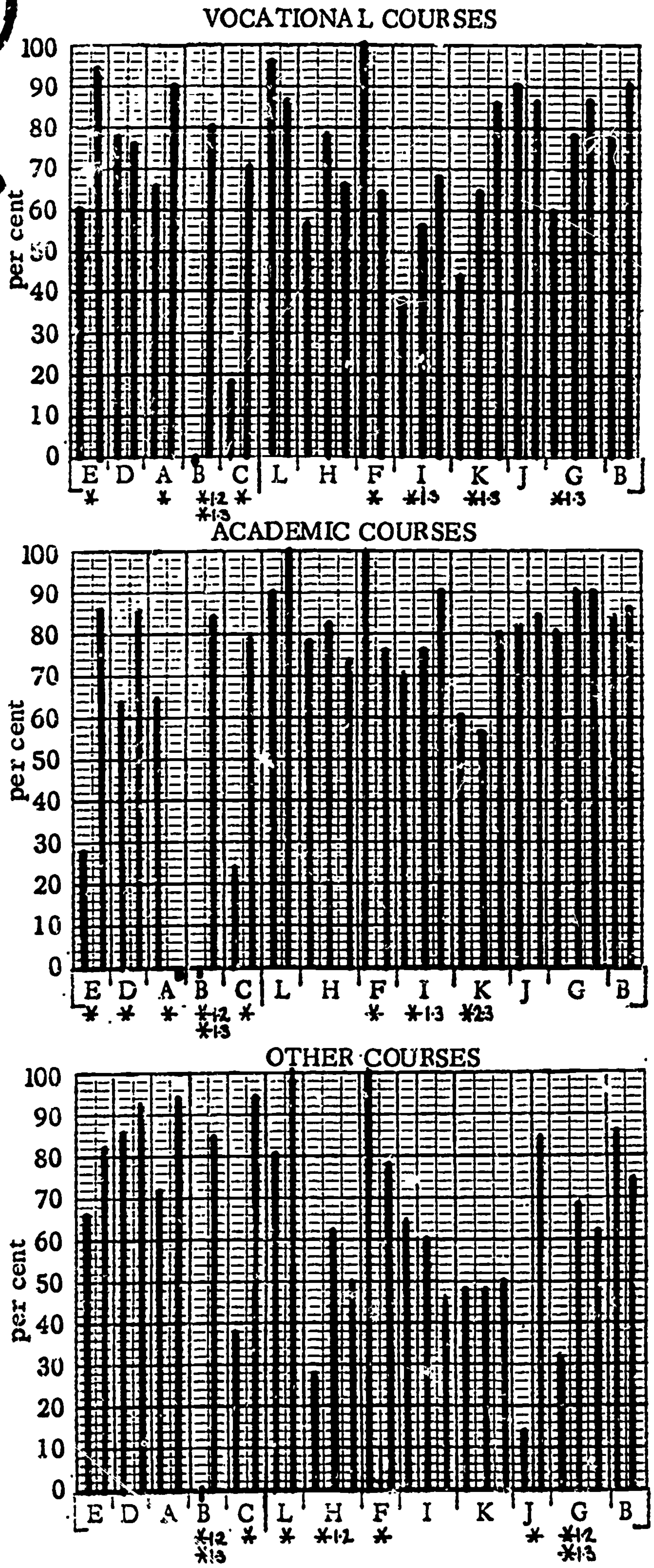
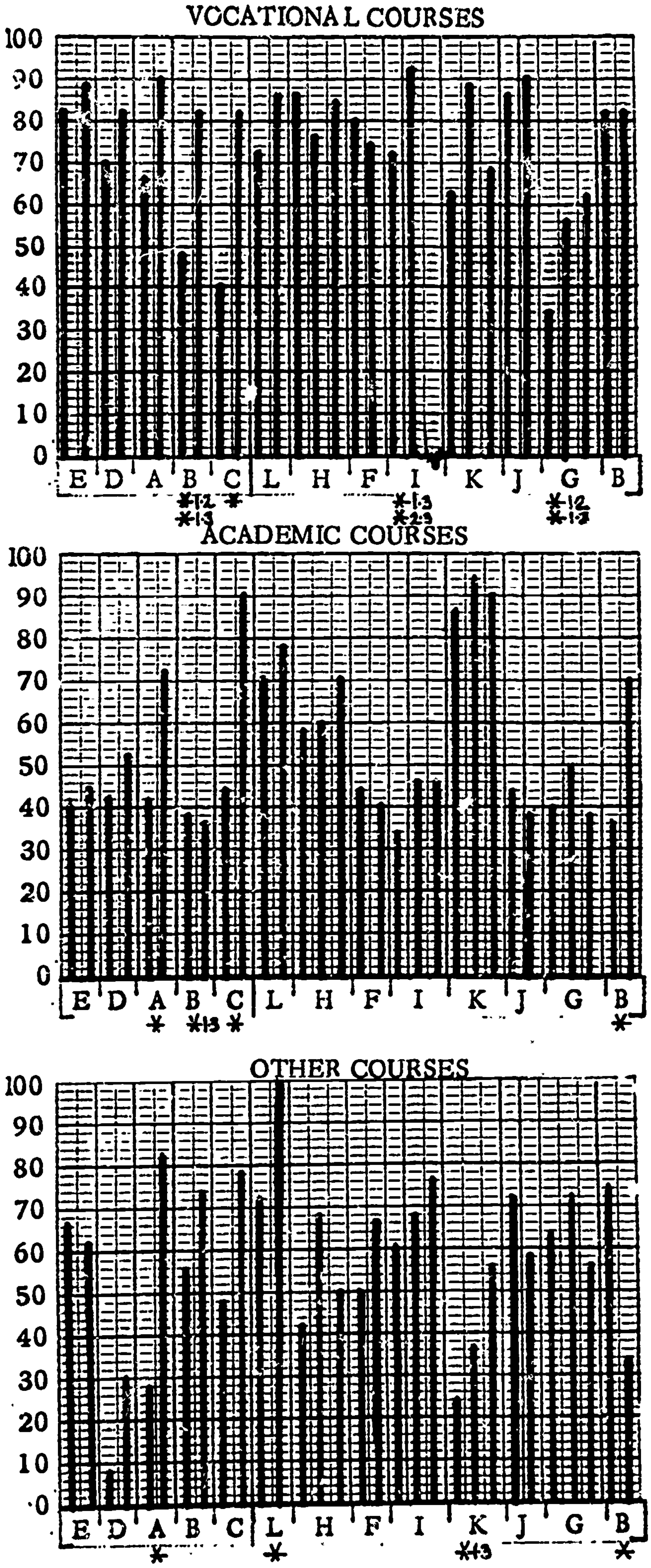


FIGURE C 18

LABORATORY INSTRUCTION PROVIDED

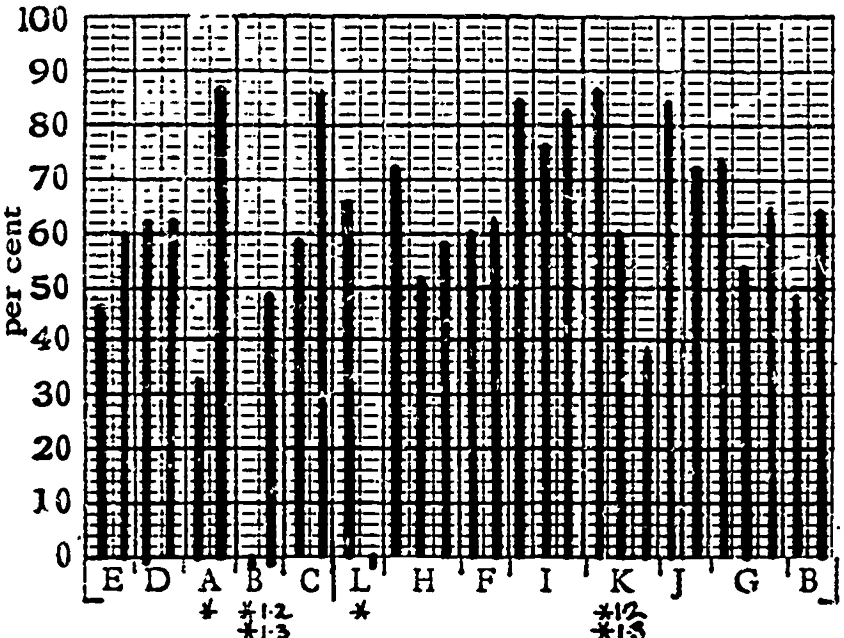


* Significant at .05 level; otherwise non-significant

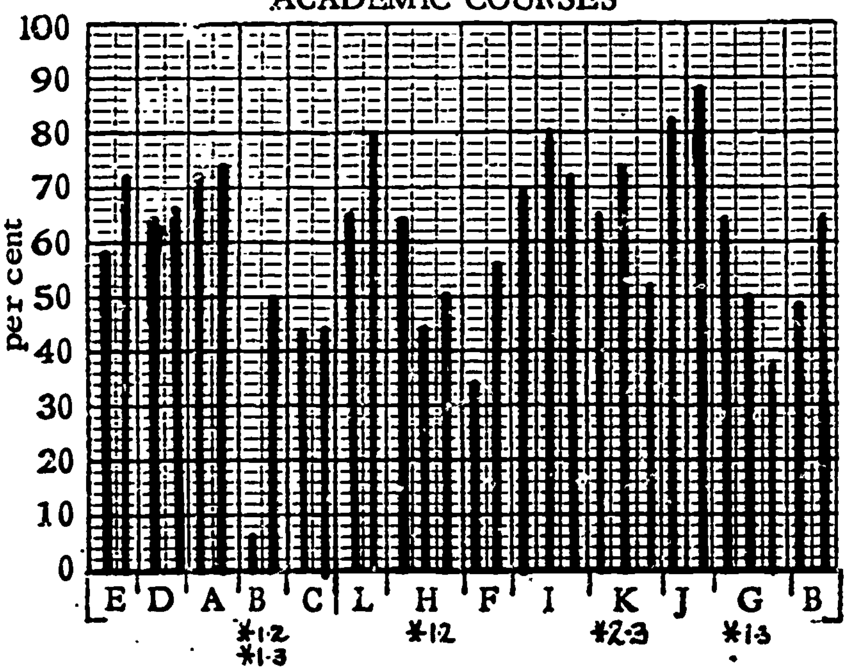
FIGURE C 19

INDEPENDENT STUDY REQUIRED

VOCATIONAL COURSES



ACADEMIC COURSES



OTHER COURSES

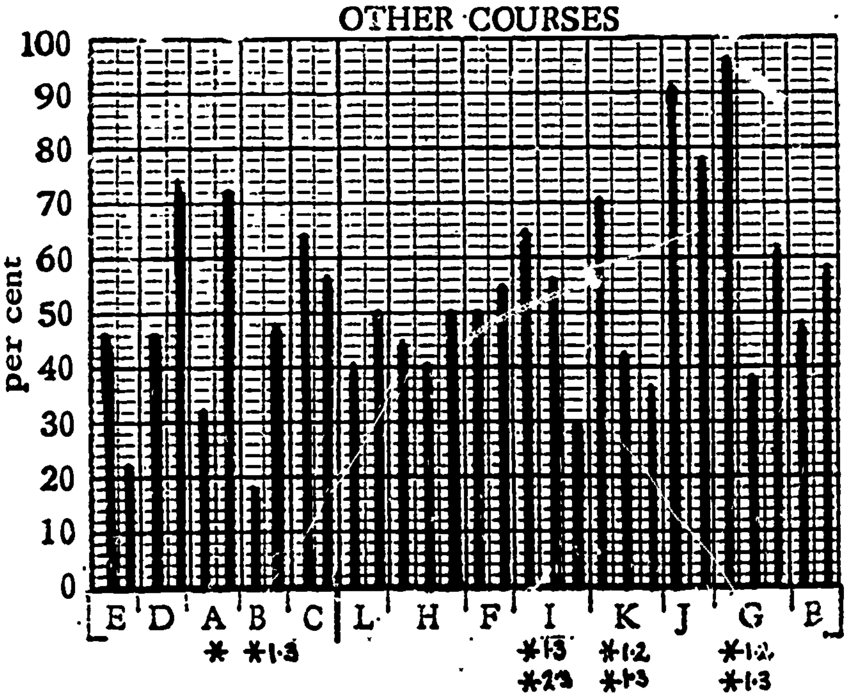
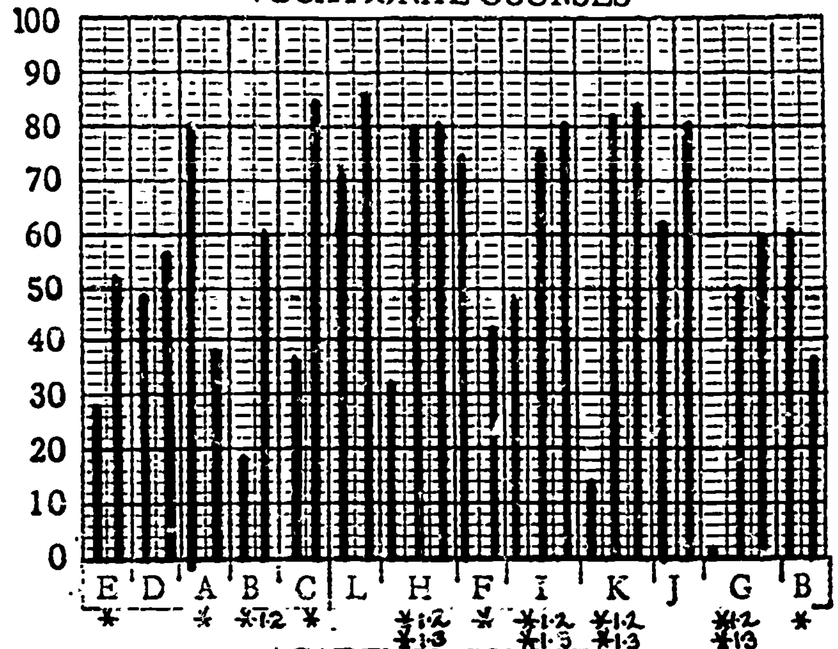


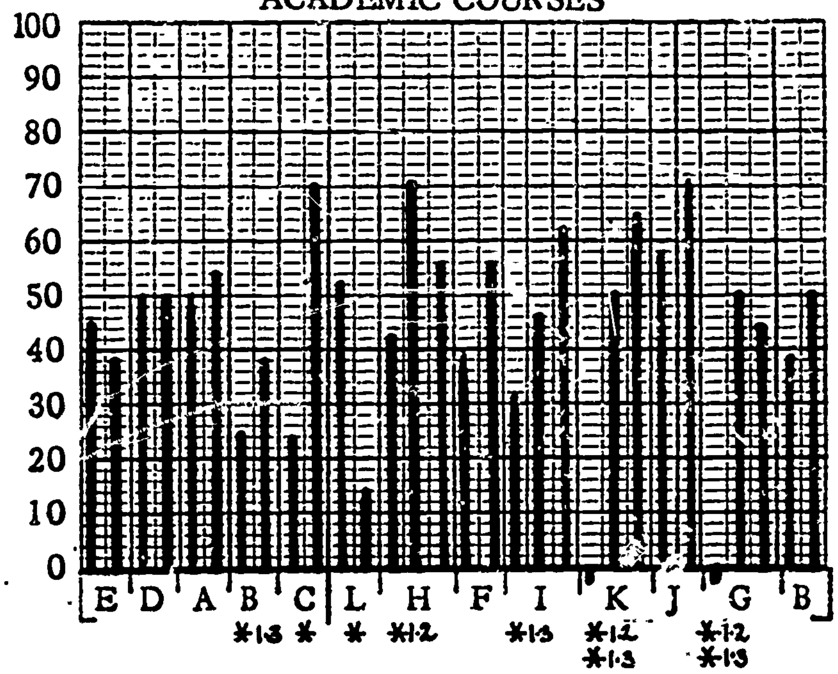
FIGURE C 20

STUDENTS PURSUE INDEPENDENT STUDY ALTHOUGH IT IS NOT REQUIRED

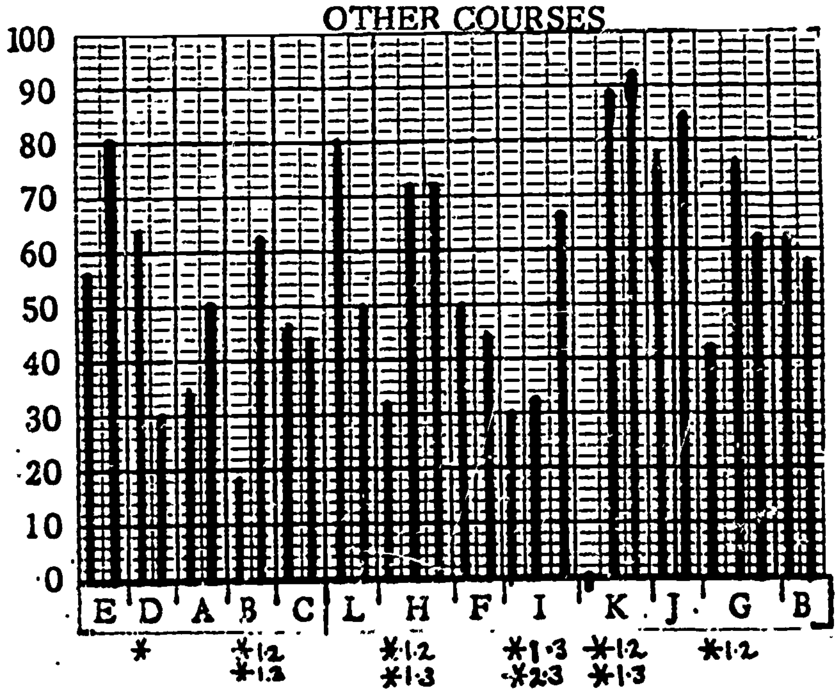
VOCATIONAL COURSES



ACADEMIC COURSES



OTHER COURSES



* Significant at .05 level; otherwise non-significant

TABLE C 17

TEAM TEACHING IS USED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		E, D, B	B				F, D, A, B, C	A, C	E, D, A, C
T-M 2	B	B							B
Modular 1 - 2			H	K			H, I, G	H, I, K, G	I, K, G
1 - 3	I, G						H, K	H, I, K, G	H, I, K, G
2 - 3	I, G				L		L, H, F, K, J, B	H, F, I, K, J, G, B	L, H, F, I, K, J, G, B

TABLE C 18

LARGE GROUP INSTRUCTION PROVIDED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	E, D, B, C	E, D, A, B, C	B				A		E, D, A, C
T-M 2	B	B	B						
Modular 1 - 2	G					I, K	H, I, K	H, I, K, G	H, G
1 - 3				I			H, K, G	H, I, K, G	H, I, K, G
2 - 3	B			I, G	L	L	L, H, F, K, J	H, F, I, K, J, G, B	H, F, I, K, J, G, B

TABLE C 19

SMALL GROUP INSTRUCTION PROVIDED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	E, A, B, C	E, D, B, C	B, C		A		D		E, D, A
T-M 2	B	B	B						
Modular 1 - 2			H, G				H, I, K, G	H, I, K, G	I, K
1 - 3	I, K, G	I	G				H	H, K, G	H, I, K
2 - 3		K	L, J	F	F	F	L, H, I, K, J, G, B	L, H, I, J, G, B	H, I, K, G, B

TABLE C 20

LABORATORY INSTRUCTION PROVIDED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B, C	A, C	A				E, D, A	E, D, B	E, D, B, C
T-M 2	B	B							B
Modular 1 - 2	G						H, I, K	H, I, K, G	H, I, K, G
1 - 3	G		K	I			H, K	H, I, K, G	H, I, G
2 - 3		B	L	I		B	L, H, F, K, J, G, B	L, H, F, I, K, J, G	H, F, I, K, J, G

TABLE C 21

INDEPENDENT STUDY REQUIRED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	A, B	B	A				E, D, C	E, D, A, C	E, D, B, C
T-M 2	B	B	B						
Modular 1 - 2				K	H	K, G	H, I, G	I, K, G	H, I
1 - 3				K	G	I, K, G	H, I, G	H, I, K	H
2 - 3				L	K	I	H, F, I, K, J, G, B	L, H, F, I, J, G, B	L, H, F, K, J, G, B

TABLE C 22

STUDENTS PURSUE INDEPENDENT STUDY THOUGH IT IS NOT REQUIRED

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-Ml	E, B, C	C	B	A		D	D	E, D, A, B	E, A, C
T-M 2		B	B				B		
Modular 1 - 2	H, I, K, G	H, K, G	H, K, G					I	I
1 - 3	H, I, K, G	I, K, G	H, I, K					H	G
2 - 3			I	F	L		L, H, I, K, J, G	H, F, I, K, J, G, B	L, H, F, K, J, G, B

FIGURE C 21

COURSE MEETS 1 SEMESTER

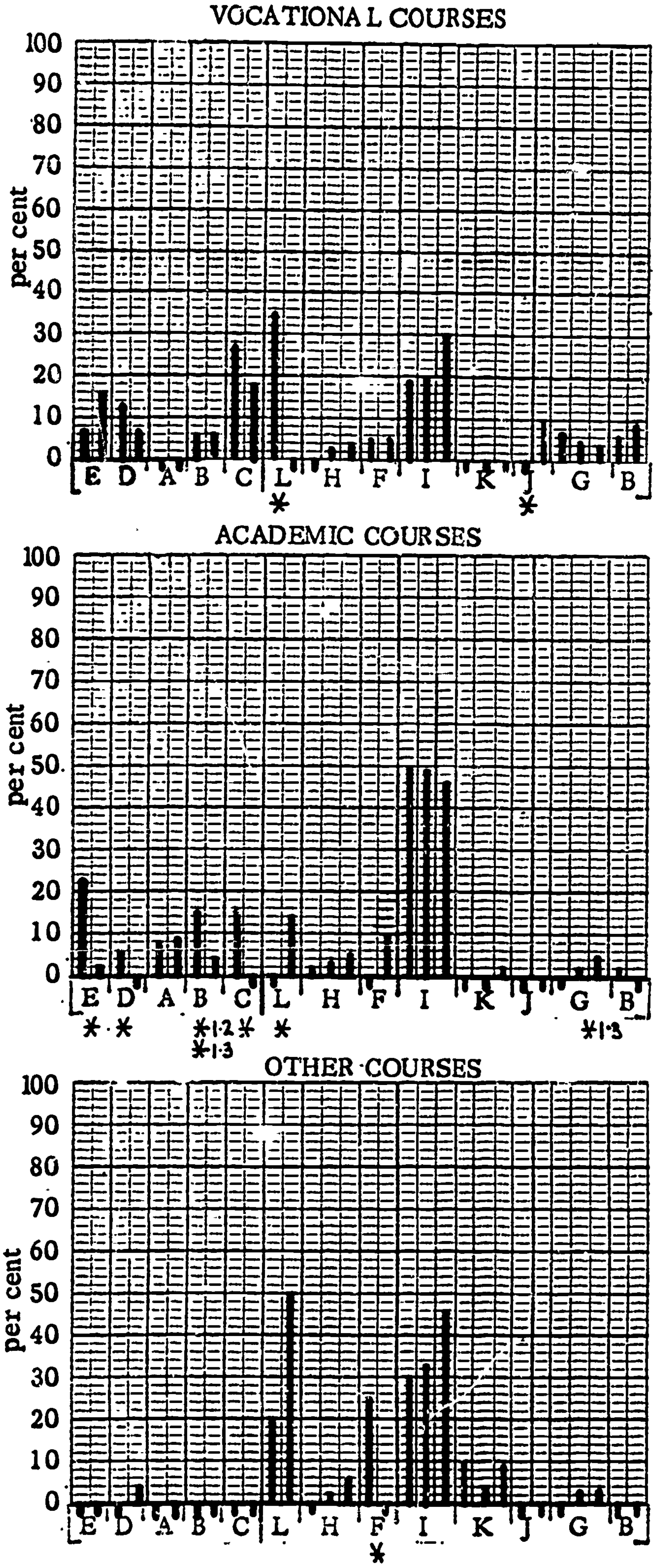
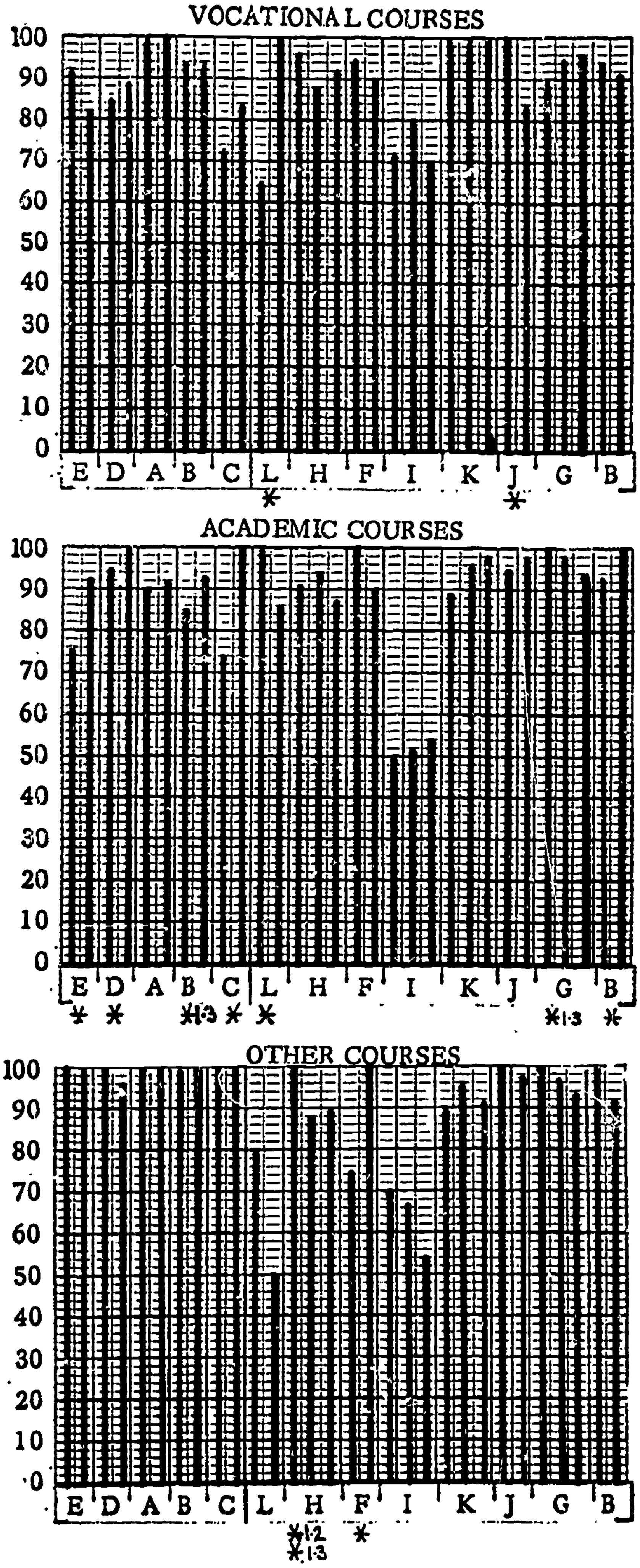


FIGURE C 22

COURSE MEETS 2 SEMESTERS



* Significant at .05 level; otherwise non-significant

FIGURE C 23

TIME REQUIRED IN FORMAL CLASSROOM INSTRUCTION VARIES WITH STUDENT ABILITY

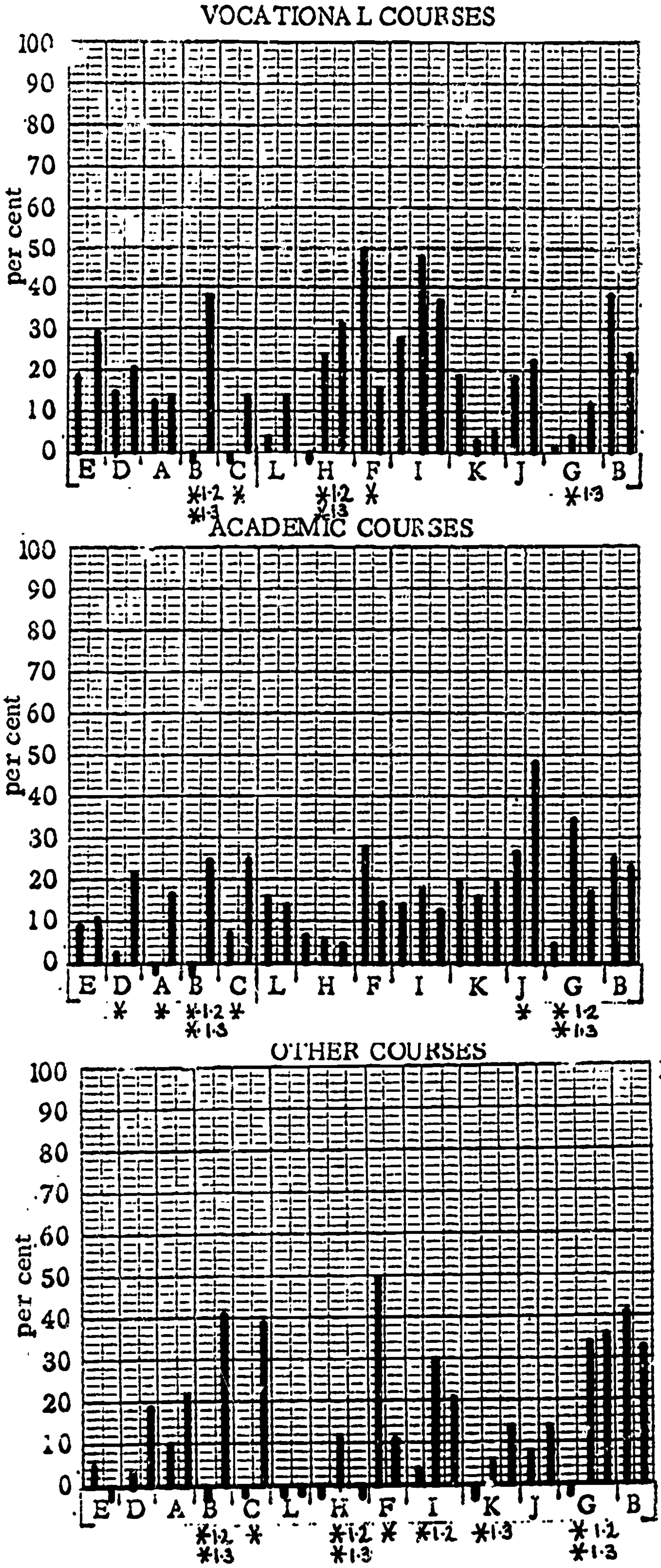
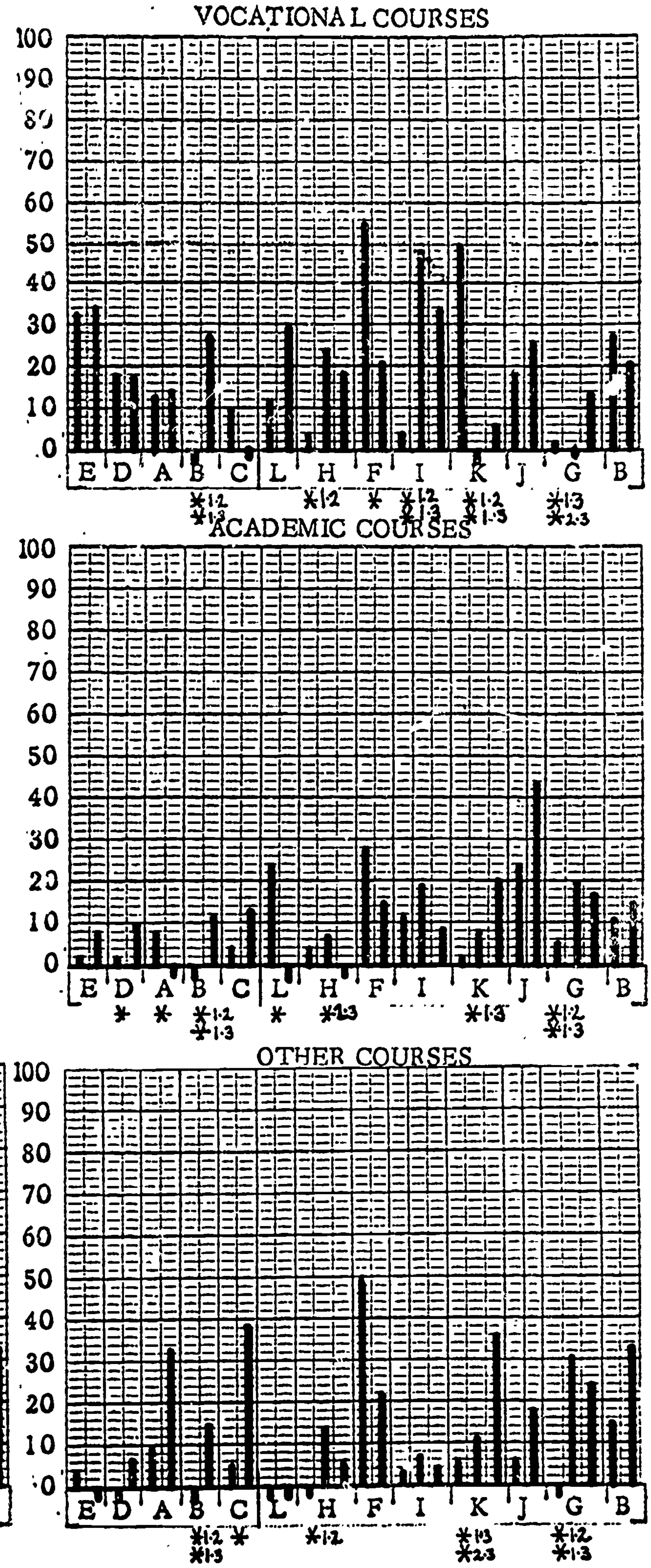


FIGURE C 24

TIME REQUIRED IN FORMAL CLASSROOM INSTRUCTION VARIES WITH STUDENT INTEREST



* Significant at .05 level; otherwise non-significant

FIGURE C 25

ACCELERATED STUDENT ACHIEVERS RELEASED FROM FORMAL CLASS MEETINGS

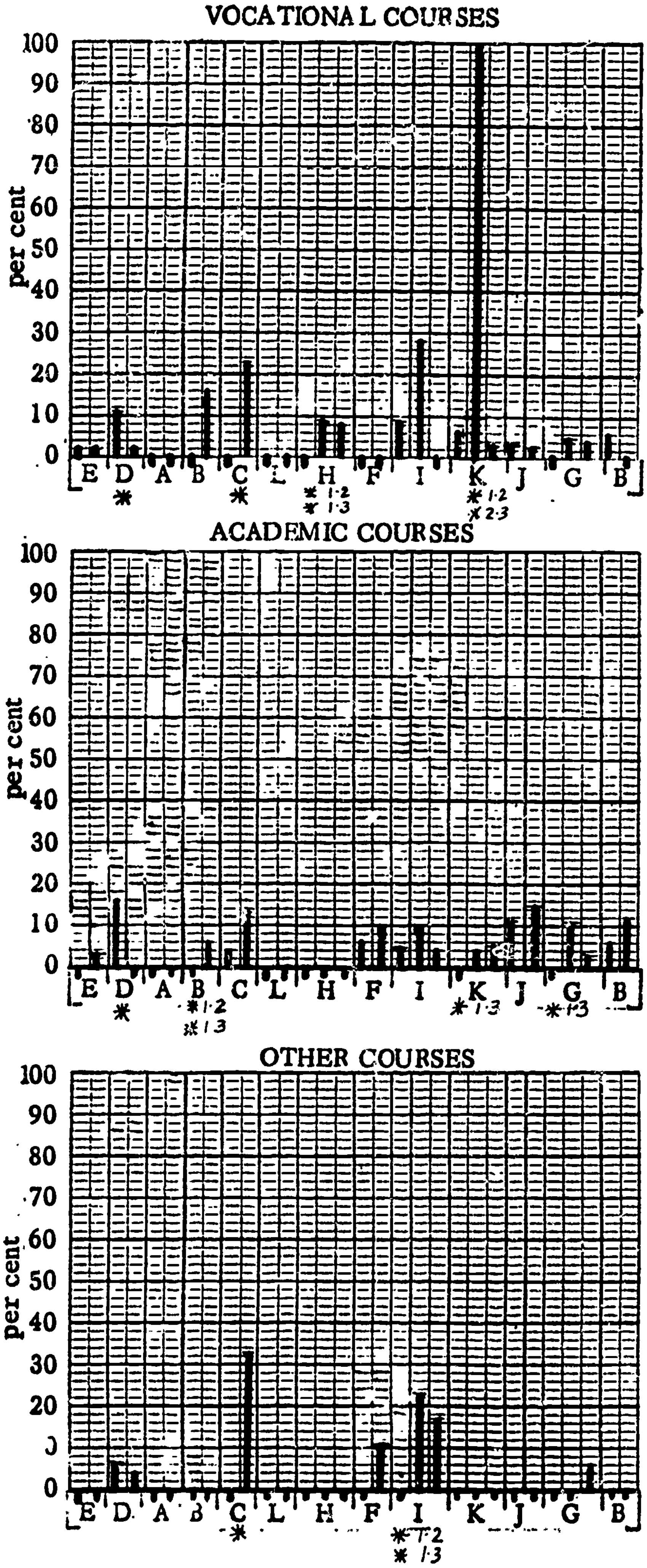
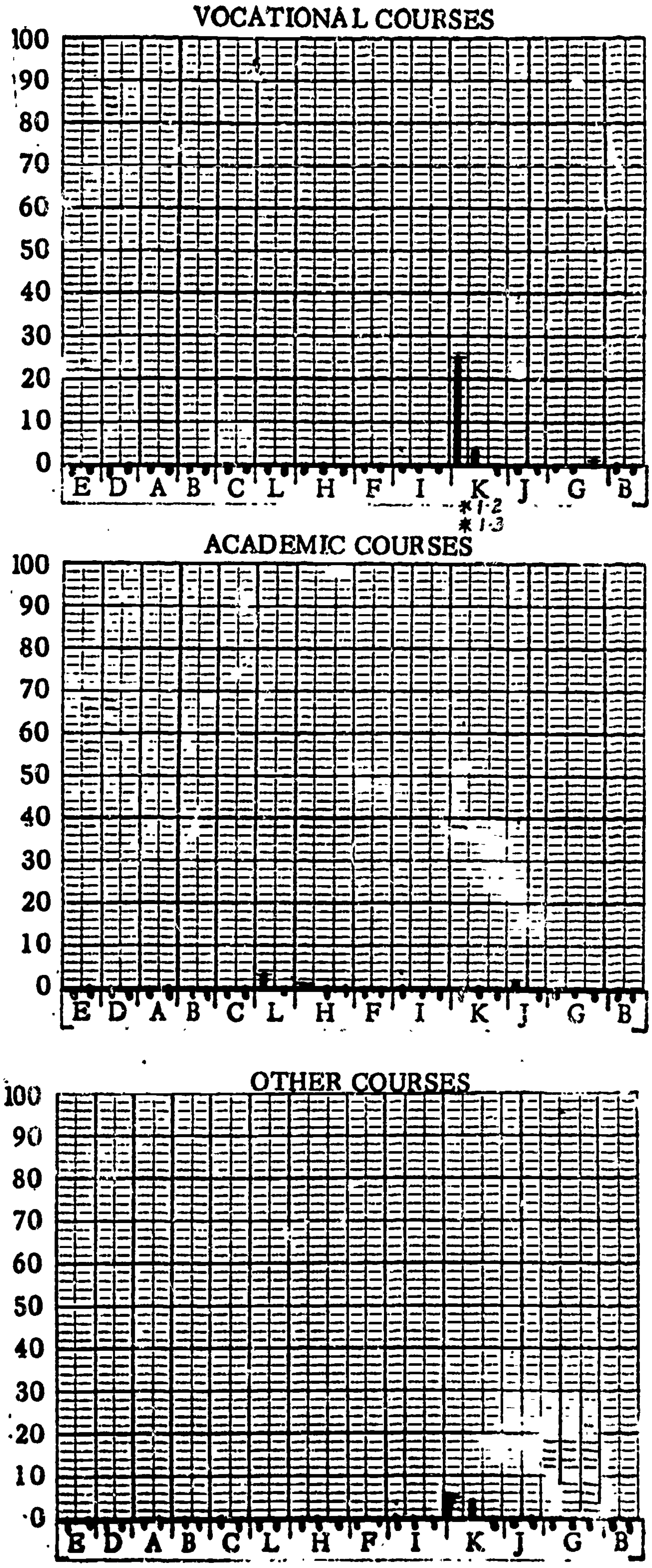


FIGURE C 26

DIFFERENT REQUIREMENTS FOR DIFFERENTIATED CREDITS



* Significant at .05 level; otherwise non-significant

FIGURE C 27

HIGH ABILITY STUDENTS SPEND MORE TIME IN INDEPENDENT STUDY

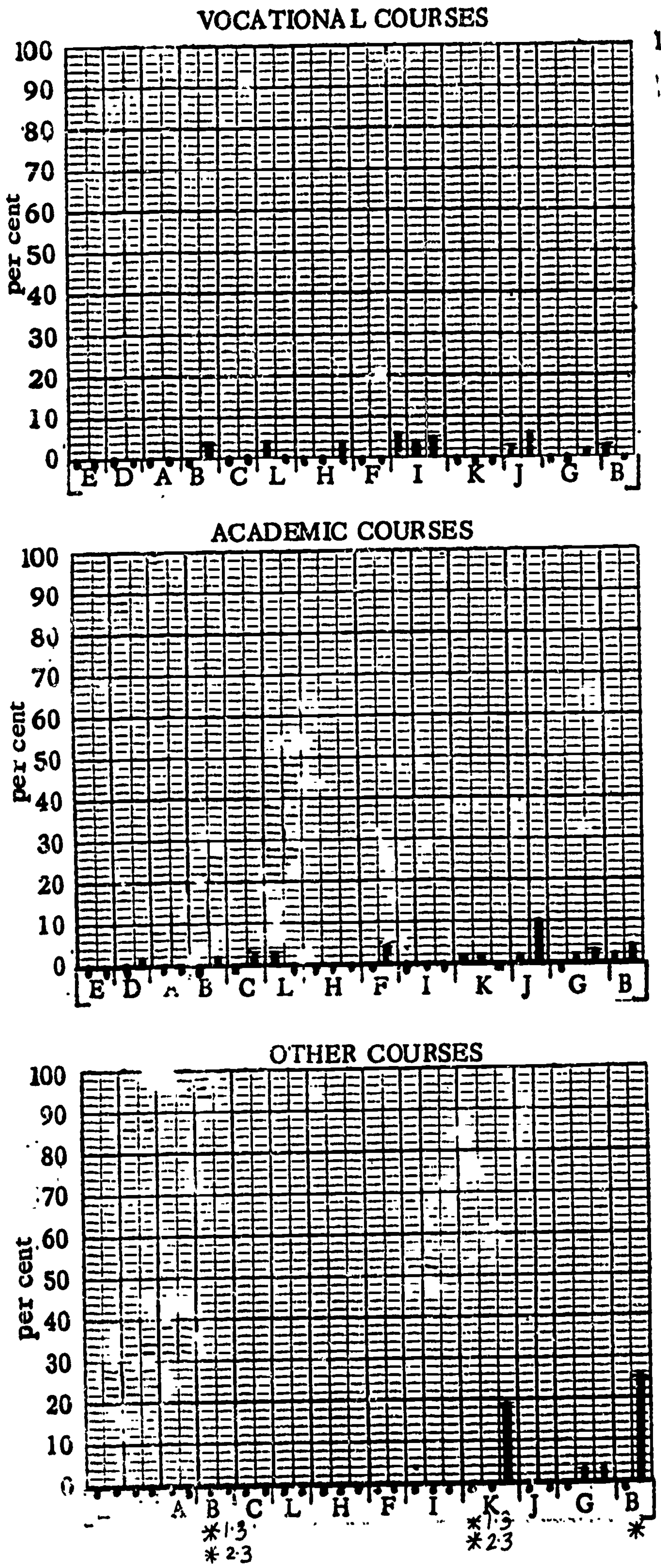
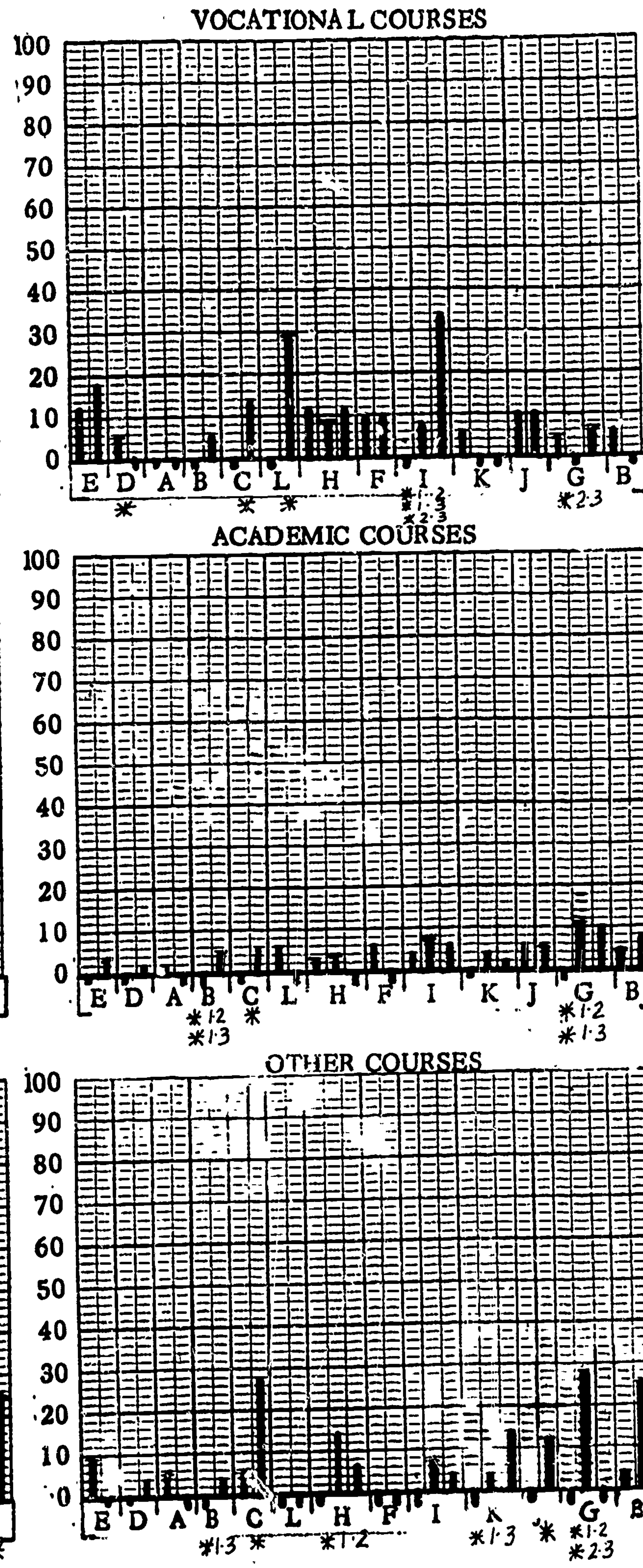


FIGURE C 28

INTERESTED STUDENTS WORK ADDITIONAL TIME IN INTEREST AREAS



* Significant at .05 level; otherwise non-significant

FIGURE C 29
MATERIAL STUDIED IN CLASS DIFFERS

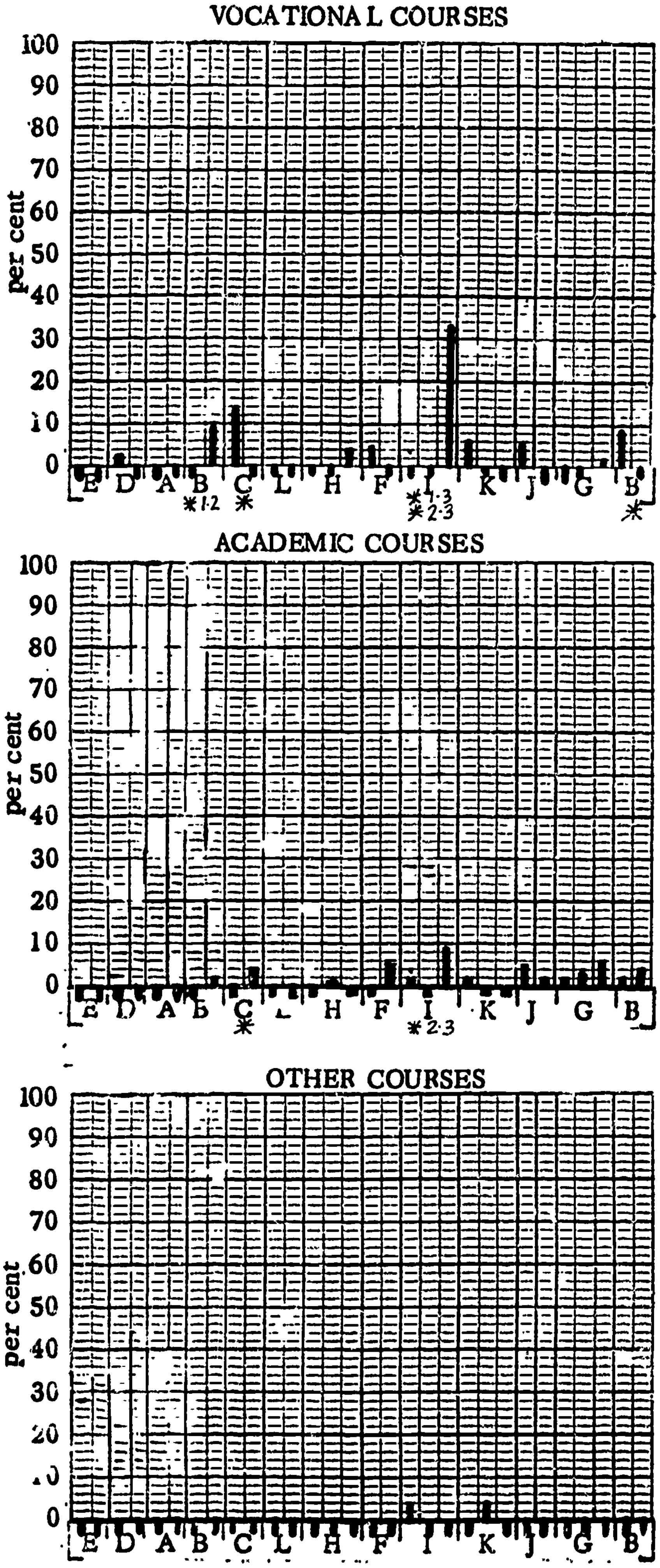
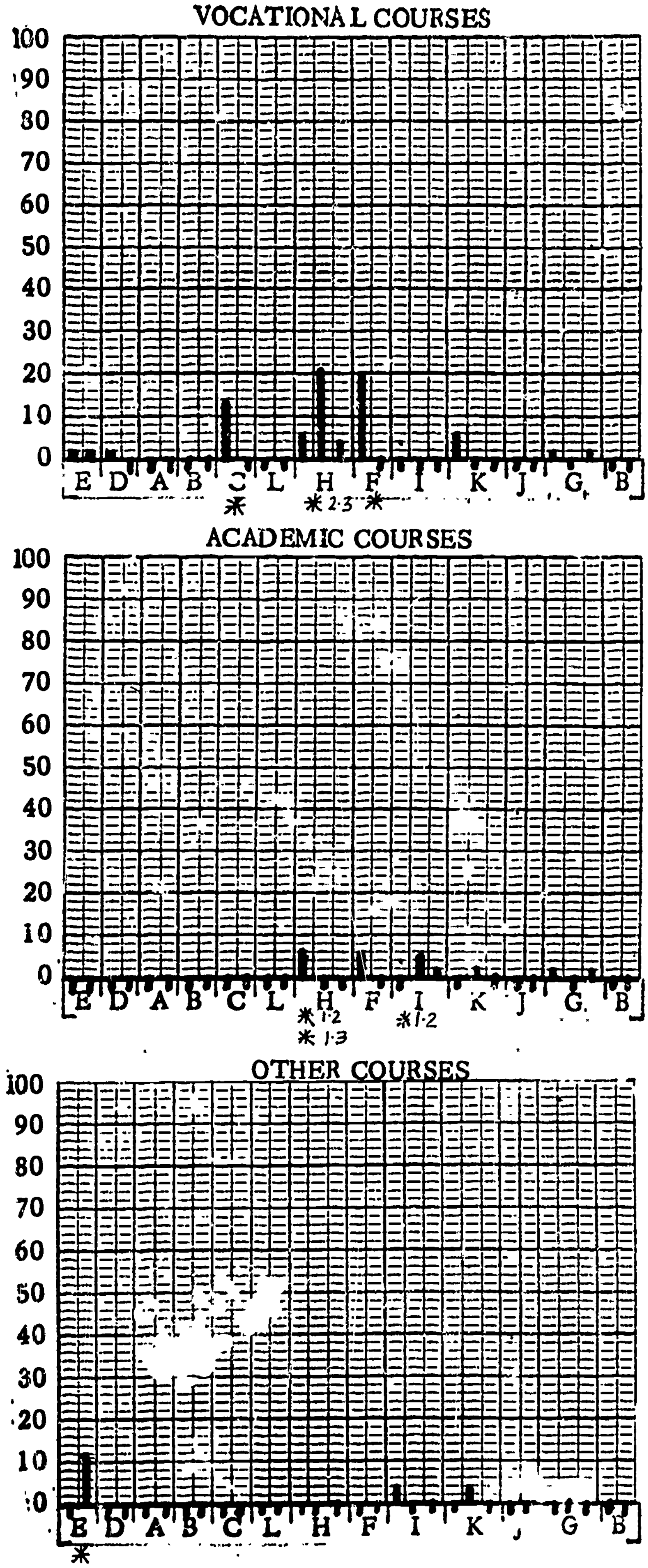


FIGURE C 30
OPEN LABS AVAILABLE TO INTERESTED STUDENTS



* Significant at .05 level; otherwise non-significant

FIGURE C 31
REQUIRED TIME DIFFERS BECAUSE OF SCHEDULING CONFLICTS

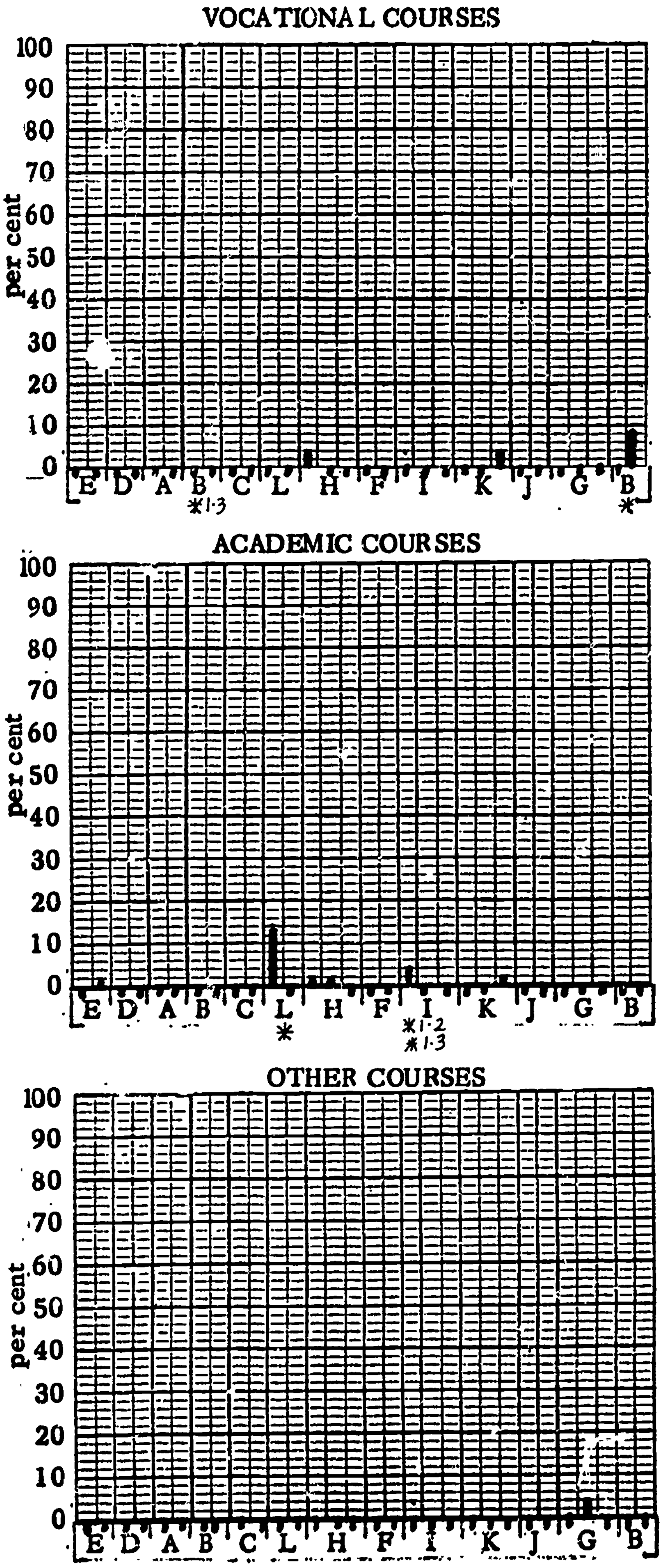
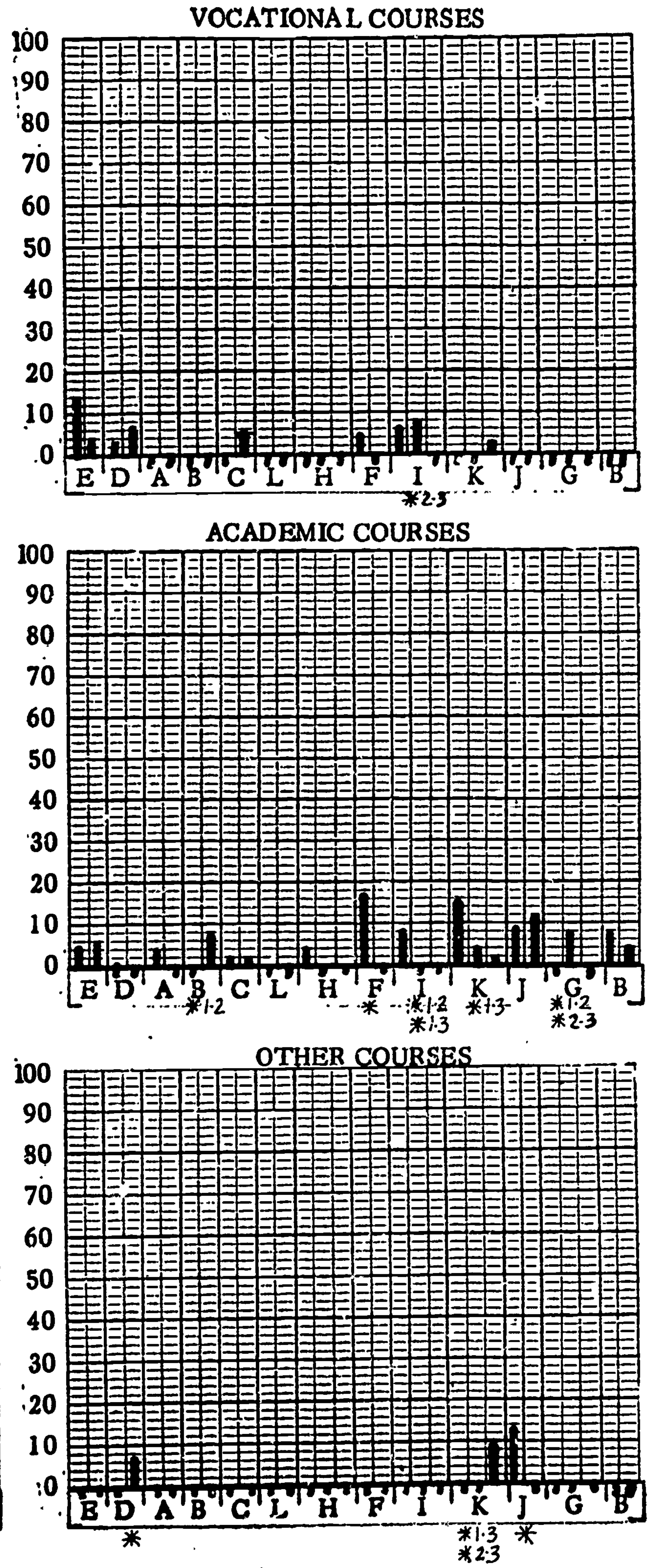


FIGURE C 32
MORE FORMAL CLASS TIME FOR SLOW ACHIEVERS



* Significant at .05 level; otherwise non-significant

TABLE C 23

Course Meets 1 Semester

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1					E, D, B, C		E, D, A, B, C	A	E, D, A, B, C
T-M 2					B		B		B
Modular 1 - 2							H, I, K, G	H, I, K, G	H, I, K, G
1 - 3		G					H, I, K, G	H, I, K	H, I, K, G
2 - 3	J	L		L		F	H, F, I, K, G, B	H, F, I, K, G, J, B	L, H, I, K, G, J, B

TABLE C 24

Course Meets 2 Semesters

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		E, D, C					E, D, A, B, C	A, B	E, D, A, B, C
T-M 2		B					B		B
Modular 1 - 2						H	H, I, K, G	H, I, K, G	I, K, G
1 - 3					G	H	H, I, K, G	H, I, K	I, K, G
2 - 3	L	B	F	J	L		H, I, K, G, F, B,	H, I, K, G, F, J	L, H, I, K. G, J, B

TABLE C 25

TIME REQUIRED IN FORMAL CLASSROOM INSTRUCTION VARIES WITH STUDENT ABILITY

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B, C	D, A, B, C	B, C				E, D, A	E	E, D, A
T-M 2	B	B	B						
Modular 1 - 2	H, I	G	H, G, I				K, G	H, I, K	K
1 - 3	H, G	G	K, G				I, K	H, I, K	H, I
2 - 3		J		F		H, F	B, L, H, I, K, J, G	L H, F, I, K, G, B	L, I, K, J, G, B

TABLE C 26

TIME REQUIRED IN FORMAL CLASSROOM INSTRUCTION VARIES WITH STUDENT INTEREST

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B	D, B	B, C		A		E, D, A, C	E, C	E, D, A
T-M 2	B	B	B						
Modular 1 - 2	H, I	G	H, G	K			G	H, I, K	I, K
1 - 3	I, G	K, G	K, G	K			H	H, I	H, I
2 - 3	G		K	F	L, H		L, H, I, J, B, K	F, I, J, K B, G	L, H, F, I, J, B, G

TABLE C 27

ACCELERATED STUDENT ACHIEVERS RELEASED FROM FROMAL CLASS MEETING

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	C	B	C	D	D		E, A, B	E, A, C	E, D, A, B
T-M 2		B					B		B
Modular 1 - 2	H, K	G	I				I, G	H, I, K	H, K, G
1 - 3	H	K	I	I			K, G	H, I, G	H, K, G
2 - 3				I, K			L, H, F, J, B, G	L, H, F, I, K, J, G, B	L, H, F, I, K, J, G, B

TABLE C 28

DIFFERENT REQUIREMENTS FOR DIFFERENTIATED CREDITS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B, C	E, D, A, B, C
T-M 2							B	B	B
Modular 1 - 2				K			H, I, G	H, I, G, K	H, I, G, K
1 - 3				K			H, I, G	H, I, G, K	H, I, G, K
2 - 3							L, H, F, I B, G, J, K	L, H, F, I, B, G, J, K	L, H, F, I, B. G, J, K

TABLE C 29

HIGH ABILITY SPENDS MORE TIME IN INDEPENDENT STUDY

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B, C	E, D, A, B, C
T-M 2			B				B	B	
Modular 1 - 2							H, I, K, G	H, I, K, G	H, I, K, G
1 - 3			K				H, I, K, G	H, I, K, G	H, I, G
2 - 3			K, B				L, H, F, I, K, J, G, B	L, H, F, I, K, G, B, J	L, H, F, I, G, J

TABLE C 30

INTERESTED STUDENTS WORK ADDITIONAL TIME IN INTERESTED AREAS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	C	B, C	C	D			E, A, B	E, D, A	E, D, A, B
T-M 2		B	B				B		
Modular 1 - 2	I	G	H, G				H, K, G	H, I, K	K, I
1 - 3	I	G	K				H, K, G	H, I, K	H, I, G
2 - 3	L, I, G		J			G	H, F, K, B, I	L, H, F, I, K, G, B, I	L, H, F, I, K, B

TABLE C 31

MATERIAL STUDIED IN CLASS DIFFERS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	B	C		B			E, D, A	E, D, A, B	E, D, A, B, C
T-M 2							B	B	B
Modular 1 - 2							H, I, K, G	H, I, K, G	H, I, K, G
1 - 3	I						H, K, G	H, I, K, G	H, I, K, G
2 - 3	I	I		B			L, H, F, K, G, J	L, H, F, K, G, J, B	L, H, F, I, K, J, G, B

TABLE C 32

OPEN LABS AVAILABLE TO INTERESTED STUDENTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1	C					E	E, D, A, B	E, D, A, B, C	D, A, B, C
T-M 2							B	B	B
Modular 1 - 2		H			I		H, I, K, G	K, G	H, I, K, G
1 - 3		H					H, I, K, G	I, K, G	H, I, K, G
2 - 3	H, F						L, B I, K, J, G	H, F, I, K, J, G, B	L, H, F, I, K, J, G, B

TABLE C 33

REQUIRED TIME DIFFERS BECAUSE OF SCHEDULING CONFLICTS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1							E, D, A, B, C	E, D, A, B C	D, A, B, C, E
T-M 2	B							B	B
Modular 1 - 2					I		H, I, K, G	H, K, G	H, I, K, G
1 - 3					I		H, I, K, G	H, K, G	H, I, K, G
2 - 3	B				L		L, H, F, K, G, J, I, B	H, F, I, K, J, G, B	L, H, F, I, K, J, G, B

TABLE C 34

MORE FORMAL TIME FOR SLOW ACHIEVERS

PROJECT YEAR	SIGN. +			SIGN. -			N. S.		
	Voc.	Acad.	Other	Voc.	Acad.	Other	Voc.	Acad.	Other
Trad. to Modular T-M 1		B	D				E, D, A, B, C	E, D, A, C	E, A, B, C
T-M 2							B	B	B
Modular 1 - 2		G			I		H, I, K, G	H, K	H, I, K, G
1 - 3			K		I, K		H, I, K, G	H, G	H, I, G
2 - 3			K	I	F, G	J	L, H, F, K, G, J, B	L, H, I, K, J, B	L, H, F, I, G, B

APPENDIX D

INDEPENDENT STUDY FACILITIES

To attempt to determine how students use unassigned time in a modular schedule, a data collection instrument was developed which asked teachers in project schools to tally the number of students using independent study facilities. The facilities so designated were classified as vocational facilities, academic course facilities, other course facilities (i. e., neither vocational nor academic), library and study hall facilities, and student center or social facilities. Resource centers which were clearly used for study in a specific area of the curriculum were classified with the facility type to which that area belongs. Otherwise the resource center was categorized with the library and study hall facilities.

Data was collected on the use of these independent study facilities from project schools during the months of April and May of the second year, and from October to May during the third year. A minimum of five days per month, including one of each of the days of the week, were randomly selected and monitored for this information. During the second project year these data were collected from a randomly selected 60 percent of the available modules per sample day. During the third project year all modules in a sample day were included in the tally.

In evaluating the data, the following underlying assumptions were made:

> The objective of providing students with the opportunity to learn on their own has been met in schools where a percentage of the school schedule is devoted to unassigned time.
>
> Students appearing in study facilities during their unassigned time are assuming responsibility for their own learning.

A general null hypothesis was used . This stated that there would be no difference in the mean percentage of students who spent unscheduled time in a facility type between project year two and project year three. This hypothesis was tested for each facility type. In schools B, C, F, and J, project years two and three were the first and second years respectively on modular scheduling. In schools G, I, and K, the comparisons between the two years were for the second and third years of modular scheduling. School H comparisons were for the fourth and fifth years of modular scheduling. A two-tailed test of significance was used to test the null hypothesis. A difference between mean percentages for each year was accepted as significant at the .05 level. Schools A, D, E, and M were only modularly scheduled for one year, project year 3, so no comparisons were possible. The mean percentages for these schools have been reported, however, along with all other results in Figure D .

In treatment of the data, tallies from each facility of a certain type were summed for total student use of that facility type. These sums were calculated for each module in each sample day using the following formula:

$$X_{mdF} = x_{md1} + x_{md2} + x_{md3} + \dots + x_{mdf}$$

F = facility type
f = facility
m = module
d = sample day

Because of differences in the size of schools from one year to the next it was necessary to calculate percentages of students using each facility type during each module of each sample day. Thus, comparisons of equivalent values could be made between project years two and three. These percentages were calculated using the formula:

$$P_{mdF} = \frac{X_{mdF}}{(Avg)}$$

P = percentage of students
(Avg) = average number of students unassigned during each module of the school year.

For each school the average number of students unassigned during each module of the year was calculated by the formula:

$$(Avg) = \frac{(\text{Number students enrolled})\ (\text{modules per cycle}) - (\text{Total number student modules scheduled per cycle})}{(\text{modules per cycle}) - (\text{lunch modules per cycle})}$$

A cycle is the number of days in which the schedule will vary before it repeats itself. The average number of students unassigned each module for each year are:

School	Year 2	Year 3
A	---	428
B	447	542
C	393	360
D	---	1,150
E	---	1,049
F	51	39
G	526	663
H	860	846
I	418	365
J	516	510
K	872	373
M	301	290

From the percentage calculations a mean percentage was calculated for each facility type using the formula:

$$\overline{P}_F = \frac{\sum_{1}^{N} P_{mdF}}{N}$$

where N = md and represents the total number of observations for each facility type.

These mean percentages of student use of unassigned time are reported in Figure D 1.

TABLE D1

Stanford University,
School of Education

Date ______________________________

Voc.Ed. - Flex.Sched.
(Form B 1)

Name of School ______________________________

INDEPENDENT STUDY INTERVIEW GUIDE

Interviewer ______________________________

Interviewee ______________________________

This form is designed for completion during an interview with the School Principal.

1. Are there opportunities for students to undertake independent study, to follow independent interests, or to undertake independent projects

   before school? ______ Yes ______ No

   during school? ______ Yes ______ No

   after school? ______ Yes ______ No

2. What are the conditions under which independent work takes place (e.g., are students able to leave study hall or class for independent study purposes; are there areas kept open, such as the Library, for students to use during free time) ?

3. What facilities are available for independent study?

(Please use the form on the next page.)

In the left-hand vertical column of the form is a list of subjects and subject departments commonly found in a secondary school. In the horizontal columns to the right is a list of independent study facilities. Indicate the number of facilities of each type which is available for each department or subject, and <u>which is actually used for independent study</u>.

<u>Example</u>

If the English Department has two study centers* and one laboratory, a "2" should be placed in the Study Center column and a "1" in the Laboratory column.

If departments share facilities, as in a situation where the English and Social Studies departments share a study center, then the number "½" should be placed in the Study Center column for both subjects.

* Study centers are also called Resource Centers. The terminology will vary with schools. Study centers are commonly spaces or rooms containing source material where students may go for independent study.

For each facility identified in Question 3, please provide whatever data are available regarding student use of each facility (e.g., number of students using the facility and the types of things that students are doing while using each facility). Also, by giving one or two examples, explain how teachers use these facilities in connection with the independent study arrangements that they have established.

(Form B 1

DEPARTMENT OR SUBJECT	STUDY CENTER	LABORATORY	PROJECT ROOM	SHOP	PRACTICE ROOM	OTHER						
ENGLISH												
SOCIAL STUDIES												
MATHEMATICS												
GENERAL SCIENCE												
BIOLOGY												
CHEMISTRY												
PHYSICS												
EARTH SCIENCE												
OTHER SCIENCE												
FOREIGN LANGUAGES												
BUSINESS EDUCATION												
ART												
HOMEMAKING												
AUTO MECHANICS												
WOODWORKING												
MACHINES												
METALS												
DRAFTING												
MUSIC												
PHYSICAL EDUCATION												
GUIDANCE												
OTHER												

TABLE D 2

Stanford University
School of Education

Voc.Ed. - Flex.Sched.
(Form B-1a)

Date ____________________

School ____________________

Facility ____________________

Recorder ____________________

STUDENT USE OF INDEPENDENT STUDY FACILITIES

On this form we would like you to indicate the total number of students who have used this facility during each of the specified modules or class periods.

1. Must students remain in the facility from the beginning of the module to the end of the module? Yes ______ No ______

   If the answer is "Yes" you may make only one count of the students at any time during the module you wish.

2. Are students allowed to leave the facility whenever they wish at any time during the module? Yes ______ No ______

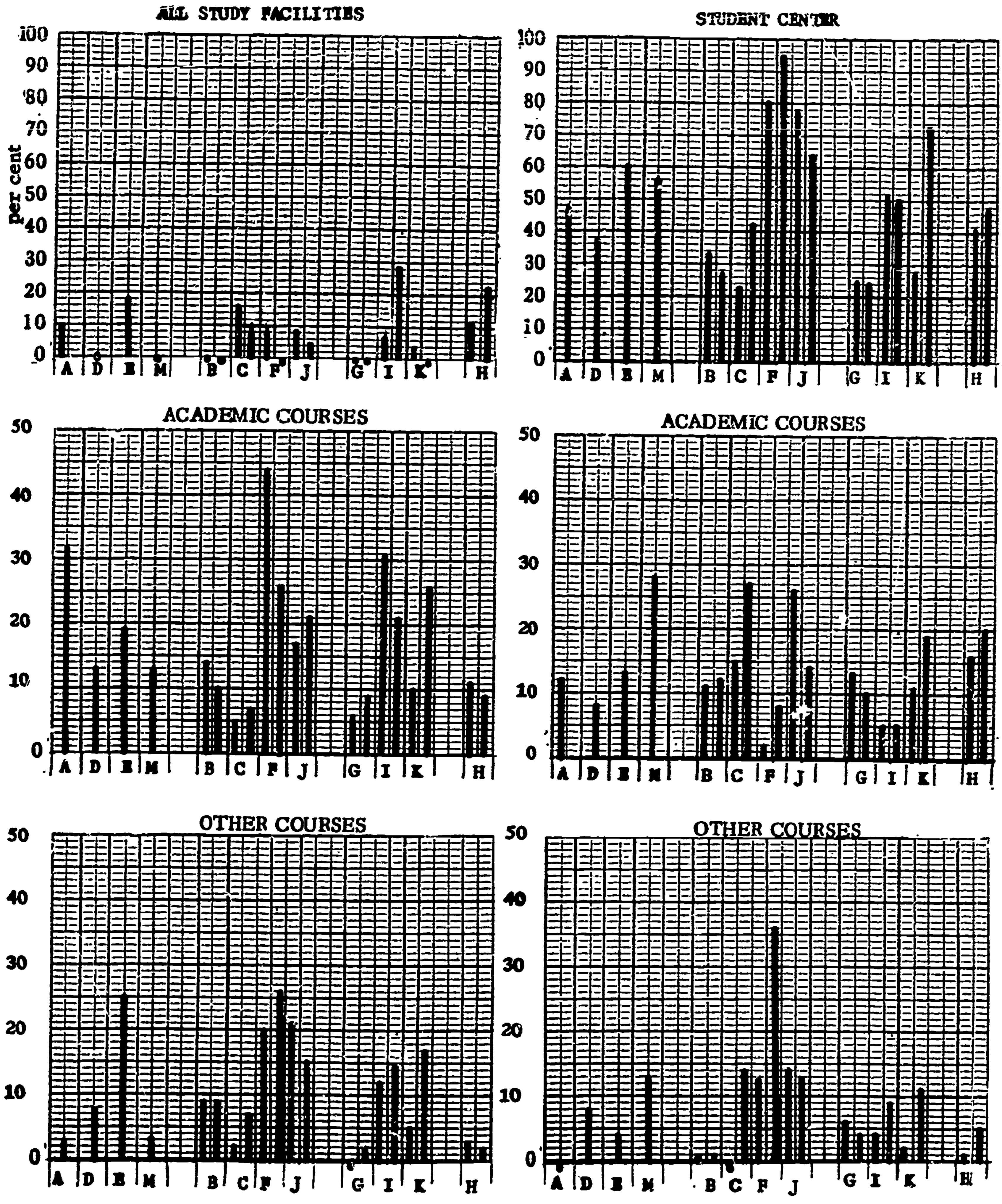
   If the answer is "Yes" please count the number of students present at the beginning of the module and then add to that figure the number of students who enter the facility at any time during the module.

3.

MODULE NUMBER	TIME	NUMBER PRESENT

FIGURE D1

FACILITY UTILIZATION



* Significant at .05 level; otherwise non-significant

SUMMARY OF CHANGE IN STUDENT USE OF UNASSIGNED TIME

VOCATIONAL FACILITIES

The "years" column identifies the years of modular scheduling.

Years	Increase	Decrease	N.S.
1 - 2	C, F	J	B
2- 3	I, K		
4- 5		H	
Total:	4	2	1

ACADEMIC FACILITIES

1 - 2	C, F	J	B
2 - 3	K	G	I
4 - 5	H		
Total:	4	2	1

OTHER COURSE FACILITIES

1 - 2	F		B, J
2 - 3	I, K	G	
4 - 5	H		
Total:	4	1	2

LIBRARY FACILITIES

1 - 2	C, J	B, F	
2 - 3	G, K	I	
4 - 5		H	
Total:	4	4	0

STUDENT CENTER FACILITIES

				No Student Center Either One or Both Years
1 - 2	I	C, J		B, F
2 - 3		(One of these schools did away with student center during year.)		G, K
4 - 5	H			
Total:	2	2	0	4

ALL STUDY FACILITIES

(Includes Vocational, Academic, Other Facilities and Library)

1 - 2	C, F	B, J	
2 - 3	K		G, I
4 - 5	H		
Total:	4	2	2

FACILITIES SAMPLED FOR STUDENT USE OF UNASSIGNED TIME

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School E - Year 1			
Auto Mechanics (2)	Science(6)	Vocal Music	Library	Cafeteria
Auto Body	Math	Instrumental Music	Study Hall(2)	
Electronics	English	ROTC		
General Shop	Chemistry	Art (2)		
Woodworking (2)	Social Studies			
Homemaking (3)				
Business (4)				
Machine Shop				
Metal Shop				
Office Practice (3)				
Drafting (3)				
Printing				
	School D - Year 1			
Home Ec. Res. Center	Science Open Lab(9)	Choral	Library	
CBE	Social Studies Res. Center (2)	Art Res. Center		
Gen. Electricity	Foreign Language Res. Center	Gym P. E. Open Lab.		
Voc. Ed. Res. Center	Lang. Arts Res. Ctr.	P. E. /Activities		
Sales & Distr. Ed.	Science-Math Res. Center	Band Res. Center		
Voc. Drtg. Lab		Orchestra Res. Ctr.		
Id. Arts Draft Lab		Arts Open Lab.		
Id. Electr. Lab				
Machine Shop				
Graphic Lab				
Home Ec. Open Lab(2)				
Metal Shop				
Voc. Auto Lab				
Wood Shop				
Typing Lab(4)				
Business Mach.				
Shorthand Lab				
Power Machine Lab.				

NOTE: Numbers within parentheses indicate number of rooms of that type which were sampled. Designation of a year refers to the number of years which modular scheduling had been in existence when this sample was made.

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School A - Year 1			
Home Ec. Home Ec. Lab. Voc. Ed. Resource Center Circle	Math-Science Res. Center Biology Lab Chemistry-Phys. Lab Social Studies Res. Center English Res. Center		7th-8th Res. Ctr. Auditorium Library So. Library No.	Student Center
	School M - Year 1			
Tech. Arts Lab Shop I	Foreign Language Phys. Science Open Lab Science Math Social Studies English	Gym Girls P. E. Art	Library	Cafeteria Study Hall
	School F - Year 1			
Business Ed.	Science Lab Foreign Language	Phys. Ed. Gym Art	Resource Center	Multipurpose
	School E - Year 2			
Business Ed. Shop Farmpower Welding Basic Shop Woodcraft Drafting	Science Lab Foreign Language Lab	Art Gym P. E.	Library	

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School J. - Year 1			
Foods Homeliving Business Math Woodwork Voc. Resource Center Clothing Auto Mech. Shop Drafting Electronics Metals Shop Business Machines Typing	English Res. Center Foreign Language Math Resource Center Social Studies Res. Center Science Res. Center	Music Practice Studies Boys Crafts & Ceramics Phys. Ed. -Boys Girls Craft Art Phys. Ed. -Girls	Library	Cafeteria
	School J - Year 2			
Drafting Steno Electronics Bus. Machines Typing Voc. Res. Center Clothing Foods Homeliving Business Math Metals Auto Mech. Shop	Social Studies Science/Math Res. Center Science/Math Learning Ctr. English Res. Center Science Lab	Art Lab Phys. Ed. Music Practice Studio	Library	Cafeteria (CLOSED AFTER ONE MONTH OF SCHOOL YEAR)

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School B - Year 1			
Agriculture Auto Shop Business Radio Lab Woodship	Social Studies Res. Center Science (3) English Res. Center	Art Lab Crafts Lab	Library	
	School B - Year 2			
Agriculture Lab Business/Math Res. Center Radio Lab Auto Shop Woodshop Home Economics Lab	Social Studies Res. Center Science Lab (3) English Res. Center Science Res. Center Language Lab	Arts/Crafts Lab Phys. Ed. Lab	Library	
	School C - Year 1			
Business Res. Center Industrial Arts	Social Science Res. Center English Res. Center Foreign Language Res. Center Science Res. Center Math Learning Center		Library	Student Lounge
	School C - Year 2			
Business Res. Center Typing Open Lab Shop - Open Lab Drafting -Open Lab Home Ec. Open Lab	Listening Center Math/Science Res. Center Social Science Res. Center English Res. Center Physics-Open Lab Biology-Open Lab Chemistry-Open Lab Math-Open Lab	Arts Res. Center Phys. Ed. Open Lab Art - Open Lab	Library	Student Lounge

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School I - Year 2			
Teachers Workroom Merchandising Auto. Mechanics Metals Home Economics Business Ed.(3) Woodworking	Foreign Language Science (3)	Gym Physical Ed. Guidance Main Office Music Art	Library Study Room(4)	Cafeteria
	School I - Year 3			
Home Economics Business Education(3) Woodworking Auto Mechanics & Metal	Foreign Language Science (3) Math Resource Center	Art Gym P. E. Music Main Office Guidance	Library Complex Resource	Cafeteria Student Center
	School G - Year 2			
	Social Science Resource Center English Resource Center Math-Science Resource Center	Fine & Appl. Arts Res. Center	Library	
	School G - Year 3			
Typing Room	Math/Science Resource Center English Resource Center Social Science Resource Center	Fine Applied Arts Res. Center Art Studio	Main Library	

Vocational Facilities	Academic Facilities	Other Courses	Library	Student Center
	School H - Year 4			
Business Education Resource Center	Math-Science Resource Cntr. Foreign Language Lab English Resource Cntr. Social Studies Resource Cntr. English Soc. Studies Resource Cntr.	Art Ind. Arts Home Ec. Physical Education	Library Ind. Study Lab	Club Student Union
	School H - Year 5			
	Math/Science Resource Cntr. Foreign Language English Resource Cntr. Social Studies Resource Cntr. English/Soc. Studies Resource Cntr.	Art Ind. Arts Home Ec. Physical Ed. Res. Center	Library	Club Student Union

APPENDIX E

STUDENT CONTROL

The degree to which students assume responsibility for their own learning and behavior can to some extent be measured by tallying the number and types of referrals for classroom and campus disciplinary actions. School officials in each project school who were responsible for handling student control problems were asked to tally on the provided form the number of students conferenced each day for each type of violation.

The sampling procedure for the first year consisted of reporting all student control conferences held during each day of the first week of each month. The sampling procedure was changed the second year so that a random selection of five school days was sampled throughout each month, including at least one Monday, one Tuesday, one Wednesday, one Thursday, and one Friday. One of the first five school days of the month was selected at random, and each fourth school day following the first sampling date was then used to complete the sample.

The tallies reported by each respondent were summed for each violation for each sample day using the formula

$$X_{nj} = \Sigma x_{ijn}$$

where i = school official reporting
j = type of violation conferenced for
n = sample day

Using this total sum of conferences held for each violation on a given day, proportions of the student body involved in such conferences were developed. The formula we used was:

$$P_{jn} = \frac{X_{nj}}{\text{Average Daily Attendance For the Year}}$$

where P_{jn} = Proportion of students conferenced for student control violation "j" on day "n"

It was necessary to utilize proportions so that despite changes in enrollment we might make comparisons between years. The mean proportion of students conferenced for a student control violation was then calculated using the following formula:

$$\overline{P}_j = \frac{\sum_1^n P_{jn}}{N}$$

where N = total number of days sampled

This mean proportion represents the average number of conferences held for a particular student control violation during the school year in which the sample was taken.

The student control questionnaire allows the respondent to differentiate between "classroom violations" and "school and campus violations". It identifies a total of 22 possible classroom violations which might occur and a total of 25 school and campus violations which might occur. All classroom violations were summed for each day, as were all school and campus violations. Proportions were calculated for these two composite groups for each sample day. Mean proportions were then calculated for the "classroom violations" group and for the "school and campus violations" group. Finally, the sum of all violations for each sample day was tallied and a proportion calculated. Then the mean proportion of students conferenced for an "all student control violations" group was calculated.

A null hypothesis was proposed to test the difference in the mean proportion of students conferenced for student control violations between project year two and project year three. The t-statistic was used to test the difference in mean proportions between these two years for each separate type of student control violation, the "classroom violations" group, the "school and campus violations" group, and the "all student control violations" group. The level which was accepted as indicating a significant difference was .05. Comparisons were not made using data collected during project year one because this data was felt to be spurious as a result of the collection methods used.

Tables E 3 through E 6 list the schools in which a significant increase, significant decrease, or non-significant change occurred between project years two and three. Three schools were traditionally scheduled during year two of the project, and employed a modular schedule generated by the computer during project year three. These were schools A, D, and E. Comparisons between years two and three within each of these schools can give us an indication of what phenomena occur in making the transition from traditional to modular scheduling

Nine schools were modularly scheduled during both project years two and three. These schools were B, C, F, G, H, I, J, K, and L. Comparisons between years two and three within these schools gives an indication of whether trends developed in the transition from traditional to modular scheduling remain as students and teachers become acclimated to the new environment.

TABLE E1

Stanford University
School of Education

Voc. Ed. - Flex. Sched.
(Form B 4)

Date ____________

Name of School ____________

Reporter ____________

STUDENT CONTROL

This form is designed to be filled out by the person or persons who are charged with the student-control responsibility in the school.

Below are listed a number of reasons for which students are commonly referred for disciplinary action. When a student is referred, place a mark in the proper column to indicate the type of conference which tool place.

The parentheses have been supplied to simplify counting. Five marks or less should be placed between each set of parentheses.

Example:

	Student Conference	Student-Parent Conference	Parent Conference	Other Conference
4. Disturbances	(~~IIII~~) (III)	(III)	(I)	(II)

CLASSROOM VIOLATIONS

	Student Conference	Student-Parent Conference	Parent Conference	Other Conference
1. Tardiness	( )( )	( )	( )	( )
2. Class cuts	( )( )	( )	( )	( )
3. Cheating	( )( )	( )	( )	( )
4. Disturbances	( )( )	( )	( )	( )
5. Disobedience	( )( )	( )	( )	( )
6. Improper dress	( )( )	( )	( )	( )
7. Misrepresentation	( )( )	( )	( )	( )
8. Disrespect	( )( )	( )	( )	( )
9. Property damage	( )( )	( )	( )	( )
10. Violating health & safety regulations	( )( )	( )	( )	( )
11. Profanity & obscenity	( )( )	( )	( )	( )
12. Smoking	( )( )	( )	( )	( )
13. Fighting	( )( )	( )	( )	( )
14. Gambling	( )( )	( )	( )	( )
15. Theft	( )( )	( )	( )	( )
16. Hazing	( )( )	( )	( )	( )
17. Use of intoxicants	( )( )	( )	( )	( )
18. Boy-girl relationships	( )( )	( )	( )	( )
19. Textbook & library violations	( )( )	( )	( )	( )
20. In unauthorized area	( )( )	( )	( )	( )
21. Personal	( )( )	( )	( )	( )
22. Other (please specify)	( )( )	( )	( )	( )

SCHOOL AND CAMPUS VIOLATIONS

	Student Conference	Student-Parent Conference	Parent Conference	Other Conference
23. Truancy	( )( )	( )	( )	( )
24. Traffic & parking	( )( )	( )	( )	( )
25. Suspensions & detentions	( )( )	( )	( )	( )
26. Leaving campus w/o authorization	( )( )	( )	( )	( )
27. Conf. w/ police, other authorities	( )( )	( )	( )	( )
28. Excessive absence	( )( )	( )	( )	( )
29. Disturbances	( )( )	( )	( )	( )
30. Disobedience	( )( )	( )	( )	( )
31. Improper dress	( )( )	( )	( )	( )
32. Misrepresentation	( )( )	( )	( )	( )
33. Disrespect	( )( )	( )	( )	( )
34. Property damage	( )( )	( )	( )	( )
35. Violating health & safety regulations	( )( )	( )	( )	( )
36. Profanity & obscenity	( )( )	( )	( )	( )
37. Smoking	( )( )	( )	( )	( )
38. Fighting	( )( )	( )	( )	( )
39. Gambling	( )( )	( )	( )	( )
40. Theft	( )( )	( )	( )	( )
41. Hazing	( )( )	( )	( )	( )
42. Use of intoxicants	( )( )	( )	( )	( )
43. Boy-girl relationships	( )( )	( )	( )	( )
44. Textbook & library violations	( )( )	( )	( )	( )
45. In unauthorized area	( )( )	( )	( )	( )
46. Personal	( )( )	( )	( )	( )
47. Other (please specify)	( )( )	( )	( )	( )

TABLE E2

SAMPLE SIZE IN DAYS

SCHOOL	YEAR 2	YEAR 3
A	33	36
B	32	39
C	40	39
D	24	30
E	41	36
F	30	27
G	38	40
H	34	39
I	38	30
J	20	34
K	36	40
L	39	41

AVERAGE DAILY ATTENDANCE

SCHOOL	YEAR 2	YEAR 3
A	939	887
B	1,037	1,050
C	800	788
D	3,278	2,947
E	2,392	2,168
F	122	131
G	1,327	1,390
H	1,953	1,966
I	843	940
J	1,339	1,455
K	1,832	1,440
L	155	134

TABLE E3

CHANGES IN PROPORTION OF STUDENTS CONFERENCED FOR STUDENT CONTROL VIOLATIONS

Schools Moving From A Traditional To Modular Schedule

Classroom Violations	Significant Increase	Significant Decrease	N. S. Change	No Conferences Reported Held During the Following Year	
				Two	Three
1. Tardiness	D, E		A		
2. Class cuts	D, E		A		
3. Cheating	E		A, D	A	A
4. Disturbances		E	A, D		
5. Disobedience		E	A, D		
6. Improper dress	D	E	A		
7. Misrepresentation	D		A, E	A	A
8. Disrespect		E	A, D		
9. Property damage	A		D, E		
10. Violating health & safety regulations			A, D, E	A	A
11. Profanity & obscenity			A, D, E		
12. Smoking	D	E	A		
13. Fighting	D	E	A		
14. Gambling	D		A, E	A	A
15. Theft			A, D, E	A	
16 Hazing			A, D, E	A, D	E
17. Use of intoxicants	D		A, E	A, E	A, E
18. Boy-Girl relationship	D		A, E	A, E	A, E
19. Textbook & library viol.			A, D, E		
20. In unauthorized area	A, D, E				
21. Personal	D		A, E		
22. Other (please specify)			A, D, E	A, D	A, D, E
SUM OF CLASSROOM VIOLATIONS	A, D		E		

TABLE E4
CHANGES IN PROPORTION OF STUDENTS CONFERENCED
FOR STUDENT CONTROL VIOLATIONS

Schools Moving From A Traditional To Modular Schedule

School and Campus Violations	Significant Increase	Significant Decrease	N. S. Change	No Conferences Reported Held During the Following Year	
				Two	Three
23. Truancy	D, E		A		
24. Traffic & parking	D, E		A		
25. Suspensions & detentions	A, D, E				
26. Leaving campus w/o authorization	A, D, E				
27. Conf. w/police, other authorities	A, D, E				
28. Excessive Absence	D, E		A		
29. Disturbances	E	D	A		
30. Disobedience			A, D, E		
31. Improper Dress	D	E	A		
32. Misrepresentation			A, D, E	A	
33. Disrespect	A, E		D	A	
34. Property damage	E		A, D		
35. Violating health & safety regulations	D, E		A	A	A
36. Profanity & obscenity			A, D, E	A	A
37. Smoking	D		A, E	A	A
38. Fighting			A, D, E		
39. Gambling	D, E		A	A, D	A
40. Theft	E		A, D		
41. Hazing			A, D, E	A, D	A, D
42. Use of intoxicants	D		A, E	A	
43. Boy-girl relationships	E		A, D		A
44. Textbook & library violations	E		A, D	A	A
45. In unauthorized area	D, E		A		
46. Personal	D		A, E		
47. Other (please specify)			A, D, E		A, D, E
SUM OF SCHOOL & CAMPUS VIOLATIONS	A, D, E				
SUM OF ALL TYPES OF VIOLATIONS	A, D, E				

TABLE E5

CHANGES IN PROPORTION OF STUDENTS CONFERENCED FOR STUDENT CONTROL VIOLATIONS

Schools Always Modularly Scheduled

Classroom Violations	Significant Increase	Significant Decrease	N. S. Change	No Conferences Reported Held During the Following Year	
				Two	Three
1. Tardiness	F	G, J	B, C, H, I, K, L		G
2. Class Cuts	B, F, H	G, K, L	C, I, J		
3. Cheating		H	B, C, F, G, I, J, K, L	F, I, L	F, G, L
4. Disturbances	C, F, I, J	K	B, G, H, L	I, J, L	
5. Disobedience	F, I	K, L	B, C, G, H, J	I, J	
6. Improper Dress	B, F, I	G	C, H, J, K, L	F	G
7. Misrepresentation	J	H	B, C, F, G, I, K, L	B, C, G, J, L	G, I
8. Disrespect	F, G	H, K	B, C, I, J, L	G, J	
9. Property Damage	F		B, C, G, H, I, J, K, L	F, G, I, L	G, L
10. Violating health & safety regulations			B, C, G, H, I, J, K, L	C, F, G, I, J, L	B, F, G, H, I, K, L
11. Profanity & obscenity		K	B, C, F, G, H, I, J, L	C, F, G, I, J, L	C, I, K, L
12. Smoking			B, C, F, G, H, I, J, K, L	F, G, L	G, L
13. Fighting	F	K	B, C, G, H, I, J, L	F, G, I, L	G, I, L
14. Gambling		H	B, C, F, G, I, J, K, L	B, C, F, G, I, K, L	C, F, G, I, K, L
15. Theft		H	B, C, F, G, I, J, K, L	F, I, L	C, I, K, L
16. Hazing			B, C, F, G, H, I, J, K, L	B, C, F, G, I, J, K, L	B, C, F, G H, I, J, L
17. Use of intoxicants			B, C, F, G, H, I, J, K, L	B, C, F, G, I, J, K, L	G, I, K, L
18. Boy-girl relationship	F		B, C, G, H, I, J, K, L	B, F, G	G, J, L
19. Textbook & library viol.	F, I		B, C, G, H, J, K, L	F, G, I, L	G, L
20. In unauthorized area	F	J	B, C, G, H, I, K, L	F, G	G, L
21. Personal	B	H	C, F, G, I, J, K, L	C, F, G, L	L
22. Other (please specify)		C	B, F, G, H, I, J, K, L	F, G, L	I, K, L
SUM OF CLASSROOM VIOLATIONS	F, H	G, J, K, L	B, C, I		

TABLE E 6
CHANGES IN PROPORTION OF STUDENTS CONFERENCED
FOR STUDENT CONTROL VIOLATIONS

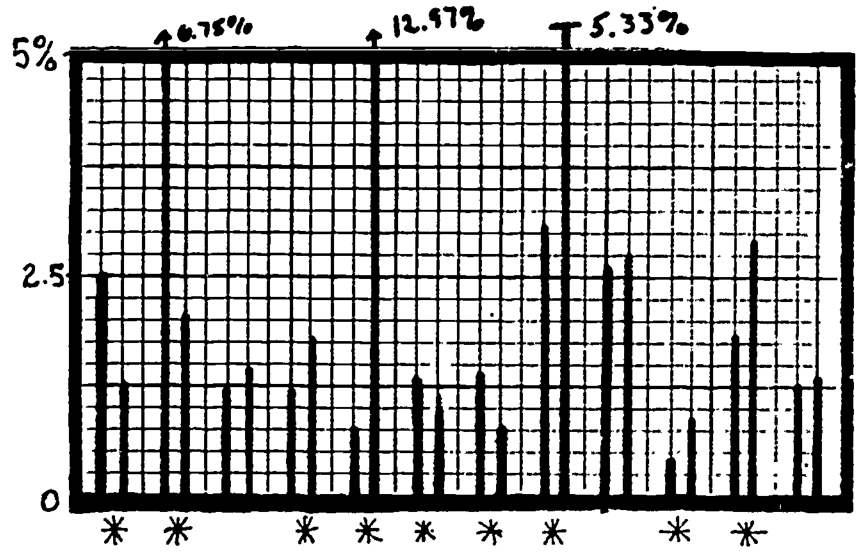
Schools Always Modularly Scheduled

School and Campus Violations	Significant Increase	Significant Decrease	N. S. Change	No Conferences Reported Held During the Following Year	
				Two	Three
23. Truancy	H	J,K,L	B,C,F,G,I		
24. Traffic & Parking	B,I	L	C,F,G,H,J,K	F,G	G,L
25. Suspensions & detentions	F,G,H,I	K,L	B,C,J		L
26. Leaving campus w/o authorization	F,G,I	H,K,L	B,C,J		
27. Conf. w/police, other authorities	F	J,K	B,C,G,H,I,L		G,L
28. Excessive absence	F,H,I	J	B,C,G,K,L	F	G
29. Disturbances	F,I,K		B,C,G,H,J,L	I	L
30. Disobedience	B,C		F,G,H,I,J,K,L	G,L	L
31. Improper Dress	B,C,G,H,I,K		F,J,L		
32. Misrepresentation			B,C,F,G,H,I, J,K,L	B,G,I,J	G,I,L
33. Disrespect	C,F	K	B,G,H,I,J,L	B,G,L	L
34. Property Damage	F,G	B	C,H,I,J, K,L	F	
35. Violating healty & safety regulations		G	B,C,H,I,J, K,L	F,J,L	F,G,I, J,L
36. Profanity & obscenity	F,H	K	B,C,G,I,J,L	J,L	B,I,L
37. Smoking	H,I	J	B,C,F,G,K,L	F	
38. Fighting	F	K	B,C,G,H,I,J, L		L
39. Gambling	G,I	J,K	B,C,F,H,L	C,F,G, I,L	C,F,J, K,L
40. Theft	G,H	L	B,F,I,J,K,L	F	F, L
41. Hazing			B,C,F,G,H,I, J,K,L	G,K,L	F,I,J, K,L
42. Use of intoxicants	I		B,C,F,G,H,J, K,L	B,G,I, J	G,J,K, L
43. Boy-girl relationship	F,H,I	J,L	B,C,G,K		
44. Textbook & library viol.	I	C	B,G,H,J,K,L	B,F,G,L	B,C,F, G,L
45. In unauthorized area	F,I	C	B,G,H,J,K,L	F	L
46. Personal	H,K		B,C,F,G,I,J,L		
47. Other (please specify)	B,G,H		C,F,I,J,K,L	B,L	F,L
SUM OF SCHOOL & CAMPUS VIOLATIONS	F,G,H,I	J,L	B,C,K		
SUM OF ALL TYPES OF VIOLATIONS	F,H,I	G,J,K,L	B,C		

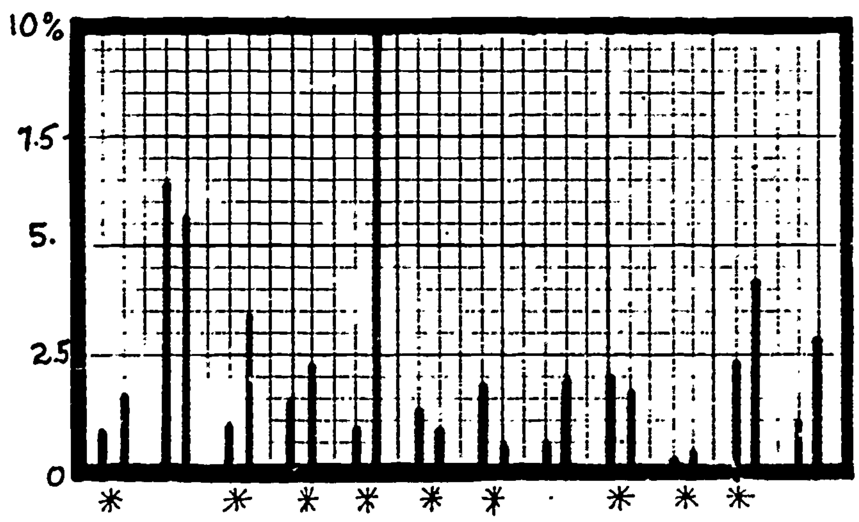
FIGURE E1

STUDENT CONTROL PROFILE

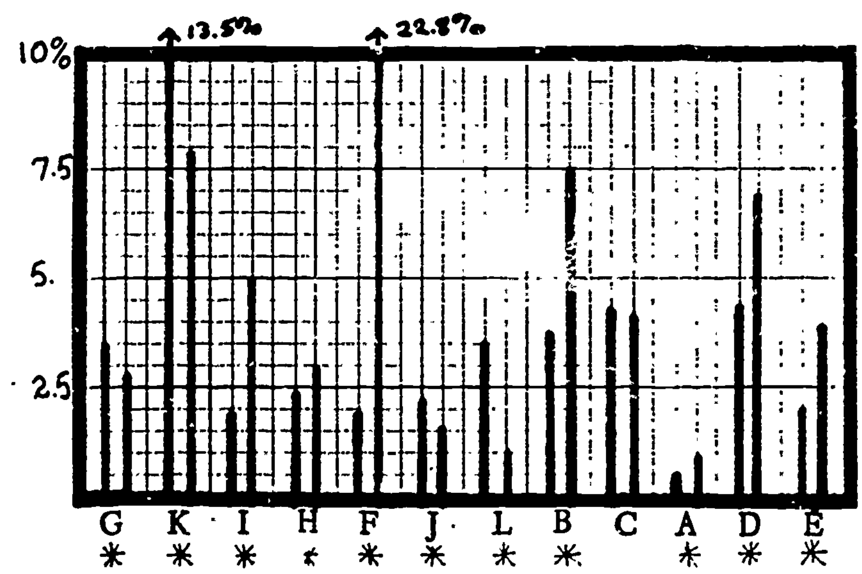
Mean percentage of students conferenced for all classroom violations.



Mean percentage of students conferenced for all school and campus student control violations.



Mean percentage of students conferenced for all student control violations.



KEY:

(N) = Number of Violation Type

* = Significant Difference at .05 Level

▬ = No Conferences Reported for This Violation in This School

FIGURE E2

STUDENT CONTROL PROFILE

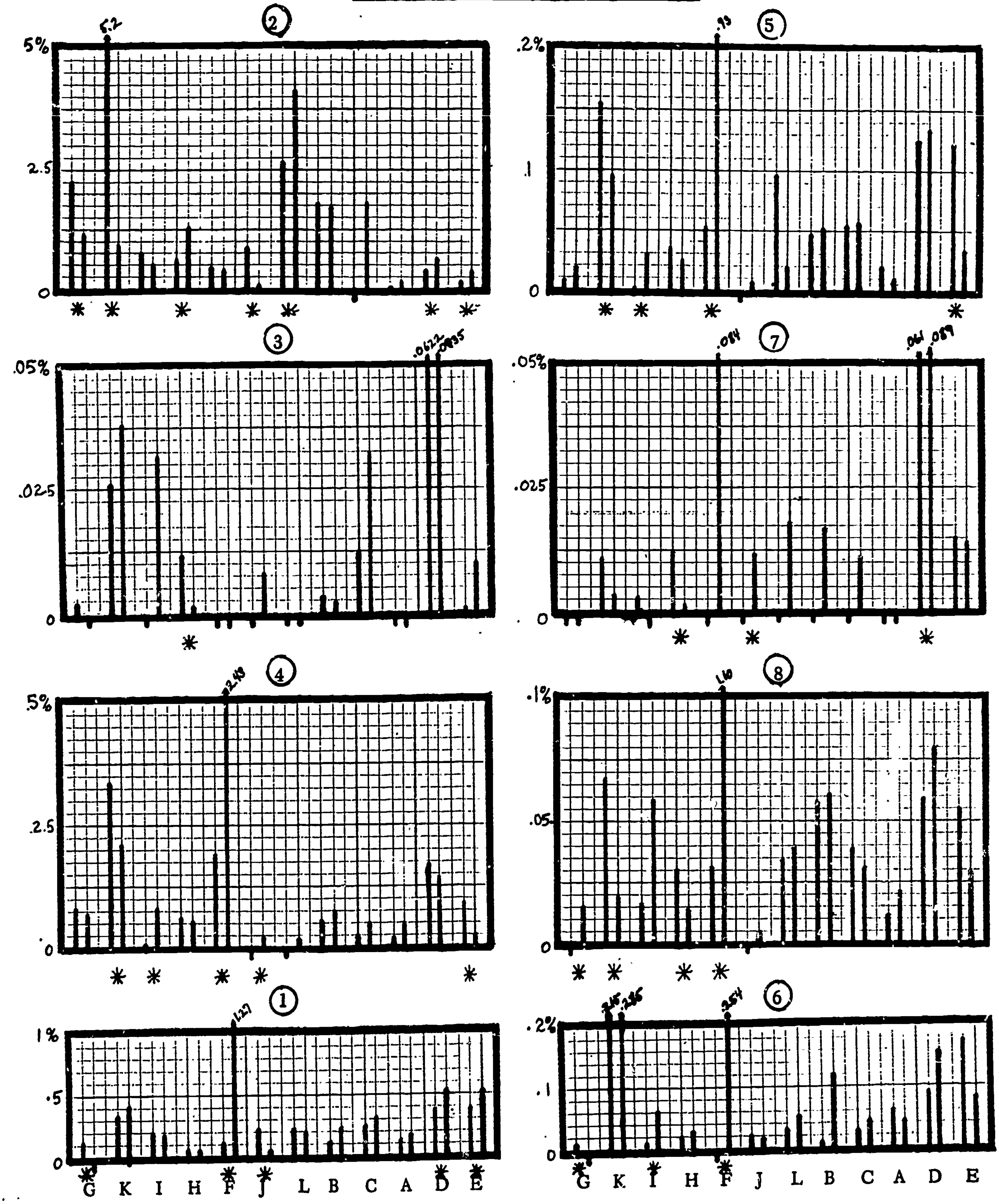


FIGURE E3
STUDENT CONTROL PROFILE

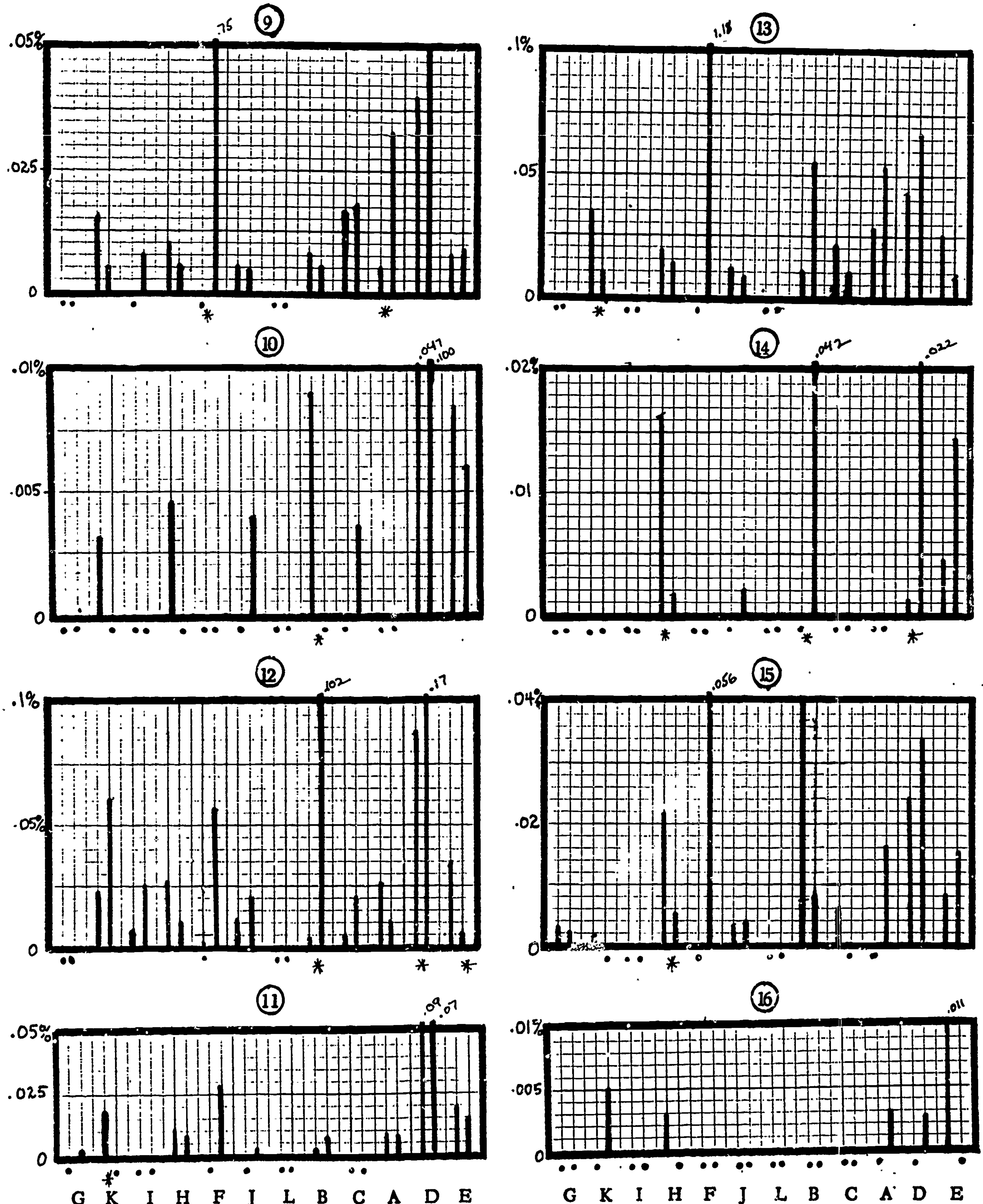


FIGURE E4
STUDENT CONTROL PROFILE

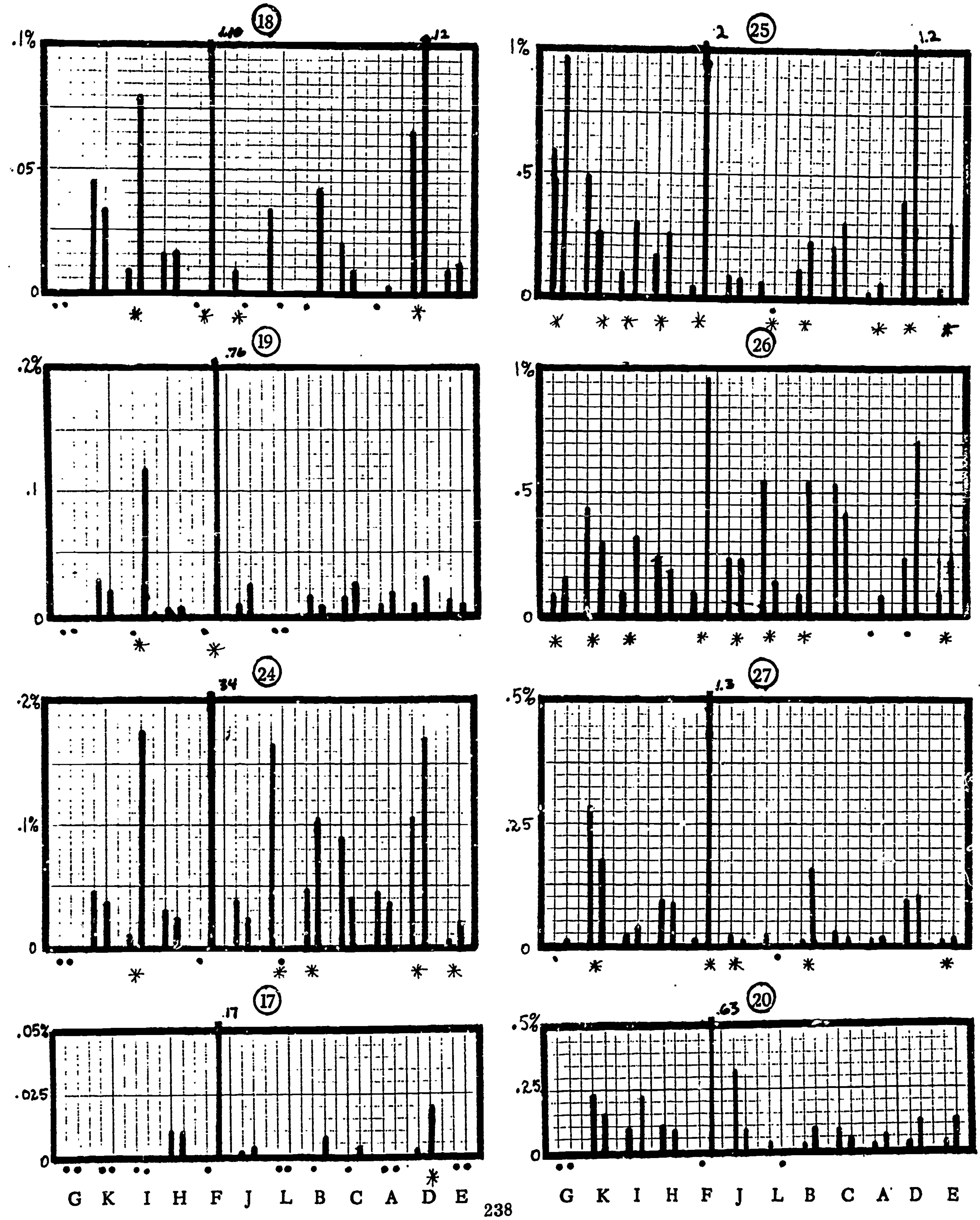


FIGURE E5
STUDENT CONTROL PROFILE

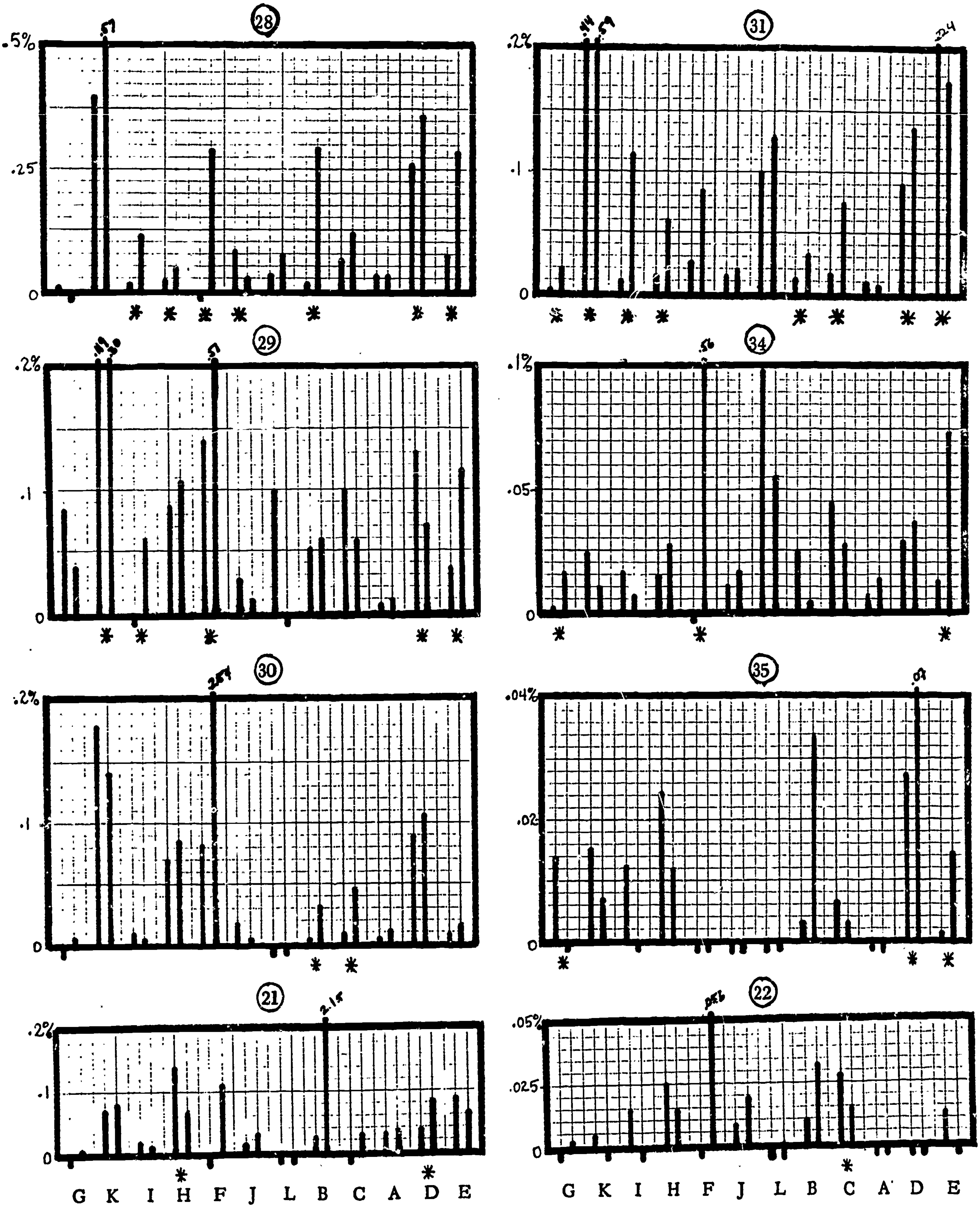


FIGURE E6

STUDENT CONTROL PROFILE

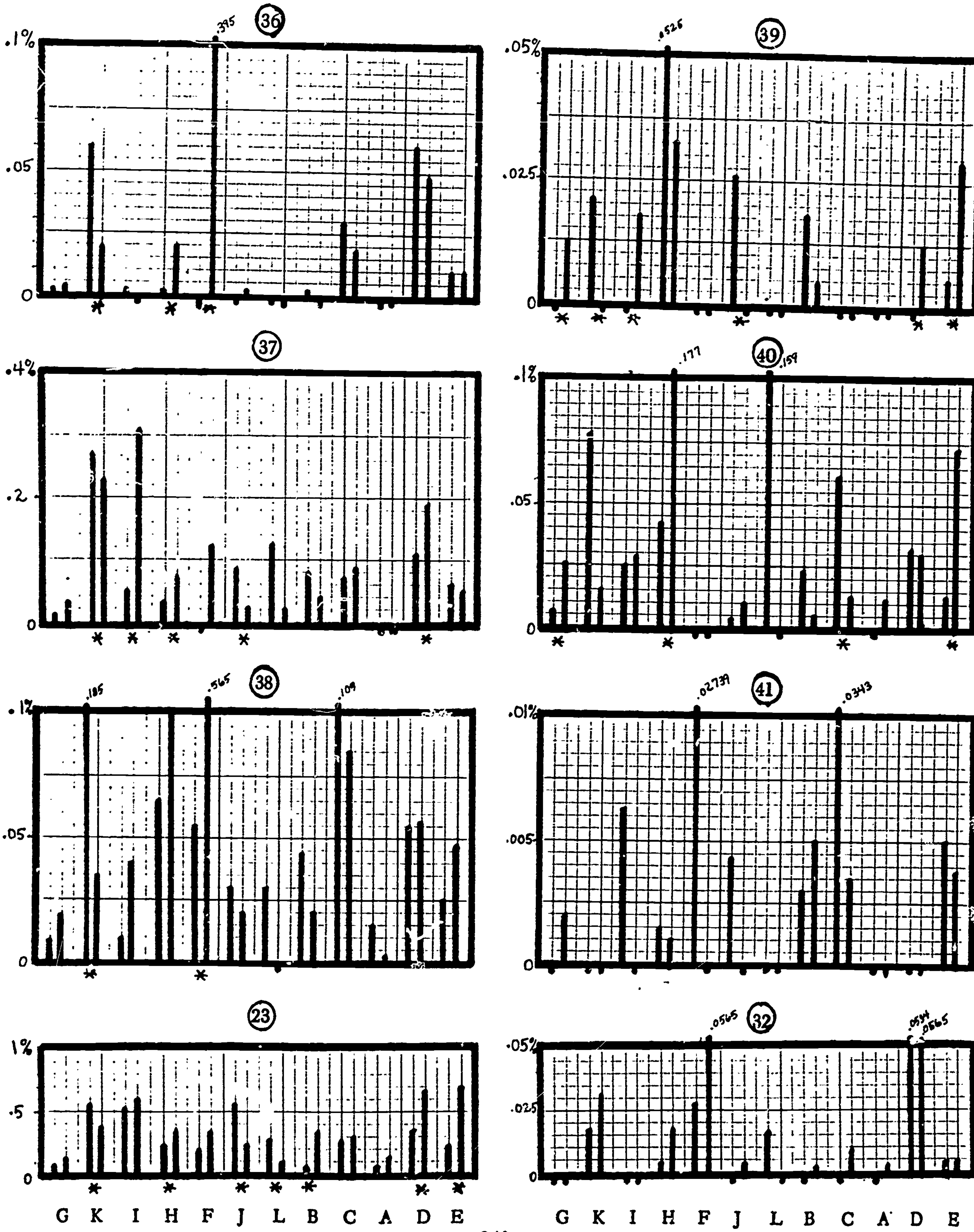
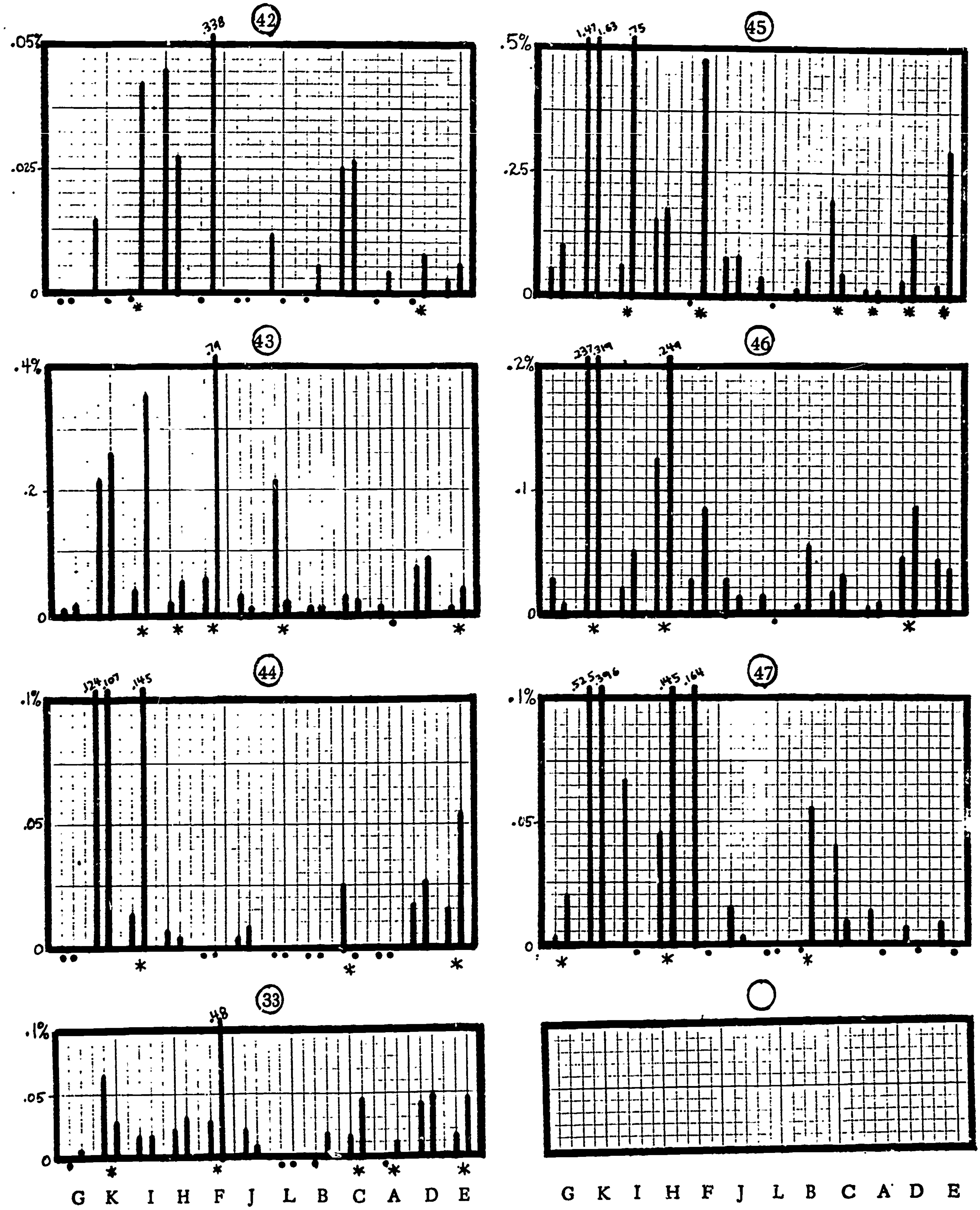


FIGURE E7
STUDENT CONTROL PROFILE



APPENDIX F

EDUCATOR-STUDENT CONFERENCE PROFILE

At the outset of this project it was hypothesized that modular scheduling would provide substantially more open or unassigned time in teacher's and pupil's schedules and that this would result in more educator-student consultation outside of regularly scheduled classes. It was further postulated that more student-initiated consultations outside of class would occur than had been the case under a traditional schedule. Finally, a significant difference in the purpose and type of such out-of-class consultations was postulated to occur as a consequence of shifting to a modular schedule. These out-of-class conferences were assumed to be a valid measure of increased student-staff interaction. It was also assumed that educator-student conferences enhance the student's educational opportunity.

Using the C-1 form, each teacher was sampled on a randomly selected day of each month for eight months of the school year. No more than five teachers were sampled on the same day. No limit was placed upon the number of forms each teacher could submit. A total of 48,000 conferences were reported on these forms. A sample form is located in Table F11.

Using the C-2 forms, each counselor and administrator submitted conferencing data with the same frequency and under the same procedures as for the C-1 form. Over 90,000 conferences were reported on C-2 forms during the three years of the project. A sample form is located in Table F12.

The C-1 and C-2 forms were processed together and the following statistics were computed for composite departments consisting of instructors of academic subjects, of vocational subjects, and "other" subjects, administrators, and counselors:

1. Average number of conferences per day;

2. Average number of minutes per day devoted to conferences;

3. Average number of minutes per conference; and,

4. Average number of items in each sample.

The Teacher-Student Conference Profile and the Administrator/ Counselor-Student Conference Profile questionnaires were designed to elicit information regarding educator conferences with students in various settings. (See Tables F11 and F12).

The data from these questionnaires has enabled us to estimate the average number of educator-student conferences (NC) per day, the average number of minutes (T) per day devoted by educators to conferencing and the average duration (T/C) of conferences for various classifications of educators in various settings.

These statistics have been computed for five schools (A, B, C, D, and E) and the results are displayed in Tables F1 to F5. For each of these schools, statistics are shown for its last year on traditional scheduling (year a) and its first year on modular scheduling (year b). Means and standard deviations have been computed for NC, T, and T/C for year a and year b for each composite department. N is the number of observations on which the statistic is based. The t-statistic is that for the difference obtained by subtracting the mean of year a from the mean of year b. The t-statistics for the five schools are summarized in Table F6.

In each of these tables, the composite departments are as follows. The first, "School," consists of all the teachers, administrators and counselors in the school. The second, titled "Teachers," consists of all the teachers in the school. The third, fourth and fifth consist respectively of the teachers in the "Academic," Vocational," and "Other" composite departments. The sixth, titled "Admin./Couns.," consists of all the administrators and counselors in the school. The seventh and eighth consist respectively of the administrators and the counselors.

Table F6 is a compilation of the t statistics relevant to the difference between the means for year b and the means for year a of the statistics NC, number of conferences per educator-day; T, the number of minutes devoted to conferencing per educator-day; and T/C, the number of minutes per conference. The symbol DOF stands for degrees of freedom. Comparisons were made between year b and year a for each of eight composite departments within each of the schools A, B, C, D, and E.

If we observe the Academic composite department block we note that NC showed a significant increase at schools A, B, C, and E. In the counselors composite department block we note that NC showed a significant increase at all schools, and T showed a significant increase in schools A, B, C, D while it showed a significant decrease at school E. In the Administrators composite department there was a significant increase in NC in school E, and significant increases in T at schools A, B, and E. In the Vocational composite department a possibly significant increase in NC occurred in school E, and significant decreases in T/C occurred in schools B and E.

The means and standard deviations on which these t-scores are based are displayed in Tables F1 to F5 for schools A, B, C, D, and E, respectively.

The graphs in Figures F1 to F5 show the relative frequency of occurrance and the minutes/day devoted to selected categories of educator-student conferences. For each category there is typically a pair of lines. The upper line is associated with year a (the last year that school was scheduled traditionally), and the lower line is associated with year b (the first year that school was scheduled flexibly). If no conferences were reported in a particular category in a particular year, a dot appears to the left of where the line would be.

In all schools, the vast majority (.70 to .85) of the conferences reported involved an educator and an individual student. Conferences involving 2-5 students were reported with a relative frequency that ranged from .15 in school E to .22 in school A.

In all schools, Academic Work was reported as the predominate reason for calling conferences. The relative frequency of such conferences ranged from .32 to .50 . Discipline (.07 to .18), School Government and Extra-Curricular Activities (.07 to .15), Attendance (.01 to .21), and Program (.03 to .17) accounted for most conferences reported for reasons other than Academic Work. The data indicates a tendency toward a reduction in the frequency with which Discipline was reported as the reason for the conference and a tendency toward an increase in the frequency with which attendance was the reason for calling the conference.

Conferences were requested by students with a relative frequency ranging from .45 to .65, by the educator with a relative frequency ranging from .25 to .35 and by parents with a relative frequency ranging from .07 to .20. In schools A, D, and E there was a noticeable increase between year a and b in the relative frequency with which students requested conferences. School C showed no noticeable change and school B showed a noticeable decrease. In all schools except school B there were noticeable decreases in the relative frequencies with which parents and teachers requested conferences.

The graphs in Figures F6 to F10 show the relative frequency of occurrence and the minutes/day devoted to selected categories of teacher-student conferences. Similarly, the sets of graphs in Figures F11 to F15, F16 to F20 and F21 to F25 show relative frequency distributions for Administrators, Counselors, and Vocational Teachers, respectively. These have been presented so the reader can make his own inferences regarding the conferencing characteristics of different categories of educators.

Table F7 summarizes selected Teacher-Student conference statistics for year b. The number of Teacher-Student conferences per teacher-day NC ranged from a low of 3.58 at school D to a high of 5.97 at school C. The t statistics for NC indicate that all schools except D showed a notable increase in NC between years b and a. In a five day school week the number of teacher-student conferences range from 1290 at school B to 2540 at school D. Dividing the number of conferences per week by the number of students, we obtain an estimate of the number of conferences per student week. This value ranges from .9 at school D to 1.7 at school C. If conferencing were spread uniformly over the student body, every student in four of the five schools would have had at least one conference per week with some teacher.

The average number of minutes per conference T/C varies from 10.90 at school E to 17.71 at school D. The t statistics for T/C indicate that between years b and a a notable increase in T/C occurred for schools B, D, and E.

In these five schools, the time devoted by all teachers to student-conferencing ranged from 12 minutes per student per week at school E to about 20 minutes per student per week in school C.

Figures F6 to F10 show the relative frequency distributions as to type of conference, reason for conference, and conference requested by. Teacher-student conferences predominately (.70 to .80) involved a teacher and an individual student. Academic work was the predominant (.43 to .63) reason for calling the conference.

The categories of Student Government and Extra Curricular Activities were the second most popular (.10 to .18) reasons for calling the conference. Discipline and attendance generally accounted for about .05 to .10 of the conferences.

Table F8 summarizes selected Administrator-Student conference statistics for year b. The total numbers of administrator-student conferences per week are quite small as compared to the numbers of teacher-student conferences. They ranged from 23 per week at school C to 76 per week at school D. The number of conferences per student-week ranged from .056 at school A to .198 at school B. Only in school E, where the t statistic for the change in NC is 9.33, is a significant change between years b and a indicated.

The average duration of a conference ranged from 10.5 minutes at school B to 15.3 minutes at school D.

Figures F11 to F15 show the relative frequency distributions as to type of conference, reason for conference, and conference requested by. We observe that discipline and attendance were reported as the predominant reasons for administrator-student conferences. Discipline was reported with a relative frequency that ranged from .10 in school E to .40 in school A. Attendance was reported with a relative frequency that ranges from .10 in school A to .53 in school B. Either one or the other of these reasons were reported with a relative frequency that ranged from .32 at school D to .83 at school B.

Table F9 summarizes selected Counselor-Student conference statistics for year b. The number of counselor-student conferences per counselor day ranged from 8.56 at school C to 22.09 at school B. In every school there was a significant increase in NC between years b and a. Counselors tend to have many more conferences with students per day than do teachers, but the number of counselor-student conferences per week is relatively few as the number per student-week. If these conferences were uniformly distributed among the students, we could infer that 11.3% of the students in school A, 31.6% of the students in school B, 16.3% of the students in school C, 20.9% of the students in school D, and 25.0% of the students in school E met with a counselor in an average week. The average number of minutes per conference ranged from a low of 10.24 in school E to a high of 20.16 in school C.

Figures F11 to F15 show that counselors too tended to conference with individual students (.72 to .95), usually at the student's request (.45 to .82). The relative frequency with which students requested conferences increased appreciably in schools A, D, and E with the advent of flexible scheduling.

The reasons for counselor-student conferences were quite diversified. Academic work, planning (either vocational or college), personal, and program all appeared with appreciable frequency. In three schools (B, C, and E) attendance was reported with relatively high frequency (.10 to .50) as the reason for the conference. In these schools there was an appreciable increase in year b in the relative frequency with which this reason was reported. Discipline was not reported frequently as the reason for counselor-student conferences.

Table F10 shows the proportions of the conferences that took place during school hours in years a and b for selected composite departments in each of the five schools. It was expected that there would be an increase in the proportion of conferences held during school hours when flexible scheduling was introduced. Quite noticeable increases were reported by schools A, D, and E, while a slight increase was reported by school C. Most of this increase resulted from the tendancy of teachers to schedule a greater proportion of conferences during school hours. Increases were reported by administrators and counselors, but they were less impressive. This may be because they have traditionally scheduled a large proportion of their conferences during school hours.

Description of the Data Processing

A computer program was written to process the data and compute the statistics displayed in the tables and graphs. A formal description of the computational process follows.

The term group refers to the "cases" for a "composite department" in a single school in a single year. The "composite departments" are: 1. Academic, 2. Vocational, 3. Other, 4. Administrators, 5. Counselors. A "case" comprises the conferences reported by a particular department on a particular day.

We will let

y_{qjk}	be the reported value of variable j (see the key to variable code) reported on questionnaire q by a respondent belonging to group k .
W_D	be the fraction of the respondent's day that is devoted to composite department k .

The following preliminary computations were performed on the data transcribed from a questionnaire. In this discussion we will only carry the j subscript because q and k remain constant.

a. Number of conferences, INOC

y_1 = INOC

b. Compute values of the Type of Conference variables, j = 2, 3, 4, 5

$y_j = 0$ for $j = 2, 3, 4, 5$

The transcribed value would be ITOC = 0, 1, 2, 3, 4

If ITOC = 0 ; j = 5

If ITOC = 3 or 4 ; j = 4

If ITOC = 2 ; j = 3

If ITOC = 1 ; j = 2

$y_j = 1$

c. Compute values of Reason For Conference variables, j = 6, 7, 8, ..., 17

The transcribed values are $y_j = 0, 1$.

Compute $NES = \sum_{j=6}^{17} y_j$

If NES = 0, $y_{17} = 1$

If NES $>$ 1, $y_j = y_j/NES \quad j = 6, 7, 8, \ldots, 17$

d. Compute values of Conference Requested By variables, $j = 18, 19, \ldots, 22$

The transcribed values are $y_j = 0, 1$.

Compute $NES = \sum_{j=18}^{22} y_j$

If NES = 0, $y_{22} = 1$

If NES $>$ 1, $y_j = y_j/NES \quad j = 18, 19, \ldots, 22$

e. Compute values of Time (of Day) of Conference, $j = 23, 24, 25$

Transcribed value is ITOD = 0, 1, 2, 3 .

If ITOD = 1 or ITOD = 3, $j = 24$

If ITOD = 2 , $j = 23$

Otherwise, $j = 25$.

f. Compute the values of the Joint Entry variables, $j = 26, 27, \ldots, 58$

For $i = 1, 2, 3, \ldots, 33$

1. j_1 = JELST(1) and j_2 = JELST(2) are a specified pair of j's ($j = 2, 3, \ldots, 21$)

2. $y_{(i+25)} = y_{j_1} \times y_{j_2}$

g. Multiply each variable y_j by the transcribed number of conferences, INOC,

$y_j = y_j \times INOC \quad j = 1, 2, 3, \ldots, 58$.

The values of the variables X_j for a particular case are computed from the y_j as follows. A case consists of all the questionnaires submitted by a particular respondent on a particular day.

$$N = \sum_q y_{qjk}$$

$$X_1 = N/W_D$$

$$X_j = \frac{1}{X_1} \sum_q y_{qjk} \qquad j = 2, 3, \ldots, 58$$

M_q = Number of minutes of conferencing reported on questionnaire q.

$$X_{59} = \sum_q M_q$$

$$X_j = \sum_q M_q \, y_{q,j-58,k} \qquad j = 60, 61, \ldots, 116$$

$$X_j = \frac{X_{j-58}}{X_{j-116}} \qquad j = 117, 118, \ldots, 174 \text{ and } X_{j-116} \neq 0$$

$$= 0 \qquad j = 117, 118, \ldots, 174 \text{ and } X_{j-116} = 0$$

The means and standard deviations of the variables X_j for group k were computed as follows:

N_{kj} = Number of cases in the group k when $j = 1, 2, 3, \ldots, 116$

= Number of cases in which $X_j \neq 0$ when $j = 117, 118, 119, \ldots, 174$

c = $1, 2, 3, \ldots, N_{kj}$ is an index on the cases

$$S_j = \sum_c X_{jc}$$

$$SS_j = \sum_c X_{jc}^{\ 2}$$

$$M_j = \frac{S_j}{N_{kj}}$$

$$SD_j = \sqrt{(SS_j - (M_j \times S_j)) / (N_{kj} - 1)}$$

Table F1

MEANS, STANDARD DEVIATIONS and t - STATISTICS

Educator-Student Conference Profile

High School A Years a and b

Composite Dept.		Year a Mean	Year a Std. Dev.	Year b Mean	Year b Std. Dev.	t*
School	NC	5.37	4.52	5.92	4.14	1.70
	T	53.04	54.55	61.84	57.47	2.14
	T/C	11.47	10.53	12.34	10.11	1.13
	N	498		289		785
Teachers	NC	5.19	4.72	5.90	4.00	1.80
	T	43.11	53.25	54.68	50.74	2.51
	T/C	10.23	10.78	11.94	11.37	1.76
	N	325		213		536
Academic	NC	4.29	3.72	5.69	3.72	3.66
	T	39.66	44.10	53.58	42.43	3.12
	T/C	11.46	11.75	12.25	11.86	.65
	N	235		159		392
Vocational	NC	7.56	3.47	7.86	5.10	.30
	T	43.03	35.31	37.64	22.67	-.73
	T/C	6.40	5.05	7.65	7.21	.86
	N	43		29		70
Other	NC	7.51	7.79	4.92	3.66	-1.57
	T	60.41	92.58	81.48	95.82	.91
	T/C	7.58	8.02	14.92	11.27	3.20
	N	47		25		70
Admn./Couns.	NC	5.69	4.12	5.97	4.53	.48
	T	71.69	52.17	81.88	69.67	1.28
	T/C	13.80	9.63	13.46	4.94	-.29
	N	173		76		247
Administrators	NC	2.88	2.00	3.30	2.18	1.08
	T	24.78	16.67	36.13	19.40	3.33
	T/C	10.99	11.90	12.12	5.20	.61
	N	67		46		111
Counselors	NC	7.47	4.13	10.07	4.17	3.03
	T	101.35	44.62	152.03	59.62	5.08
	T/C	15.57	7.40	15.50	3.75	-.05
	N	106		30		134

* N equals the degrees of freedom for the t-statistic.

Table F2

MEANS, STANDARD DEVIATIONS and t - STATISTICS

Educator-Student Conference Profile

High School B   Years a and b

Composite Dept.		Year a Mean	Year a Std. Dev.	Year b Mean	Year b Std. Dev.	t*
School	NC	8.63	8.99	10.83	9.61	2.94
	T	100.38	98.28	145.18	150.34	4.39
	T/C	16.67	21.70	15.03	16.17	-1.06
	N	314		302		614
Teachers	NC	3.94	3.47	5.50	4.45	3.64
	T	53.54	44.40	84.23	126.26	3.02
	T/C	20.03	38.12	16.52	20.47	-1.33
	N	173		175		346
Academic	NC	4.07	3.20	5.44	4.80	2.43
	T	49.65	35.39	58.73	60.53	1.33
	T/C	15.92	14.19	14.26	17.41	-.75
	N	108		98		204
Vocational	NC	4.62	4.30	5.09	4.00	.44
	T	69.69	58.57	58.89	76.92	-.61
	T/C	24.40	29.70	10.48	8.59	-2.64
	N	27		35		60
Other	NC	3.09	3.49	5.98	3.97	3.43
	T	53.13	53.84	164.85	212.88	3.14
	T/C	28.61	48.31	26.81	29.13	-.20
	N	38		42		78
Admn./Couns.	NC	14.38	10.26	18.19	9.97	3.07
	T	157.84	114.61	229.16	140.41	4.57
	T/C	12.53	7.07	12.98	6.20	.54
	N	141		127		266
Administrators	NC	13.58	12.51	13.83	11.53	.12
	T	75.46	57.71	125.42	111.71	3.25
	T/C	8.11	4.98	10.51	7.35	2.19
	N	69		60		127
Counselors	NC	15.15	7.51	22.09	6.17	5.93
	T	236.79	98.97	322.06	89.08	5.32
	T/C	16.78	6.13	15.19	3.82	-1.82
	N	72		67		137

* N equals the degrees of freedom for the t-statistic.

Table F3

MEANS, STANDARD DEVIATIONS and t - STATISTICS

Educator-Student Conference Profile

High School C Years a and b

Composite Dept.		Year a Mean	Year a Std. Dev.	Year b Mean	Year b Std. Dev.	t*
School	NC	6.45	6.81	6.80	5.04	.80
	T	80.93	68.80	79.97	67.23	- .19
	T/C	16.13	13.13	13.92	11.89	- 2.42
	N	511		309		818
Teachers	NC	5.40	4.46	5.97	4.66	1.34
	T	63.83	63.09	52.92	40.71	-2.14
	T/C	14.50	13.67	11.88	11.34	-2.23
	N	294		196		488
Academic	NC	6.00	4.95	6.93	5.15	1.60
	T	66.07	65.96	53.96	40.90	-1.82
	T/C	13.58	12.83	9.58	8.15	-3.07
	N	197		121		316
Vocational	NC	4.04	2.53	3.48	1.90	-1.10
	T	46.57	45.65	41.83	25.10	- .55
	T/C	14.26	15.39	17.19	15.12	.88
	N	60		33		91
Other	NC	4.43	3.40	5.13	3.79	.86
	T	79.89	67.10	58.62	48.59	-1.63
	T/C	19.83	14.26	14.35	13.93	-1.72
	N	37		42		77
Admn./Couns.	NC	7.86	8.89	8.26	5.36	.44
	T	104.10	69.57	126.89	77.73	2.71
	T/C	18.33	12.03	17.44	12.04	- .63
	N	217		113		328
Administrators	NC	9.25	11.86	7.80	7.28	- .76
	T	87.55	59.71	79.93	68.02	- .69
	T/C	16.95	14.76	13.33	13.63	-1.42
	N	110		45		153
Counselors	NC	6.42	3.48	8.56	3.60	3.91
	T	121.10	74.96	157.96	67.82	3.28
	T/C	19.74	8.18	20.16	10.07	.30
	N	107		68		173

* N equals the degrees of freedom for the t-statistic.

Table F4

MEANS, STANDARD DEVIATIONS and t - STATISTICS

Educator-Student Conference Profile

High School D Years a and b

Composite Dept.		Year a Mean	Year a Std. Dev.	Year b Mean	Year b Std. Dev.	t*
School	NC	6.99	6.81	7.16	6.72	.46
	T	103.20	101.32	115.15	112.34	2.08
	T/C	16.80	15.29	18.55	18.39	1.93
	N	762		621		1381
Teachers	NC	3.51	3.76	3.58	2.51	.31
	T	42.61	52.76	51.34	51.83	2.34
	T/C	15.51	18.26	17.71	21.96	1.55
	N	437		370		805
Academic	NC	3.80	4.24	3.60	2.52	-.62
	T	46.09	57.29	54.79	50.56	1.77
	T/C	16.23	19.73	19.32	22.05	1.64
	N	285		215		498
Vocational	NC	3.12	2.86	3.24	2.38	.34
	T	35.86	43.44	44.71	50.49	1.34
	T/C	13.36	12.84	16.58	20.61	1.35
	N	105		98		201
Other	NC	2.62	1.74	4.09	2.63	3.29
	T	37.28	40.58	49.74	58.25	1.24
	T/C	15.96	19.24	13.61	23.53	-.55
	N	47		57		102
Admn./Couns.	NC	11.67	7.19	12.43	7.49	1.24
	T	184.58	93.73	209.20	111.47	2.88
	T/C	18.54	9.74	19.79	11.15	1.43
	N	325		251		574
Administrators	NC	13.04	10.69	12.69	11.24	-.22
	T	122.35	81.10	114.20	62.73	-.72
	T/C	14.13	11.56	15.28	15.97	.56
	N	115		70		183
Counselors	NC	10.91	4.02	12.33	5.41	2.96
	T	218.66	82.06	245.94	104.31	2.89
	T/C	20.95	7.58	21.53	7.99	.73
	N	210		181		389

* N equals the degrees of freedom for the t-statistic.

Table F5

MEANS, STANDARD DEVIATIONS and t - STATISTICS

Educator-Student Conference Profile

High School E Years a and b

Composite Dept.		Year a Mean	Year a Std. Dev.	Year b Mean	Year b Std. Dev.	t*
School	NC	7.44	6.62	9.23	8.70	4.65
	T	91.65	98.09	90.30	93.53	-.27
	T/C	13.52	12.56	11.56	10.12	-3.23
	N	1032		597		1627
Teachers	NC	3.93	2.99	4.64	4.64	2.88
	T	47.50	56.25	43.87	47.30	-1.03
	T/C	13.90	14.89	11.32	10.90	-2.88
	N	604		363		965
Academic	NC	3.83	2.65	4.42	3.93	2.06
	T	35.27	29.74	35.65	34.81	.13
	T/C	10.88	9.18	9.13	6.76	-2.38
	N	340		205		543
Vocational	NC	4.14	3.64	5.19	5.95	1.90
	T	52.81	62.70	50.62	55.74	-.30
	T/C	15.07	17.52	11.62	10.15	-1.90
	N	192		111		301
Other	NC	3.86	2.52	4.34	3.89	.82
	T	91.08	96.73	63.79	63.12	-1.71
	T/C	25.06	21.97	20.16	19.61	-1.24
	N	72		47		117
Admn./Couns.	NC	12.40	7.15	16.33	8.75	6.24
	T	153.96	110.06	162.34	101.63	.96
	T/C	12.97	8.20	11.95	8.78	-1.49
	N	428		234		660
Administrators	NC	6.22	3.71	13.56	7.30	9.33
	T	64.44	50.56	162.00	110.40	8.40
	T/C	12.36	12.10	14.62	11.39	1.36
	N	114		91		203
Counselors	NC	14.64	6.77	18.09	9.16	4.51
	T	186.46	107.81	162.55	96.04	-2.27
	T/C	13.18	6.23	10.24	6.06	-4.72
	N	314		143		455

* N equals the degrees of freedom for the t-statistic.

TABLE F6

EDUCATOR-STUDENT CONFERENCE PROFILE

t-Statistics

Composite Dept.		A	B	C	D	E
School	NC	1.70	2.94	.80	.46	4.65
	T	2.14	4.39	-.19	2.08	-.27
	T/C	1.13	-1.06	-2.42	1.93	-3.23
	DOF	785	614	818	1381	1627
Teachers	NC	1.80	3.64	1.34	.31	2.88
	T	2.51	3.02	-2.14	2.34	-1.03
	T/C	1.76	-1.33	-2.23	1.55	-2.88
	DOF	536	346	488	805	965
Academic	NC	3.66	2.43	1.60	-.62	2.06
	T	3.12	1.33	-1.82	1.77	.13
	T/C	.65	-.75	-3.07	1.64	-2.38
	DOF	392	204	316	498	543
Vocational	NC	.30	.44	-1.10	.34	1.90
	T	-.73	-.61	-.55	1.34	-.30
	T/C	.86	-2.64	.88	1.35	-1.90
	DOF	70	60	91	201	301
Other	NC	-1.57	3.43	.86	3.29	.82
	T	.91	3.14	-1.63	1.24	-1.71
	T/C	3.20	-.20	-1.72	-.55	-1.24
	DOF	70	78	77	102	117
Adm./Couns.	NC	.48	3.07	.44	1.24	6.24
	T	1.28	4.57	2.71	2.88	.96
	T/C	-.29	.54	-.63	1.43	-1.49
	DOF	247	266	328	574	660
Administrators	NC	1.08	.12	-.76	-.22	9.33
	T	3.33	3.25	-.69	-.72	8.40
	T/C	.61	2.19	-1.42	.56	1.36
	DOF	111	127	153	183	203
Counselors	NC	3.03	5.93	3.91	2.96	4.51
	T	5.08	5.32	3.28	2.89	-2.27
	T/C	-.05	-1.82	.30	.73	-4.72
	DOF	134	137	173	389	455

TABLE F7

TEACHER-STUDENT CONFERENCE SUMMARY

Year b, The First Year of Flexible Scheduling.

School	Students	Teachers	N/C Value	t	Teacher-Student Conference Per Week	Per Student-Week	T/C	t
A	887	46	5.90	1.80	1360	1.5	11.94	1.76
B	1050	47	5.50	3.64	1290	1.2	16.52	-1.33
C	788	45	5.97	1.34	1340	1.7	11.88	-2.23
D	2947	142	3.58	.31	2540	.9	17.71	1.55
E	2168	99	4.64	2.88	2300	1.1	11.32	-2.88

TABLE F8

ADMINISTRATOR-STUDENT CONFERENCE SUMMARY

Year b, The First Year of Flexible Scheduling

School	Students	Admin.	NC Value	t	Number of Conferences Per Week	Per Student-Week	T/C	t
A	887	3	3.30	1.08	50	.056	12.12	.61
B	1050	3	13.83	.12	207	.198	10.51	2.19
C	788	3	7.80	- .76	117	.148	13.33	- 1.42
D	2947	6	12.69	-.22	381	.129	15.28	.56
E	2168	5	13.56	9.33	203	.094	14.62	1.36

TABLE F9

COUNSELOR-STUDENT CONFERENCE SUMMARY

Year b, The First Year of Flexible Scheduling

School	Students	Counselors	NC Value	t	Number of Conferences Per-Week	Number of Conferences Per Student-Week	T/C	t
A	887	2	10.07	3.03	101	.114	15.50	- .05
B	1050	3	22.09	5.93	331	.315	15.19	-1.82
C	788	3	8.56	3.91	128	.163	20.16	.30
D	2947	10	12.33	2.96	617	.209	21.53	.73
E	2168	6	18.09	4.51	543	.250	10.24	-4.72

TABLE F10

PROPORTION OF CONFERENCES SCHEDULED DURING SCHOOL HOURS

	School A		School B		School C		School D		School E	
	a	b	a	b	a	b	a	b	a	b
School	.578	.765	.909	.907	.851	.867	.735	.866	.589	.724
Teacher	.426	.733	.866	.879	.839	.845	.603	.821	.464	.757
Admin.	.752	.882	.954	.935	.834	.897	.780	.804	.714	.758
Counselor	.784	.811	.970	.954	.903	.912	.983	.982	.784	.619

TABLE F 11

STANFORD UNIVERSITY
SCHOOL OF EDUCATION
Voc. Ed. -- Flex. Sched.
(Form C-1)

Date ______________________

Name of School ______________________

Name of Teacher ______________________

Department of Reporter ______________________

TEACHER-STUDENT CONFERENCE PROFILE

The following form is designed for teachers to provide information regarding teacher conferences with students in various group settings outside of regularly scheduled classes. During the specified data-collection days, please complete one of these forms and send it to the school liaison official for the flexible scheduling project.

No Conferences Were Held ____

CONFERENCES	1	2	3	4	5	6	7	8	9	10
TYPE OF CONFERENCE:										
Individual Student										
Small Group (2-5)										
Small Group (6-15)										
Larger than 15										
CONFERENCE REQUESTED BY:										
Teacher										
Student										
Administrator/Counselor										
Parent										
TIME OF CONFERENCE:										
Before School										
During School										
After School										
REASON FOR CONFERENCE:										
Academic Work										
Attendance										
College Planning										
Discipline										
Extra or Co-Curricular Activities										
Personal										
Program Change -planning										
Student Participation in School Government										
Vocational Planning										
Work Experience										
Other (Please Specify)										
MINUTES SPENT:										

TABLE F 12

STANFORD UNIVERSITY
SCHOOL OF EDUCATION
Voc. Ed. - Flex. Sched.
(Form C-2)

Date ____________________

Name of School ____________________

Name of Reporter ____________________

ADMINISTRATOR/COUNSELOR - STUDENT CONFERENCE PROFILE

The following form is designed for administrators and counselors to provide information regarding conferences with students in various group settings. A total of ten conferences may be reported on each form. During the specified data-collection days, please report all conferences held with students. When the forms have been completed for the specified day, send them to the school liaison official for the flexible scheduling project.

No Conferences Were Held ____

CONFERENCES

TYPE OF CONFERENCE	1	2	3	4	5	6	7	8	9	10
Individual Student (1)										
Small Group (2-5) (2)										
Small Group (6-15) (3)										
Larger than 15 (4)										

0 = No Response 1 = Checked Response

CONFERENCE REQUESTED BY:	1	2	3	4	5	6	7	8	9	10
Teacher:										
Student										
Administrator/Counselor										
Parent										

TIME OF CONFERENCE:	1	2	3	4	5	6	7	8	9	10
Before School (1)										
During School (2)										
After School (3)										

0 = No Response 1 = Checked Response

REASON FOR CONFERENCE	1	2	3	4	5	6	7	8	9	10
Academic Work										
Attendance										
College Planning										
Discipline										
Extra or Co-Curricular Activities										
Personal										
Program Planning/Change										
Student Participation in School Government										
Vocational Planning										
Work Experience										
Other (Please Specify)										
MINUTES SPENT:										

FIGURE F1

ALL SCHOOL

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL A NK=498 , 289

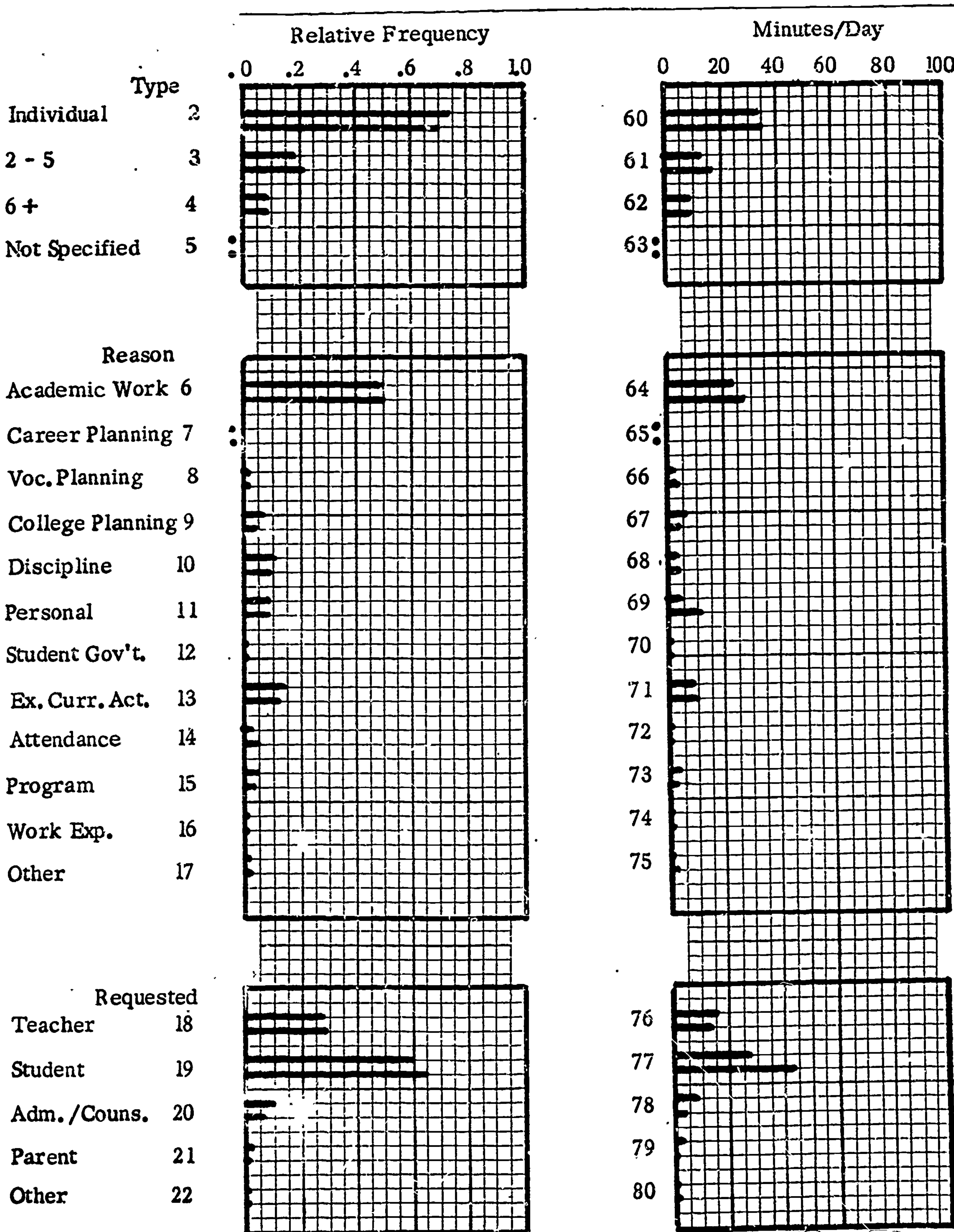


FIGURE F 2

ALL SCHOOL

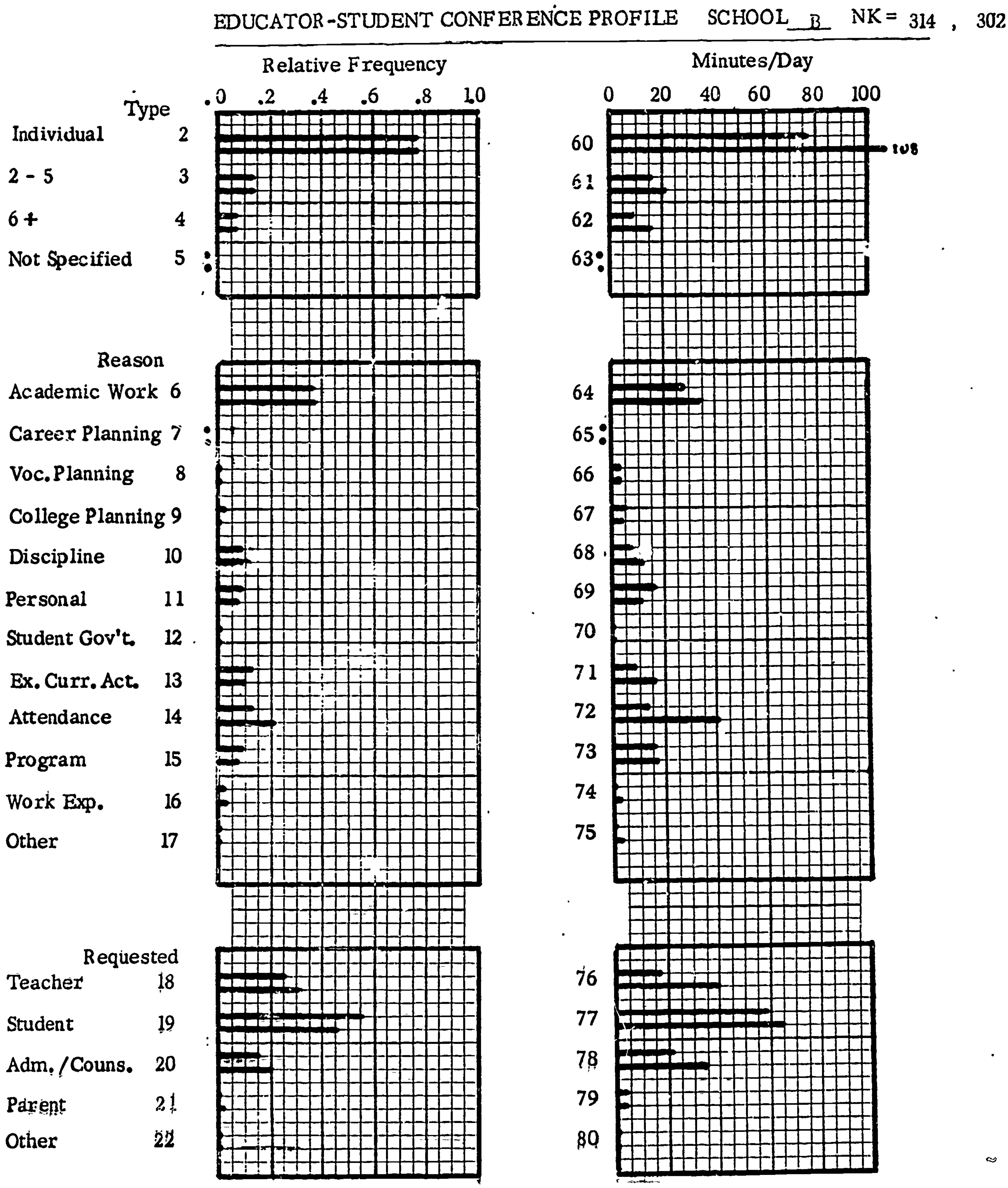


FIGURE F3
ALL SCHOOL

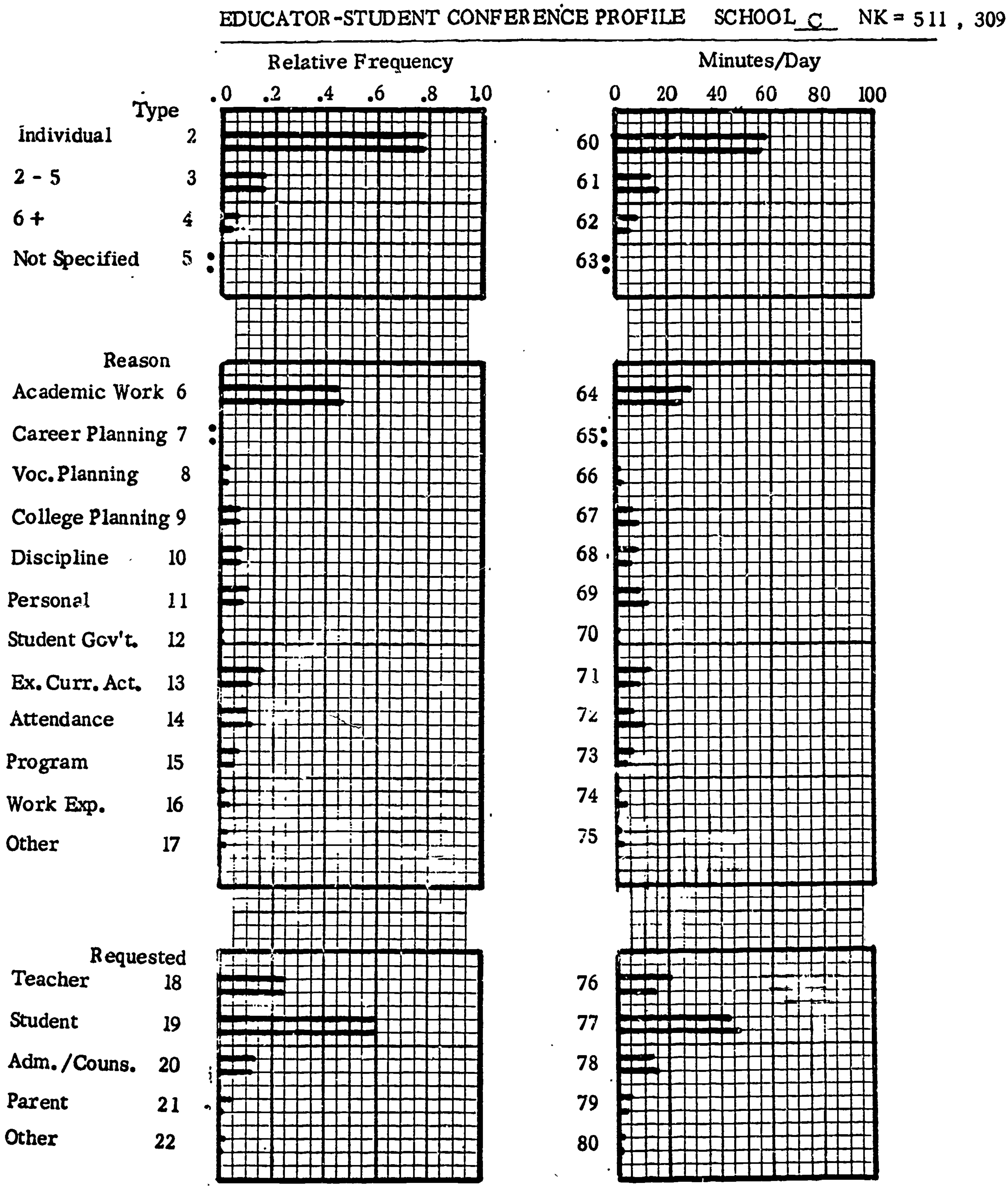


FIGURE F4

ALL SCHOOL

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL D NK = 762 , 621

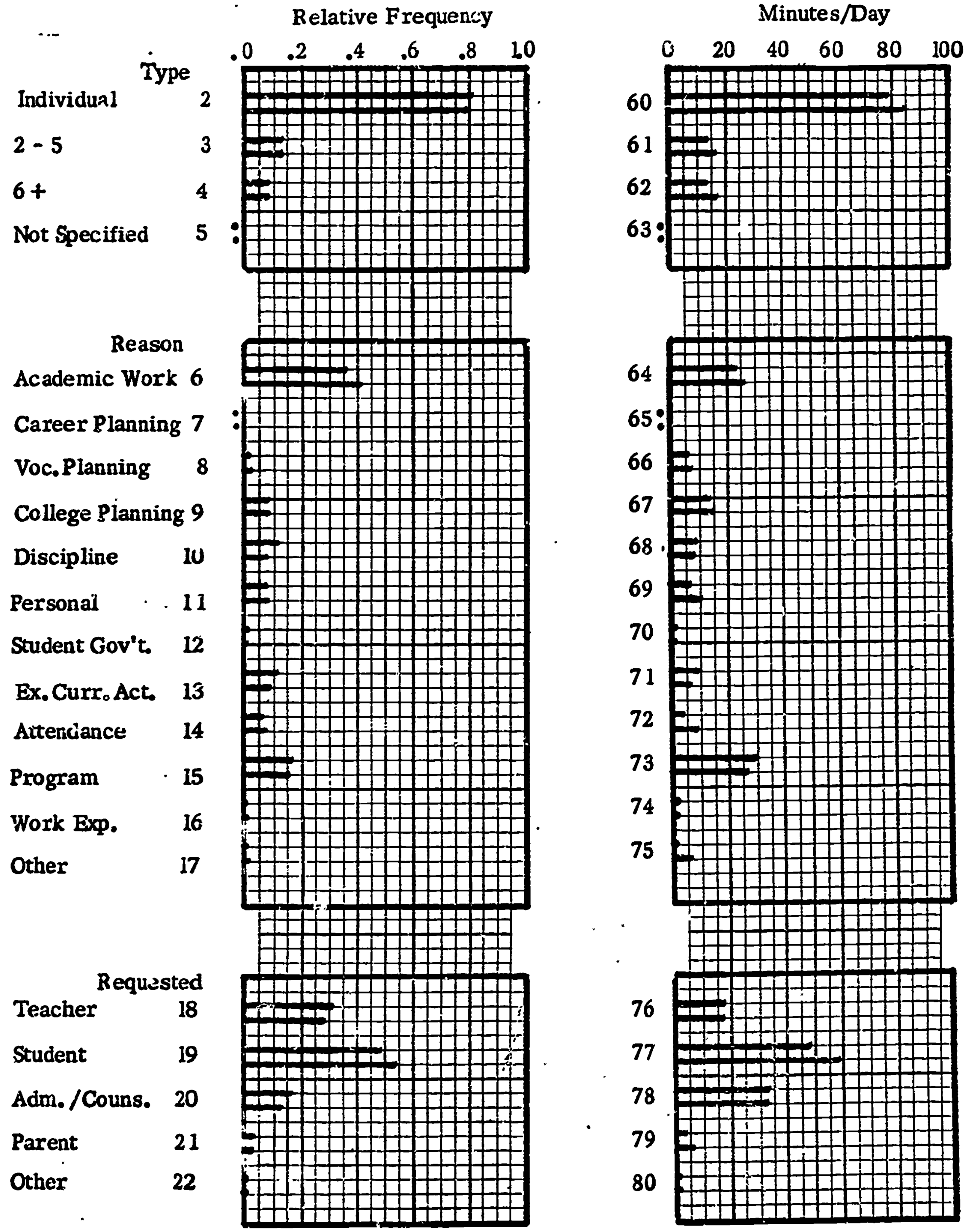


FIGURE F5

ALL SCHOOL

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL E NK = 1032 , 597

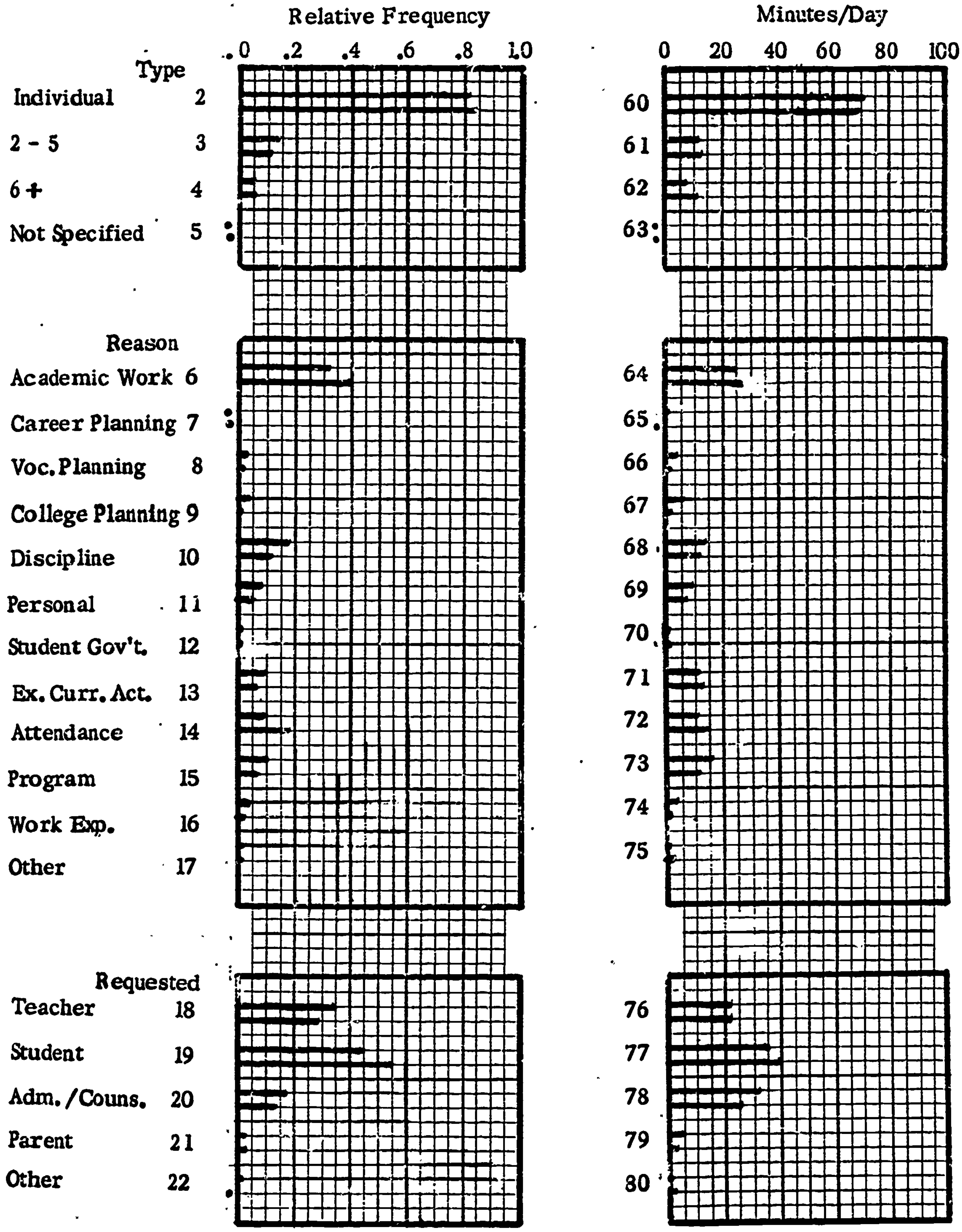


FIGURE F6

ALL TEACHERS

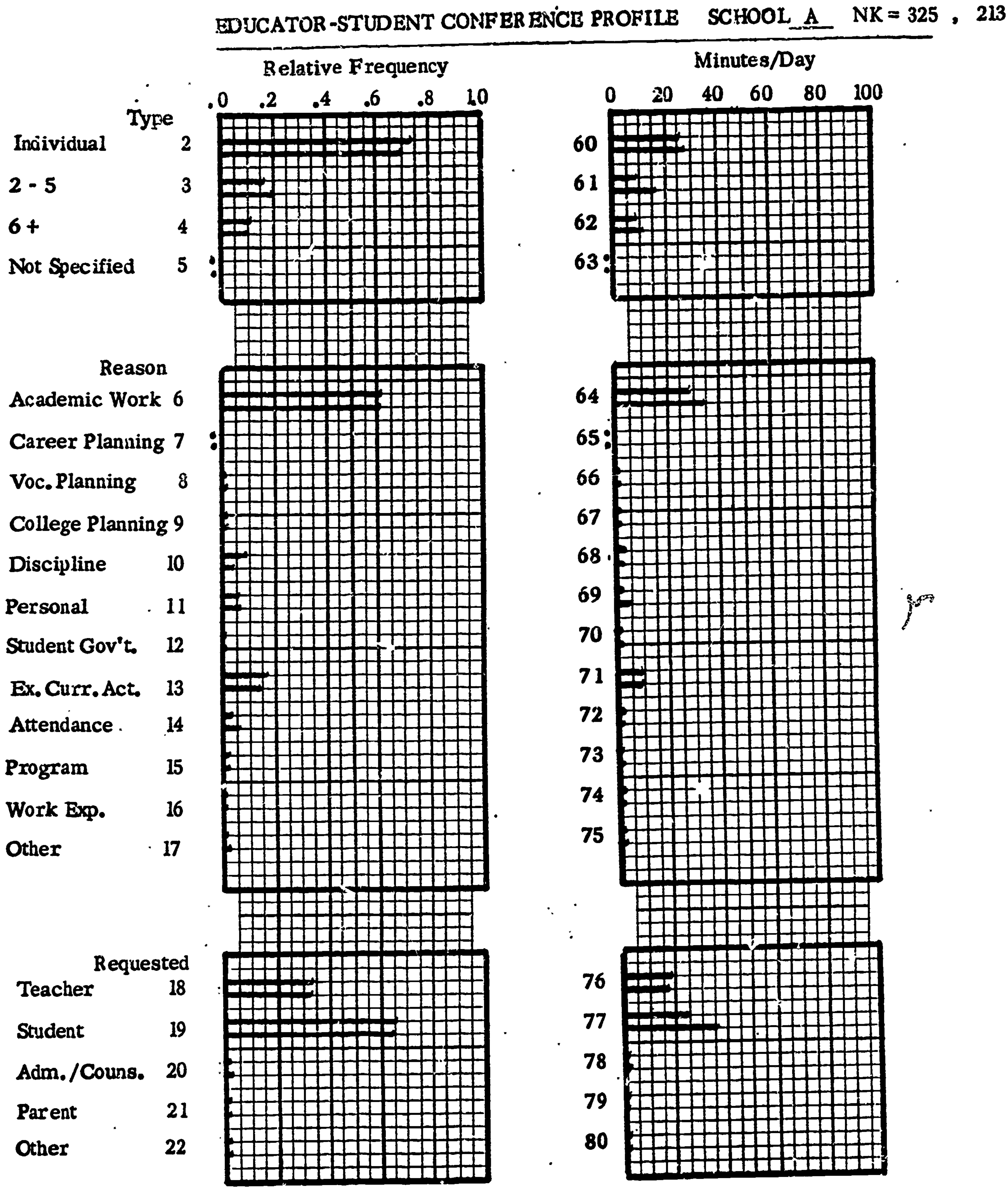


FIGURE F7

ALL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL B NK = 173, 175

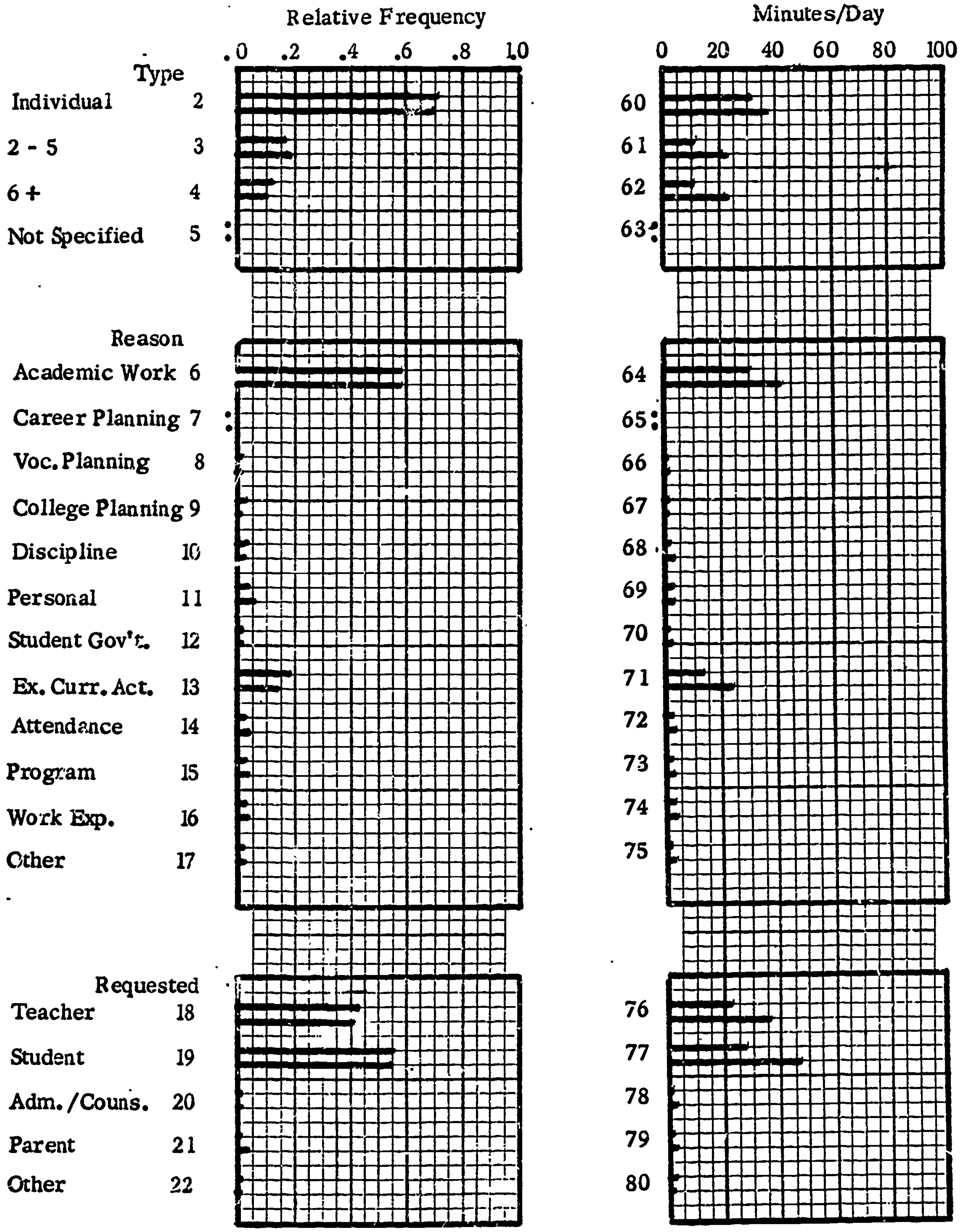


FIGURE F8

ALL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL C NK = 294 , 196

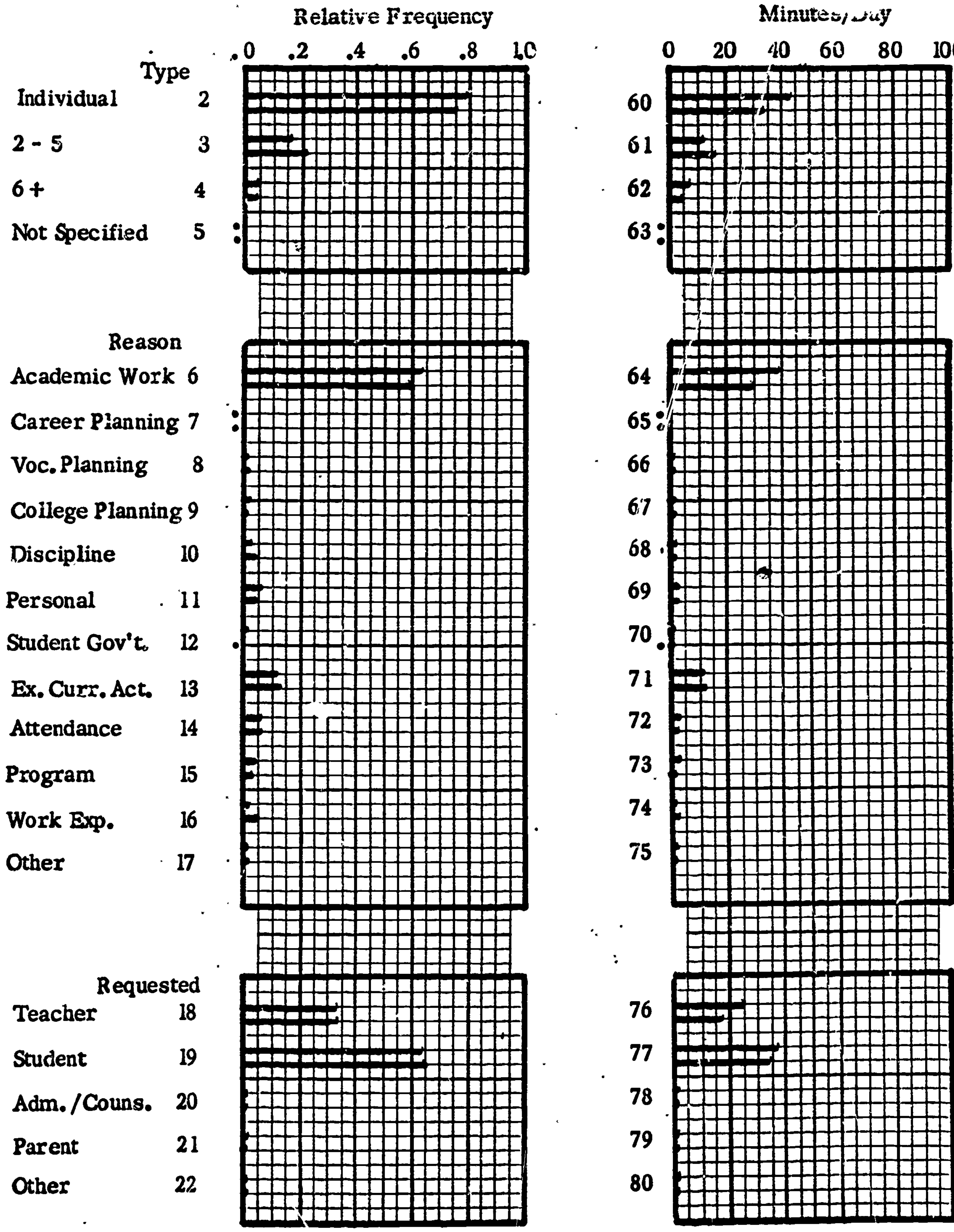


FIGURE F9
ALL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL D NK = 457 , 370

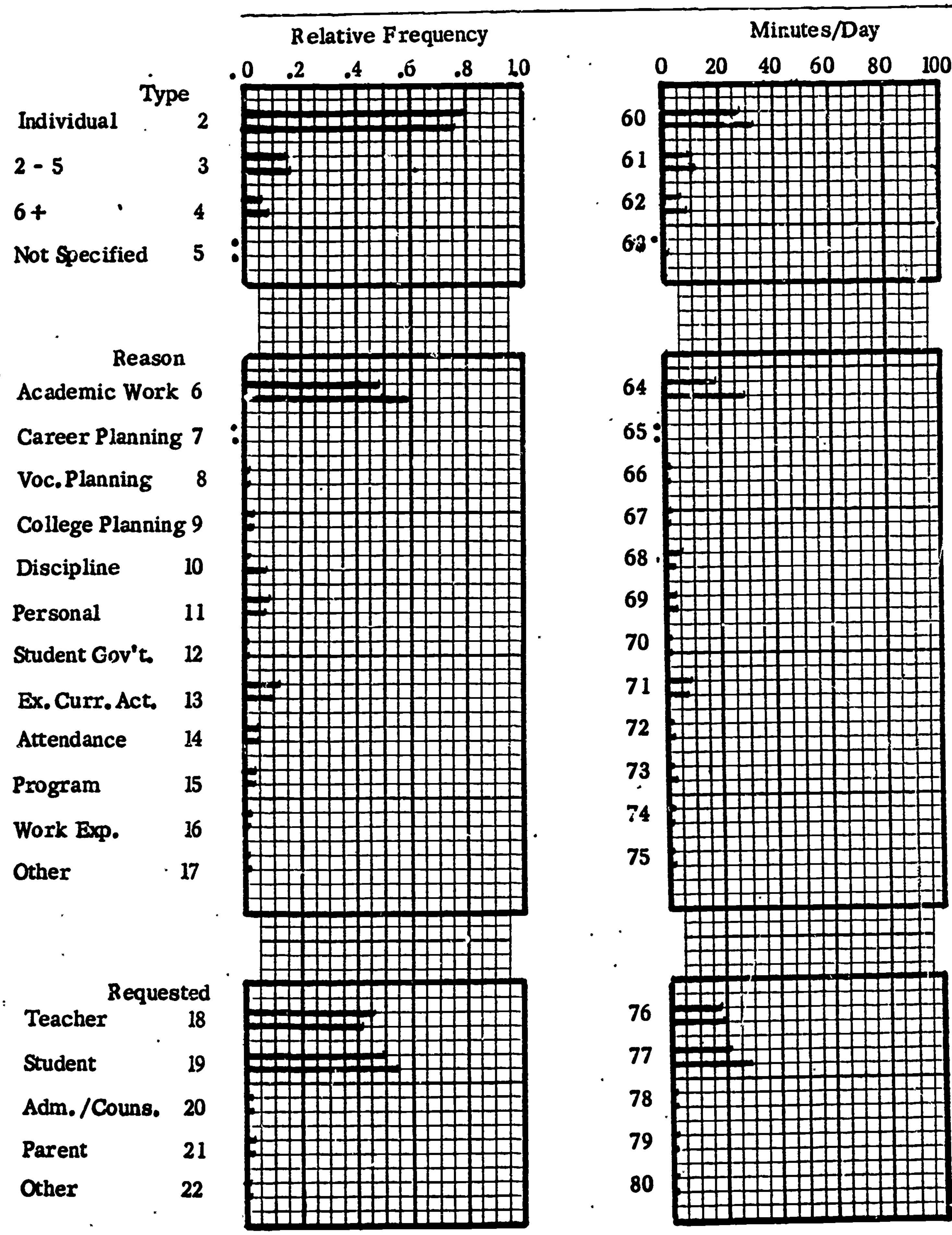


FIGURE F10

ALL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL E NK = 604 , 363

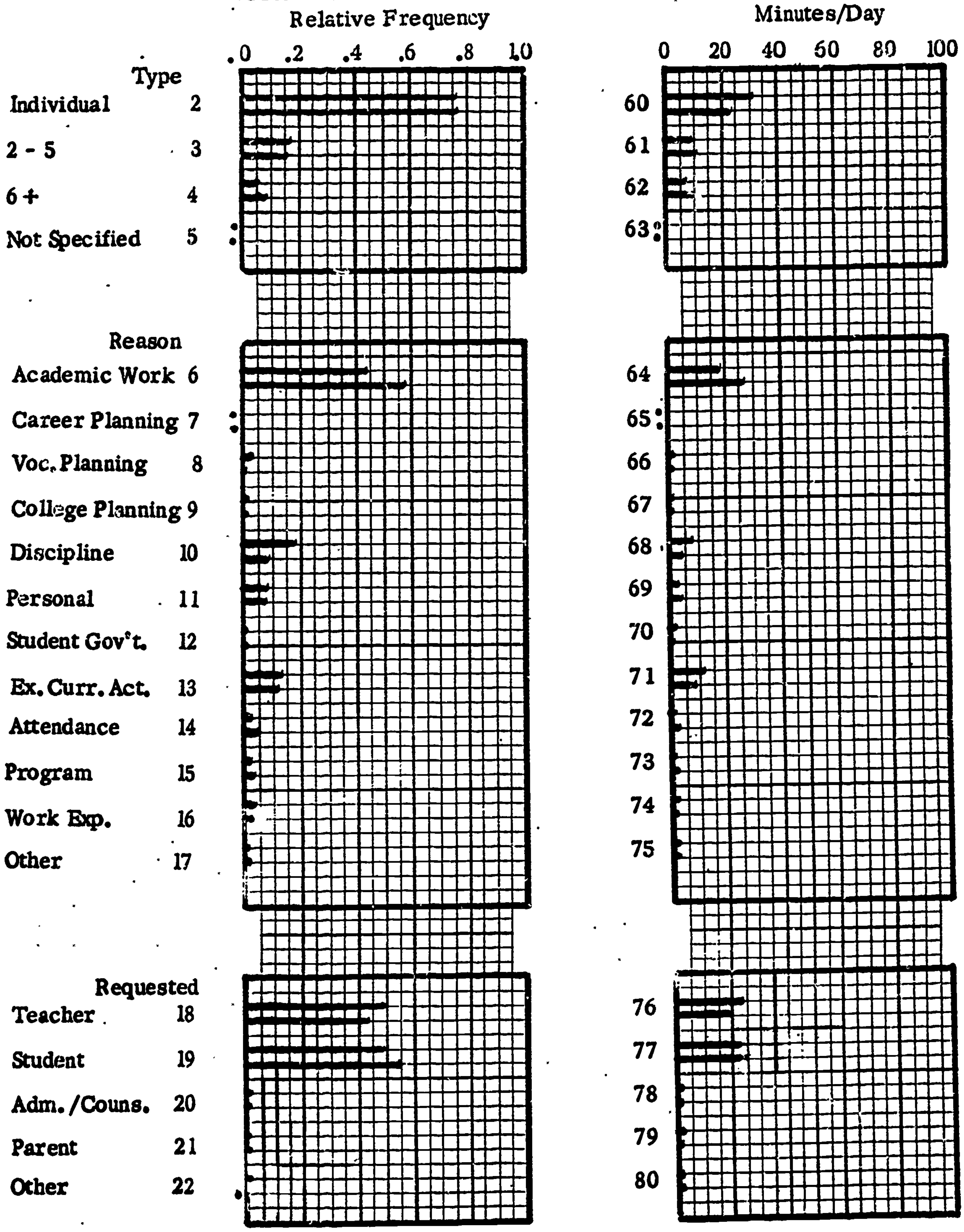


FIGURE F11

ADMINISTRATORS

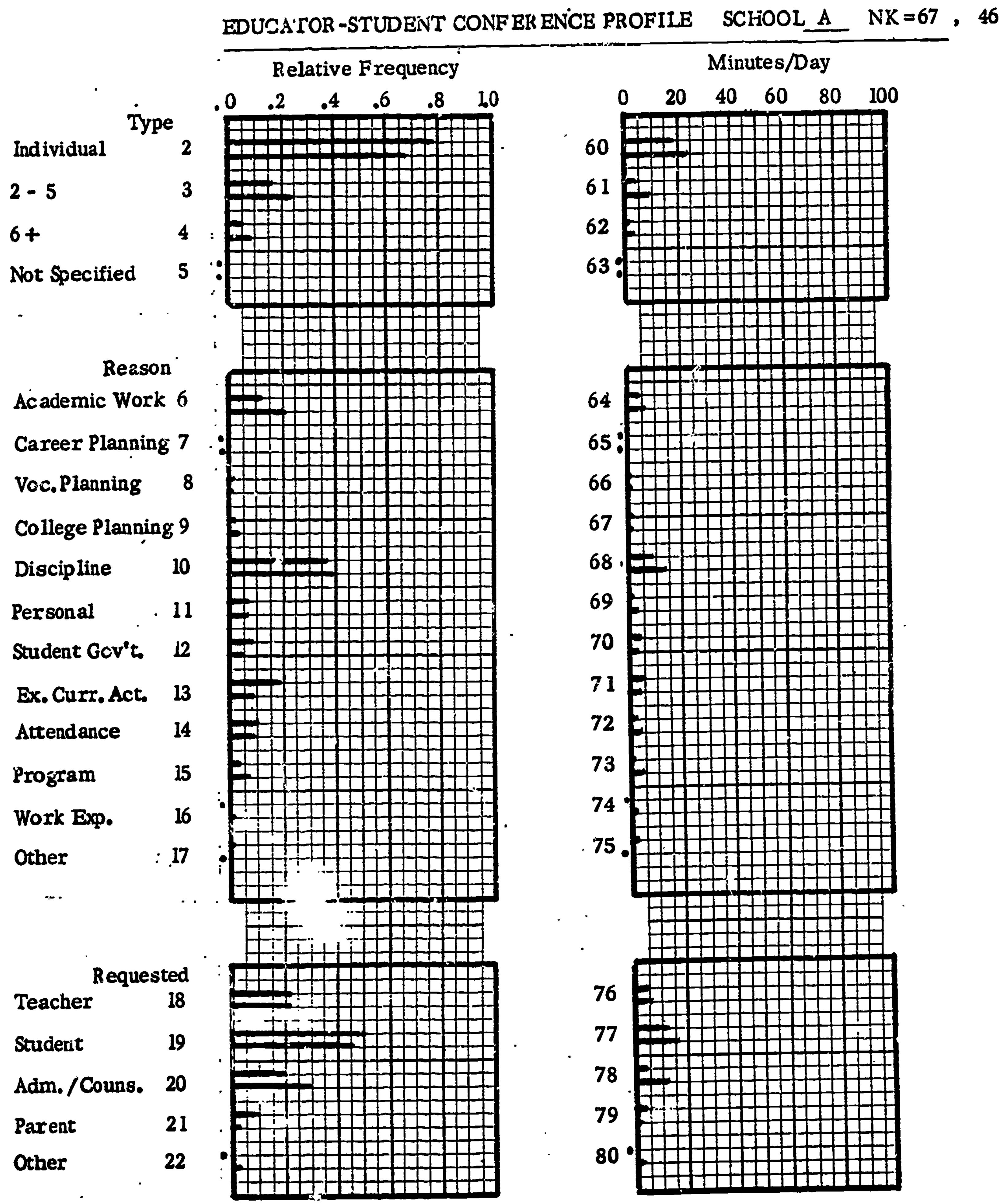


FIGURE F12

ADMINISTRATORS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL B NK = 69 , 60

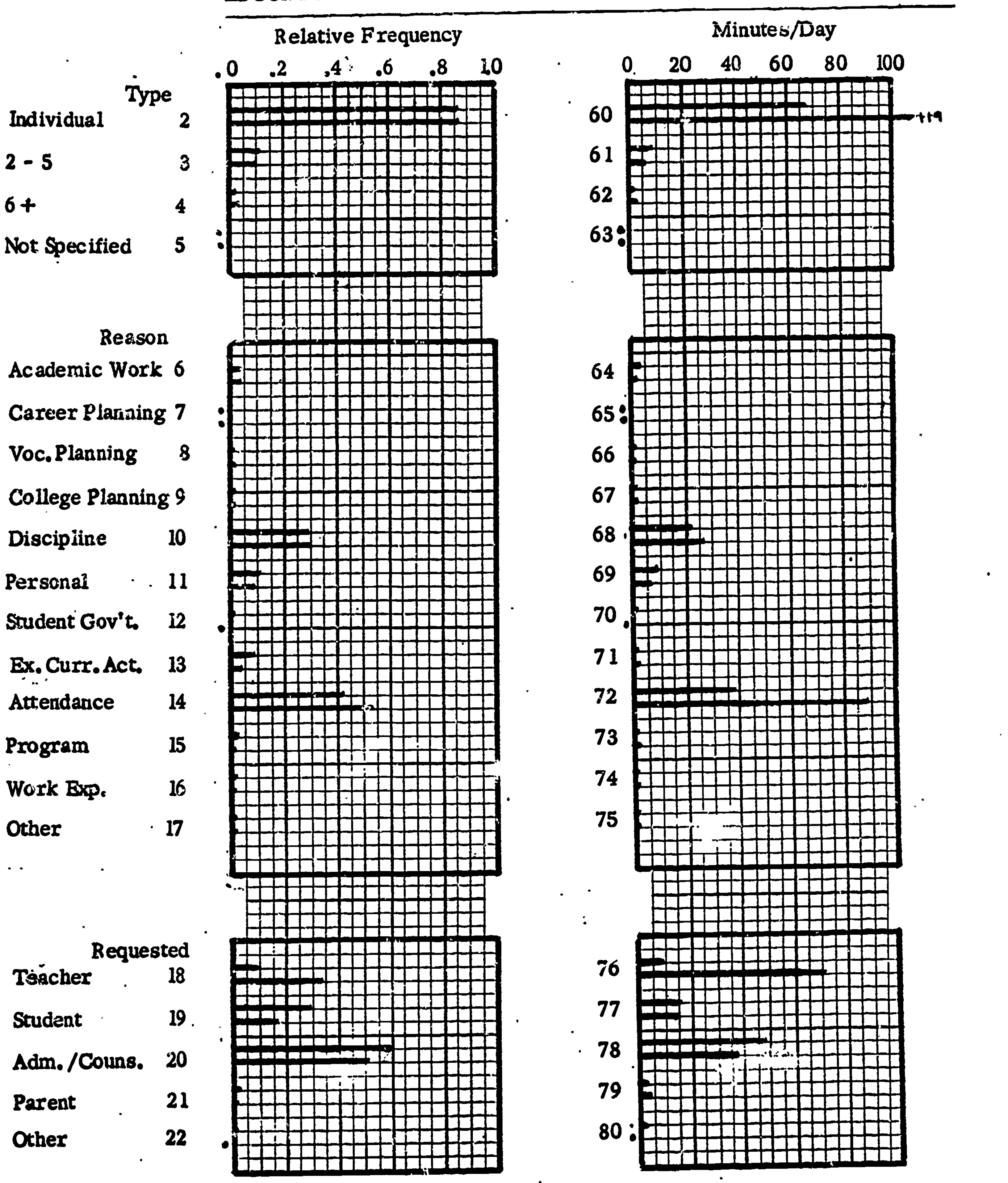


FIGURE 33

ADMINISTRATORS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL C NK = 110 , 45

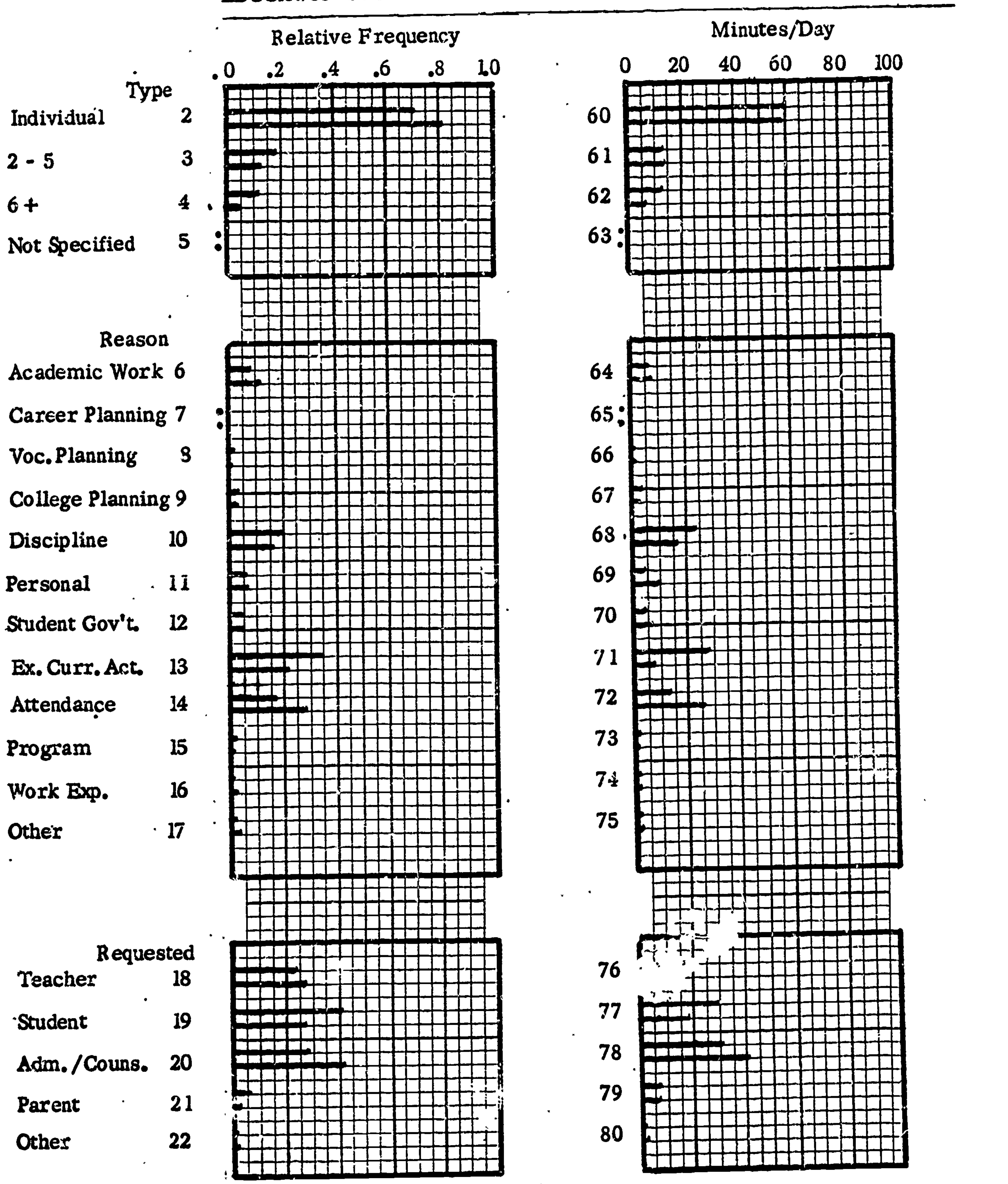


FIGURE F14

ADMINISTRATORS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL D NK = 115 , 70

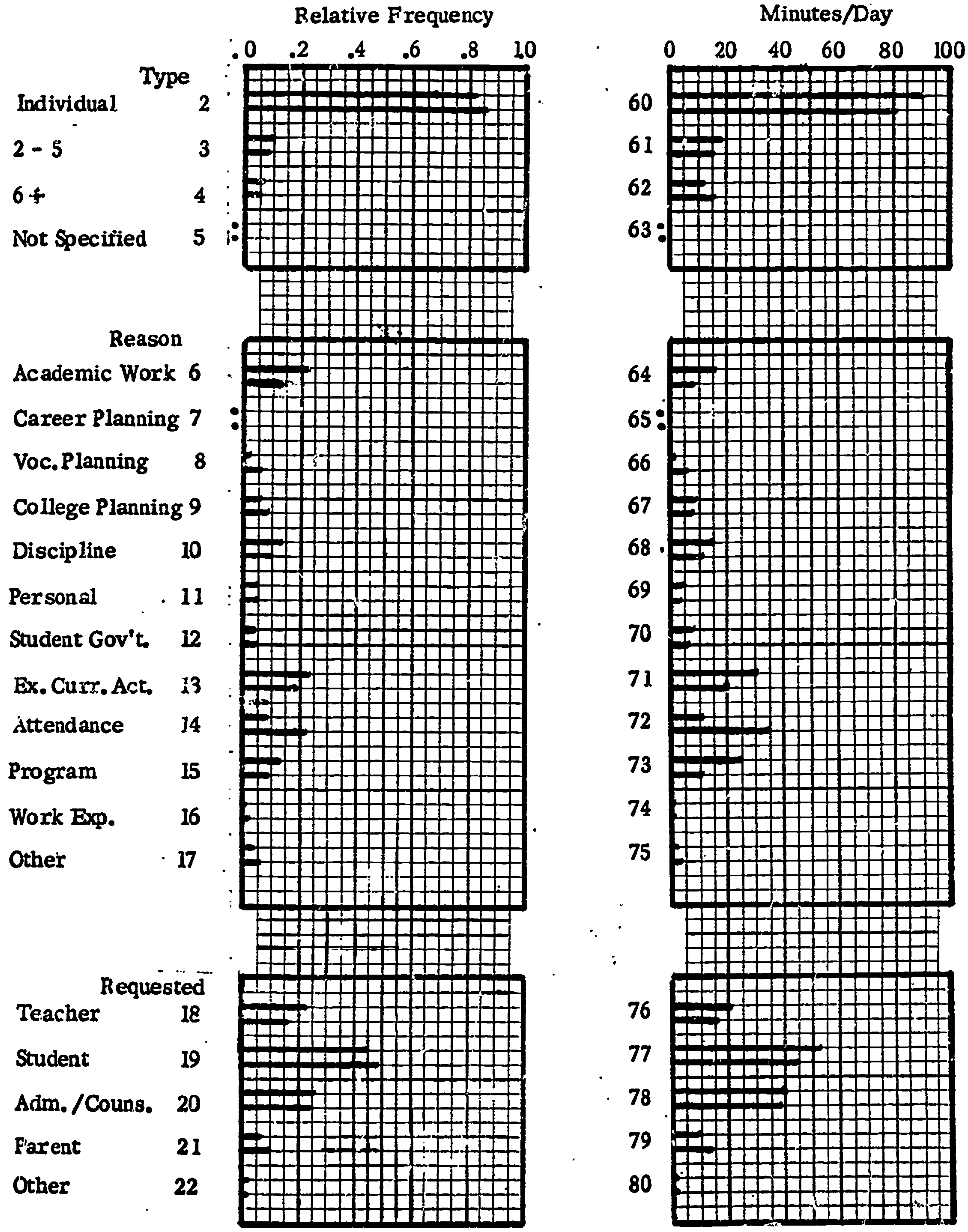


FIGURE F15

ADMINISTRATORS

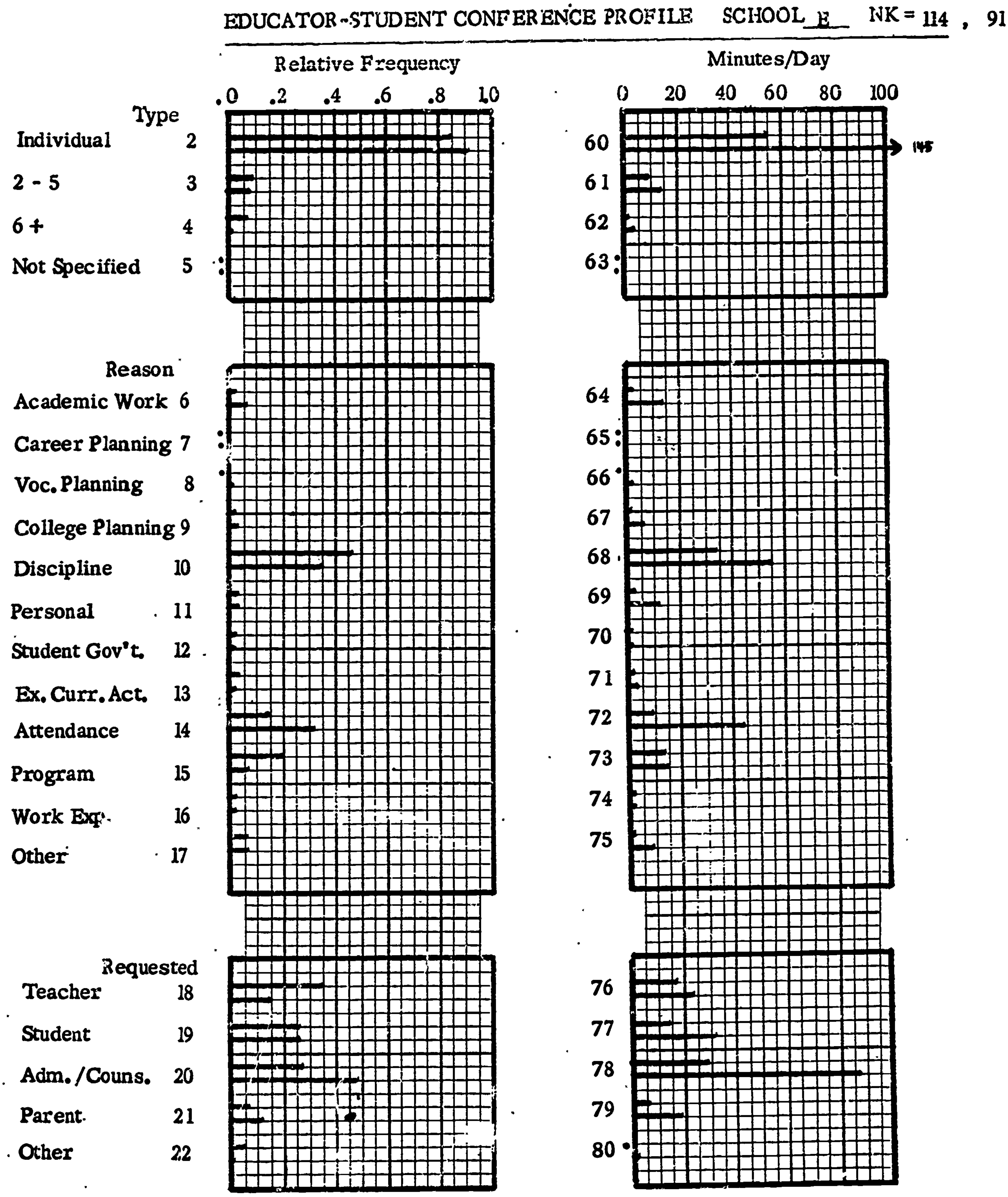


FIGURE F16

COUNSELORS

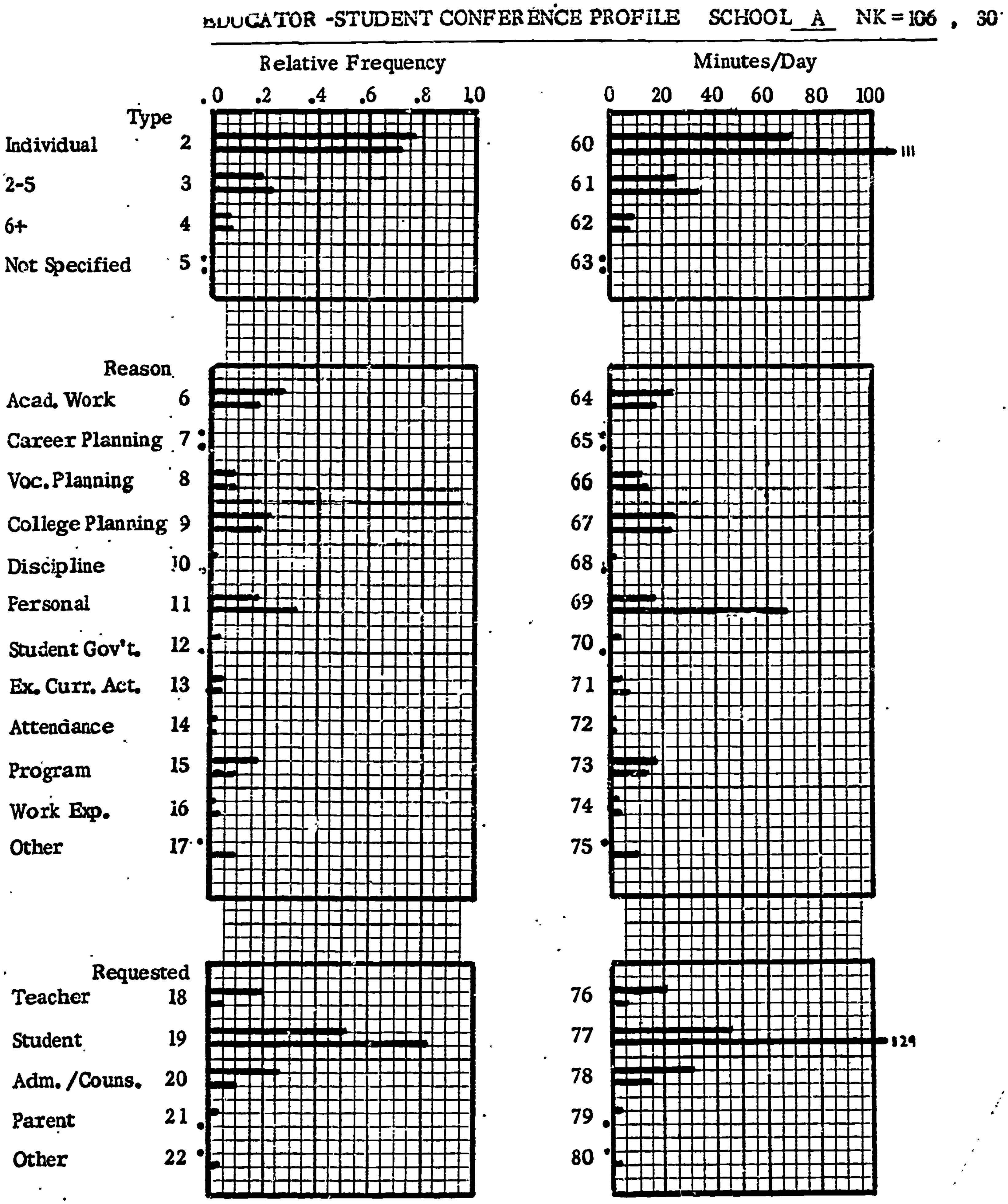


FIGURE F17

COUNSELORS

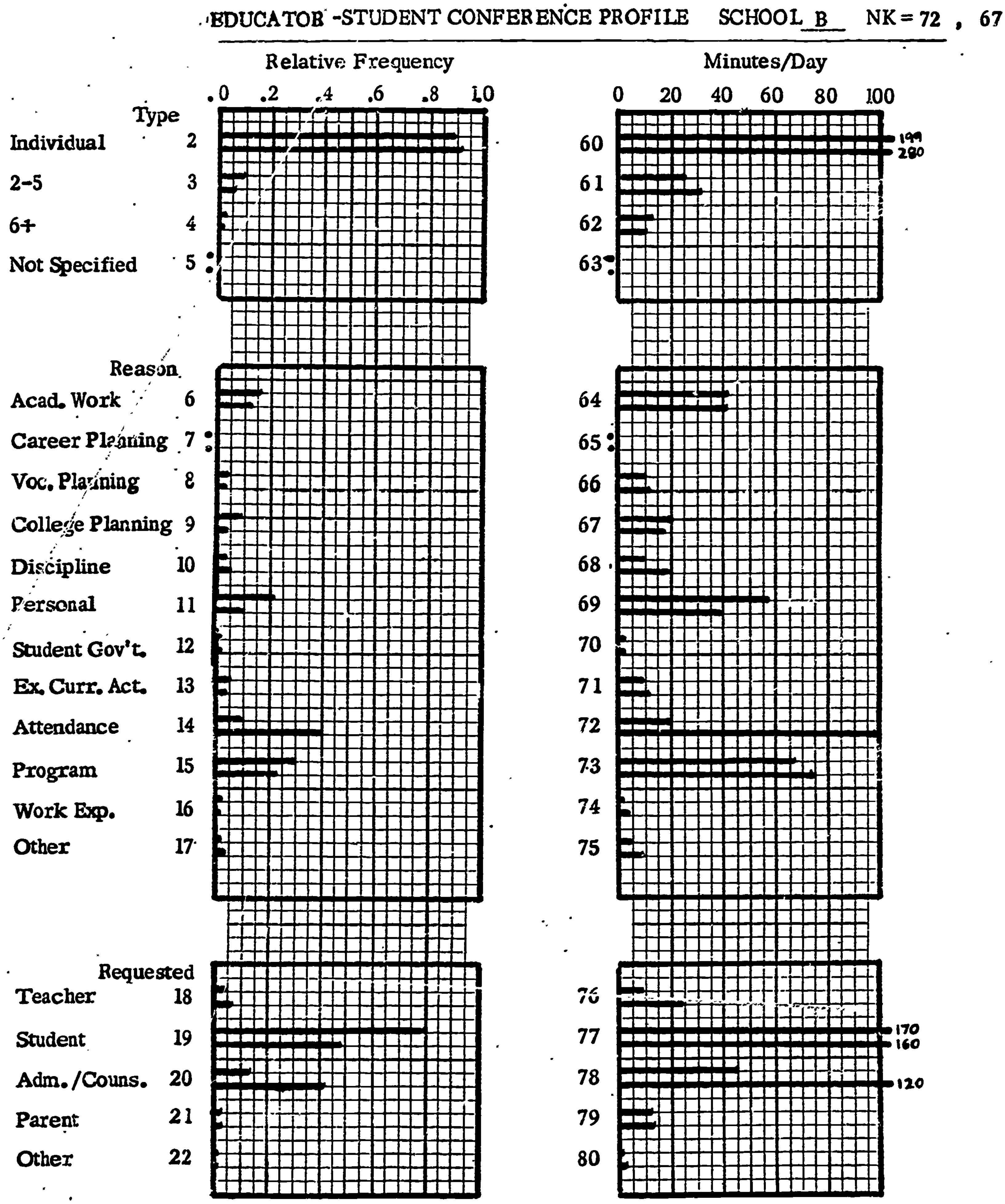


FIGURE F18

COUNSELORS

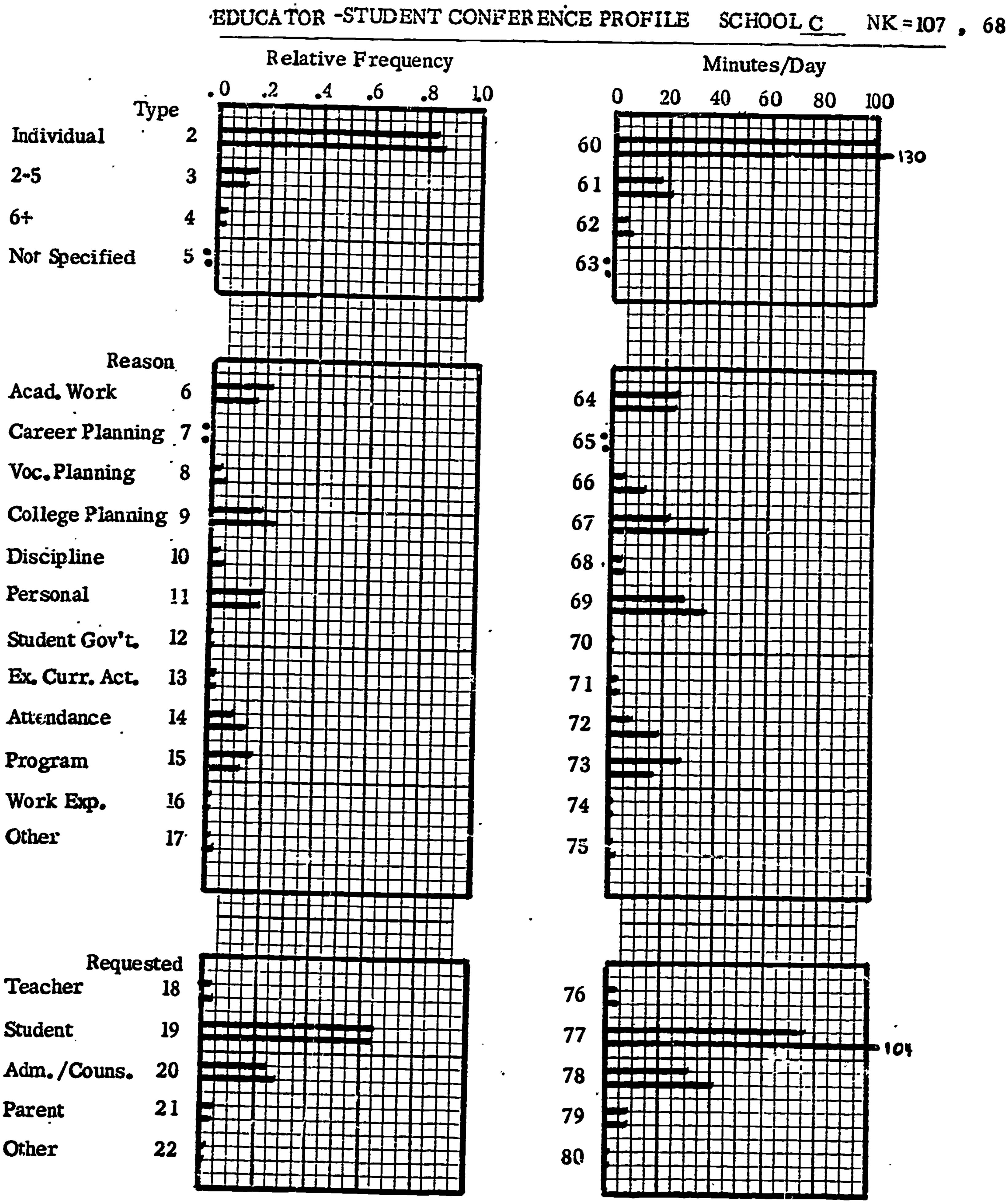


FIGURE F19

COUNSELORS

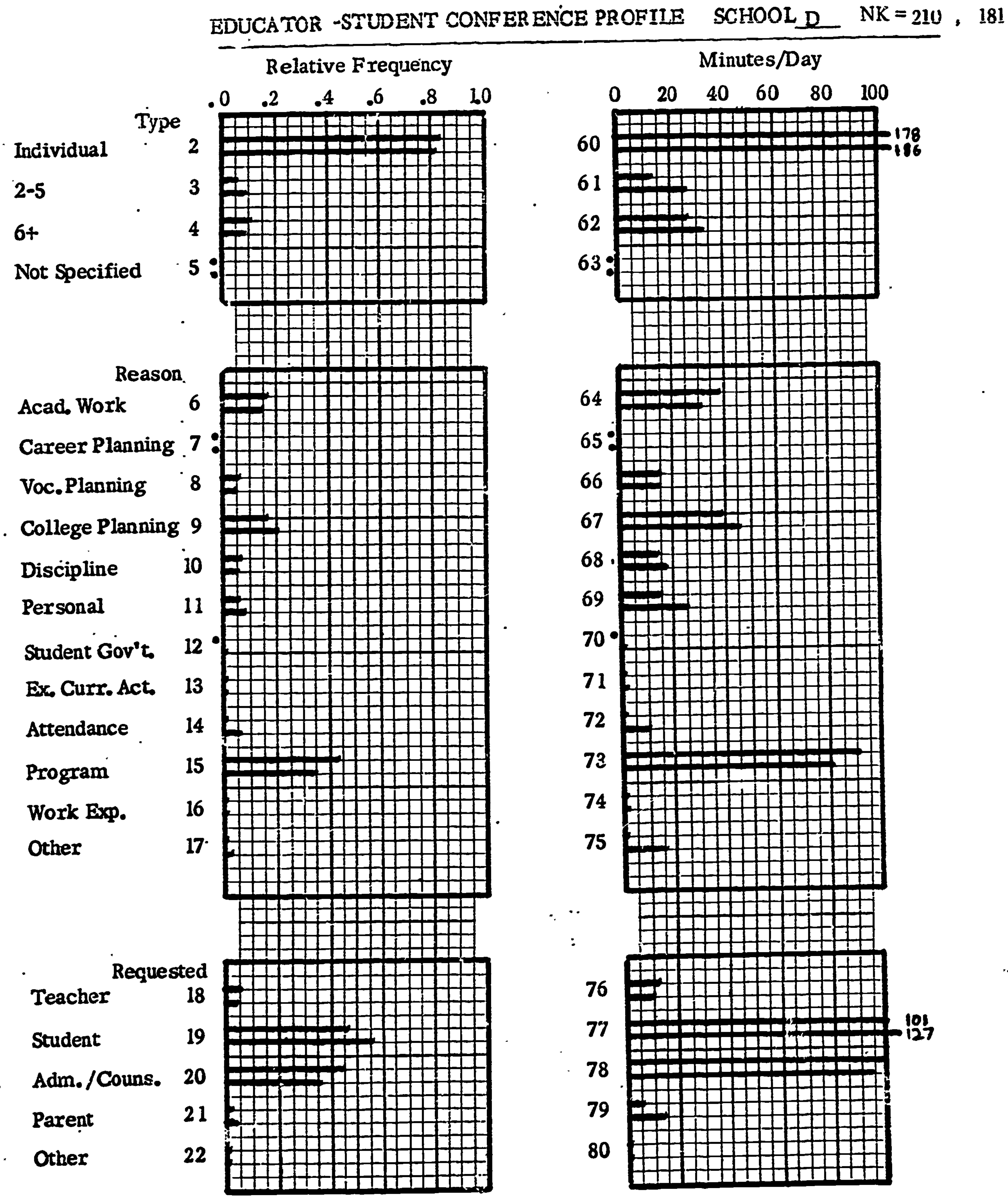


FIGURE F20

COUNSELORS

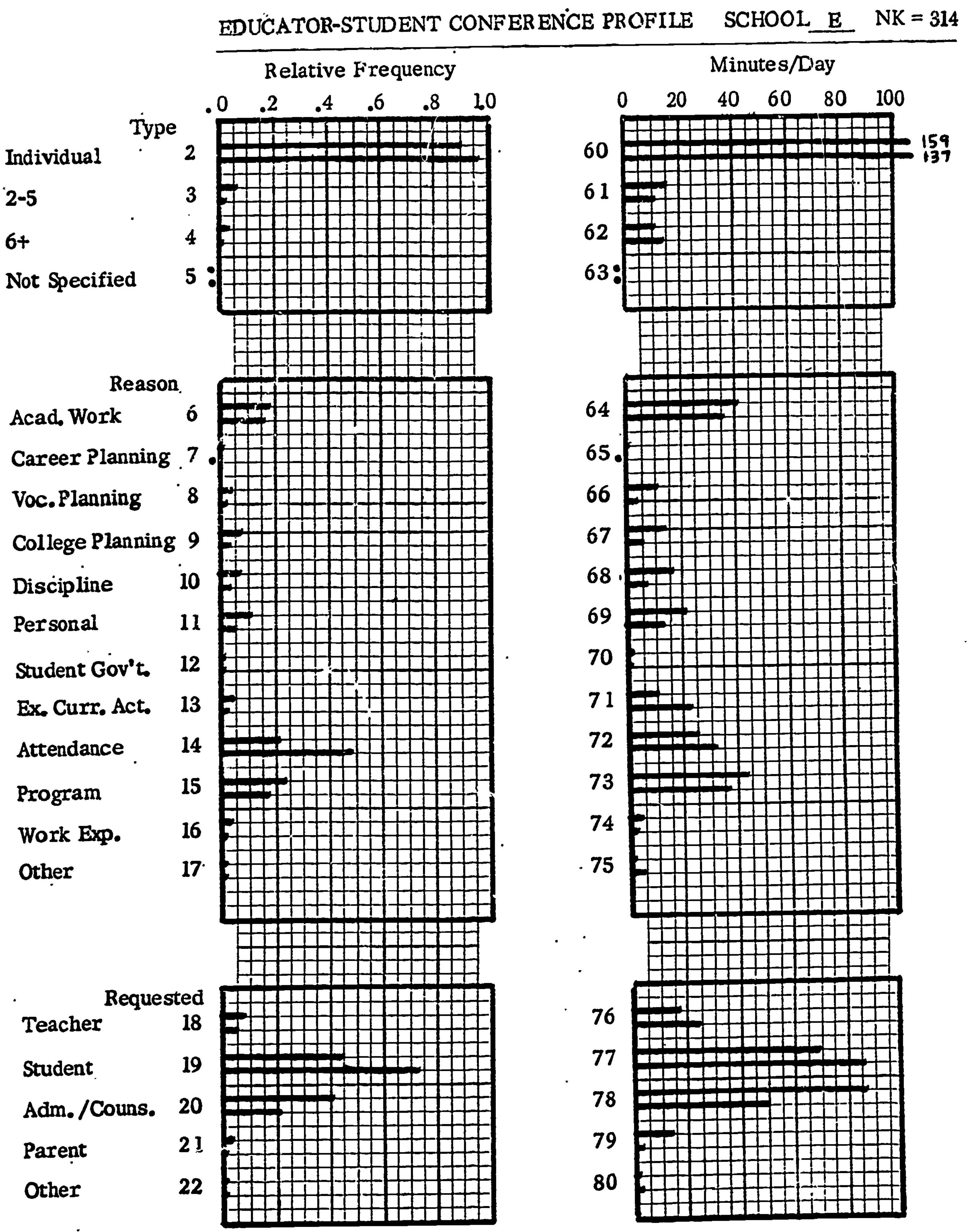


FIGURE F21

VOCATIONAL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL A NK = 43 , 29

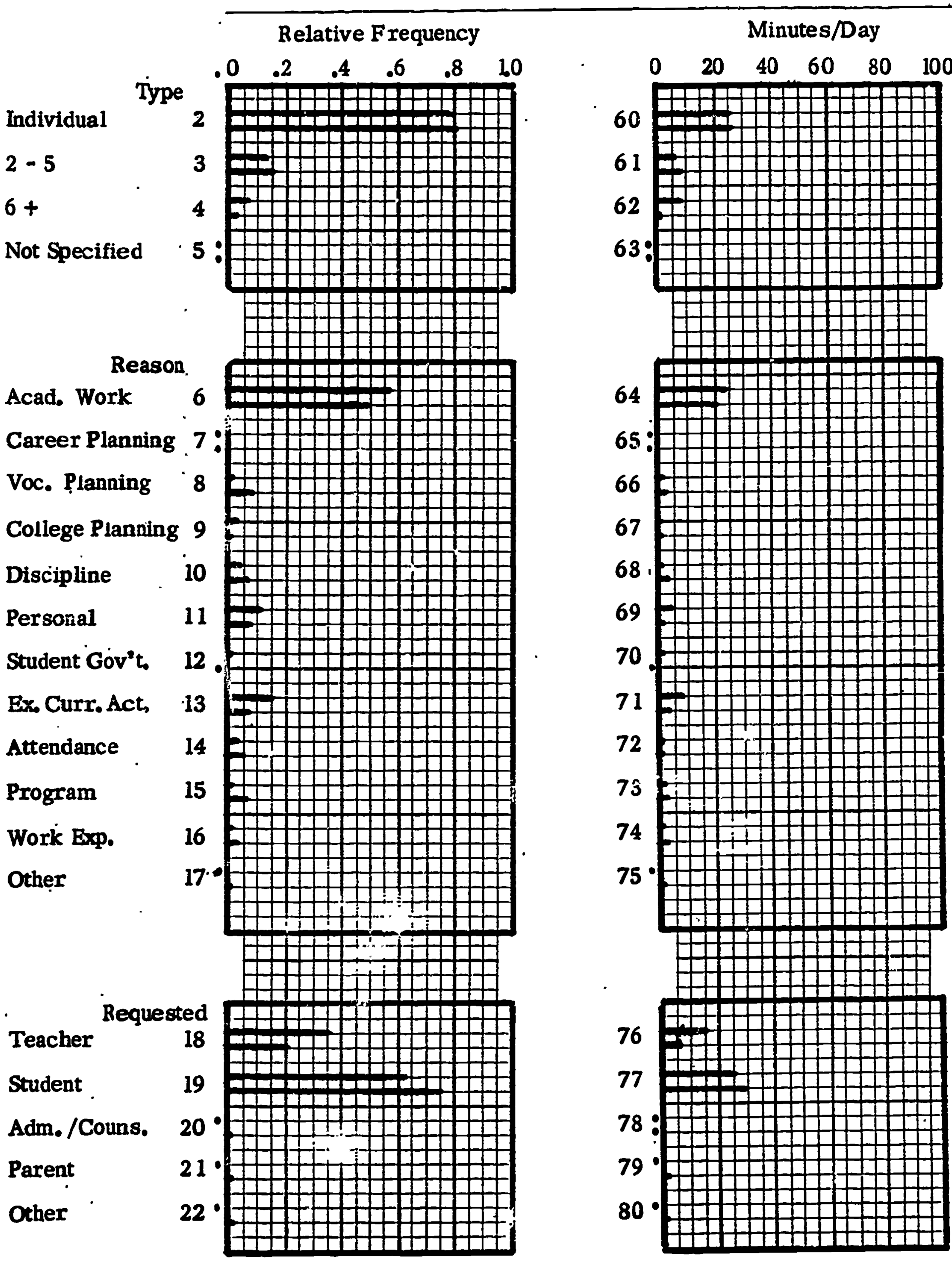


FIGURE F22

VOCATIONAL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL B NK = 27 , 35

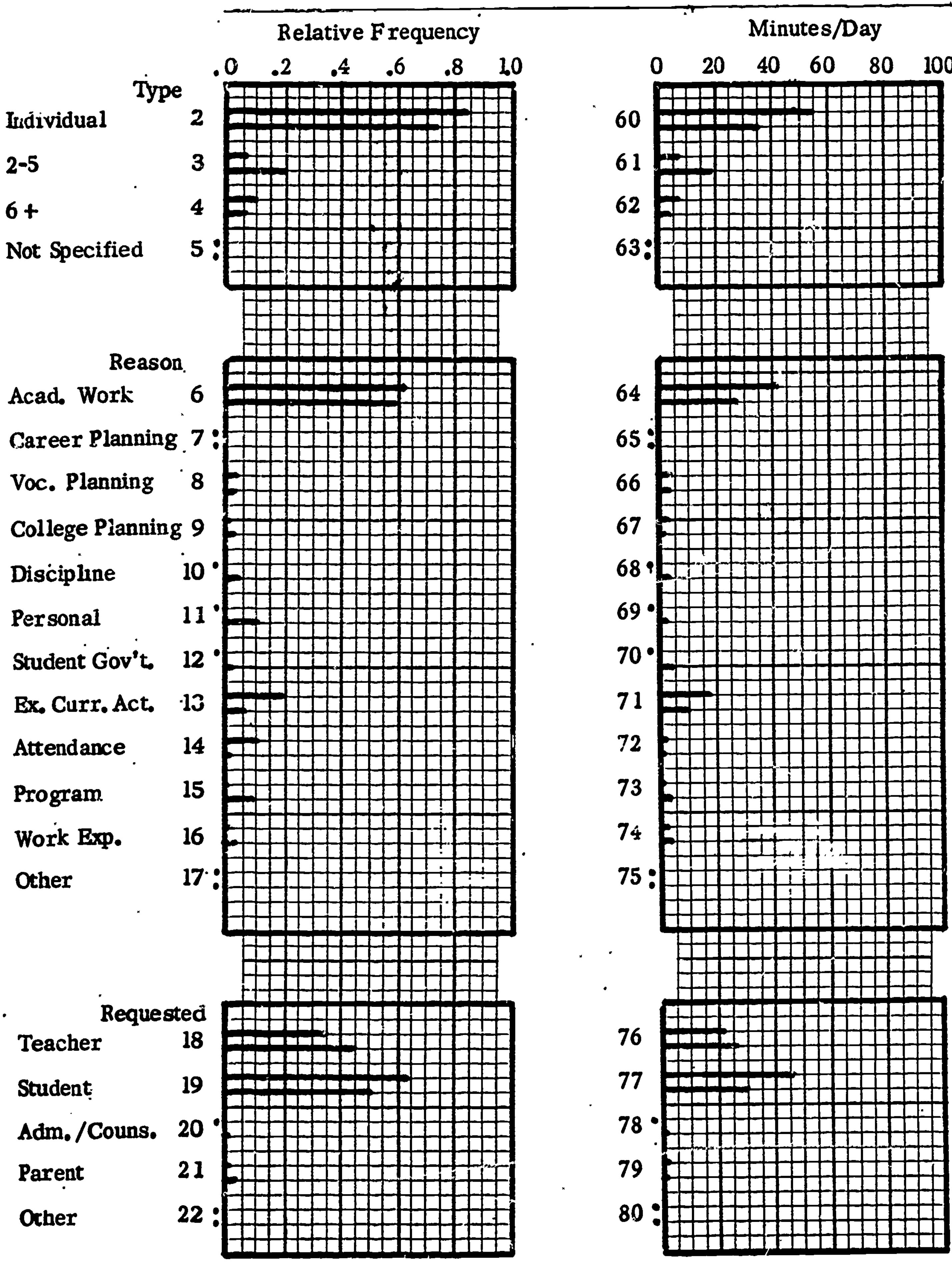


FIGURE F23

VOCATIONAL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL C NK=60, 33

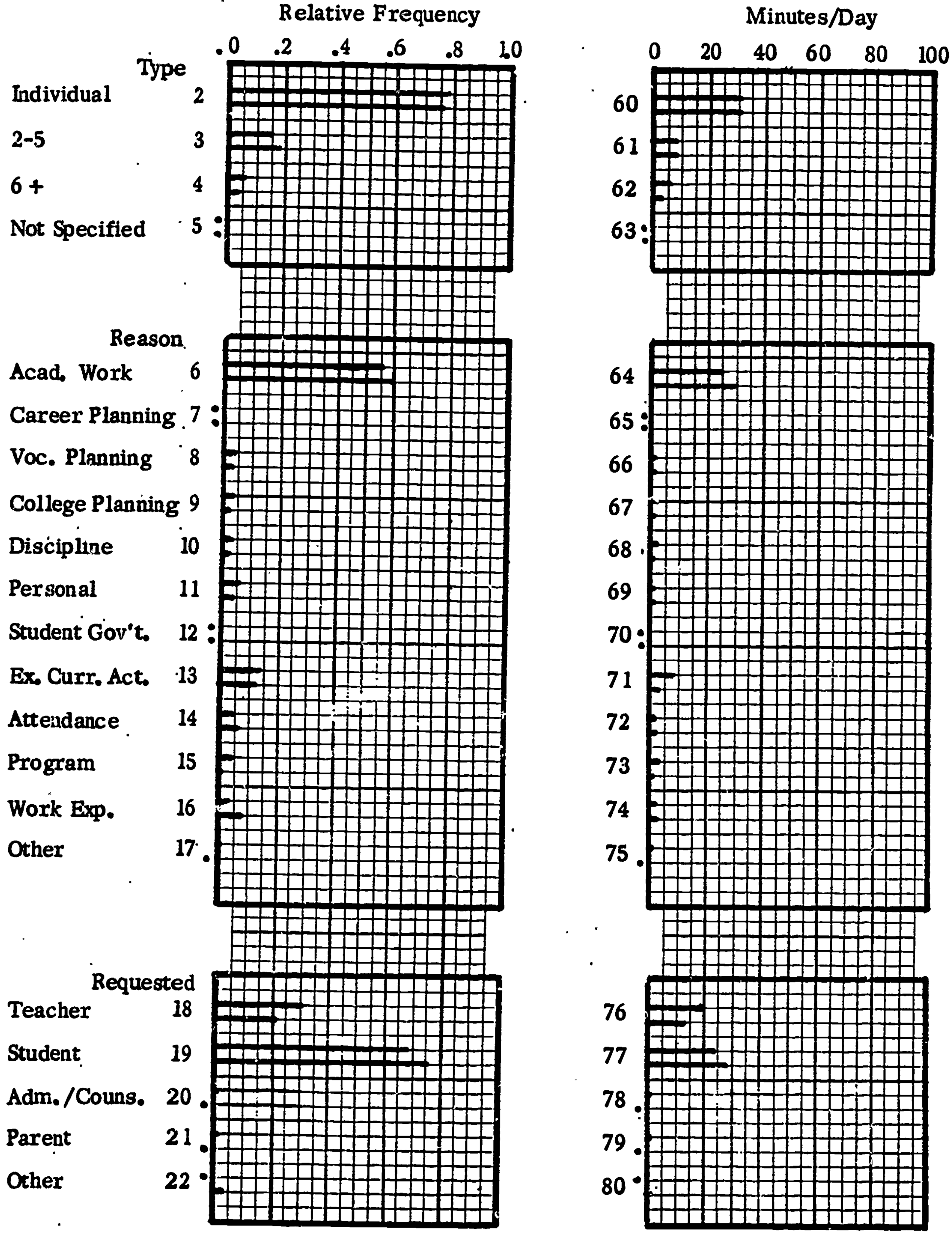


FIGURE F24

VOCATIONAL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL D NK = 105 , 98

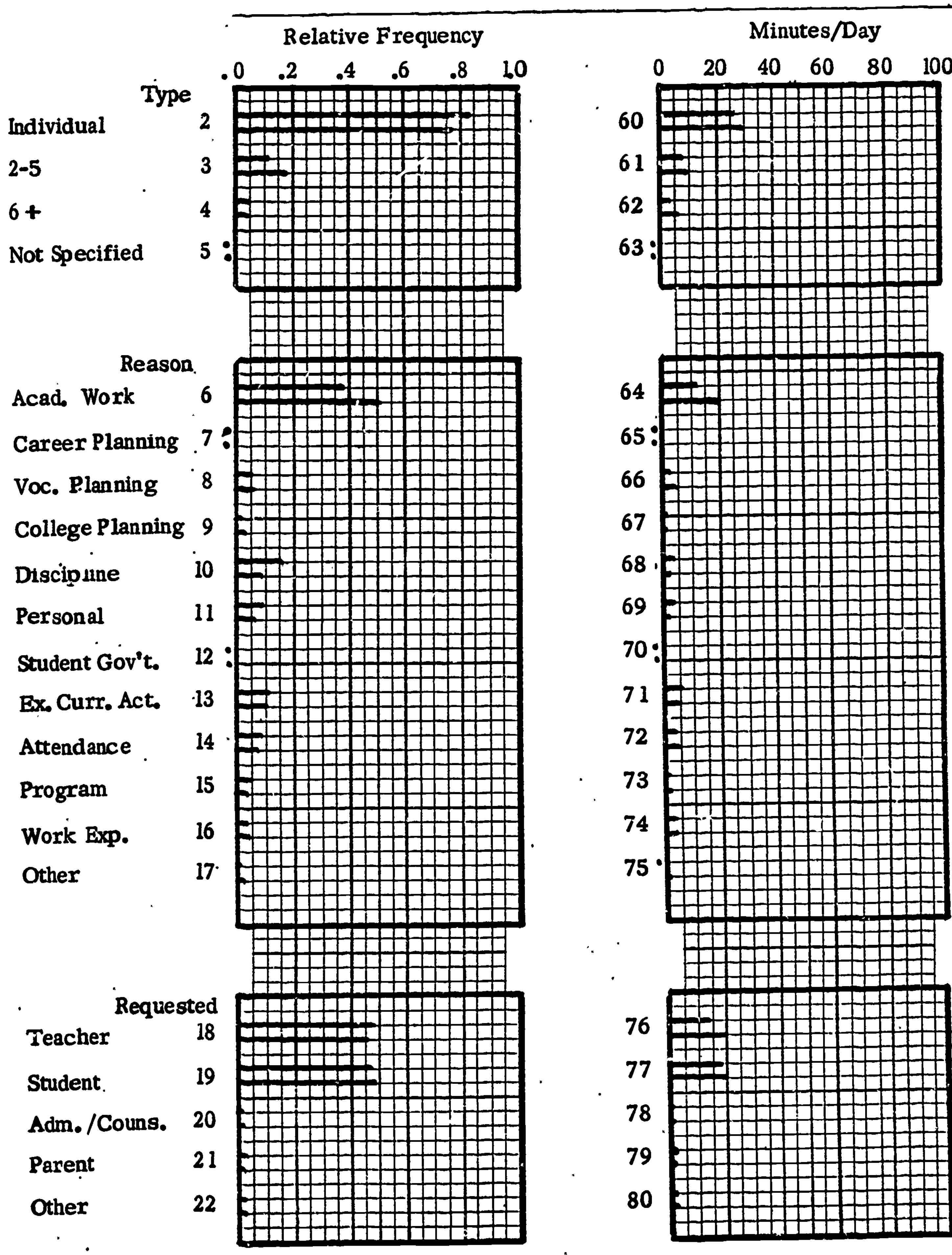
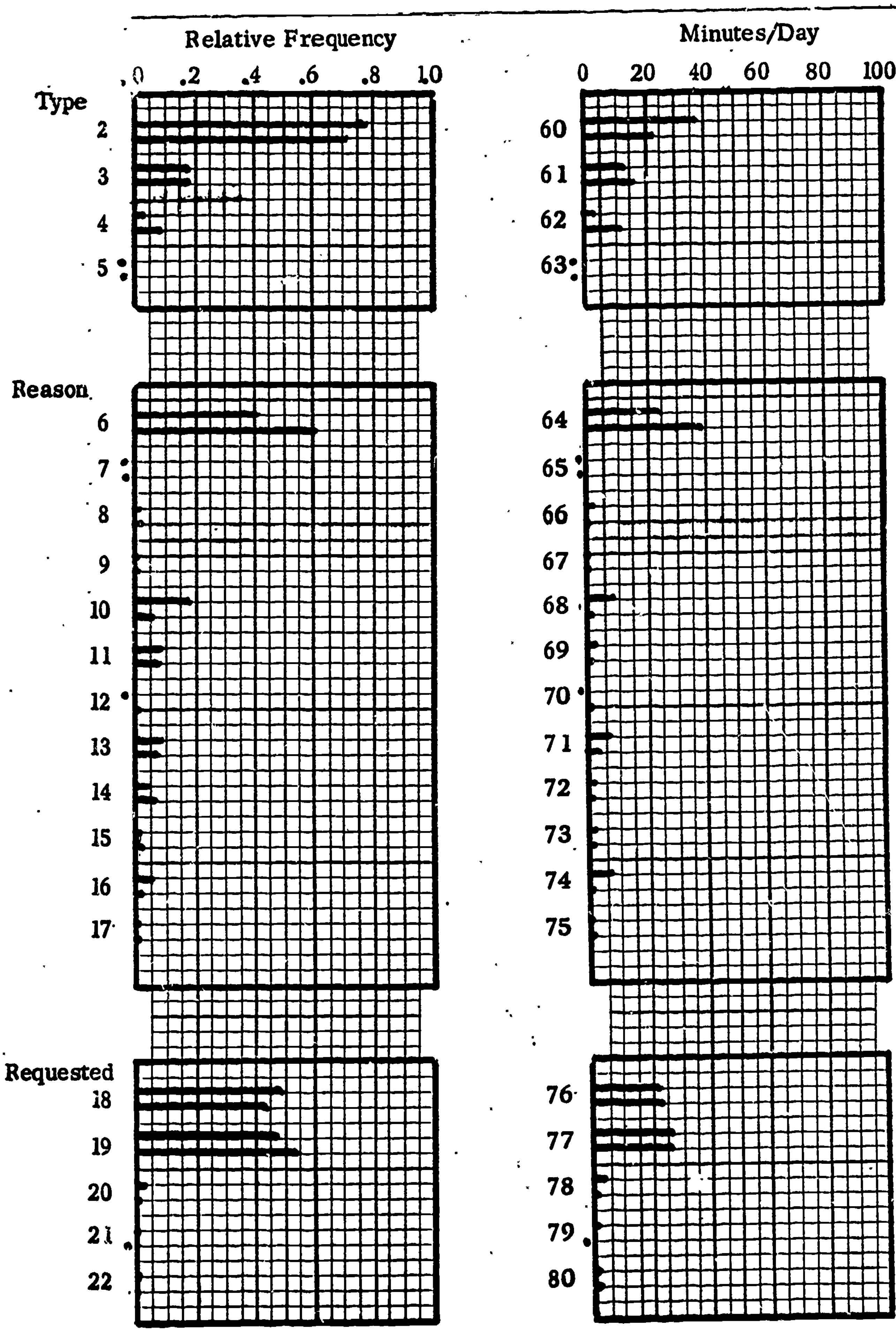


FIGURE F25

VOCATIONAL TEACHERS

EDUCATOR-STUDENT CONFERENCE PROFILE SCHOOL E NK = 192, 111



APPENDIX G

FACULTY PROFILE QUESTIONNAIRE

The Faculty Profile Questionnaire displayed in Table G1 was designed to test the following hypotheses postulated for the project:

1. There will be greater differentiation of teacher assignment under modular scheduling.

2. Instructors with special competence in dealing with small and large student group configurations will be assigned to take advantage of such competence under modular scheduling.

3. Modular scheduling will permit and encourage greater cooperation and team planning within the school staff on such matters as curriculum revisions and staff organization.

The form was completed by each teacher, administrator, counselor, and member of the instructional staff. The total number of responses obtained over the three year period was in excess of 3,700.

Comparisons reported in this report were made on a "before" and "after" modular scheduling basis, and are thus limited to five schools. Comparisons are represented graphically and include levels of significance for each variable.

The form in Table G1 has been reproduced as it appeared when coded. Numbers placed in the spaces reserved for answers represent values used in preparing the forms for computer processing, but are not intended to represent the degree of importance given to any particular answer.

The information elicited by the faculty profile questionnaire has been summarized for five schools (A, B, C, D, and E.).

Question 26 asked the individual faculty member to estimate the average number of hours per week that he devoted to (1) out of class instructional duties and (2) miscellaneous other assignments. The question divided each of the general categories into sub-categories. For each respondent the estimates in each set of sub-categories was summed to obtain the respondent estimate of the average number of hours per week devoted to categories (1) and (2).

A general summary of the resulting average estimates of the number of hours per week devoted to these activities during school hours, outside school hours, and total is tabulated below.

	Year a*			Year b*		
School	During	Outside	Total	During	Outside	Total
E	9.3	20.3	29.6	13.6	20.4	34.0
D	12.2	24.5	36.7	14.3	19.9	34.3
A	9.2	22.4	31.6	13.[illegible]	19.4	32.2
B	9.6	24.3	33.9	12.1	15.0	27.1
C	9.2	19.0	28.2	15.2	16.7	31.9

* Year a is the last year of traditional scheduling.
* Year b is the first year after the introduction of flexible scheduling.

These results suggest that the hours per week devoted during school hours to assigned activities other than scheduled classroom activities tended to increase with the introduction of flexible scheduling, while the hours per week outside school hours tended to decrease.

The teachers in these schools perceive that they spend approximately 20 hours per week outside school hours in regular assigned activities. It was not within the scope of this study to test the validity of the estimates by work sampling techniques.

Further detail on the estimates for individual schools is displayed in Tables G2 to G6.

The responses to other questions in the faculty profile questionnaire have been summarized in terms of relative frequency histograms displayed in Figures G1 to G10. For each of the five schools, A, B, C, D, and E, Figure G1 displays the histograms computed from the responses to questions 1 and 2 in Table G1. Similarly, Figures G2 through G10 display histograms computed from the responses to other sets of questions as tabulated below.

Figure	Questions
G1	1, 7
G2	2, 3, 4. a, 6
G3	8, 12, 13, 15
G4*	17NT, 17T, 18NT, 18T
G5*	19NT, 19T, 20NT, 20T
G6*	21NT, 21T, 22NT, 22T
G7*	23NT, 23T, 24NT, 24T
G8**	25. a. F, 25. a. I, 25. d. F, 25. d. I
G9**	25. g. F, 25. g. I, 25. j. F, 25. j. I
G10**	25. m. F, 25. m. I, 25. v. F, 25. v. I

* NT refers to the "not as a team member" response.
* T refers to the "as a team member" response.
** F refers to the formal meeting response.
** I refers to the informal meeting response.

Referring to question 1, there are ten possible responses. The histograms for year a (the last year of traditional scheduling) and year b (the first year of flexible scheduling) are interwoven. The bar showing the relative frequency of a particular year a response to a particular question is slightly wider and is drawn to the left of the counterpart for year b. If the relative frequency was zero, a dot is placed just below the place a bar would have appeared had the relative frequency been non-zero. To permit inter-school comparisons, the five schools' histograms for a particular question are aligned in a row on one page.

No attempt is made here to present a complete analysis of these histograms. Instead, a few comments are made here and the reader will be permitted to draw his own conclusion.

The responses to Question 2 show that male teachers predominate in all five schools. The responses to Question 4. a show a noticeable increase of faculty with Master's degrees at schools A, B, and C, although Bachelor's degrees predominate in all schools.

The responses to Questions 12 and 13 indicate that the educator's assignments utilize special interests and special competence to a very large extent.

In every school an appreciable shift to team teaching followed the advent of flexible scheduling. Except for school A, the majority of the teachers participated in team teaching in year b.

The responses indicate that the work load tends to be reasonable, but at the same time, teachers perceive themselves as experiencing an increasing involvement in organization of the courses they teach, in the selection of course content, materials and evaluative processes.

TABLE G1

Stanford University,
School of Education

Voc.Ed. - Flex.Sched.
(Form D 1)

Date ____________________

Name of School ____________________

Name of Teacher ____________________

Teacher Number ____________________

FACULTY PROFILE QUESTIONNAIRE

This form is designed to collect information regarding teacher preparation, experience, and teaching assignment. Please answer every question.

1. Your age? Check the appropriate category.

1	20-25	6	46-60
2	26-30	7	51-55
3	31-35	8	56-60
4	36-40	9	61-65
5	41-45	0	Over 65

2. Your sex?

1 M

2 F

3. Your marital status?

1 Single

2 Married

3 Other

4. (a) What is the highest college degree you have earned?

____1____No degree

____2____A degree or diploma based on less than 4 years' work

____3____Bachelor's degree

____4____Master's degree

____5____Doctor's degree

(b) How many semester hours have you earned above the bachelor's degree?________

(c) How many semester hours have you earned above the master's degree?________

5. (a) What was your undergraduate major?________

(b) What was your undergraduate minor?________

(c) What was your major in graduate school?________

(d) What was your minor in graduate school?________

6. Are you on tenure now?

____1____Yes ____2____No

7. Counting the present year, how many years have you been employed as a full-time teacher?

____1____1-2 years	____4____10-14 years	____7____25-34 years
____2____3-4 years	____5____15-19 years	____8____35-44 years
____3____5-9 years	____6____20-24 years	____9____45 years or more

8. Does your assignment include any instructional responsibilities in addition to teaching?

____1____Department head or equivalent

____2____Team leader or chairman

____3____Other (please specify)________

The following categories were developed from the other responses;

4 **Administration, Supervision, Coordination, Librarian**

5 **Miscellaneous**

9. What is your teaching schedule?

PLEASE REPORT ALL HOMEROOM PERIODS, STUDY HALLS AND CLASS MEETINGS FOR WHICH YOU ARE SCHEDULED TO MEET STUDENTS. THIS INCLUDES ALL SECTIONS OF EACH COURSE PHASE THAT YOU TEACH.

NAME OF COURSE	Section	Number of Pupils Enrolled	Periods Per Meeting (Module)	Meetings Per Week	Minutes Per Period
Traditional Example ENGLISH 1	1	30	1	5	50
Flexible Example ENGLISH 1	1	150	2	3	20
HOMEROOM					
STUDY HALL					
LUNCH					

10. How many unassigned ("free", open, preparation, etc.) periods (modules) do you have in your own schedule each week?

_______periods (modules)

11. How many periods (modules) per week of your total teaching time are in subjects that are different from your field of major preparation in college or on-the-job experience?

_______periods (modules)

12. To what extent does your primary teaching assignment utilize your own special interests?

___1___not at all

___2___to a limited extent

___3___considerably

___4___very much

___5___fully

13. To what extent does your primary teaching assignment utilize your own special competence?

___1___not at all

___2___to a limited extent

___3___considerably

___4___very much

___5___fully

14. (a) In what grades are the students you teach this year?

Please circle 7 8 9 10 11 12

0 = No Response
1 = Response

(b) In what grades were the students you taught last year?

Please circle 7 8 9 10 11 12

0 = No Response
1 = Response

15. Are you a member of a teaching team or other formally designated cooperative teaching group?

__1__Yes __2__No

If "yes" please answer the remaining questions on this page.

16. (a) How many teachers are members of the team?

Team 1:______ Team 2:______ Team 3:______

(b) How many non-teachers are members of the team?

Team 1:______ Team 2:______ Team 3:______

(c) Are teacher members all from the same department?

Team 1: _____Yes _____No

Team 2: _____Yes _____No

Team 3: _____Yes _____No

(d) If "no" what other departments are involved?

Team 1:____________________

Team 2:____________________

Team 3:____________________

(e) What are the course (s) taught by your teaching team (s)?

Team 1:Course Name________________Number of Pupils Involved_____

Team 2:Course Name________________Number of Pupils Involved_____

Team 3:Course Name________________Number of Pupils Involved_____

(f) What are your responsibilities as a member of the teaching team?

Team 1:____________________

Team 2:____________________

Team 3:____________________

(g) What are the responsibilities of the other team members?

Team 1:____________________

Team 2:____________________

Team 3:____________________

PLEASE ANSWER THE FOLLOWING QUESTIONS IN BOTH COLUMNS IF YOU ARE A MEMBER OF A TEACHING TEAM. OTHERWISE PLEASE ANSWER ONLY IN THE COLUMN ON THE RIGHT.

	AS A MEMBER OF A TEACHING TEAM	FOR ALL OTHER TEACHING ASSIGNMENTS
17. What is your general estimate of your present teaching load?	1 light 2 reasonable 3 heavy 4 extremely heavy	1 light 2 reasonable 3 heavy 4 extremely heavy
18. How much strain or tension is there in your work?	1 little or moderate strain 2 considerable strain	1 little or moderate strain 2 considerable strain
19. How often do you participate in the planning of lessons that are taught by other instructors?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always
20. How often do you teach lessons in which other instructors participated in the planning?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always

PLEASE ANSWER THE FOLLOWING QUESTIONS IN BOTH COLUMNS IF YOU ARE A MEMBER OF A TEACHING TEAM. OTHERWISE PLEASE ANSWER ONLY IN THE COLUMN ON THE RIGHT.

	AS A MEMBER OF A TEACHING TEAM	FOR ALL OTHER TEACHING ASSIGNMENTS
21. How often do you teach lessons for which you alone carried out the planning?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always
22. Do you ever teach a lesson or unit in which you have special competence or interest for another teacher in your department?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always
23. Do you ever teach a lesson or unit in which you have special competence or interest for another teacher your department?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always
24. Do you ever combine or exchange classes with one or more other teachers?	1 never 2 almost never 3 occasionally 4 frequently 5 always	1 never 2 almost never 3 occasionally 4 frequently 5 always

25. How often do you work with other teachers on the following tasks in FORMAL MEETINGS or in INFORMAL MEETINGS?

FORMAL MEETINGS ARE
1. Called by a professional staff member officially authorized to do so
or
2. Specifically arranged among colleagues for considering the problem areas listed below.

INFORMAL MEETINGS ARE
Situations in which you and one o. colleagues are informally involved ... the tasks listed below.

A = NEVER = 1
B = ALMOST NEVER = 2
C = OCCASIONALLY = 3
D = FREQUENTLY = 4
E = ALWAYS = 5

FORMAL MEETINGS: NEVER	ALMOST NEVER	OCCASIONALLY	FREQUENTLY	ALWAYS		INFORMAL MEETINGS: NEVER	ALMOST NEVER	OCCASIONALLY	FREQUENTLY	ALWAYS
1 A	2 B	3 C	4 D	5 E	a) Planning the aims for a course	1 A	2 B	3 C	4 D	5 E
A	B	C	D	E	b) Planning the aims for units within a course	A	B	C	D	E
A	B	C	D	E	c) Planning the lessons within a course	A	B	C	D	E
A	B	C	D	E	d) Planning the organization of a course	A	B	C	D	E
A	B	C	D	E	e) Planning the organization of a unit within a course	A	B	C	D	E
A	B	C	D	E	f) Planning the organization of a lesson within a course	A	B	C	D	E
A	B	C	D	E	g) Planning the selection of content in a course	A	B	C	D	E
A	B	C	D	E	h) Planning the selection of content in a unit	A	B	C	D	E
A	B	C	D	E	i) Planning the selection of content in a lesson	A	B	C	D	E
A	B	C	D	E	j) Planning the selection of materials in a course	A	B	C	D	E
A	B	C	D	E	k) Planning the selection of materials in a unit	A	B	C	D	E
A	B	C	D	E	l) Planning the selection of materials in a lesson	A	B	C	D	E

FORMAL MEETINGS ARE
1. Called by a professional staff member officially authorized to do so
or
2. Specifically arranged among colleagues for considering the problem areas listed below.

INFORMAL MEETINGS ARE
Situations in which you and one or more colleagues are informally involved in the tasks listed below.

A = NEVER = 1
B = ALMOST NEVER = 2
C = OCCASIONALLY = 3
D = FREQUENTLY = 4
E = ALWAYS = 5

FORMAL MEETINGS: NEVER 1	ALMOST NEVER 2	OCCASIONALLY 3	FREQUENTLY 4	ALWAYS 5		INFORMAL MEETINGS: NEVER 1	ALMOST NEVER 2	OCCASIONALLY 3	FREQUENTLY 4	ALWAYS 5
A	B	C	D	E	m) Planning the selection of evaluative procedures and instruments in a course	A	B	C	D	E
A	B	C	D	E	n) Planning the selection of evaluative procedures and instruments in a unit	A	B	C	D	E
A	B	C	D	E	o) Planning the selection of evaluative procedures and instruments in a lesson	A	B	C	D	E
A	B	C	D	E	p) Administering and scoring evaluative procedures and instruments for a course	A	B	C	D	E
A	B	C	D	E	q) Administering and scoring evaluative procedures and instruments for a unit	A	B	C	D	E
A	B	C	D	E	r) Administering and scoring evaluative procedures and instruments for a lesson	A	B	C	D	E
A	B	C	D	E	s) Analyzing and using the results of evaluation procedures and instruments for a course	A	B	C	D	E
A	B	C	D	E	t) Analyzing and using results of evaluative procedures and instruments for a unit	A	B	C	D	E
A	B	C	D	E	u) Analyzing and using the results of evaluation procedures and instruments for a lesson	A	B	C	D	E
A	B	C	D	E	v) Systematic observation of the classroom performance of colleagues	A	B	C	D	E
A	B	C	D	E	w) Systematic "feedback" to colleagues about classroom performance	A	B	C	D	E

FORMAL MEETINGS ARE

1. Called by a professional staff member officially authorized to do so
or
2. Specifically arranged among colleagues for considering the problem areas listed below.

INFORMAL MEETINGS ARE

Situations in which you and one or more colleagues are informally involved in the tasks listed below.

FORMAL MEETINGS

A = NEVER = 1

B = ALMOST NEVER = 2

C = OCCASIONALLY = 3

D = FREQUENTLY = 4

E = ALWAYS = 5

INFORMAL MEETINGS

NEVER	ALMOST NEVER	OCCASIONALLY	FREQUENTLY	ALWAYS		NEVER	ALMOST NEVER	OCCASIONALLY	FREQUENTLY	ALWAYS
					x) Other (please specify)					
1 A	2 B	3 C	4 D	5 E	____________	1 A	2 B	3 C	4 D	5 E
A	B	C	D	E	____________	A	B	C	D	E
A	B	C	D	E	____________	A	B	C	D	E

How much time do you spend on activities other than scheduled classroom teaching, or homeroom or study hall duty?

a) Please report on all activities that are definitely assigned to you, whether you have assumed them voluntarily or under direction. Please answer as exactly as possible, neither exaggerating nor minimizing the facts. Include both the time that it actually takes to perform each service and the time for preparation and follow up.

b) Avoid duplication. If in doubt as to the item under which to report an activity, please specify the activity and report it under "other assignments." Report on each activity only once.

c) The time reported should be the average per week for the year.

If the activity is performed every week, report the time it usually takes each week.

If done only once every month, divide by four the time the activity requires in an average month.

If done once each semester, add the time for both semesters, and divide by the number of weeks in the school year.

If done once in the year, divide the time by the number of weeks in the school

A = 1
B = 2
C = 3
D = 4
E = 5

DEFINITELY ASSIGNED ACTIVITIES OTHER THAN SCHEDULED CLASSROOM TEACHING

OR HOMEROOM OR STUDY-HALL DUTY

Assigned Activity	Before School I					During School II					After School III					Availability of non-certified assistance IV				
	THIS ACTIVITY NOT ASSIGNED	0 - 1 HOURS (AVG./WEEK)	2 - 3 HOURS (AVG./WEEK)	4 - 5 HOURS (AVG./WEEK)	6 OR MORE HOURS (AVG./WEEK)	THIS ACTIVITY NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	THIS ACTIVITY NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	NON-CERTIFICATED ASSISTANCE IS AVAILABLE IN THE DESIRED AMOUNT	NON-CERTIFICATED ASSISTANCE IS AVAILABLE IN LESS THAN THE DESIRED AMOUNT.	NON-CERTIFICATED ASSISTANCE IS NOT AVAILABLE AND MUCH IS DESIRED	NON-CERTIFICATED ASSISTANCE IS NOT AVAILABLE AND SOME IS DESIRED.	NON-CERTIFICATED ASSISTANCE IS NOT AVAILABLE AND NONE IS DESIRED.
a) <u>Out of class instructional duties.</u> Activities related directly to the instruction of your pupils, including your homeroom group if you have one. The work covered by this item may not be as definitely assigned as are other items in the list by is made necessary by your teaching assignment. 1. Preparting learning materials, such as visual aids, study guides, displays, bulletin boards, laboratory materials, paints, models, seatwork.	A 1	B 2	C 3	D 4	E 5	A 1	B 2	C 3	D 4	E 5	A 1	B 2	C 3	D 4	E 5	1	2	3	4	5
2. Individual work with pupils outside of class (do not include scheduled counseling, listed below).	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
3. Conferences (or other contacts relating to your pupils) with parents, with other school personnel, or with community agencies.	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
4. Correcting homework and class tests.	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
5. Personal study and planning; other items related to instruction not covered in items 1 to 4.	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5

Assigned Activity	Before School I					During School II.					After School III					Availability of non-certified assistance IV				
A = 1 B = 2 C = 3 D = 4 E = 5 b) Miscellaneous other assignments 1. Counseling on definite sch.	ACTIVITY NOT ASSIGNED A 1	0 - 1 HOURS B 2	2 - 3 HOURS C 3	4 - 5 HOURS D 4	6 OR MORE HOURS E 5	ACT. NOT ASSIG. A 1	0 - 1 HOURS B 2	2 - 3 HOURS C 3	4 - 5 HOURS D 4	6 OR MORE HOURS E 5	ACT. NOT ASSIG. A 1	0 - 1 HOURS B 2	2 - 3 HOURS C 3	4 - 5 HOURS D 4	6 OR MORE HOURS E 5	AVAILABLE IN DES. AMOUNT 1	AVAILABLE IN LESS THAN DES. AMOUNT 2	NOT AVAILABLE MUCH DESIRED 3	NOT AVAILABLE SOME DESIRED 4	NOT AVAILABLE NONE DESIRED 5
2. Monitorial or managerial functions such as hall duty, luncheon duty, playground duty, traffic duty, bus duty	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
3. Activities related directly to official records and reports for your class or classes (such as report cards, attendance reports, class registers, health and dental records, tests in general testing programs, ordering and accounting for textbooks and supplies)	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
4. Other types of official records such as reports on professional study completed, personnel questionnaires	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
5. Administrative assignments within the school (such as responsibilities as grade chairmanship, chairman of schedule committee, handling supplies or textbooks for whole school, head teacher without a resident principal, first-aid chairman, responsibility for school testing program)	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5

Assigned Activity	Before School I					During School II					After School III					Avai… certi…	
A = 1 B = 2 C = 3 D = 4 E = 5	ACTIVITY NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASS.	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HRS.	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	AVAIL. IN DES. AMOUNT	AVAIL. IN LESS…
6. Assisting principal with office duties.	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2
7. Assemblies, commencement, etc. (planning and responsibility for)	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
8. School savings or banking; selling milk, collecting money for national community, or school funds, selling tickets	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
9. Faculty meetings with the principal, departmental meetings, curriculum committees, and other similar conferences	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
10. Coaching athletics (name the sport). Please report average per week for the whole year.																	
(a) Autumn Season	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(b) Winter Season	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(c) Spring Season	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2

Before School I					During School II					After School III					Availability of non-certified assistance IV				
ACTIVITY NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASS.	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HRS.	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	AVAIL. IN DES. AMOUNT	AVAIL. IN LESS THAN DES. AMT.	NOT AVAIL. MUCH DESIRED	NOT AVAILABLE SOME DESIRABLE	NOT AVAILABLE NONE DESIRED
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5					
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5

Assigned Activity	Before School I					During School II					After School III					Avai cert	
A = 1 B = 2 C = 3 D = 4 E = 5	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	AVAILABLE IN DES. AMOUNT	AVAILABLE IN LESS
11. Sponsorship of pupil organizations or activities (name them):																	
(a) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(b) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(c) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
12. Other assignments (name them):																	
(a) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(b) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2
(c) ____________	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2

1 ...ies	Before School I					During School II					After School III					Availability of non certified assistance IV				
	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	ACT. NOT ASSIGNED	0 - 1 HOURS	2 - 3 HOURS	4 - 5 HOURS	6 OR MORE HOURS	AVAILABLE IN DES. AMOUNT	AVAILABLE IN LESS THAN DESIRED AMT.	NOT AVAILABLE MUCH DESIRED	NOT AVAILABLE SOME DESIRED	NOT AVAILABLE NONE DESIRED
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5					
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	1	2	3	4	5

TABLE G2

FACULTY PROFILE QUESTIONNAIRE FOR SCHOOL A

Estimates of the average number of hours per week spent on activities other than scheduled classroom teaching, or homeroom, or study hall duty.

	Year a		Year b	
Number of teachers	57		54	
	Mean	Std. Dev.	Mean	Std. Dev.
Instructional, out of class				
During school hours	5.36	4.27	8.94	6.41
Outside school hours	12.29	8.30	10.40	8.70
TOTAL:	17.64	10.88	19.34	12.07
Other Assignments				
During school hours	3.80	3.56	4.90	4.61
Outside school hours	10.09	8.63	9.04	8.22
TOTAL:	13.90	10.82	13.94	10.72

TABLE G3

FACULTY PROFILE QUESTIONNAIRE FOR SCHOOL B

Estimates of the average number of hours per week spent on activities other than scheduled classroom teaching, or homeroom, or study hall duty.

	Year a		Year b	
Number of teachers	52		52	
	Mean	Std. Dev.	Mean	Std. Dev.
Instructional, out of class				
During school hours	4.26	4.20	6.92	6.57
Outside school hours	14.34	8.07	8.34	9.73
TOTAL:	18.60	10.14	15.26	14.12
Other Assignments				
During school hours	5.34	7.29	5.20	6.75
Outside school hours	9.91	11.92	6.64	6.08
TOTAL:	15.25	18.23	11.84	11.43

TABLE G4

FACULTY PROFILE QUESTIONNAIRE FOR SCHOOL C

Estimates of the average number of hours per week spent on activities other than scheduled classroom teaching, or homeroom, or study hall duty.

	Year a		Year b	
Number of teachers	52		52	
	Mean	Std. Dev.	Mean	Std. Dev.
Instructional, out of class				
During school hours	5.57	5.41	8.51	6.06
Outside school hours	10.66	7.69	8.20	5.94
TOTAL:	16.23	10.41	16.71	9.24
Other Assignments				
During school hours	3.66	6.00	6.73	7.87
Outside school hours	8.33	12.53	8.54	9.30
TOTAL:	11.99	18.04	15.28	15.28

TABLE G5

FACULTY PROFILE QUESTIONNAIRE FOR SCHOOL. D

Estimates of the average number of hours per week spent on activities other than scheduled classroom teaching, or homeroom, or study hall duty.

	Year a		Year b	
Number of teachers	110		112	
	Mean	Std. Dev.	Mean	Std. Dev.
Instructional, out of class				
During school hours	6.04	5.95	9.53	7.09
Outside school hours	13.32	9.48	12.08	9.24
TOTAL:	19.37	13.62	21.62	14.25
Other Assignments				
During school hours	6.21	9.07	4.88	7.45
Outside school hours	11.15	16.12	7.87	13.95
TOTAL:	17.36	23.38	12.76	20.05

TABLE G6

FACULTY PROFILE QUESTIONNAIRE FOR SCHOOL. E

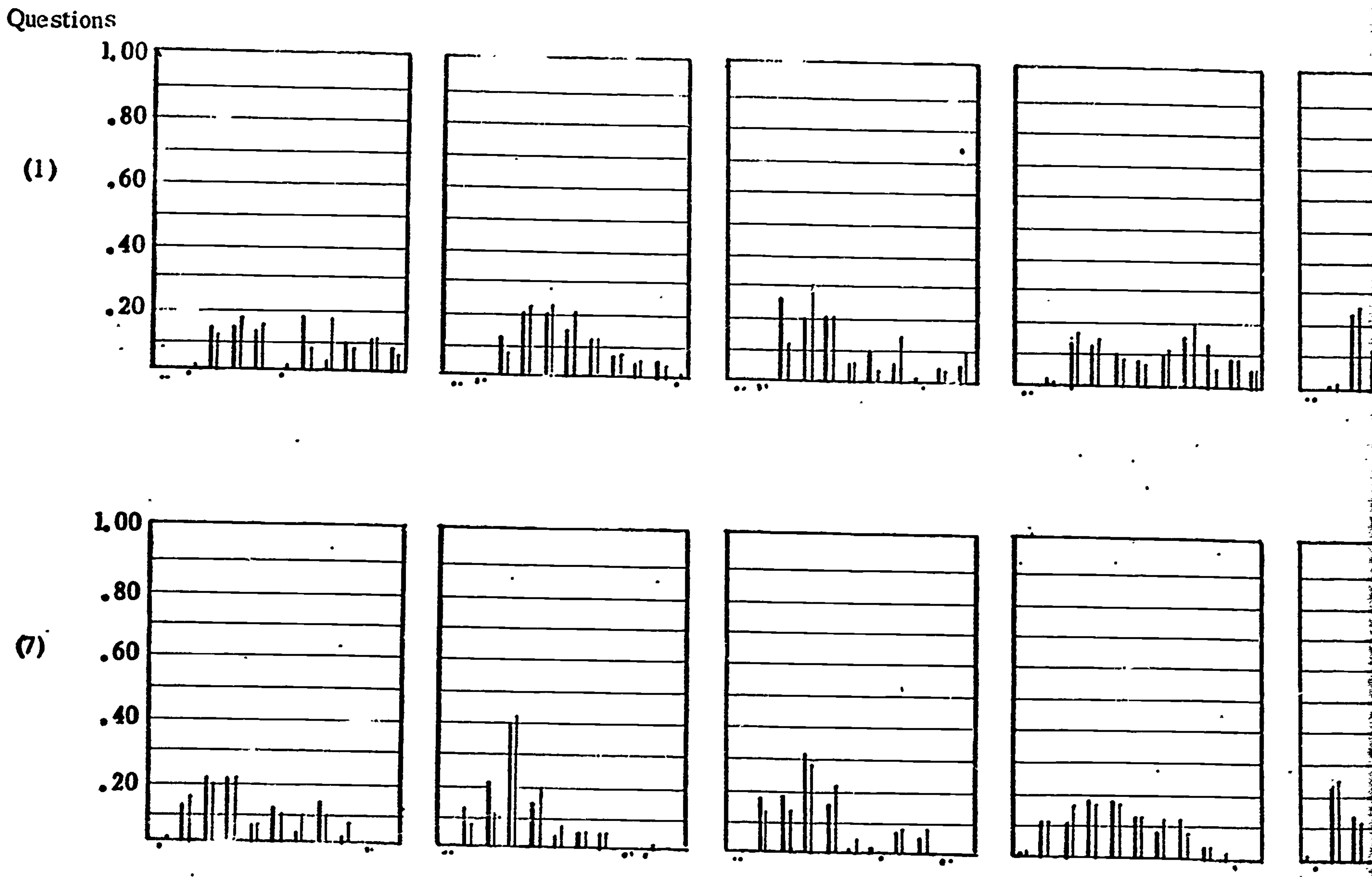
Estimates of the average number of hours per week spent on activities other than scheduled classroom teaching, or homeroom, or study hall duty.

	Year a		Year b	
Number of teachers	167		162	
	Mean	Std. Dev.	Mean	Std. Dev.
Instructional, out of class				
During school hours	4.81	4.23	7.13	5.86
Outside school hours	11.82	8.29	11.39	9.98
TOTAL:	16.63	10.55	18.52	14.20
Other Assignments				
During school hours	4.53	5.38	6.54	6.65
Outside school hours	8.52	9.07	9.05	11.94
TOTAL:	13.05	13.68	15.59	17.51

FIGURE G1

FACULTY PROFILE QUESTIONNAIRE

School :	A	B	C	D
N_a :	49	29	41	153
N_b :	45	46	47	147



FACULTY PROFILE QUESTIONNAIRE

B	C	D	E
29	41	153	116
46	47	147	105

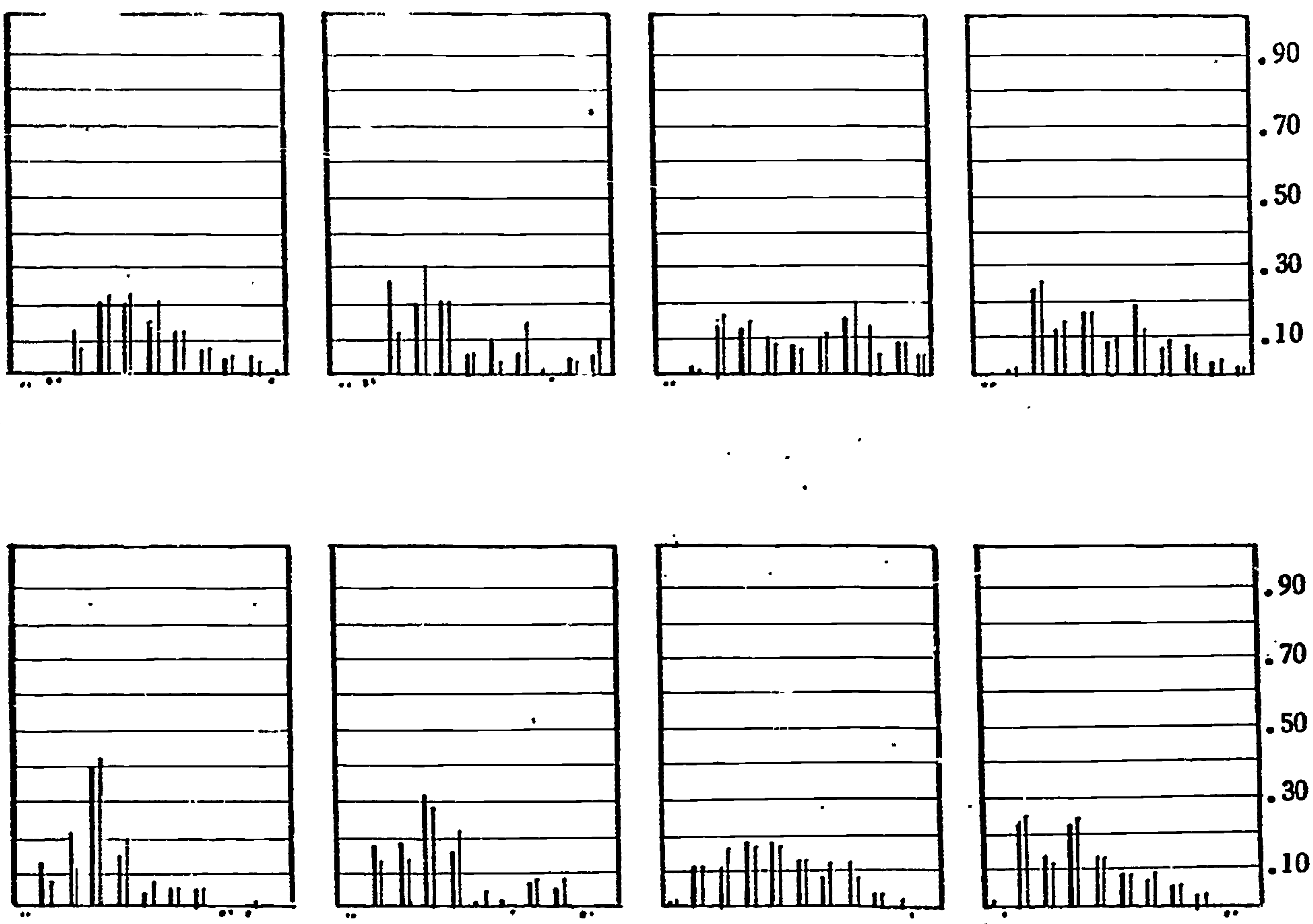


FIGURE . . . FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104

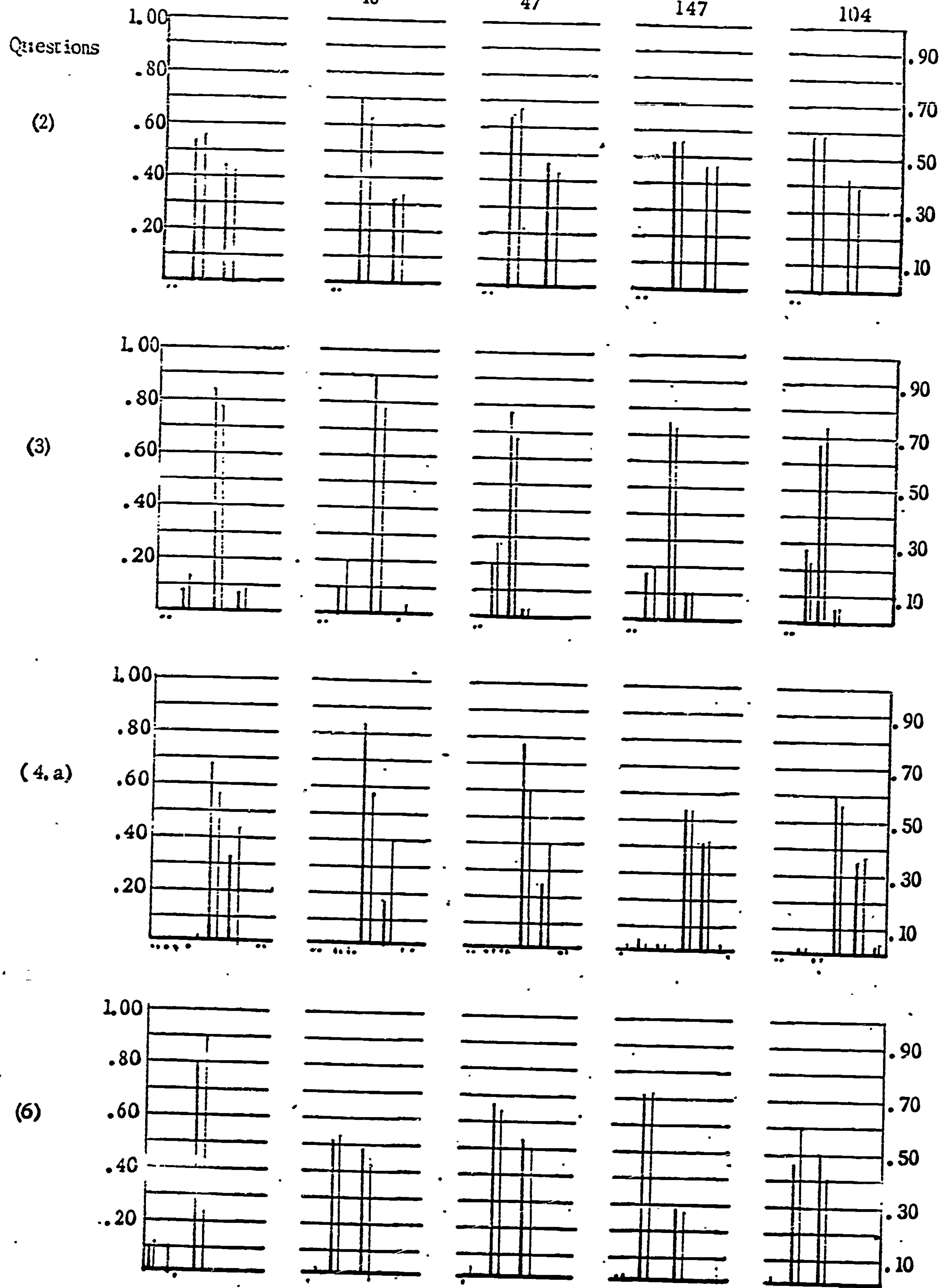


FIGURE G3 FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104

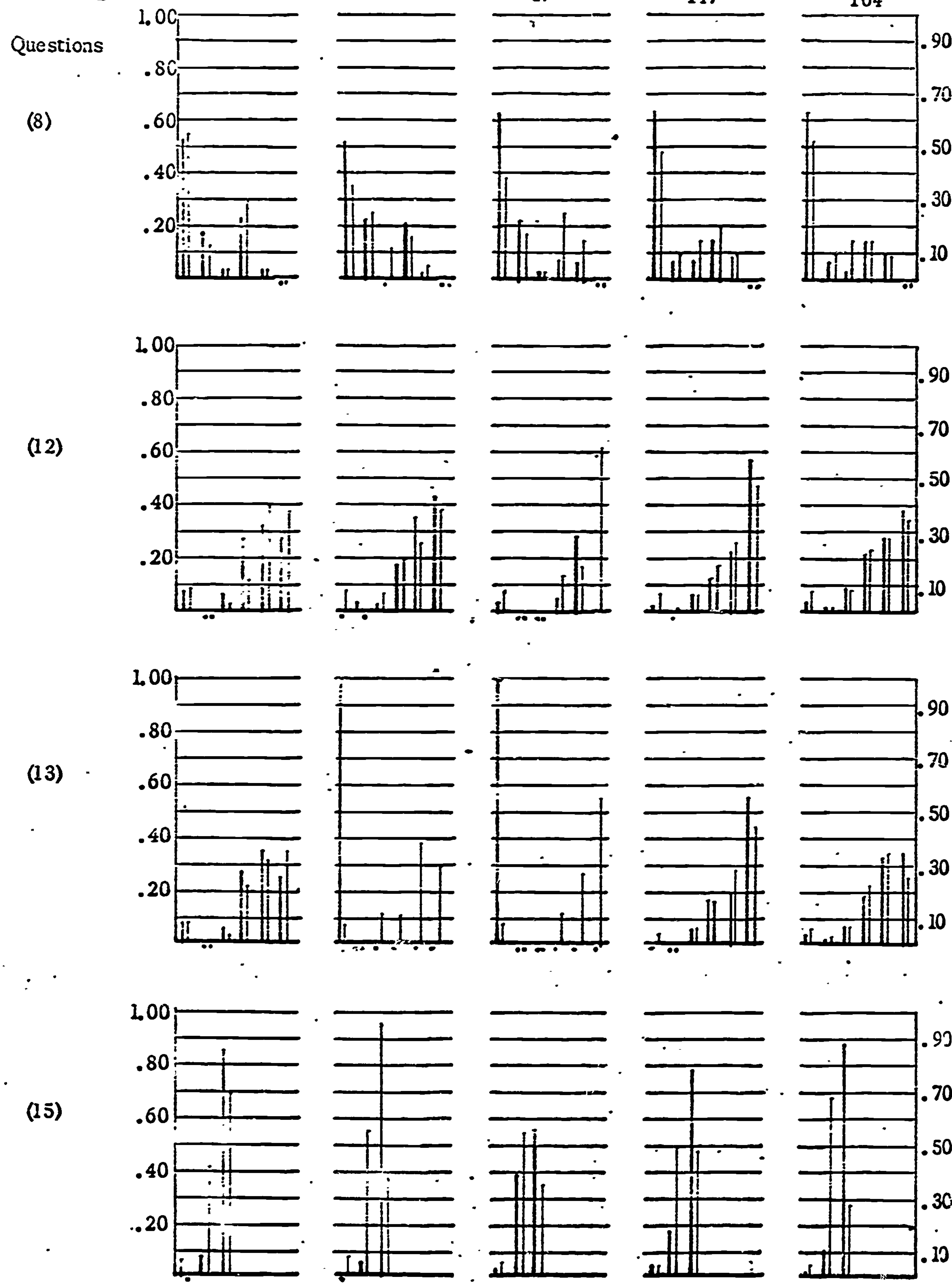


FIGURE G4 FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104

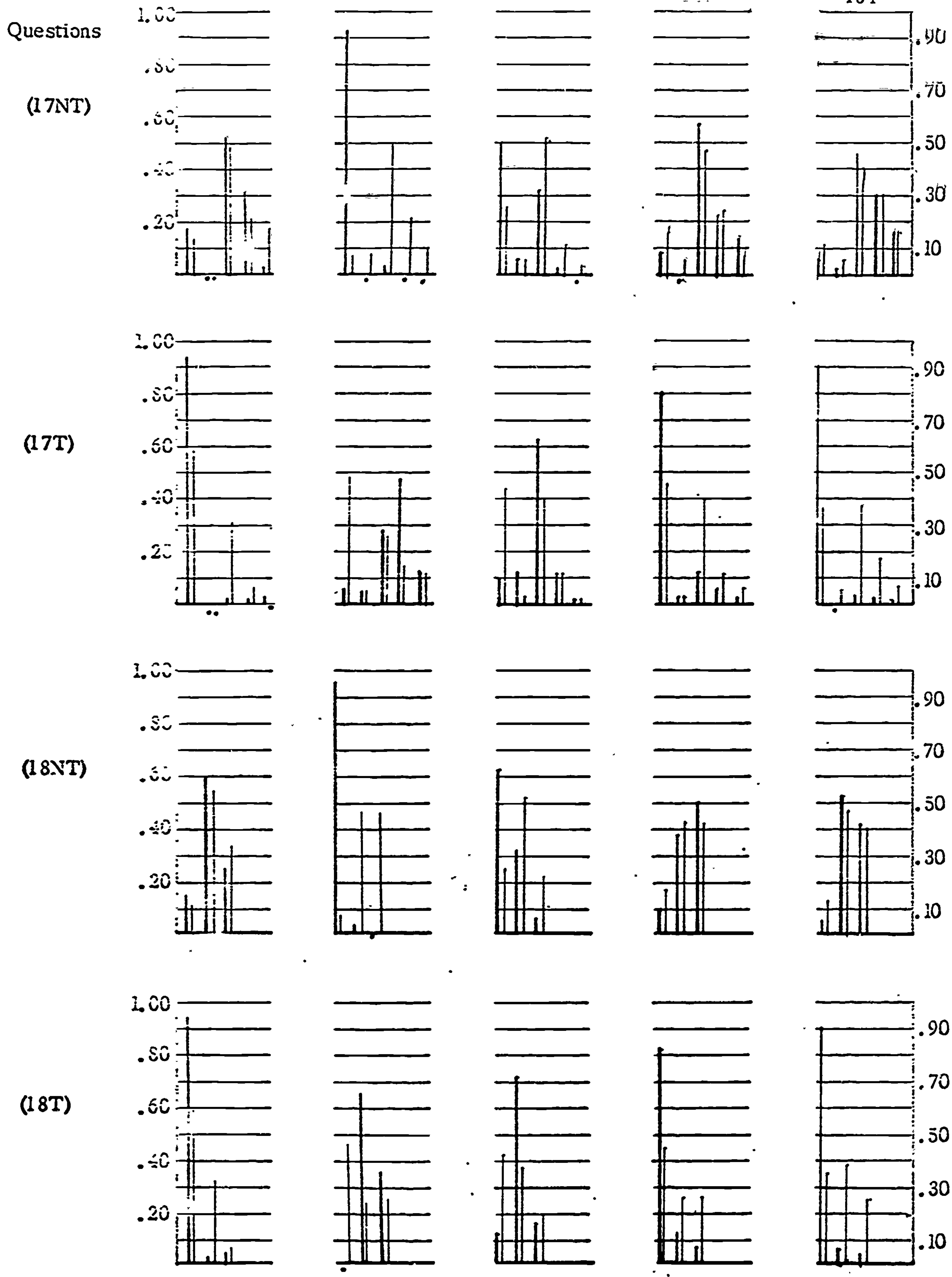


FIGURE G5 FACULTY PROFILE QUESTIONNAIRE

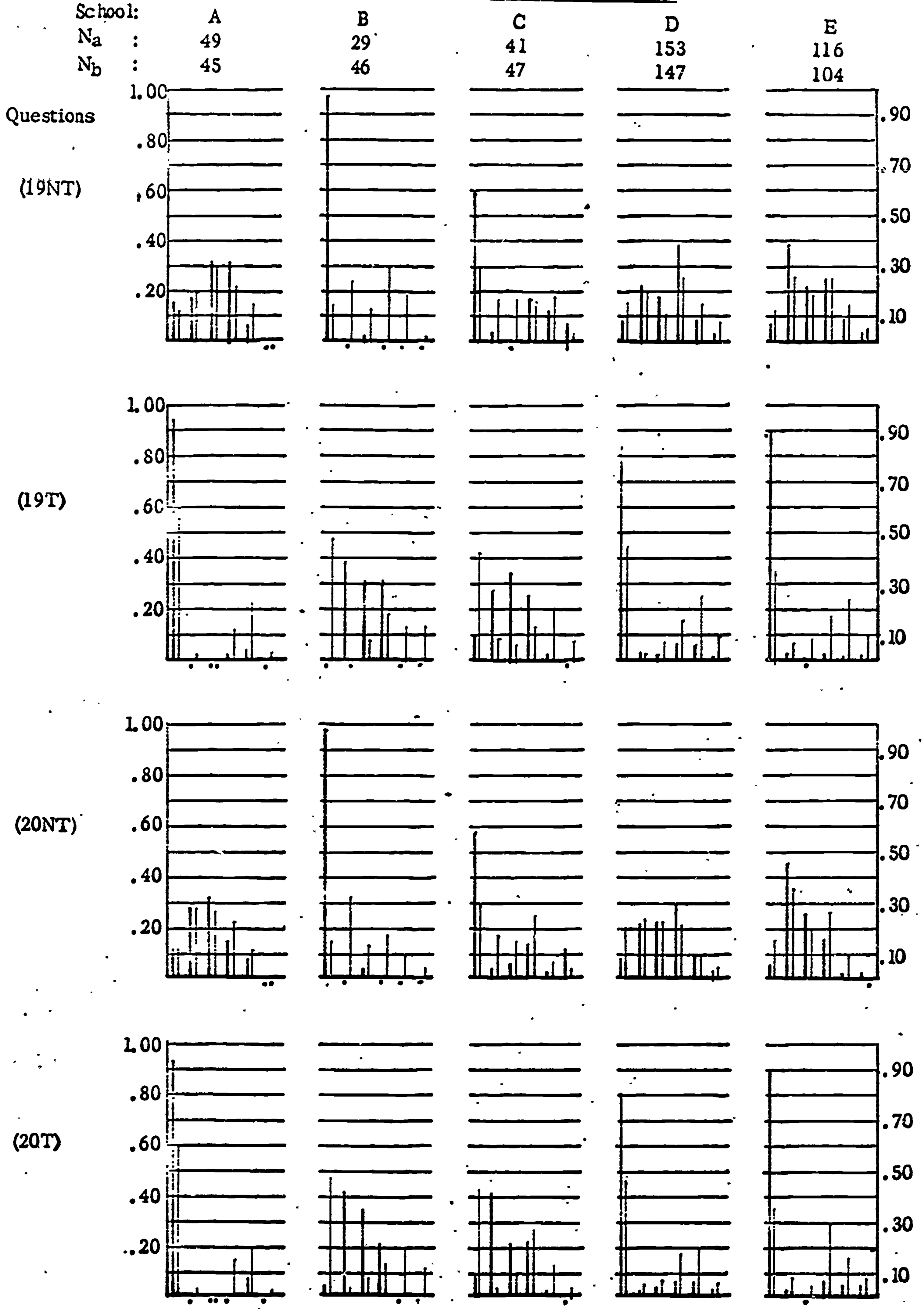


FIGURE G6 FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104

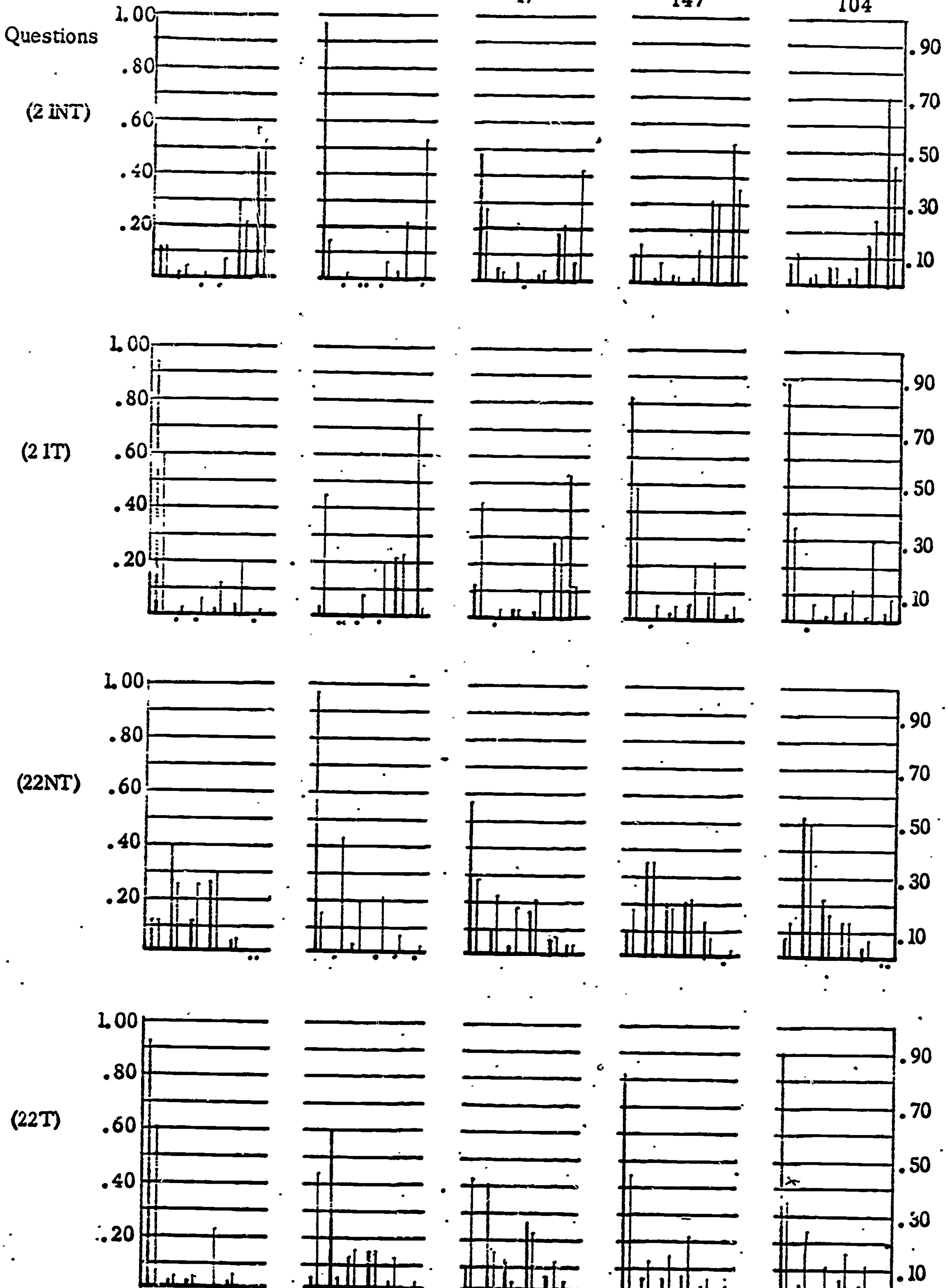


FIGURE G7 FACULTY PROFILE QUESTIONNAIRE

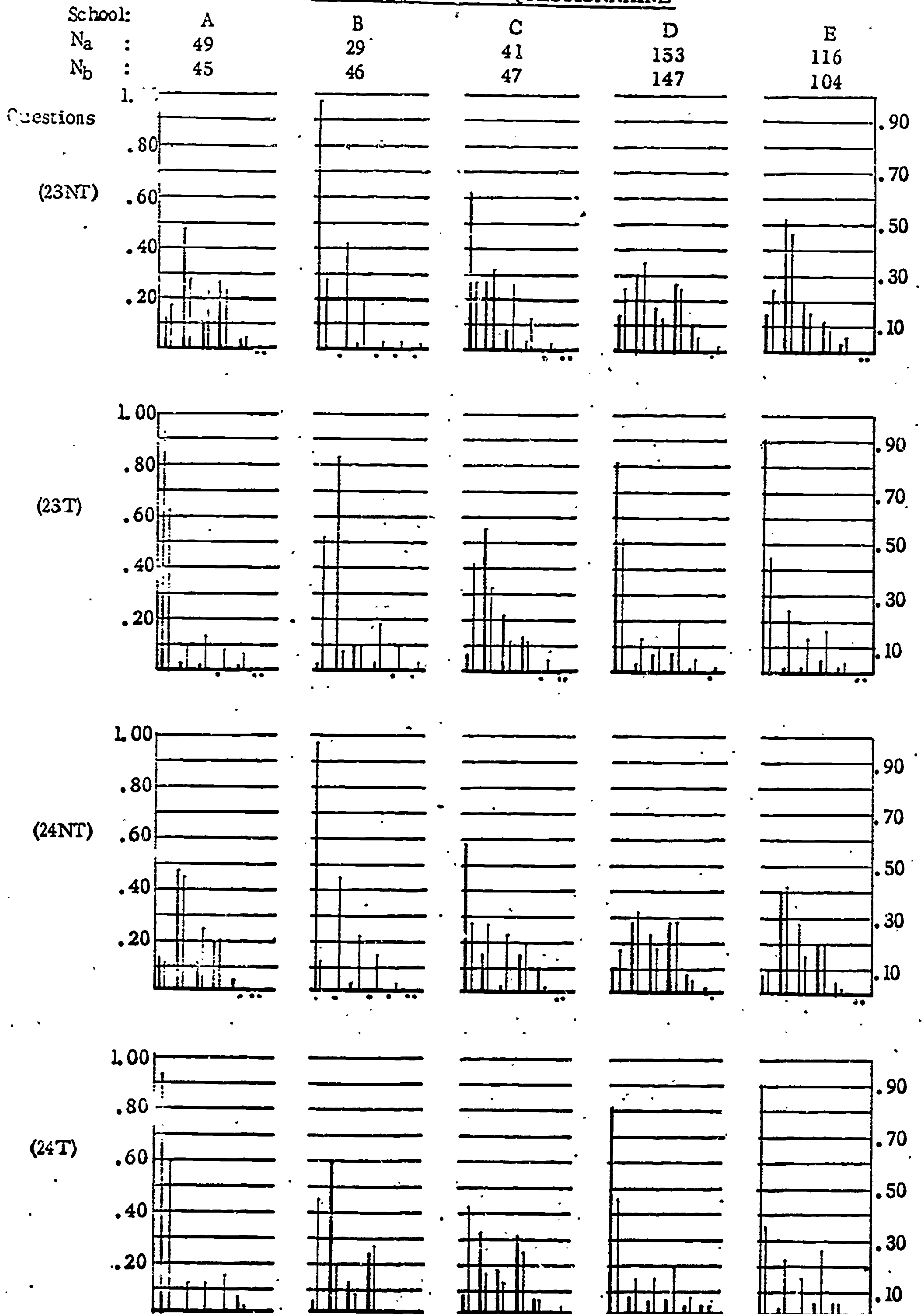


FIGURE G8 FACULTY PROFILE QUESTIONNAIRE

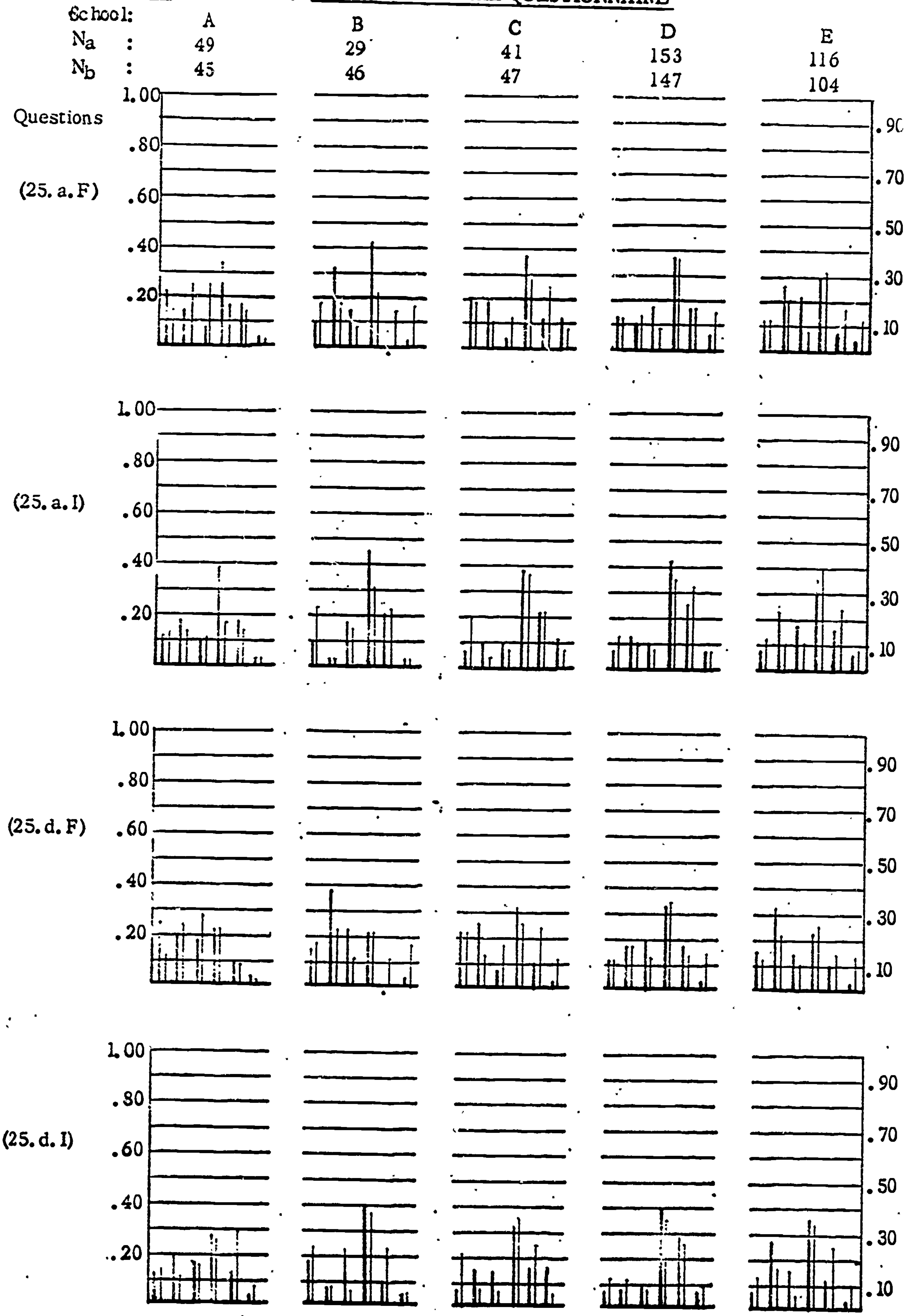


FIGURE G9 — FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104

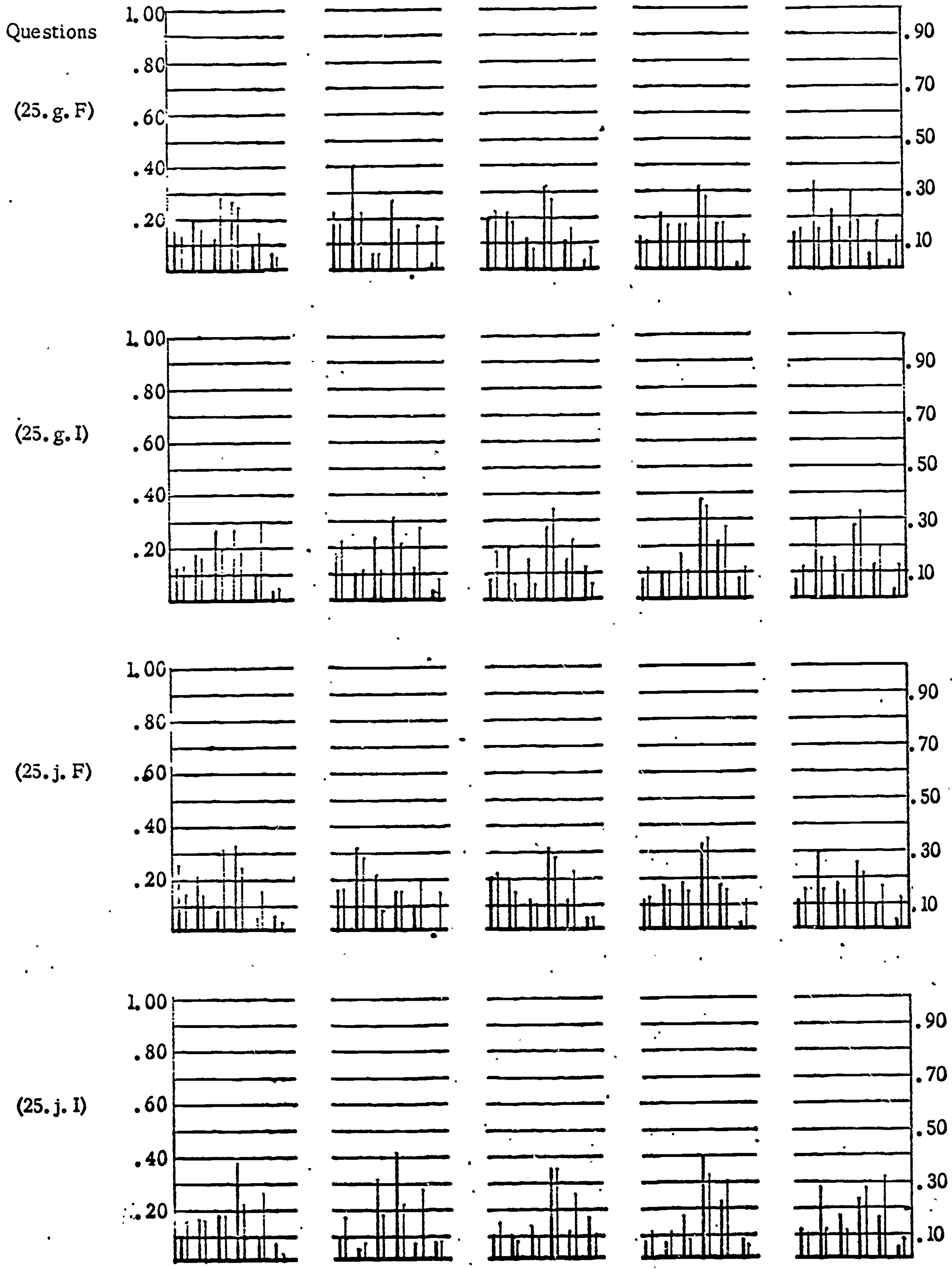
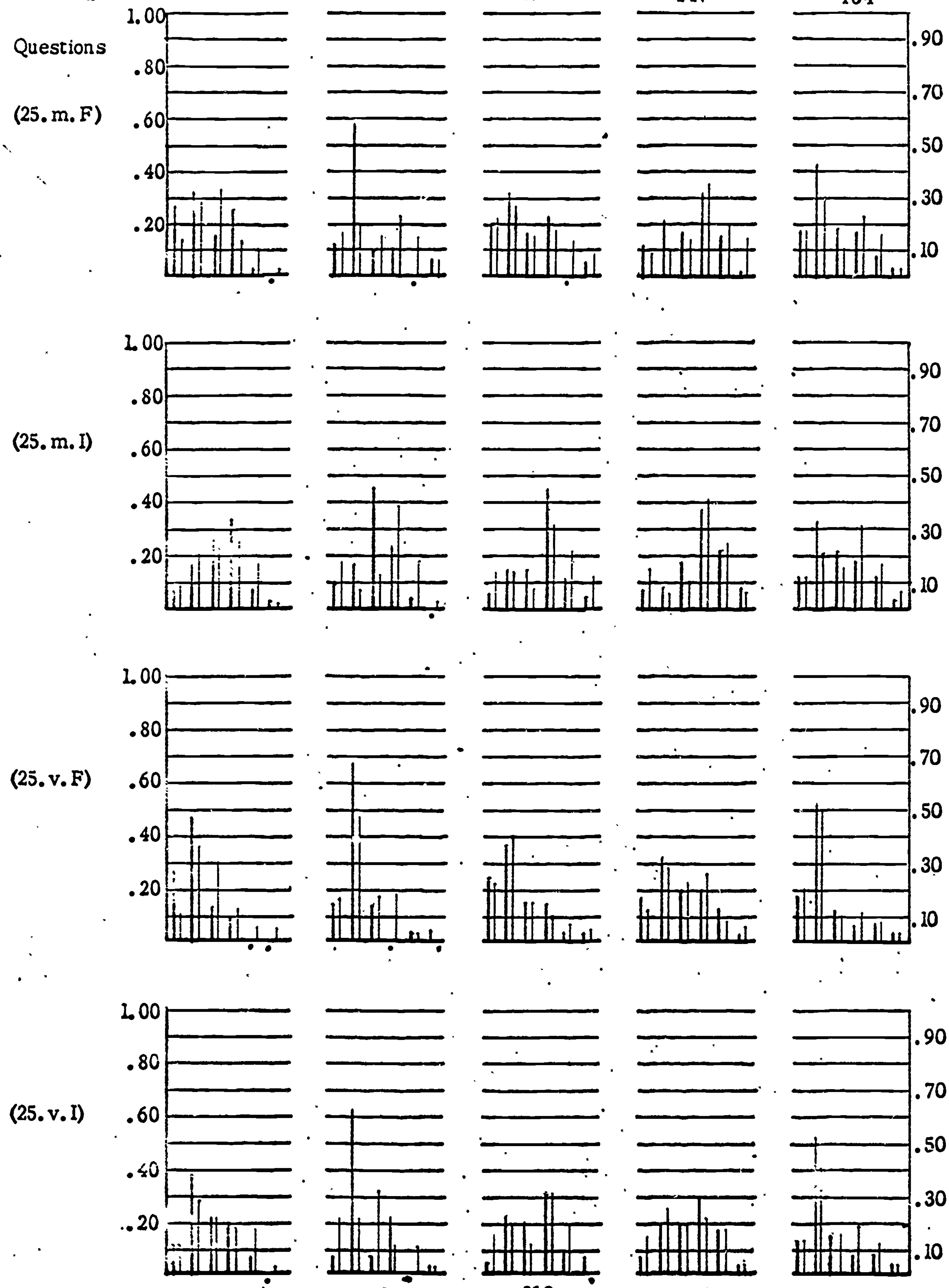


FIGURE G10 FACULTY PROFILE QUESTIONNAIRE

School:	A	B	C	D	E
N_a :	49	29	41	153	116
N_b :	45	46	47	147	104



APPENDIX H

RESPONSIBILITIES OF ADMINISTRATORS

Table H1 contains a cop` `the "Task/Time Administrator Interview" form. This form was ed to provide information concerning the amount of time de dministrators in planning educational programs with facult . One form was completed by each administrator once p y ring an interview with the school's consultant.

The "Scheduling Questionnaire," found in Table H2, was designed to provide information about amounts and percentages of time required for decisions and clerical details in schedule construction.

Obvious inaccuracies and inconsistencies in reporting and recording by administrators and consultants invalidated the data.

Table H3 contains a sample of Form B3 on which enrollment and attendance data were obtained.

Stanford University
School of Education

Voc. ' ' - Flex. Sched.
(F. ' Z 1)

TABLE H1

Date ____________

Name of School ____________

Interviewer ____________

Interviewee ____________

TASK/TIME ADMINISTRATOR INTERVIEW

This form is designed for completion during an interview with each school administrator. Please circle the number which best represents the interviewee's response.

1. With respect to planning the educational program (for example: deciding total offerings, course content and structure, grouping of students, and teacher assignments) on the average how frequently per month (before, during, and after school) do you meet with:

	0	1	2	3	4	4+*
The faculty as a whole	0	1	2	3	4	4+
Departments	0	1	2	3	4	4+
Department heads (or equivalents) as individuals	0	1	2	3	4	4+
Individual teachers	0	1	2	3	4	4+
Department heads (or equivalents) as a group	0	1	2	3	4	4+
Interdepartmental groups of teachers	0	1	2	3	4	4+
Central office personnel	0	1	2	3	4	4+
Own school's administrators	0	1	2	3	4	4+
Students	0	1	2	3	4	4+
School Board	0	1	2	3	4	4+
State and Federal Personnel	0	1	2	3	4	4+
Parents	0	1	2	3	4	4+
Counselors	0	1	2	3	4	4+
District Committees	0	1	2	3	4	4+
Service Clubs	0	1	2	3	4	4+

* 1 = once a month or less

2 = about twice a month

3 = about three times a month

4 = about four times a month

4+ = more than four times a month

2. On the average, how frequently do you work on school business at home?

_____ never

_____ one night a week

_____ two-to-three nights a week

_____ four-to-five nights a week

_____ more than five nights a week

3. On the average, how much of your weekend is taken up with school work?

_____ none

_____ very little

_____ some

_____ a great deal

4. On the average, how frequently are you contacted at home regarding school affairs?

_____ once a week or less

_____ two-to-four times a week

_____ five-to-ten times a week

_____ more than ten times a week

5. This question is designed to collect information regarding the types of activities carried out by the Administrator in various settings as he participated in the planning of the educational program.

After each setting on the left, check the activities that apply. Place a double check in the one box which represents the most frequently performed activity.

Activities / Meetings with:	School Board	Faculty as a whole	Departments	Department Heads as a group	Department Heads as individuals	Interdepartmental groups	Individual teachers	District curriculum groups	Central administrative staff	Own school's administrators	Counselors	Parents	Students	Service Clubs	State and Federal Agencies	School Board
a) Leads formal discussion of problems and ideas																
b) Informally discusses problems and ideas																
c) Arranges special programs involving outside resources																
d) Reviews and/or criticizes progress																
e) Provides evaluative evidence																
f) Recommends ideas																
g) Listens to & entertains ideas & proposals of other staff members																
h) Discusses implementation of programs & program ideas (including financing scheduling, staffing, etc.)																
i) Arbitrates on competing requests																
j) Establishes and assigns committees																
k) Alters assignments																
l) Collects data and information																
m) Obtaining resources																
n) Preparing proposals																

TABLE H2

Stanford University,
School of Education

Voc.Ed - Flex.Sched.
(Form E 2)

Name ______________________________

Position ______________________________

SCHEDULING QUESTIONNAIRE
(Part I)

This form is designed to collect data regarding (a) the total number of hours devoted to schedule construction, and (b) the percentage of this time spent on decision-making as opposed to supporting clerical activities. The form divides the overall scheduling operation into four phases: (I) Pre-planning, (II) Data collection, (III) Data analysis, and (IV) Schedule revision and refinement. Within each phase five categories of data are included: (i) courses, (ii) students, (iii) teachers, (iv) time, and (v) space. Examples of specific operations are listed under each category of data.

Phase I, PRE-PLANNING, encompasses decisions concerning the determination of course and design.

Phase II, DATA COLLECTION, encompasses decisions concerning what data to collect.

Phase III, DATA ANALYSIS, encompasses decisions concerning the question of how to incorporate the data into the construction of the initial schedule.

Phase IV, SCHEDULE REVISION AND REFINEMENTS, encompasses decisions concerning changes needed to update and improve the initial schedule.

DIRECTIONS: Write in the box labelled "Grand Total" (see last page, "Summary", of the Questionnaire) your estimate of the total number of hours you devoted to scheduling last year. Next, for each data category indicate, in the space provided, the percentage of total time devoted to (a) decision-making, and (b) supporting clerical activities. If you did not spend any time either making decisions or completing clerical activities in a given data category, enter zero (0) on the line for that category.

NOTE: To check the accuracy of your report, be sure that the total percentages listed on the summary page at the bottom of the columns for "Decision-making" and "Clerical Activities" together add up to 100%.

PHASE I - PRE-PLANNING

Directions. Write the percentage of total time spent constructing the entire schedule which you devoted to decision making and clerical activities in the appropriate columns labeled "Decision Making" and "Clerical Activities" for each of the five major categories of scheduling operations included in the PRE-PLANNING PHASE. Then, add these columns and write the percentage of total time devoted to decision making and clerical activity for the ENTIRE PRE-PLANNING PHASE. Note: The sub-total percentages for each of the four phases should be less than 100%. The sum of the sub-totals of the four phases should equal 100%.

Categories of Scheduling Operations	Decision Making % of time	Clerical Activities % of time
1. Course Data (for example: total number of course offerings for the coming year, grouping practices and procedures for each course, appropriate type of meetings for each course (e.g., conventional class size, large group, small group, independent study, laboratory, etc.), length of each course meeting, number of meetings per week for each course, calendar and procedure for publicizing and processing, information on course offerings)		
2. Student Data (for example: calendar and procedure for collecting and analyzing student data, procedures for grouping students, procedures for assigning students to courses and sections)		
3. Teacher Data (for example: number and qualifications of teachers required, teacher qualifications & competencies, procedures for assigning teachers to courses and sections, composition of teacher teams, procedures for assigning teachers to non-classroom & non-instructional activities)		
4. Time Data (for example: length of day, number of periods, length of periods)		
5. Space Data (for example: availability of rooms for courses -- general and special purposes		
SUB-TOTAL FOR PHASE I - PRE-PLANNING	_____ %	_____ %

PHASE II - DATA COLLECTION

Directions. Write the percentage of total time spent constructing the entire schedule which you devoted to decision making and clerical activities in the appropriate columns labeled "Decision Making" and "Clerical Activities" for each of the five major categories of scheduling operations included in the DATA-COLLECTION PHASE. Then, add these columns and write the percentage of total time devoted to decision making and clerical activity for the ENTIRE DATA COLLECTION PHASE. Note: The sub-total percentages for each of the four phases should be less than 100%. The sum of the sub-totals of the four phases should equal 100%.

Categories of Scheduling Operations	Decision Making % of time	Clerical Activities % of time
1. Course Data (for example: course enrollment tallies)		
2. Student Data (for example: student requests, parental requests, teacher recommendations re student placement and assignment)		
3. Teacher Data (for example: teacher requests and references, instructional and non-instructional assignments, department head recommendations re teacher assignments, counselor recommendations re teacher assignments, administrator recommendations re teacher assignments		
4. Time Data (for example: initial time conflict, resolution)		
5. Space Data (for example: room allocation for courses, assignment of rooms to teachers, initial room conflict, resolution		
SUB TOTAL FOR PHASE II - DATA COLLECTION	____%	____%

PHASE III - DATA ANALYSIS

Directions. Write the percentage of total time spent constructing the entire schedule which you devoted to decision making and clerical activities in the appropriate columns labeled "Decision Making" and "Clerical Activities" for each of the five major categories of scheduling operations included in the DATA ANALYSIS PHASE. Then add these columns and write the percentage of total time devoted to decision making and clerical activity for the ENTIRE DATA ANALYSIS PHASE. Note: The sub-total percentages for each of the four phases should be less than 100%. The sum of the sub-totals of the four phases should equal 100%.

Categories of Scheduling Operations	Decision Making % of time	Clerical Activities % of time
1. Course Data (number of sections for each course (S/T ratios), resolution of conflicts of courses, balancing section sizes, adding and dropping courses, preparation of trial schedule)		
2. Student Data (for example: assigning students to courses and sections, resolution of student conflicts, alternate course offerings for individual students, assignment of individual students to special courses, sections, teachers)		
3. Teacher Data (for example: initial teacher assignments, changes in teacher assignments, securing additional staff if needed, balancing teacher loads for size)		
4. Time Data (for example: initial time conflict, resolution)		
5. Space Data (for example: room allocation for courses, assignment of rooms to teachers, initial room conflict, resolution)		
SUB TOTAL FOR PHASE III - DATA ANALYSIS	____ %	____ %

PHASE IV - SCHEDULE REVISIONS AND REFINEMENTS

Directions. Write the percentage of total time spent constructing the entire schedule which you devoted to decision making and clerical activities in the appropriate columns labeled "Decision Making" and Clerical Activities" for each of the five major categories of scheduling operations included in the SCHEDULE REVISIONS AND REFINEMENTS PHASE. Then, add these columns and write the percentage of total time devoted to decision making and clerical activity for the ENTIRE SCHEDULE REVISIONS AND REFINEMENTS PHASE. Note. The sub-total percentages for each of the four phases should be less than 100%. The sum of the sub-totals of the four phases should equal 100%.

Categories of Scheduling Operations	Decision Making % of time	Clerical Activities % of time
1. Course Data (for example: altering no. of sections for each course (S/T ratios), re-balancing section sizes, adding and dropping courses, altering initial types of meetings for each course, altering length of course meetings, altering number of meetings per week for each course, preparation of trial schedule)		
2. Student Data (for example: re-assigning students because of enrollment change, course makeup, or transfer, resolving new student conflicts, assignment of students to alternative courses, assignment of individual students to special courses, sections)		
3. Teacher Data (for example: changes in initial teacher assignments, securing additional staff, if needed, deleting staff, balancing teacher loads for size and time)		
4. Time Data (for example: increasing or decreasing length of school day, increasing or decreasing number of periods in day, increasing or decreasing length of periods)		
5. Space Data (for example: reallocation of rooms)		
SUB TOTAL FOR PHASE IV - SCHEDULE REVISIONS AND REFINEMENTS	____%	____%

S U M M A R Y

Enter the sub-total percentages of time spent on decision making in the column labeled "Decision Making". Enter the sub-total percentages of time spent on supporting clerical activities in the column labeled "Clerical Activities".

Sub-totals	Decision Making		Clerical Activities		Percent
Phase I	______	+	______	=	______
Phase II	______	+	______	=	______
Phase III	______	+	______	=	______
Phase IV	______	+	______	=	______
TOTAL	______	+	______	=	100%

Enter below your estimate of the total number of hours you devoted to scheduling last year

GRAND TOTAL OF HOURS ____________

SCHEDULING QUESTIONNAIRE (Part II)

This form is designed to collect additional data regarding the decision-making process as it pertains to scheduling. For each category specified on the left, check the settings that apply. Place a double check in the one box which represents the most frequently used setting for each category.

Scheduling Phases and Categories	Meetings with Entire Faculty	Entire Department	Department Heads as a group	Inter-departmental groups	Departmental Heads as individuals	Individual Teachers	Principal	Other groups	Alone	Other (specify)	
I. Pre-planning Courses											
Students											
Teachers											
Time											
Space											
II. Data collection Courses											
Students											
Teachers											
Time											
Space											
III. Data analysis Courses											
Students											
Teachers											
Time											
Space											

Scheduling Questionnaire (Part II) continued

Scheduling Phases and Categories — Meetings with:	Entire Faculty	Entire Department	Department Heads as a group	Inter-departmental groups	Department Heads as individuals	Individual Teachers	Principal	Other groups	Alone	Other (specify	
IV. Revision and Refinements Courses											
Students											
Teachers											
Time											
Space											

TABLE H3

Stanford University,
School of Education

Voc.Ed. - Flex.Sched.
(Form B 3)

Date ______________________________

Name of School______________________

ATTENDANCE DATA

This form should be completed
by the School Attendance Officer.

1. The October 1 enrollment:

_____for the current school year; _____ for the previous school year

2. The enrollment as of the last day of school:

_____for the current school year; _____for the previous school year

3. The average daily attendance:

_____for the current school year to date _____ for the previous school year

4. What records are kept by the school regarding truancy and class-cutting? Please attach to this form some copies of these records.

5. Describe the method used to determine the number of students who are considered to be voluntary school drop-outs. Then give the drop-out figure for the previous school year, as well as for the present school year to date.

APPENDIX I

STUDENT ATTITUDES

To determine how successfully students adjust to the different environment resulting from modular scheduling, a study was made of student attitudes about school in general and about school tasks in particular. Eighteen relevant items were included which may be identified by reading the questionnaire in Table I 1.

The questionnaire was coded to give a value from one to four points for the responses to items 1 through 12. One represents a negative attitude and four represents a positive attitude toward the subject of the item. On items 13 to 18 a negative attitude was coded with a one and a positive attitude was coded with a two.

To compensate for "acquiescence response set", the tendency for some people to respond to a positive statement in a more positive way and a negative statement in a more negative way, parallel forms of the instrument were prepared and designated form A and form B. If a particular item on form A is stated positively the same item on form B is stated negatively. Items were randomly assigned to one of the two forms, giving each some negative statements and some positive statements.

The questionnaire was administered to students in the project schools during May of both project years two and three. Students whose last name begins with the letters A-K received form A. Students whose last name begins with the letters L-Z received form B. School F, a school which returned from their modular schedule to a traditional schedule on February 15 of year three did not complete questionnaires for year three.

The statistical procedure for evaluating the data was as follows. All of the form A data for the two years was combined into one group and all the form B data for the two years was combined into a second group. The data in these two groups were then processed to produce means, standard deviations, sums of squares, a cross product matrix, and a correlation matrix for each group. The N for the form A group was 11,318 responses while the N for the form B group was 11,376 responses. The correlation values for both groups were then averaged to create a correlation matrix for all the responses. To compensate for the slightly unequal "N" in both groups, a constant of .4988 was multiplied by each form A correlation coefficient and a constant of .5012 was multiplied by each form B correlation coefficient, with the two products then being added together to produce the averaged correlation matrix. This matrix may be found in table I- 2.

The resultant correlation matrix was then factor analyzed to discover what combinations of items on the questionnaire actually did relate to each other.

The factor analysis produced nine factors after rotation. The rotated factor matrix is found in table I- 3. The factor, its component items, and what the factor represents follow:

	Items	Name
Factor 1	14,15,18	Student feeling about school now compared to a year ago (Item 15, student learning, obviously relates to a students feeling about school)
Factor 2	2,3,4	Teacher Performance (Item 3, student learning in large groups, is felt to logicaly as well as mathematically relate to teacher performance, since large groups are generally teacher oriented, lecture type situations.
Factor 3	16,17	Courses which students like and which prepare them for jobs.
Factor 4	7,8	School (cleanliness and spirit)
Factor 5	11,12	Student assumption of responsibility for their own education and access to counseling.
Factor 6	13	Amount of homework vs. the previous year.
Factor 7	6,9,10	Student use of time. Noisy halls are considered more likely to result when students are not using their unscheduled time to get some work done. The type of student who is likely to create noise in the halls and not use unscheduled time is probably a student who has a serious problem budgeting his time, item 10.
Factor 8	1	Students being given responsibility
Factor 9	5	Student learning in small groups

The next step in analysis involved normalizing the form A and form B data. Normalized T scores were calculated for each response on each of the 18 form A items and each of the 18 form B items. The formulas used were as follows:

$$T_{j_A} = \frac{10(x_{j_A} - \mu_{j_A})}{\sigma_{j_A}} + 50$$

$$T_{j_B} = \frac{10(x_{j_B} - \mu_{j_B})}{\sigma_{j_B}} + 50$$

where j = the item on either form A or form B of the questionnaire.

T scores were calsulated so that the form A and form B scores might have the same scaling. The necessity for equivalent scaling was to equate discrepancies that might have occured because of acquiescence response set. We assumed that the distribution of responses on form A items was the same as for form B items. Because the groups were extremely large this seemed to be a safe assumption. It was further strengthened by the assignment of all form A questionnaires to students whose last names begin with the letters A-K and the form B questionnaires to students whose last names begin with the letters L-Z. This sampling technique should have produced the desired randomness needed for similar distributions.

The final analysis involved combining all form A and form B data for year two and all for A and form B data for year three so that a comparison might be made between the mean normalized T score for each factor cluster for year 2 and year 3. The formulas we used to calculate the mean normalized T score for a factor cluster are as follows.

<u>Combining 3 T Scores For A 3 Item Factor Cluster</u>

$$T_A = \frac{T_1 + T_2 + T_3}{\sqrt{3}} + 50\,(1 - \sqrt{3})$$

$$\sigma_{T_A} = \sqrt{\frac{\sigma_{T_1}^2 + \sigma_{T_2}^2 + \sigma_{T_3}^2}{3}}$$

T_A = the mean normalized T score for a 3 item factor cluster

σ_{T_A} = the standard deviation for a 3 item factor cluster

<u>Combining 2 T Scores for A 2 Item Factor Cluster</u>

$$T_B = \frac{T_1 + T_2}{\sqrt{2}} + 50(1 - \sqrt{2})$$

$$\sigma_{T_B} = \sqrt{\frac{\sigma_{T_1}^2 + \sigma_{T_2}^2}{2}}$$

T_B = the mean normalized T score for a 2 item factor cluster

σ_{T_B} = the standard deviation for a 2 item factor cluster

Combinations and comparisons were made for three groups of students. These were all students in the school, boys, and girls. We assumed that the responses reported by students in each of the two years were a reasonably accurate measure of the attitudes the students had at the time of measurement. We realize, however, that attitudes are subject to change. Any inference of change from year two to year three can only be made with the understanding that we are comparing attitudes on a particular day in May, 1967 with another particular day in May, 1968. The results of the calculations are reported in Table I- 4. The means are reported in normalized T scores, and the t-test for significance of the difference between two means is repor[illegible] [illegible]e have tested the null hypothesis and accepted any difference as being significant which meets the .05 level. A summary of those schools having a significant increase during their modular year, or during their traditional year, and which schools had a significant increase during year 2 or during year 3, as well as those schools which had a no significant change, is shown for each factor cluster in Table I-7.

Conclusions

With the possible exception of factor 4, where 5 schools showed increases and 5 showed decreases, there was no real tendency for decrease in average score on any factor for any school. Seven schools showed significant increases with respect to factor 1, eight with respect to factor 2, seven with respect to factor 5, five with respect to factor 7 and four with respect to factor 8. For each of these factors (1, 2, 5, 7, and 8) there was at most one school that showed a decrease in average score.

This suggests a general improvement in the students attitude toward school between years two and three in the schools studied. With respect to schools, this appears to be particularly true of schools A, D and E. With respect to these factors it appears that the student generally felt more positive in their attitudes relative to their liking for school, their perception of teacher performance, their assumption of responsibility for their own education, their use of time and in their receipt of responsibility.

Other conclusions are as follows:

1. There is strong evidence that students like their school better after entering modular scheduling. (Factor grouping 1)
   - Trad.-Modular Comparison: Schools D and E had a significantly greater mean standard while school A change was non-significant.
   - Modularly Scheduled: Schools B, H, I, J, and K had a significantly greater mean standard score while schools C, G, and L reported non-significant changes.
2. There is strong evidence that students view teacher performance in a more favorable way after entering modular scheduling. (Factor grouping 2)
   - Trad.-Modular Comparison: All schools, A, D, and E had a significantly higher mean standard score.
   - Modularly Scheduled: Schools G, H, J, and K reported a significant mean standard score increase, while school B reported a significant mean standard score decrease, and schools C, I, and L had a non significant change.

3. There is evidence that introduction of modular scheduling has no effect on the courses offered in the school as far as offering enough to prepare for jobs or for courses that students really like. How students view courses seems to be caused by something other than the type of scheduling. (Factor grouping 3)

   Trad.-Modular Comparison: School A students reported a significant mean standard score increase, while schools D and E reported no significant changes.

   Modularly Scheduled : School I reported a significant mean standard score increase while school C reported a mean standard score decrease and schools B, G, H, J, K, and L reported no significant changes.

4. The evidence indicates that student attitudes toward school spirit and school cleanliness decreases during the first year of modular scheduling, but increases appreciably in subsequent years. (Factor 4)

   Trad.-Modular Comparison: Schools, A, D, E reported a mean standard score decrease after going into modular scheduling.

   Modularly Scheduled: Schools H and L reported a mean standard score decrease while schools B, C, G, J, and K reported a mean standard score increase and school I reported no significant change.

5. There is strong evidence that students assume more responsibility for their own education and receive help from counselors after school begins modular scheduling. (Factor 5)

   Trad.-Modular Comparison: All schools, A, D, and E reported a significant increase.

   Modularly Scheduled: Schools C, H, J, and K reported a significant increase, school G reported a significant decrease and schools B, I, and L reported a non-significant change.

6. There were no distinguishable trends on amount of homework vs. a year ago. (Factor 6)

   Trad.-Modular Comparison: Schools A and E showed a significant increase, school D showed a non significant change.

   Modularly Scheduled: Schools C, I, and J showed a significant decrease, school K reported a significant increase and schools B, G, H, and L showed a non-significant change.

7. Students in schools making the transition from traditional to modular feel they use their time better, but this is not substantiated in schools which were always modularly scheduled. (Factor 7)

   Trad.-Modular Comparison: Schools A, D, and E showed a significant increase

   Modularly Scheduled: Schools B and H reported a significant increase; school J reported a significant decrease; schools C, G, I, K, and L reported a non-significant change.

8. Students in schools making the transition from traditional to modular scheduling feel they are receiving more responsibility. (Factor grouping 8)
   Trad.-Modular Comparison: Schools A, D, and E all report a mean standard score significant increase.
   Modularly Scheduled: Only school G maintains this feeling with a significant increase in mean standard score; schools B, C, H, I, J, K, and L report a non-significant change.

9. Students do not feel that they learn more in small groups.
   Trad.-Modular Comparison: Schools A, D, and E show a non significant change.
   Modularly Scheduled: Only school C shows a significant increase while schools B and G report a significant decrease. Schools H, I, J, K, and L report a non-significant change.

When separated by sex, essentially the same conclusions hold for girls, but there are variations for boys. Essential differences are as follows:

1. The evidence is not strong that boys like their school better after making the transition to modular scheduling. (Factor1)
2. There is evidence that schools making the transition from traditional to modular scheduling have boys who view teacher performance in a more favorable way, but the trend is not continued after the transition is made. (Factor 2)
3. The conclusion on assuming more responsibility is same only for the transition from traditional to modular scheduling, but does not continue with additional experiences with modular scheduling. (Factor 5)
4. The evidence is not as strong that boys in schools making the transition from traditional to modular feel they use their time better. Only schools A and D have a significant mean standard score increase. (Factor 7)

TABLE I 1

Form Q-1 (A)

STUDENT AND TEACHER QUESTIONNAIRE
YEAR 2 and 3

SCHOOL NAME ____________ DATE ____________

GRADE IN SCHOOL BOY ______

7 ______ 10 ______ GIRL ______

8 ______ 11 ______

9 ______ 12 ______

DID YOU ATTEND THIS SCHOOL LAST YEAR? YES ______ NO ______

The following questions are designed to provide information about how you feel about your school. Please answer all questions by checking the appropriate response.

1. Students at this school are given too little responsibility.

   _1_ Always
   _2_ Most of the time
   _3_ Some of the time
   _4_ Never

2. The teachers at this school really dislike teaching.

   _1_ Always
   _2_ Most of the time
   _3_ Some of the time
   _4_ Never

3. Students learn very little when they meet in large groups of 50 or more students.

   _1_ Always
   _2_ Most of the time
   _3_ Some of the time
   _4_ Never

4. Teachers have too little time to spend with students.

   _1_ Always
   _2_ Most of the time
   _3_ Some of the time
   _4_ Never

5. Students learn a great deal when they meet in small groups of less than 20 students.

4 Always

3 Most of the time

2 Some of the time

1 Never

6. Students tend to waste their unscheduled time and really get very little work done.

1 Always

2 Most of the time

3 Some of the time

4 Never

7. Our school is not kept clean enough.

1 Always

2 Most of the time

3 Some of the time

4 Never

8. School spirit at this school is high.

4 Always

3 Most of the time

2 Some of the time

1 Never

9. The halls are quiet.

4 Always

3 Most of the time

2 Some of the time

1 Never

10. Students have no problem budgeting their time.

4 Always

3 Most of the time

2 Some of the time

1 Never

11. Counselors have plenty of time to spend with students.

4 Always

3 Most of the time

2 Some of the time

1 Never

12. Students should take responsibility for their own education.

4 Always

3 Most of the time

2 Some of the time

1 Never

Answer the following questions by checking either "yes" or "no".

	YES	NO
13. The amount of homework is less than it was a year ago.	2	1
14. This school is worse than it was a year ago.	1	2
15. Students are learning more this year than they did a year ago.	2	1
16. This school needs more courses to prepare students for jobs when they graduate.	1	2
17. This school needs more courses that students enjoy [illegible]ng.	1	2
18. I like school better this year than last year.	2	1

NOTE: These scores represent the value given to each response for each questionnaire item. The higher the value for each response the more that response is thought to reflect an attitude favorable to the topic of the item.

Form Q-1 (B)

STUDENT AND TEACHER QUESTIONNAIRE
YEAR 2 and 3

SCHOOL NAME ______________ DATE ______________

GRADE IN SCHOOL BOY ______

7 ______ 10 ______ GIRL ______

8 ______ 11 ______

9 ______ 12 ______

DID YOU ATTEND THIS SCHOOL LAST YEAR? YES ______ NO ______

The following questions are designed to provide information about how you feel about your school. Please answer all questions by checking the appropriate response.

1. Students at this school are given too much responsibility.

__4__ Always

__3__ Most of the time

__2__ Some of the time

__1__ Never

2. The teachers at this school really enjoy teaching.

__4__ Always

__3__ Most of the time

__2__ Some of the time

__1__ Never

3. Students learn a great deal when they meet in large groups of 50 or more students.

__4__ Always

__3__ Most of the time

__2__ Some of the time

__1__ Never

4. Teachers have plenty of time to spend with students.

__4__ Always

__3__ Most of the time

__2__ Some of the time

__1__ Never

5. Students learn very little when they meet in small groups of less than 20 students.

1 Always

2 Most of the time

3 Some of the time

4 Never

6. Students take advantage of their unscheduled time and really get some work done.

4 Always

3 Most of the time

2 Some of the time

1 Never

7. Our school is kept very clean.

4 Always

3 Most of the time

2 Some of the time

1 Never

8. School spirit at this school is low.

1 Always

2 Most of the time

3 Some of the time

4 Never

9. The halls are noisy.

1 Always

2 Most of the time

3 Some of the time

4 Never

10. Students have a serious problem budgeting their time.

1 Always

2 Most of the time

3 Some of the time

4 Never

11. Counselors have too little time to spend with students.

1 Always

2 Most of the time

3 Some of the time

4 Never

12. Students should take responsibility for their own education.

4 Always

3 Most of the time

2 Some of the time

1 Never

Answer the following questions by checking either "yes" or "no".

	YES	NO
13. The amount of homework is greater than it was a year ago.	1	2
14. This school is a better school than it was a year ago.	2	1
15. Students are learning less this year than they did a year ago.	1	2
16. This school has enough courses to prepare students for jobs when they graduate.	2	1
17. This school offers the types of courses students really like to take.	2	1
18. I liked school better last year than this year.	1	2

NOTE: These scores represent the value given to each response for each questionnaire item. The higher the value for each response the more that response is thought to reflect an attitude favorable to the topic of the item.

AVERAGED CORRELATION COEFFICIENTS FOR STUDENT ATTITUDE

Variable	1	2	3	4	5	6	7
1	1.00000	0.06660	0.07240	0.09170	-0.05080	0.01180	0.01280
2		1.00000	0.15000	0.25370	0.10280	0.10130	0.16610
3			1.00000	0.23330	-0.09090	0.15990	0.04250
4				1.00000	0.02370	0.14030	0.11650
5.					1.00000	0.04020	0.04940
6						1.00000	0.13630
7							1.00000
8							
9							

Variable	10	11	12	13	14	15	16
10	1.00000	0.11290	0.01810	0.01870	0.06700	0.09280	0.03160
11		1.00000	0.10290	0.05220	0.11780	0.09370	0.08670
12			1.00000	0.01440	0.07900	0.07630	0.03220
13				1.00000	0.00570	0.00220	-0.00640
14					1.00000	0.33170	0.08190
15						1.00000	0.07750
16							1.00000
17							
18							

D CORRELATION COEFFICIENTS FOR STUDENT ATTITUDE QUESTIONAIRE

TABLE 12

Variable

3	4	5	6	7	8	9
0.07240	0.09170	-0.05080	0.01180	0.01280	0.02000	0.01450
0.15000	0.25370	0.10280	0.10130	0.16610	0.14490	0.09740
1.00000	0.23330	-0.09090	0.15990	0.04250	0.03440	0.11870
	1.00000	0.02370	0.14030	0.11650	0.08940	0.14980
		1.00000	0.04020	0.04940	0.10680	0.03630
			1.00000	0.13630	0.10690	0.18260
				1.00000	0.19840	0.13650
					1.00000	0.15790
						1.00000

12	13	14	15	16	17	18
0.01810	0.01870	0.06700	0.09280	0.03160	0.03890	0.05640
0.10290	0.05220	0.11780	0.09370	0.08670	0.09930	0.09630
1.00000	0.01440	0.07900	0.07630	0.03220	0.04620	0.06010
	1.00000	0.00570	0.00220	-0.00640	0.01590	0.07160
		1.00000	0.33170	0.08190	0.11540	0.32620
			1.00000	0.07750	0.09130	0.27130
				1.00000	0.34290	0.04300
					1.00000	0.07850
						1.00000

ROTATED FACTOR MATRIX

Variable	Factors 1	2	3	4	5	6	7
1	-0.02607	0.05463	0.02754	0.03710	0.01044	0.07433	-0.030
2	0.15033	0.58109*	0.08047	0.28320	-0.01711	0.08808	-0.142
3	0.11552	0.66329*	0.01014	-0.18358	0.01400	-0.12780	0.141
4	0.02764	0.67197*	0.07016	0.16470	0.18123	0.14148	0.074
5	0.06402	-0.07298	0.02290	0.08227	0.11907	0.05800	0.057
6	0.13060	0.33798	0.01828	-0.09583	-0.17802	-0.37698	0.498
7	0.01606	0.19495	0.07442	0.67529*	-0.13524	-0.12263	0.040
8	0.29821	-0.10498	0.02512	0.61836*	0.08351	-0.05354	0.197
9	0.06186	0.12474	-0.00801	0.19883	0.06133	-0.05025	0.634
10	0.03816	-0.08375	0.05373	0.03523	0.04009	0.16968	0.725
11	0.00707	0.22140	0.06990	0.38982	0.52782*	0.27896	0.180
12	0.09973	0.07819	0.01919	-0.17026	0.81291*	-0.17143	-0.012
13	0.06296	0.08938	-0.00547	-0.15469	-0.08575	0.83495*	0.050
14	0.72888*	0.06523	0.06338	0.17617	0.05930	-0.03630	0.018
15	0.68130*	0.12263	0.05455	0.03358	0.00136	-0.07803	0.096
16	0.03951	0.00245	0.82957*	0.03638	0.02736	-0.02967	0.012
17	0.07424	0.10040	0.79522*	0.05439	0.01342	0.02766	0.028
18	0.73017*	0.01727	0.01118	0.00655	0.02863	0.15728	0.014

NOTE: * = variable was selected for this factor.

ROTATED FACTOR MATRIX

Factors						
3	4	5	6	7	8	9
0.02754	0.03710	0.01044	0.07433	-0.03073	0.94902*	-0.03517
0.08047	0.28320	-0.01711	0.08808	-0.14276	-0.00623	0.31590
0.01014	-0.18358	0.01400	-0.12780	0.14142	0.04776	-0.25587
0.07016	0.16470	0.18123	0.14148	0.07471	0.03181	-0.03207
0.02290	0.08227	0.11907	0.05800	0.05707	-0.03728	0.85611*
0.01828	-0.09583	-0.17802	-0.37698	0.49801*	0.12140	0.23752
0.07442	0.67529*	-0.13524	-0.12263	0.04039	-0.03318	0.11471
0.02512	0.61836*	0.08351	-0.05354	0.19786	0.10445	0.01465
-0.00801	0.19883	0.06133	-0.05025	0.63412*	0.12919	-0.04468
0.05373	0.03523	0.04009	0.16968	0.72586*	-0.22742	0.04085
0.06990	0.38982	0.52782*	0.27896	0.18003	-0.05276	-0.14214
0.01919	-0.17026	0.81291*	-0.17143	-0.01256	0.03354	0.20490
-0.00547	-0.15469	-0.08575	0.83495*	0.05028	0.09114	0.09848
0.06338	0.17617	0.05930	-0.03630	0.01851	0.05535	-0.00596
0.05455	0.03358	0.00136	-0.07803	0.09663	-0.08584	0.08160
0.82957*	0.03638	0.02736	-0.02967	0.01295	0.01094	-0.01270
0.79522*	0.05439	0.01342	0.02766	0.02823	0.01273	0.04371
0.01118	0.00655	0.02863	0.15728	0.01419	0.00566	0.01159

for this factor.

TABLE I 3

TABLE I 4

ALL SCHOOL TOTALS

VARIABLE CLUSTERS

SCHOOL		1	2	3	4	5	6	7	8	9
A										
N = 731	Yr2 mean	51.220	49.000	44.635	58.734	49.183	48.251	48.398	48.654	49.517
N = 722	Yr3 mean	51.600	52.656	49.383	51.879	52.630	52.653	50.228	51.117	49.423
	t	0.596	5.980	7.905	-12.783	6.164	8.451	3.148	4.900	-0.185
D										
N =1783	Yr2 mean	50.331	43.659	52.599	56.335	47.735	48.973	48.855	48.594	52.023
N =1329	Yr3 mean	52.798	50.383	52.743	54.428	51.076	49.230	51.756	52.707	51.566
	t	5.671	16.563	0.372	-5.313	8.636	0.726	7.033	12.206	-1.295
E										
N= 2078	Yr2 mean	47.140	47.820	51.107	47.534	49.536	49.980	45.974	47.321	49.268
N= 1646	Yr3 mean	48.336	50.206	51.412	44.762	51.317	50.871	47.313	49.627	49.669
	t	2.825	6.214	0.856	-7.625	5.147	2.696	3.350	·7.090	1.142
********										
B										
N = 624	Yr2 mean	45.923	51.934	44.727	45.235	51.516	51.399	46.815	51.477	49.991
N = 527	Yr3 mean	51.330	49.865	45.307	49.134	50.890	51.432	50.709	51.572	49.036
	t	6.853	-2.903	0.849	6.373	-1.024	0.056	6.023	·0.162	-1.650
C										
N = 381	Yr2 mean	51.765	56.441	51.407	48.647	52.924	52.553	53.626	51.952	49.871
N = 439	Yr3 mean	51.485	56.028	49.875	49.926	54.443	51.199	54.561	51.794	51.318
	t	-0.333	-0.540	-1.791	1.805	2.369	-1.9[illegible]	1.345	-0.231	2.327
G										
N = 851	Yr2 mean	53.371	53.112	47.547	49.705	50.892	51.990	50.921	49.247	50.096
N = 887	Yr3 mean	53.287	54.927	47.992	51.083	48.922	52.611	51.756	50.598	48.990
	t	-0.158	3.302	0.827	3.053	·4.048	1.278	1.490	2.738	-2.282
H										
N= 1236	Yr2 mean	46.331	51.776	48.590	48.660	49.975	50.604	51.166	50.322	49.559
N= 1318	Yr3 mean	49.517	52.588	48.650	47.676	50.878	50.521	53.128	50.613	49.493
	t	5.609	1.782	0.121	-2.469	2.119	-0.200	4.764	0.732	-0.167
I										
N = 518	Yr2 mean	46.669	53.610	49.539	42.736	48.653	50.547	51.043	53.398	48.980
N = 519	Yr3 mean	48.341	52.811	51.186	43.605	48.191	48.670	51.403	52.885	49.566
	t	1.944	-1.068	·2.283	1.384	-0.721	-3.104	0.500	-0.828	0.960
J										
N= 1005	Yr2 mean	48.517	50.147	51.760	49.139	49.379	48.572	53.441	51.537	50.406
N= 1165	Yr3 mean	52.704	52.368	51.218	50.736	50.182	47.826	52.705	51.791	50.114
	t	7.694	3.315	-1.155	4.058	1.879	-1.849	-1.723	0.636	-0.750
K										
N= 1105	Yr2 mean	50.777	45.007	46.820	43.936	48.191	48.082	47.988	48.576	4[illegible].689
N= 769	Yr3 mean	52.286	48.592	46.336	48.914	49.476	50.052	48.196	47.899	49.911
	t	2.568	6.201	-0.859	9.389	2.611	4.295	0.363	-1.298	·0.436
L										
N = 125	Yr2 mean	47.819	46.910	45.269	53.916	48.730	48.826	47.624	48.647	47.204
N = 76	Yr3 mean	49.952	47.836	43.321	50.633	48.779	46.739	50.497	48.823	48.875
	t	0.984	·0.499	-1.056	-1.993	0.028	1.441	1.521	0.119	1.035

TABLE I 5

BOYS TOTAL

VARIABLE CLUSTERS

SCHOOL		1	2	3	4	5	6	7	8	9
A										
N = 364	Yr2 mean	50.594	48.645	44.704	57.947	49.272	48.844	47.193	48.254	49.111
N = 355	Yr3 mean	50.841	52.678	48.955	50.566	52.274	53.516	48.773	50.744	49.321
	t	0.261	4.467	4.962	-9.041	3.736	6.251	1.843	3.252	0.278
D										
N = 920	Yr2 mean	50.336	44.139	52.238	56.312	47.914	49.086	48.645	48.377	52.112
N = 696	Yr3 mean	53.139	50.293	52.567	54.357	50.945	49.755	51.570	52.099	51.877
	t	4.686	10.534	0.593	-3.731	5.541	1.353	4.911	7.648	-0.487
E										
N =1029	Yr2 mean	47.199	47.503	51.003	47.261	49.696	50.125	45.985	46.804	48.827
N = 784	Yr3 mean	48.346	50.035	50.951	44.962	51.016	50.891	47.001	49.844	49.396
	t	1.918	4.412	-0.099	-4.272	2.594	1.609	1.641	6.189	1.087
B										
N = 318	Yr2 mean	46.580	51.744	45.590	46.287	51.362	51.122	46.612	51.299	49.904
N = 279	Yr3 mean	51.668	48.979	46.223	49.351	50.458	50.773	50.869	51.052	48.351
	t	4.693	-2.702	0.685	3.538	-1.047	-0.420	4.404	-0.288	-1.921
C										
N = 198	Yr2 mean	51.895	55.742	50.154	48.748	54.089	53.033	53.302	51.144	51.159
N = 220	Yr3 mean	51.787	55.058	48.693	50.677	54.114	51.010	54.845	51.879	50.777
	t	-0.092	-0.616	-1.200	1.863	0.028	-2.054	1.484	0.766	-0.423
G										
N = 407	Yr2 mean	53.671	52.860	46.696	49.393	51.067	52.163	50.469	49.037	49.735
N = 491	Yr3 mean	53.958	54.385	47.535	50.655	49.092	52.596	50.950	50.015	49.298
	t	0.407	1.946	1.102	1.958	-2.838	0.637	0.595	1.386	-0.639
H										
N = 536	Yr2 mean	46.421	50.430	46.774	48.812	50.596	51.126	50.319	49.406	48.874
N = 570	Yr3 mean	49.521	53.364	50.041	47.938	50.737	50.059	53.314	50.979	50.033
	t	3.596	1.619	0.067	-1.884	0.717	0.005	3.975	1.133	-0.144
I										
N = 282	Yr2 mean	46.836	53.355	48.974	42.706	48.796	50.299	51.188	53.948	48.437
N = 270	Yr3 mean	47.778	52.010	50.172	43.314	48.758	48.611	50.857	52.748	49.490
	t	0.818	-1.249	1.202	0.677	-0.042	-2.046	-0.325	-1.397	1.241
J										
N = 533	Yr2 mean	49.381	51.688	51.916	49.279	49.963	49.257	52.511	51.444	50.115
N = 589	Yr3 mean	53.351	51.267	50.726	50.650	50.912	48.225	52.004	51.623	49.865
	t	5.330	-0.086	-1.785	2.405	1.550	-1.803	-0.795	0.316	-0.461
K										
N = 538	Yr2 mean	50.768	44.113	47.069	43.930	48.504	48.326	47.283	48.183	49.199
N = 401	Yr3 mean	51.996	49.049	46.619	48.142	49.636	49.973	47.386	48.240	49.521
	t	1.466	5.938	-0.557	6.035	1.606	2.527	0.123	0.076	0.439
L										
N = 64	Yr2 mean	47.652	46.316	43.978	52.396	49.868	50.677	46.500	50.174	49.214
N = 34	Yr3 mean	47.403	48.495	43.113	49.684	50.142	45.387	49.242	48.483	47.650
	t	-0.086	0.909	-0.352	-1.228	0.122	-2.665	1.079	-0.827	-0.760

TABLE I 6

GIRLS TOTAL

VARIABLE CLUSTERS

SCHOOL		1	2	3	4	5	6	7	8	9
A										
N = 367	Yr2 mean	51.842	49.352	44.567	59.515	49.095	47.663	49.592	49.050	49.920
N = 367	Yr3 mean	52.334	52.635	49.798	53.148	52.971	51.817	51.636	51.477	49.522
	t	0.576	3.969	6.206	-9.219	4.983	5.746	2.631	3.712	-0.576
D										
N = 863	Yr2 mean	50.325	43.147	52.983	56.359	47.545	48.852	49.079	48.826	51.928
N = 633	Yr3 mean	52.423	50.481	52.936	54.507	51.221	48.653	51.960	53.374	51.225
	t	3.310	13.079	-0.087	-3.804	6.725	-0.394	5.075	9.836	-1.364
E										
N =1049	Yr2 mean	47.082	48.132	51.209	47.802	49.379	49.837	45.964	47.828	49.701
N = 862	Yr3 mean	48.326	50.362	51.831	44.580	51.590	50.852	47.596	49.429	49.917
	t	2.076	4.341	1.266	-6.553	4.695	2.208	3.187	3.739	0.460
******************************										
B										
N = 306	Yr2 mean	45.241	52.131	43.829	44.141	51.675	51.686	47.026	51.662	50.082
N = 248	Yr3 mean	50.929	50.861	44.276	48.891	51.377	52.173	50.529	52.158	49.806
	t	4.963	-1.287	0.443	5.527	-0.345	0.564	4.124	0.612	-0.332
C										
N = 183	Yr2 mean	51.625	57.197	52.762	48.539	51.664	52.033	53.978	52.825	48.476
N = 219	Yr3 mean	51.181	57.002	51.063	49.172	54.774	51.289	54.276	51.708	51.862
	t	-0.365	-0.186	-1.427	0.657	3.433	-0.741	0.325	-1.146	4.016
G										
N = 444	Yr2 mean	53.095	53.343	48.327	49.991	50.731	51.831	51.337	49.440	50.427
N = 396	Yr3 mean	52.455	55.599	48.558	51.613	48.710	52.629	52.757	51.322	48.609
	t	-.805	2.916	0.303	2.560	-2.956	1.141	1.832	2.721	-2.634
H										
N = 700	Yr2 mean	46.262	52.806	49.981	48.773	49.499	50.205	51.814	51.024	50.083
N = 748	Yr3 mean	49.514	53.364	50.041	47.938	50.737	50.059	53.314	50.979	50.033
	t	4.303	0.940	0.092	-1.621	2.195	-0.266	2.815	-0.090	-0.099
I										
N = 236	Yr2 mean	46.469	53.195	50.214	42.772	48.481	50.844	50.869	52.740	49.628
N = 249	Yr3 mean	48.950	53.680	52.285	43.920	47.577	48.733	51.995	53.034	49.648
	t	1.923	-0.229	1.988	1.316	-0.997	-2.368	1.111	0.328	0.022
J										
N = 472	Yr2 mean	47.543	49.689	51.585	48.980	48.719	47.797	54.491	51.642	50.734
N = 576	Yr3 mean	52.043	53.127	51.721	50.823	49.434	47.417	53.421	51.962	50.370
	t	5.666	5.241	0.207	3.410	1.209	-0.671	-1.916	0.570	-0.655
K										
N = 567	Yr2 mean	50.786	45.856	46.584	43.941	47.894	47.851	48.656	48.949	50.153
N = 368	Yr3 mean	52.601	48.093	46.028	48.710	49.301	50.138	49.079	47.528	50.336
	t	2.201	2.790	-0.707	7.327	2.046	3.538	0.537	-1.971	0.258
L										
N = 61	Yr2 mean	47.994	47.533	46.675	55.511	47.536	47.884	48.804	47.044	45.096
N = 42	Yr3 mean	52.015	47.302	43.489	51.401	47.676	47.833	51.514	49.099	49.866
	t	1.253	-0.082	-1.121	-1.695	0.053	0.459	0.972	0.957	1.964

TABLE I 7

ALL STUDENTS

Trad. to Mod.	1	2	3	4	5	6	7	8	9
Sign. + Mod.	D E	A D E	A		A D E	A E	A D E	A D E	
Sign. + Trad.				A D E					
N. S.	A		D E			D			A D E
Modular									
Sign. + Yr. 2		B	C	H L	G	C I J	J		B G
Sign. + Yr. 3	BHIJK	GHJK	I	BCGJK	CHJK	K	BH	G	C
N. S	CGL	CIL	BGHJKL	I	BIL	BGHL	CGIKL	BCHIJKL	HIJKL

TABLE I 8

BOYS

Trad. to Mod.	1	2	3	4	5	6	7	8	9
Sign. + Mod.	D E	A D E	A		A D E	A	A D	A D E	
Sign. + Trad.				A D E					
N. S.	A		D E			D E	E		A D E
Modular									
Sign. + Yr. 2		B	J	H	G	CIJL			B
Sign. + Yr. 3	BHJ	GK		BCGJK		K	BH		
N. S.	CGIKL	CHIJL	BCGHIKL	IL	BCHIJKL	BGH	CGIJKL	BCGHIJKL	CGHIJKL

TABLE I 9

GIRLS

Trad. to Mod.	1	2	3	4	5	6	7	8	9
Sign. + Mod.	D E	A D E	A		A D E	A E	A D E	A D E	
Sign. + Trad.				A D E					
N. S.	A		D E			D			A D E
Modular									
Sign. + Yr. 2				L	G	I	J	K	G
Sign. + Yr. 3	BHIJK	GJK	I	BGJK	CHK	K	BGH	G	C
N. S.	CGL	BCHIL	BCGHJKL	CHI	BIJL	BCGHJL	CIKL	BCHIJL	BHIJKL

NOTE:

Sign. + Mod. = Significantly larger T score during the modular year.

Sign. + Trad. = Significantly larger T score during the traditional year.

Sign. + Yr. 2 = Significantly larger T score during year 2.

Sign. + Yr. 3 = Significantly larger T score during year 3.

TABLE I 10

SUMMARY OF STUDENT ATTITUDE CHANGES

SCHOOL	POSITION						CHANGE		
	ABOVE AVERAGE		AVERAGE		BELOW AVERAGE		INCREASE	NO CHANGE	DECREASE
	Yr. 2	Yr. 3	Yr. 2	Yr. 3	Yr. 2	Yr. 3			
A	2	6	1	3	6	0	6	2	1
D	3	7	1	1	5	1	5	3	1
E	1	3	1	3	7	3	6	2	1
B	4	4	1	2	4	3	3	4	2
C	7	7	1	2	1	0	3	4	2
G	5	5	2	1	1	3	3	4	2
H	4	5	2	0	3	4	4	4	1
I	3	4	2	1	4	4	3	5	1
J	3	5	2	2	4	1	4	3	2
K	1	1	1	3	7	5	5	4	0
L	1	0	0	6	8	3	0	8	1
FACTORS									
1	4	7	1	2	6	2	7	4	0
2	5	6	1	3	5	2	8	2	1
3	4	6	1	3	6	2	2	8	1
4	3	4	1	2	7	5	5	1	5
5	3	6	1	2	7	3	7	3	1
6	3	6	3	1	5	4	3	5	3
7	5	6	0	3	6	2	5	5	1
8	4	6	1	2	6	3	4	7	0
9	1	2	8	6	2	3	1	9	2

APPENDIX J

STUDENT WORK SURVEY

One specific hypothesis to be tested by the project was that students would be more adequately prepared for the world of work than at present. It was impractical to do a follow-up study on graduates from modularly scheduled schools, so a survey was conducted on students currently in school who were working in either part time or full time jobs after school hours. An instrument was developed to identify how the employer felt about 17 different aspects of the student employee's work. Each employer could respond to one of four possible answers on each item in the instrument. The answers were coded on a scale from 1 to 4, with 4 representing the most desirable response, and 1 representing the least desirable response.

The instrument was administered during project year two to students in eight schools (A, C, D, E, G, H, J, and L). These schools were contacted and asked to furnish a list of all students who were released from school on a work-study program, or who worked after school. Information concerning name of student, name of employer, year in school, type of business in which the student was employed, and the nature of the student's duties, was solicited. From each school's list, the names of 50 seniors and 50 underclassmen were randomly selected. Some of the schools participating did not contain that many students who were working. There was no distinction made between seniors and underclassmen in those schools. A coordinator in each school then interviewed the employers of each randomly selected student and secured answers for each item on the questionnaire.

The means and standard deviations were computed for the 17 items. These means and standard deviations were studied and it was decided to continue the study in those schools making the transition to a modular schedule. Schools A, D, and E were then sampled during project year 3, to provide comparisons between "before" and "after" modular scheduling.

The null hypothesis was stated that there would be no difference between a school's mean score for year 2 and mean score for year 3 on each of the 17 items of the questionnaire. All 17 items were summed to give a composite score of student employee performance. The null hypothesis was also used to test the difference between the year 2 and year 3 means of this composite score. The level of significance that was accepted was .05.

Data was processed to provide comparisons for the following groups: All students; all boys; all girls; all 12th graders; and all underclassmen. The results from each of the schools in each of the categories are shown in the following tables. Also shown is whether the school had a significant increase, significant decrease, or no significant change in the mean score from year 2 to year 3 for each item and for the composite score.

TABLE J 1

STUDENT SURVEY
INTERVIEW GUIDE

____
Name of School

____
Date

____
Name of Interviewer

Name of Employer ______________________________

Type of Business ______________________________

Name of Student ______________________________

Nature of Duties Performed ____________________

____

Name of Supervisor ______________________________

Duties of Supervisor ______________________________

Average Number of Hours Worked per Week __________

Total Number of Weeks Worked During School Year ____

Please check the appropriate box in each category which most closely represents the interviewee's estimate of the student's performance.

1. <u>Responsibility</u> This student:

- [4] accepts responsibility for tasks of all kinds without hesitation.
- [3] can usually be counted upon to accept responsibility for most tasks.
- [2] occasionally will accept responsibility.
- [1] will not accept responsibility under any conditions.

2. <u>Dependability</u> This student:

- [4] can be counted upon for an acceptable performance at all times.
- [3] can usually be counted upon for an acceptable performance.
- [2] requires supervision for an acceptable performance.
- [1] can not be counted upon for an acceptable performance under any conditions.

3. <u>Initiative</u> This student:

- [4] actively seeks tasks.
- [3] will initiate tasks and duties on occasion.
- [2] usually needs direction.
- [1] has no initiative and requires constant supervision.

4. <u>Quantity of Work</u> This student:

- [4] produces a work output far in excess of the minimum level expected of his position.
- [3] produces more work than is expected of his position
- [2] produces an acceptable output of work.
- [1] produces less than an acceptable output of work.

5. <u>Quality of Work</u>

- [4] The quality of this student's work is of the highest order.
- [3] The quality of this student's work is above average.
- [2] This student produces an acceptable quality of work.
- [1] The quality of this students work is unacceptable.

6. Ability to Learn — This student:

- [4] quickly grasps new concepts and techniques with a minimum of effort.
- [3] learns new material with a normal degree of effort.
- [2] has difficulty learning new material.
- [1] is unable to cope with unfamiliar material.

7. Response to Supervision — This student:

- [4] accepts direction and criticism from superiors without question.
- [3] shows little objection to directions by superiors.
- [2] accepts supervision, but prefers to be left alone.
- [1] resents supervision of any kind.

8. Judgment — This student:

- [4] always makes good decisions.
- [3] usually makes good decisions.
- [2] occasionally makes good decisions
- [1] never makes good decisions.

9. Courtesy — This student:

- [4] is courteous to all associates and clients at all times.
- [3] is usually courteous to those with whom he comes into contact.
- [2] is not especially courteous, but he does not offend anyone.
- [1] is tactless and offensive.

10. <u>Cooperation</u> This student:

4 gives unquestioned cooperation to all his associates at all times.

3 can usually be counted upon to cooperate with his associates.

2 shows some degree of resistance toward working with others.

1 actively resists any form of joint endeavor with any other persons.

11. <u>Relation to Co-workers</u> This student:

4 works with and is well-accepted by his co-workers.

3 has few problems in joint-efforts with co-workers.

2 has some difficulty in working with others.

1 is not accepted by and is unable to work with other co-workers.

12. <u>Ability to Follow Directions</u> This student:

4 effectively follows directions with no need for supervision.

3 is able to follow directions with occasional need for supervision.

2 requires constant supervision in order to complete his tasks.

1 is unable to follow directions with or without supervision.

13. Employee-employer relationship

4 This student's working relationship and respect for his employer are of the highest order.

3 This student has a good working relationship with his employer.

2 The relationship between this student and his employer has been acceptable, but has resulted in some problems.

1 The relationship between this student and his employer has been totally unacceptable.

14 Punctuality

This student:

4 has always been on time without exception.

3 is usually on time.

2 has had some degree of difficulty arriving on time.

1 is constantly late.

15. Attendance

This student:

4 is never absent.

3 is occasionally absent.

2 is frequently absent.

1 is always absent.

16. Appearance

4 This student's appearance is excellent at all times.

3 This student's appearance is usually presentable.

2 This student's appearance needs some attention.

1 This student's appearance is untidy and unacceptable at all times.

17. Relationship with clientele

This student:

[4] gets along extremely well with clientele at all times.

[3] is usually able to get along with clientele.

[2] has had some difficulty working with clientele.

[1] is unable to work with clientele under any conditions.

TABLE J 2

STUDENT WORK SURVEY

SUMMARY OF RESULTS — ALL STUDENTS SAMPLED

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Responsibility Sign. +: Sign. –: A N. S. : DE	$\bar{X}$ =	3.420	3.216	3.301	3.244	3.041	3.084
	S. D. =	.589	.668	.674	.547	.702	.767
	N =	81	74	133	90	98	95
Dependability Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	3.272	3.224	3.286	3.278	3.051	3.053
	S. D. =	.742	.741	.681	.581	.765	.790
	N =	81	76	133	90	98	95
Initiative Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	3.148	2.946	2.947	3.100	2.796	2.935
	S. D. =	.792	.842	.819	.704	.861	.791
	N =	81	74	133	90	98	93
Quantity of work Sign. +: D Sign. –: N. S. : AE	$\bar{X}$ =	2.457	2.493	2.724	2.956	2.612	2.684
	S. D. =	.708	.685	.853	.733	.782	.762
	N =	81	75	134	90	98	95
Quality of work Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	2.823	2.720	2.924	2.989	2.684	2.840
	S. D. =	.712	.798	.797	.666	.768	.693
	N =	79	75	132	89	98	94
Ability to learn on the job Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	3.370	3.270	3.289	3.299	3.133	3.048
	S. D. =	.580	.688	.584	.552	.741	.802
	N =	81	74	135	87	98	94
Response to supervision Sign. +: Sign. –: E N. S. : AD	$\bar{X}$ =	3.438	3.397	3.276	3.322	3.408	3.074
	S, D. =	.709	.740	.719	.619	.784	.765
	N =	80	73	134	87	98	94
Judgement Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	3.000	2.986	2.911	2.919	2.622	2.763
	S. D. =	.500	.608	.579	.466	.618	.615
	N =	81	74	135	86	98	93
Courtesy Sign. +: Sign. –: E N. S. : AD	$\bar{X}$ =	3.587	3.554	3.437	3.575	3.398	3.096
	S. D. =	.630	.665	.708	.583	.743	.791
	N =	80	74	135	87	98	94
Cooperation Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ =	3.444	3.303	3.227	3.360	3.235	3.054
	S. D. =	.570	.611	.637	.569	.715	.771
	N =	81	76	132	89	98	93

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Relation To co-workers	$\bar{X}$ =	3.556	3.526	3.354	3.404	3.500	3.118
Sign. +: Sign. -: E	S. D. =	.689	.757	.735	.598	.646	.819
N. S. : AD	N =	81	76	130	89	98	93
Ability to follow directions	$\bar{X}$ =	3.074	3.120	3.176	3.045	3.000	2.871
Sign. +: Sign. -:	S. D. =	.543	.492	.588	.424	.642	.679
N. S. : ADE	N =	81	75	131	89	98	93
Employee-Employer relations	$\bar{X}$ =	3.354	3.122	3.092	3.189	3.072	3.011
Sign. +: Sign. -:	S. D. =	.661	.721	.687	.685	.725	.779
N. S. : ADE	N =	79	74	130	90	97	95
Punctuality	$\bar{X}$ =	3.525	3.373	3.331	3.522	3.361	3.138
Sign. +: D Sign. -: E	S. D. =	.551	.632	.693	.657	.710	.727
N. S. : A	N =	80	75	133	90	97	94
Attendance	$\bar{X}$ =	3.646	3.592	3.466	3.711	3.330	3.200
Sign. +: D Sign. -:	S. D. =	.556	.575	.634	.503	.625	.752
N. S. : AE	N =	79	71	133	90	97	95
Appearance	$\bar{X}$ =	3.550	3.360	3.571	3.753	3.340	3.149
Sign. +: D Sign. -: E	S. D. =	.614	.671	.607	.459	.644	.687
N. S. : A	N =	80	75	133	89	97	94
Relationship with clientele	$\bar{X}$ =	3.550	3.521	3.526	3.589	3.351	3.228
Sign. +: Sign. -:	S. D. =	.634	.580	.584	.598	.678	.665
N. S. : ADE	N =	80	73	135	90	97	92
Summed scores for all items	$\bar{X}$ =	56.425	55.092	54.615	56.217	53.000	50.845
Sign. +: Sign. -:	S. D. =	7.069	7.907	9.183	7.991	8.684	9.904
N. S. : ADE	N =	73	65	117	83	96	84

THE LEVEL OF SIGNIFICANCE THAT HAS BEEN TESTED FOR IS .05

TABLE J 3

STUDENT WORK SURVEY

SUMMARY OF RESULTS — GRADES 10 - 11

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Responsibility Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.302	3.268	3.226	3.178	3.036	3.022
	S.D. =	.599	.633	.688	.535	.576	.774
	N =	43	41	62	45	28	46
Dependability Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.163	3.220	3.230	3.178	3.000	2.978
	S.D. =	.814	.690	.716	.576	.667	.856
	N =	43	41	61	45	28	46
Initiative Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.000	2.974	2.918	3.000	2.821	2.911
	S.D. =	.816	.873	.843	.674	.723	.821
	N =	43	39	61	45	28	45
Quantity of work Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	2.419	2.525	2.738	2.822	2.607	2.609
	S.D. =	.698	.679	.874	.747	.629	.745
	N =	43	40	61	45	28	46
Quality of work Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	2.881	2.625	2.847	2.889	2.750	2.711
	S.D. =	.772	.774	.827	.611	.645	.695
	N =	42	40	59	45	28	45
Ability to learn on the job Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.326	3.175	3.290	3.279	3.036	2.956
	S.D. =	.606	.712	.611	.504	.744	.796
	N =	43	40	62	43	28	45
Response to supervision Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.405	3.564	3.17[illegible]	3.256	3.286	2.978
	S.D. =	.665	.641	.758	.621	.854	.812
	N =	42	39	62	43	28	45
Judgement Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	2.884	2.875	2.903	2.929	2.536	2.667
	S.D. =	.498	.463	.670	.463	.508	.640
	N =	43	40	62	42	28	45
Courtesy Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.558	3.650	3.387	3.465	3.286	3.067
	S.D. =	.590	.622	.776	.631	.713	.809
	N =	43	40	62	43	28	45
Cooperation Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.488	3.293	3.115	3.267	3.179	3.000
	S.D. =	.592	.602	.661	.580	.723	.769
	N =	43	41	61	45	28	45

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Relation To co-workers Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.465 .735 43	3.512 .675 41	3.322 .797 59	3.333 .603 45	3.250 .752 28	3.000 .905 45
Ability to follow directions Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.023 .597 43	3.150 .427 40	3.117 .613 60	2.978 .398 45	2.964 .576 28	2.800 .786 45
Employee-Employer relations Sign. +: Sign. -: A N. S. : DE	$\bar{X}$ = S. D. = N =	3.333 .650 42	3.000 .679 40	3.067 .710 60	3.044 .673 45	3.000 .667 28	3.043 .729 46
Punctuality Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.465 .550 43	3.317 .650 41	3.258 .745 62	3.444 .659 45	3.179 .723 28	3.111 .714 45
Attendance Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.738 .544 42	3.605 .595 38	3.419 .714 62	3.667 .522 45	3.286 .600 28	3.109 .795 46
Appearance Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.395 .695 43	3.317 .650 41	3.484 .695 62	3.667 .522 45	3.286 .535 28	3.130 .718 46
Relationship with clientele Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.500 .634 42	3.564 .552 39	3.484 .620 62	3.511 .589 45	3.296 .669 27	3.174 .643 46
Summed scores for all items Sign. +: Sign. -: N. S. : ADE	$\bar{X}$ = S. D. = N =	55.342 7.535 38	54.889 7.551 36	53.407 10.042 54	55.095 8.186 42	51.852 7.744 27	49.738 10.350 42

THE LEVEL OF SIGNIFICANCE THAT HAS BEEN TESTED FOR IS .05

TABLE J 4 **STUDENT WORK SURVEY**

SUMMARY OF RESULTS — GRADE 12

		SCHOOL					
		A		D		E	
		Traditional	**Modular**	**Traditional**	**Modular**	**Traditional**	**Modular**
Responsibility Sign. +: Sign. –: A N. S. : DE	$\bar{X}$ = S. D. = N =	3.553 .555 38	3.152 .712 33	3.366 .660 71	3.311 .557 45	3.043 .751 70	3.143 .764 49
Dependability Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.395 .638 38	3.229 .808 35	3.333 .650 72	3.378 .576 45	3.071 .804 70	3.122 .726 49
Initiative Sign. +: Sign. –: A N. S. : DE	$\bar{X}$ = S. D. = N =	3.316 .739 38	2.914 .818 35	2.972 .804 72	3.200 .726 45	2.786 .915 70	2.958 .771 48
Quantity of work Sign. +: D Sign. –: N. S. : AE	$\bar{X}$ = S. D. = N =	2.500 .726 38	2.457 .701 35	2.712 .841 73	3.089 .701 45	2.614 .839 70	2.755 .778 49
Quality of work Sign. +: E Sign. –: N. S. : AD	$\bar{X}$ = S. D. = N =	2.757 .641 37	2.829 .822 35	2.986 .773 73	3.091 .709 44	2.657 .814 70	2.959 .676 49
Ability to learn on the job Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.421 .552 38	3.382 .652 34	3.288 .565 73	3.318 .601 44	3.171 .742 70	3.122 .807 49
Response to supervision Sign. +: Sign. –: E N. S. : AD	$\bar{X}$ = S. D. = N =	3.474 .762 38	3.206 .808 34	3.361 .678 72	3.386 .618 44	3.457 .755 70	3.163 .717 49
Judgement Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.132 .475 38	3.118 .729 34	2.918 .493 73	2.909 .473 44	2.657 .657 70	2.854 .583 48
Courtesy Sign. +: Sign. –: E N. S. : AD	$\bar{X}$ = S. D. = N =	3.622 .681 37	3.441 .70[illegible] 34	3.479 .648 73	3.682 .518 44	3.443 .754 70	3.122 .781 49
Cooperation Sign. +: Sign. –: N. S. : ADE	$\bar{X}$ = S. D. = N =	3.395 .547 38	3.314 .631 35	3.324 .604 71	3.455 .548 44	3.257 .716 70	3.104 .778 48

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Relation To co-workers	$\overline{X}$ =	3.658	3.543	3.380	3.477	3.600	3.229
Sign. +: Sign. -: E	S.D. =	.627	.852	.684	.590	.575	.722
N.S.: AD	N =	38	35	71	44	70	48
Ability to follow directions	$\overline{X}$ =	3.132	3.086	3.225	3.114	3.014	2.937
Sign. +: Sign. -:	S.D. =	.475	.562	.566	.443	.670	.561
N.S.: ADE	N =	38	35	71	44	70	48
Employee-Employer relations	$\overline{X}$ =	3.378	3.265	3.114	3.333	3.101	2.980
Sign. +: Sign. -:	S.D. =	.681	.751	.671	.674	.750	.829
N.S.: ADE	N =	37	34	70	45	69	49
Punctuality	$\overline{X}$ =	3.595	3.441	3.394	3.600	3.435	3.163
Sign. +: Sign. -: E	S.D. =	.551	.613	.643	.654	.696	.746
N.S.: AD	N =	37	34	71	45	69	49
Attendance	$\overline{X}$ =	3.541	3.576	3.507	3.756	3.348	3.286
Sign. +: D Sign. -:	S.D. =	.558	.561	.557	.484	.638	.707
N.S.: AE	N =	37	33	71	45	69	49
Appearance	$\overline{X}$ =	3.730	3.412	3.648	3.841	3.362	3.167
Sign. +: D Sign. -: A	S.D. =	.450	.701	.510	.370	.685	.663
N.S.: E	N =	37	34	71	44	69	48
Relationship with clientele	$\overline{X}$ =	3.605	3.471	3.562	3.667	3.371	3.283
Sign. +: Sign. -:	S.D. =	.638	.615	.552	.603	.685	.688
N.S.: ADE	N =	38	34	73	45	70	46
Summed scores for all items	$\overline{X}$ =	57.600	55.345	55.651	57.366	53.449	51.952
Sign. +: Sign. -:	S.D. =	6.427	8.457	8.319	7.716	9.038	9.430
N.S.: ADE	N =	35	29	63	41	69	42

THE LEVEL OF SIGNIFICANCE THAT HAS BEEN TESTED FOR IS .05

TABLE J 5 **STUDENT WORK SURVEY**

SUMMARY OF RESULTS — ALL BOYS SAMPLED.

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Responsibility Sign. +: Sign. -: A N.S.: DE	X̄ =	3.396	3.119	3.300	3.200	3.045	3.082
	S.D. =	.536	.633	.694	.524	.666	.759
	N =	48	42	90	55	66	61
Dependability Sign. +: Sign. -: N.S.: ADE	X̄ =	3.292	3.209	3.289	3.236	3.061	3.049
	S.D. =	.683	.742	.674	.576	.699	.784
	N =	48	43	90	55	66	61
Initiative Sign. +: Sign. -: N.S.: ADE	X̄ =	3.104	2.805	2.889	3.091	2.818	2.967
	S.D. =	.751	.872	.841	.646	.858	.802
	N =	48	41	90	55	66	60
Quantity of work Sign. +: D Sign. -: N.S.: AE	X̄ =	2.458	2.429	2.626	2.982	2.682	2.656
	S.D. =	.651	.668	.839	.733	.705	.793
	N =	48	42	91	55	66	61
Quality of work Sign. +: Sign. -: N.S.: ADE	X̄ =	2.854	2.786	2.876	2.982	2.667	2.803
	S.D. =	.684	.871	.795	.623	.687	.628
	N =	48	42	89	55	66	61
Ability to learn on the job Sign. +: Sign. -: N.S.: ADE	X̄ =	3.396	3.214	3.250	3.278	3.136	3.066
	S.D. =	.536	.717	.567	.492	.699	.772
	N =	48	42	92	54	66	61
Response to supervision Sign. +: Sign. -: E N.S.: AD	X̄ =	3.426	3.341	3.209	3.296	3.455	3.066
	S.D. =	.651	.762	.738	.603	.661	.750
	N =	47	41	91	54	66	61
Judgement Sign. +: Sign. -: N.S.: ADE	X̄ =	2.979	2.976	2.837	2.962	2.667	2.750
	S.D. =	.437	.643	.560	.437	.591	.628
	N =	48	42	92	53	66	60
Courtesy Sign. +: Sign. -: E N.S.: AD	X̄ =	3.617	3.429	3.337	3.556	3.379	3.082
	S.D. =	.610	.770	.745	.572	.718	.802
	N =	47	42	92	54	66	61
Cooperation Sign. +: Sign. -: N.S.: ADE	X̄ =	3.438	3.302	3.156	3.333	3.242	3.067
	S.D. =	.542	.638	.634	.549	.658	.756
	N =	48	43	90	54	66	60

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Relation To co-workers	$\bar{X}$ =	3.583	3.512	3.295	3.389	3.470	3.133
Sign. +: Sign. −: E	S.D. =	.647	.798	.730	.564	.661	.791
N.S. : AD	N =	48	43	88	54	66	60
Ability to follow directions	$\bar{X}$ =	3.104	3.095	3.124	3.019	3.030	2.867
Sign. +: Sign. −:	S.D. =	.472	.484	.618	.412	.632	.676
N.S. : ADE	N =	48	42	89	54	66	60
Employee-Employer relations	$\bar{X}$ =	3.319	3.143	3.045	3.145	3.123	3.000
Sign. +: Sign. −:	S.D. =	.663	.751	.689	.650	.650	.753
N.S. : ADE	N =	47	42	89	55	65	61
Punctuality	$\bar{X}$ =	3.438	3.419	3.253	3.455	3.246	3.167
Sign. +: Sign. −:	S.D. =	.580	.587	.754	.633	.708	.763
N.S. : ADE	N =	48	43	91	55	65	60
Attendance	$\bar{X}$ =	3.604	3.500	3.418	3.673	3.262	3.[illegible]0
Sign. +: D Sign. −:	S.D. =	.536	.599	.684	.474	.619	.785
N.S. : AE	N =	48	40	91	55	65	61
Appearance	$\bar{X}$ =	3.479	3.186	3.505	3.667	3.262	3.083
Sign. +: Sign. −: A	S.D. =	.652	.732	.656	.514	.668	.671
N.S. : DE	N =	48	43	91	54	65	60
Relationship with clientele	$\bar{X}$ =	3.489	3.488	3.457	3.545	3.348	3.220
Sign. +: Sign. −:	S.D. =	.718	.597	.601	.571	.668	.645
N.S. : ADE	N =	47	41	92	55	65	59
Summed scores for all items	$\bar{X}$ =	56.045	53.865	53.377	55.882	52.954	50.778
Sign. +: Sign. −:	S.D. =	6.008	8.842	9.630	7.812	8.148	9.788
N.S. : ADE	N =	44	37	77	51	65	54

THE LEVEL OF SIGNIFICANCE THAT HAS BEEN TESTED FOR IS .05

TABLE J 6 **STUDENT WORK SURVEY**

SUMMARY OF RESULTS — ALL GIRLS SAMPLED

		SCHOOL					
		A		D		E	
		Traditional	**Modular**	**Traditional**	**Modular**	**Traditional**	**Modular**
Responsibility Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.455	3.344	3.302	3.314	3.031	3.088
	S.D. =	.666	.701	.638	.583	.782	.793
	N =	33	32	43	35	32	34
Dependability Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.242	3.242	3.279	3.343	3.031	3.059
	S.D. =	.830	.751	.701	.591	.897	.814
	N =	33	33	43	35	32	34
Initiative Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.212	3.121	3.070	3.114	2.750	2.879
	S.D. =	.857	.781	.768	.796	.880	.781
	N =	33	33	43	35	32	33
Quantity of work Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	2.455	2.576	2.930	2.914	2.469	2.735
	S.D. =	.794	.708	.856	.742	.915	.710
	N =	33	33	43	35	32	34
Quality of work Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	2.774	2.636	3.023	3.000	2.719	2.909
	S.D. =	.762	.699	.801	.739	.924	.805
	N =	31	33	43	34	32	33
Ability to learn on the job Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.333	3.344	3.372	3.333	3.125	3.000
	S.D. =	.645	.653	.618	.645	.833	.866
	N =	33	32	43	33	32	33
Response to supervision Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.455	3.469	3.419	3.364	3.312	3.091
	S.D. =	.794	.718	.663	.653	.998	.805
	N =	33	32	43	33	32	33
Judgement Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.030	3.000	3.070	2.848	2.531	2.788
	S.D. =	.585	.568	.593	.508	.671	.600
	N =	33	32	43	33	32	33
Courtesy Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.545	3.719	3.651	3.606	3.438	3.121
	S.D. =	.666	.457	.573	.609	.801	.781
	N =	33	32	43	33	32	33
Cooperation Sign. +: Sign. -: N.S. : ADE	$\bar{X}$ =	3.455	3.303	3.381	3.400	3.219	3.030
	S.D. =	.617	.585	.623	.604	.832	.810
	N =	33	33	42	35	32	33

		SCHOOL					
		A		D		E	
		Traditional	Modular	Traditional	Modular	Traditional	Modular
Relation To co-workers Sign. +: Sign. -: E N.S.: AD	$\bar{X}$ = S.D. = N =	3.515 .755 33	3.545 .711 33	3.476 .740 42	3.429 .655 35	3.562 .619 32	3.091 .879 33
Ability to follow directions Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	3.030 .637 33	3.152 .508 33	3.286 .508 42	3.086 .445 35	2.937 .669 32	2.879 .696 33
Employee-Employer relations Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	3.406 .665 32	3.094 .689 32	3.195 .679 41	3.257 .741 35	2.969 .861 32	3.029 .834 34
Punctuality Sign. +: Sign. -: AE N.S.: D	$\bar{X}$ = S.D. = N =	3.656 .483 32	3.312 .693 32	3.500 .506 42	3.629 .690 35	3.594 .665 32	3.088 .668 34
Attendance Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	3.710 .588 31	3.710 .529 31	3.571 .501 42	3.771 .547 35	3.469 .621 32	3.235 .699 34
Appearance Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	3.656 .545 32	3.594 .499 32	3.714 .457 42	3.886 .323 35	3.500 .568 32	3.265 .710 34
Relationship with clientele Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	3.636 .489 33	3.562 .564 32	3.674 .522 43	3.657 .639 35	3.355 .709 31	3.242 .708 33
Summed scores for all items Sign. +: Sign. -: N.S.: ADE	$\bar{X}$ = S.D. = N =	57.000 8.515 29	56.714 6.259 28	57.000 7.825 40	56.750 8.367 32	53.097 9.857 31	50.967 10.277 30

THE LEVEL OF SIGNIFICANCE THAT HAS BEEN TESTED FOR IS .05

APPENDIX K

PERFORMANCE CURRICULUM

Development of performance oriented curricula was one of the main thrusts of the Vocational Education Project. During the second year of the project, a ten item questionnaire was designed to measure the extent of use of performance curriculum in a course. This questionnaire was administered to students in all vocational courses in the project schools, as well as to students in randomly selected courses from the academic course group and the other course group. The items on the questionnaire were written to identify the existence of performance curriculum attributes. Students were the respondents since they probably reflect most accurately what occurs in a course. The instrument was field tested in classrooms in the Palo Alto Public Schools, and modified prior to being used in project schools.

In coding the questionnaire, items were weighted so that a high value always represented the existence of a performance curriculum attribute. The coding was <u>one</u> for a response that indicated non-existence of an attribute, and <u>four</u> for a response representing the existence of an attribute, with intermediate values of <u>2</u> and <u>3</u> permitted. It should be stressed that in each course it is possible to have varying degrees of performance curriculum in existence. The component attributes of performance curriculum may be entirely non-existent, partially existent, or totally existent. Consequently, the measure of performance curriculum orientation would be better approximated by a continuum of values rather than by two values.

The sampling procedure developed to obtain data in each course required all students to fill out a questionnaire if enrollment in the course was less than fifty students. If more than fifty students were enrolled, the respondents were selected according to the rules outlined in Table K2 .

After studying the data collected during year 2, it was decided that the questionnaire should be expanded. Thirteen additional items were added, several of which were written to identify the non-existence of performance curriculum attributes. The coding and sampling procedures of year 2 were retained.

Validation of the enlarged questionnaire was undertaken in the Autumn of 1967. Several schools with performance oriented courses were visited, and arrangements were made to administer the questionnaire to students in those courses. These schools included Theodore High School, Theodore, Alabama; Nova High School, Fort Lauderdale, Florida; Cocoa Beach High School, Cocoa Beach, Florida; East Hills Junior High School and Lahser Senior High School, both in the Bloomfield Hills Public Schools, Bloomfield Hills, Michigan; and Duluth Central High School, Duluth, Minnesota. In addition, several schools which were traditional in their curriculum were requested to participate in the validation process, to test the discriminating power of the instrument. Courses without performance attributes were sampled from Mountain View High School, Mountain View, California; San Carlos High School, San Carlos, California; and McKinley Junior High School, Redwood City, California.

The validation data was first processed in the following way. All 23 items were summed for each student's completed questionnaire. This gave a total possible score of 92 if a student indicated the complete existence of performance curriculum attributes in each of his 23 responses. The mean summed value was then calculated for each course. The frequency of these course mean sums is reported in the histograms depicted in Figure K 1 for both the performance oriented distribution and the distribution for courses without performance attributes.

The sum of the 23 items in the questionnaire is a numerical value somewhere on the continuum from the absence of performance orientation to complete performance orientation. Rather than assume that each item on the questionnaire was of equal value in its discriminating power between performance oriented courses and others, it was decided to calculate a stepwise regression formula to determine weighted coefficients for each item. We arbitrarily assigned the value 0 to a dependent variable in all responses from courses that had been classified as nonperformance oriented and the value 1 to a dependent variable in all responses from courses that had been classified as performance oriented. We called the dependent variable $Y_{predicted}$. The regression function was chosen to minimize the mean squared deviation of $Y_{predicted}$ from the arbitrarily imposed value 0 or 1.

The stepwise regression procedure computed coefficients for a linear function of the 23 items. This formula is as follows:

$$Y_{predicted} = \sum_{j=1}^{23} C_j \ x_j$$

where C_j = regression coefficient for the j-th response.
x_j = the student's response to question
j = index on the questions

The $Y_{predicted}$ value calculated for each student is regarded as an indication of that student's perception of the relative orientation of a particular course. $Y_{predicted}$ is a real number, usually between 0 and 1. When it is close to 0 it indicates the absence of performance orientation in a course. When it is close to 1 it indicates the presence of many performance curriculum attributes. Some students provided extreme responses which resulted in a $Y_{predicted}$ value greater than 1. The regression calculations did not correct the final coefficient of the dependent variable to a zero intercept value. This accounts for many $Y_{predicted}$ values being greater than one. The coefficient of the constant was calculated to be -0.43526, and all $Y_{predicted}$ values which were calculated were not corrected for this coefficient of the constant.

The stepwise regression calculations produced the following coefficients for each item of the questionnaire:

1.	0.03383	13.	-0.01686
2.	0.00129	14.	0.04786
3.	0.01436	15.	0.04047
4.	-0.00143	16.	0.00162
5.	0.01571	17.	0.08506
6.	0.00567	18.	0.04777
7.	-0.01208	19.	0.10313
8.	-0.02226	20.	-0.01306
9.	-0.01385	21.	0.02135
10.	0.00862	22.	0.04216
11.	-0.00944	23.	0.03310
12.	-0.02526		

The $Y_{predicted}$ value was calculated using 3,071 responses from courses which were predetermined to be performance oriented, and 3,071 responses from courses predetermined to be of an orientation other than performance. Frequency polygons for each distribution are shown in Figure K 4 .

The frequency polygons for each distribution clearly show that there is little overlap in the two distributions. This suggests that there is in fact a performance oriented population and another population that is not performance oriented. A decision was made to calculate the mean orientation value for each course and compare it with the orientation value selected as a minimum for classifying the course as performance oriented.

Cumulative frequencies were calculated for both frequency distributions.

These cumulative frequencies are as follows:

Frequency Interval	Cumulative Frequency of Performance Oriented Courses	Cumulative Frequency of Non-performance Oriented Courses
.05 - .0999	1	0
.10 - .1499	1	0
.15 - .1999	1	0
.20 - .2499	1	3
.25 - .2999	2	15
.30 - .3499	4	63
.35 - .3999	9	232
.40 - .4499	23	457
.45 - .4999	46	746
.50 - .5499	75	1,103
.55 - .5999	116	1,457
.60 - .6499	169	1,767
.65 - .6999	219	2,091
.70 - .7499	300	2,322
.75 - .7999	352	2,500
.80 - .8499	417	2,663
.85 - .8999	502	2,775
.90 - .9499	603	2,862
.95 - .9999	720	2,929

Frequency Interval	Cumulative Frequency of Performance Oriented Courses	Cumulative Frequency of Non-Performance Oriented Courses
1.00 - 1.0499	849	2,987
1.05 - 1.0999	986	3,005
1.10 - 1.1499	1,146	3,032
1.15 - 1.1999	1,330	3,042
1.20 - 1.2499	1,531	3,050
1.25 - 1.2999	1,765	3,060
1.30 - 1.3499	2,012	3,063
1.35 - 1.3999	2,247	3,067
1.40 - 1.4499	2,489	3,069
1.45 - 1.4999	2,701	3,070
1.50 - 1.5499	2,870	3,070
1.55 - 1.5999	2,974	3,070
1.60 - 1.6499	3,023	3,070
1.65 - 1.6999	3,053	3,071
1.70 - 1.7499	3,068	3,071
1.75 - 1.7999	3,071	3,071

The critical value appeared to be between .8 and 1.0 . The following cumulative frequency tables confirm that observation.

Frequency of Responses from Courses Classified as Not Performance Oriented

Above .7999 = 571
Above .8499 = 408
Above .8999 = 296
Above .9499 = 209
Above .9999 = 142

Frequency of Responses from Courses Classified as Performance Oriented

Below .7999 = 352
Below .8499 = 417
Below .8999 = 502
Below .9499 = 603
Below .9999 = 720

This information was graphed and the intersection point of the two frequency polygons was determined to be .8480. There are 415 responses which lie above .8480 from validation courses classified as not performance oriented. This represents 13.51% of these courses. There are also 415 responses from validation courses classified as performance oriented which lie below .8480. This represents 13.51% of the responses from these performance oriented courses.

The average values of $Y_{predicted}$ was computed for courses in project schools for year 3. If the average value for a course exceeded .848, that course was classified as being performance oriented. If the average score for a course was less than .848, that course was classified as not being performance oriented.

Of the courses sampled in year 3 the percentage of academic and of vocational courses which met the foregoing standard is tabulated below.

PERCENTAGE OF COURSES CONSIDERED PERFORMANCE ORIENTED

School	Vocational Courses	Academic Courses
A	0	6
B	17	13
C	22	5
D	22	3
E	9	3
F	60	10
G	17	4
H	29	7
I	33	18
J	20	39
K	0	9
L	36	12

Short Version

PERFORMANCE CURRICULUM ASSESSMENT INSTRUMENT - YEAR 2

TABLE K1

Secondary School Students
Grades 7-12

DATE ______________ SUBJECT ______________ PERIOD (MODULE) ______________

1. Are you studying or doing the same thing that the rest of the class is doing at the same time?

   No 4 Sometimes 3 Most of the time 2 Always 1

2. Do you know at the beginning of the course exactly what you will be expected to know or do at the end of the course?

   No 1 Sometimes 2 Most of the time 3 Always 4

3. Do you know exactly what to do next as you advance through the content of the course without having to ask the teacher or another student?

   No 1 Sometimes 2 Most of the time 3 Always 4

4. Is it common to find some students working ahead of most of the class?

   No 1 Sometimes 2 Most of the time 3 Always 4

5. Is it common to find some students working behind most of the class?

   No 1 Sometimes 2 Most of the time 3 Always 4

6. If you already know some of the material, do you have to do the work anyhow?

   No 4 Sometimes 3 Most of the time 2 Always 1

7. Can you work on different materials than the rest of the class in the course if you want to?

   No 1 Sometimes 2 Most of the time 3 Always 4

8. Does your teacher let you know exactly what you are going to be graded on before you start working?

   No 1 Sometimes 2 Most of the time 3 Always 4

9. Do you have the opportunity to work on something that interests you, but is not required?

   No 1 Sometimes 2 Most of the time 3 Always 4

10. If your assignment or lesson comes in late, is your grade lowered?

   No 4 Sometimes 3 Most of the time 2 Always 1

NOTE: These scores represent the value given to each response for each questionnaire item. The higher the value for each response, the more that response is thought to reflect the existance of performance curriculum.

DIRECTIONS

1. PLEASE READ EACH QUESTION AND TELL US TO WHAT EXTENT IT IS TRUE.

   IF IT IS NEVER TRUE, MARK "NO". IF IT IS ALWAYS TRUE, THEN MARK "ALWAYS". IF IT IS ONLY SOMETIMES TRUE, THEN MARK "SOMETIMES," BUT IF IT IS TRUE MOST OF THE TIME, THEN MARK "MOST OF THE TIME."

2. PLEASE ANSWER ALL QUESTIONS AS THEY PERTAIN TO THE COURSE YOU ARE TAKING FROM THE TEACHER WHO GAVE YOU THIS FORM.

   WE WANT YOU TO TELL US ABOUT THIS COURSE ONLY, AND NOT ANY OTHERS YOU MIGHT BE TAKING.

   IF THE WORD "COURSE" IS UNCLEAR, USE THE WORD "SUBJECT." FOR EXAMPLE: IN AN "AMERICAN HISTORY COURSE" YOU STUDY THE SUBJECT "AMERICAN HISTORY."

3. PLEASE ANSWER EVERY QUESTION TO THE BEST OF YOUR ABILITY.

4. GO BACK TO THE TOP OF PAGE ONE AND PUT IN THE DATE, NAME OF THIS COURSE, AND THE MODULES YOU TAKE THE COURSE.

Long Version PERFORMANCE CURRICULUM ASSESSMENT INSTRUMENT - YEAR 3

TABLE K 2

Secondary School Students

Grades 7-12

P.C.-SI

DATE ______________ COURSE ______________ PERIOD (MODULE) ______________

1. In this course are you studying or doing at the same time the same thing that the rest of the class is doing?

   Never 4 Sometimes 3 Most of the time 2 Always 1

2. Do you know at the beginning of this course exactly what you will be expected to know or do at the end of this course?

   Never 1 Sometimes 2 Most of the time 3 Always 4

3. Do you know exactly what to do next as you study the content of this course without having to ask the teacher or another student?

   Never 1 Sometimes 2 Most of the time 3 Always 4

4. How often do you find some students working ahead of most of the class?

   Never 1 Sometimes 2 Most of the time 3 Always 4

5. How often do you find some students working behind most of the class?

   Never 1 Sometimes 2 Most of the time 3 Always 4

6. If you already know some of the information or the skills, do you have to do the work anyhow?

   Never 4 Sometimes 3 Most of the time 2 Always 1

7. In this course can you work, if you want to, on different materials than the rest of the class?

   Never 1 Sometimes 2 Most of the time 3 Always 4

8. Does your teacher let you know exactly what you are to be tested on, or what projects you must do for a grade, before you start working?

   Never 1 Sometimes 2 Most of the time 3 Always 4

9. Do you have the opportunity to work on something that interests you, but is not required?

   Never 1 Sometimes 2 Most of the time 3 Always 4

10. If your assignment or lesson comes in late, is your grade lowered?

    Never 4 Sometimes 3 Most of the time 2 Always 1

11. Are you given a time limit by the teacher for completing the assignments and learning tasks in this course?

    Never 4 Sometimes 3 Most of the time 2 Always 1

12. Do you help to determine your own deadlines for completing assignments and learning tasks in this course?

Never 1 Sometimes 2 Most of the time 3 Always 4

13. May you successfully pass a test to receive credit for information you already know so you don't have to study it?

Never 1 Sometimes 2 Most of the time 3 Always 4

14. If you fail a test, may you take a similar test at a later date to improve your grade?

Never 1 Sometimes 2 Most of the time 3 Always 4

15. May you complete all the requirements for this course before the semester ends and then begin study in another course?

Never 1 Sometimes 2 Most of the time 3 Always 4

16. Are you given time limits for finishing tests or projects in this course?

Never 4 Sometimes 3 Most of the time 2 Always 1

17. Must the students in this course always take the same tests together at the same time?

Never 4 Sometimes 3 Most of the time 2 Always 1

18. If you fail a test or project, are you required to pass a second test or project before being allowed to study new material in this course?

Never 1 Sometimes 2 Most of the time 3 Always 4

19. May you decide when you are ready for a test?

Never 1 Sometimes 2 Most of the time 3 Always 4

20. Does your class study this subject for the same amount of time each day?

Never 4 Sometimes 3 Most of the time 2 Always 1

21. Is your class time in this subject spent listening to your teacher talk?

Never 4 Sometimes 3 Most of the time 2 Always 1

22. In this course is there one standard text from which you study?

Never 4 Sometimes 3 Most of the time 2 Always 1

23. Does your teacher make homework assignments in this course?

Never 4 Sometimes 3 Most of the time 2 Always 1

NOTE: These scores represent the value given to each response for each questionnaire item. The higher the value for each response, the more that response is thought to reflect the existance of performance curriculum.

ENCLOSED YOU WILL FIND 50 QUESTIONNAIRES TO ADMINISTER TO STUDENTS IN THIS COURSE AND ONE QUESTIONNAIRE FOR YOU, AS A TEACHER, TO COMPLETE.

DIRECTIONS:

How many sections of this course are there? ______

If there is more than one section please administer this form to only one section in the following manner.

1. How many students are in this section? ______

   Please write this number in the above blank.

2. Find this number in the left column of the following chart.

3. Hand out the forms to all students whose last name begins with a letter in the alphabetic grouping indicated by the corresponding right column of the chart. Example: If there are 75 students in this section of the class, have all students from K - Z fill out the questionnaire.

SIZE OF SECTION	LETTERS OF ALPHABET
50 or less	A - Z (all)
51 62	A - M
63 75	K - Z
76 95	A - J
96 125	N - Z
126 175	S - Z
176 250	F - H
251 360	C - D

4. Please review all questionnaires to insure that all 10 questions have been answered.

FIGURE K 1

FREQUENCY OF RAW SCORE MEAN SUMS FOR VALIDATION COURSES

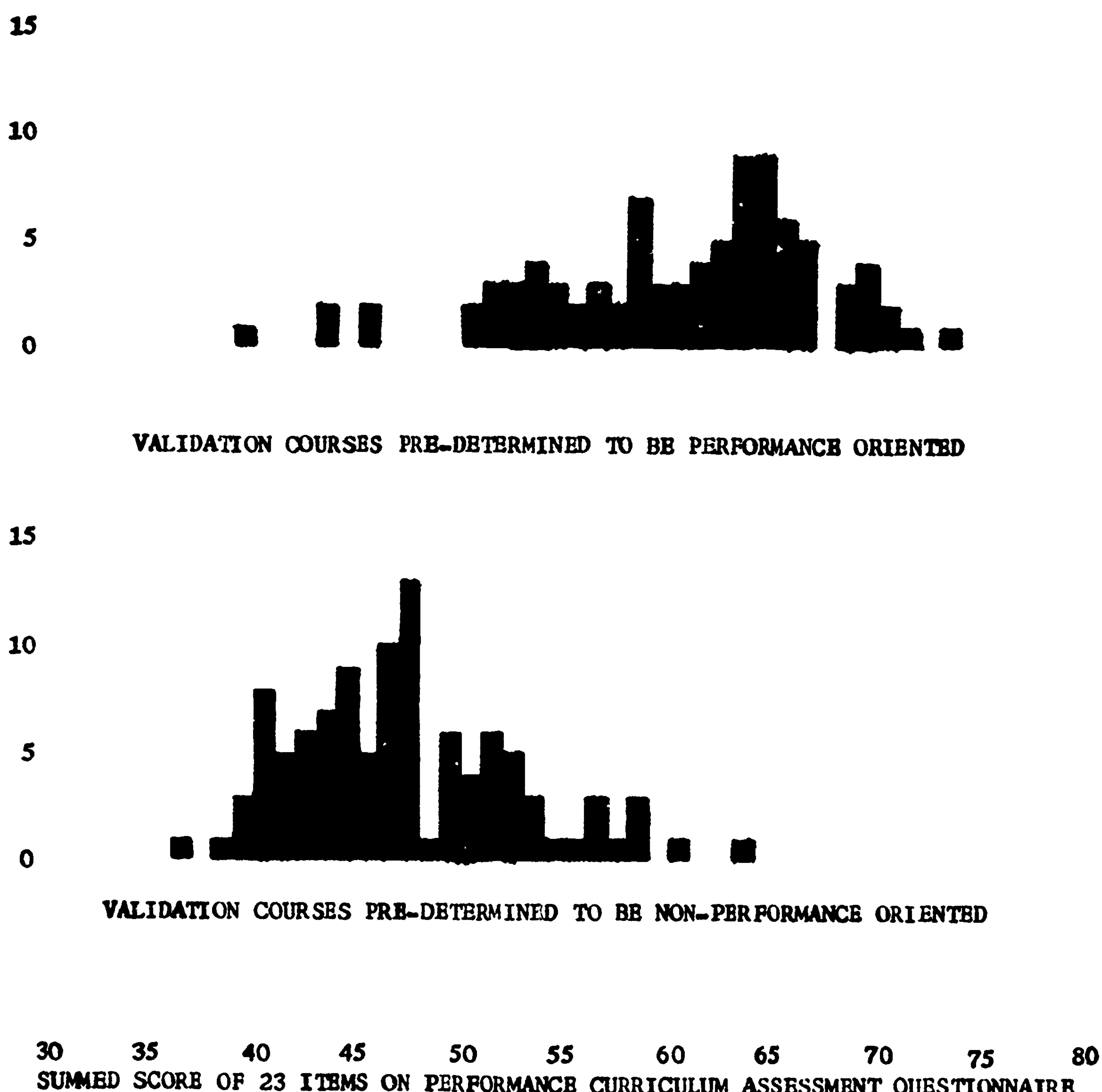


FIGURE K 2

FREQUENCY OF $Y_{Predicted}$ VALUES FOR RESPONSES DETERMINED TO BE:

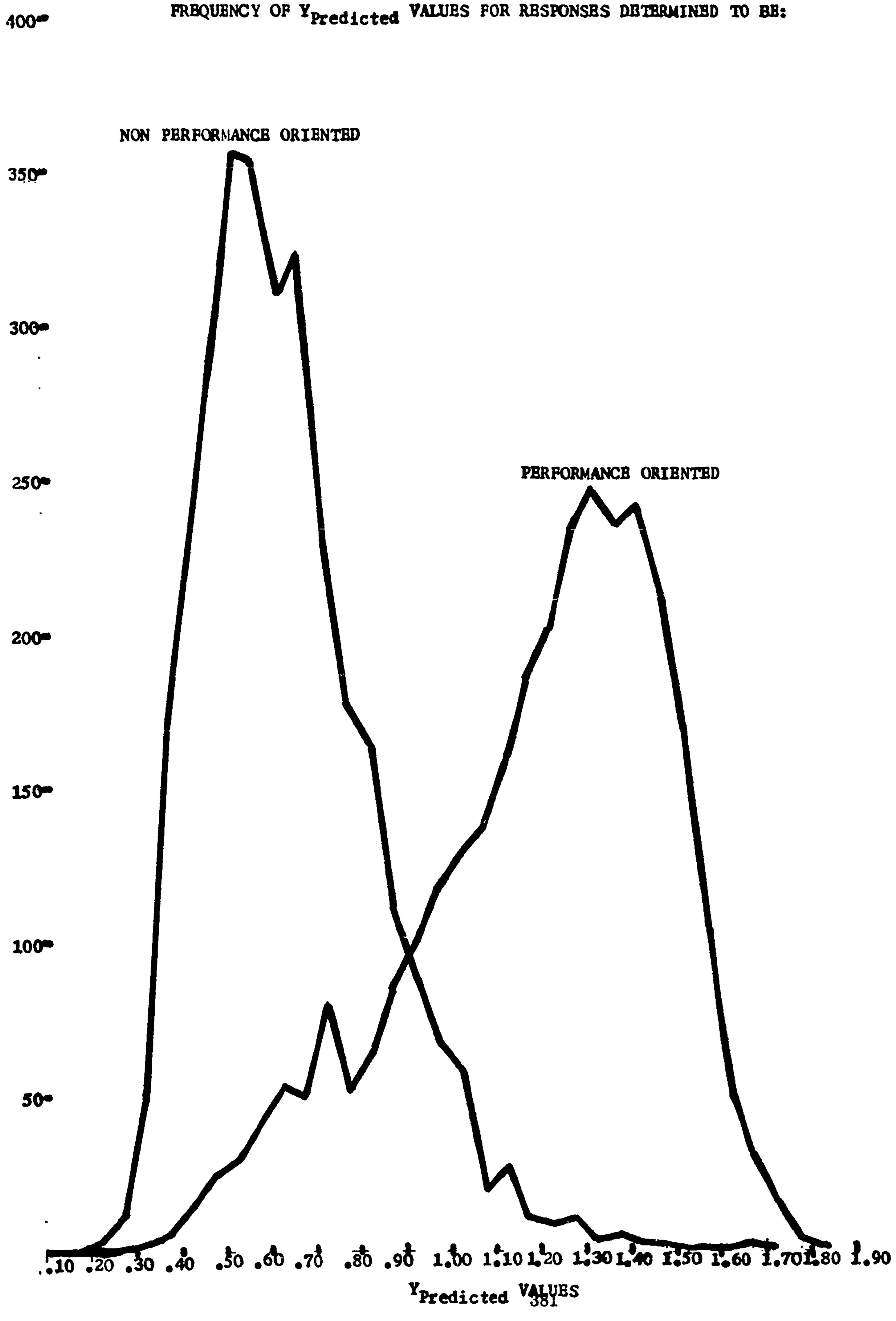


FIGURE K 3

CUMULATIVE FREQUENCY OF $Y_{Predicted}$ VALUES FOR

RESPONSES DETERMINED TO BE:

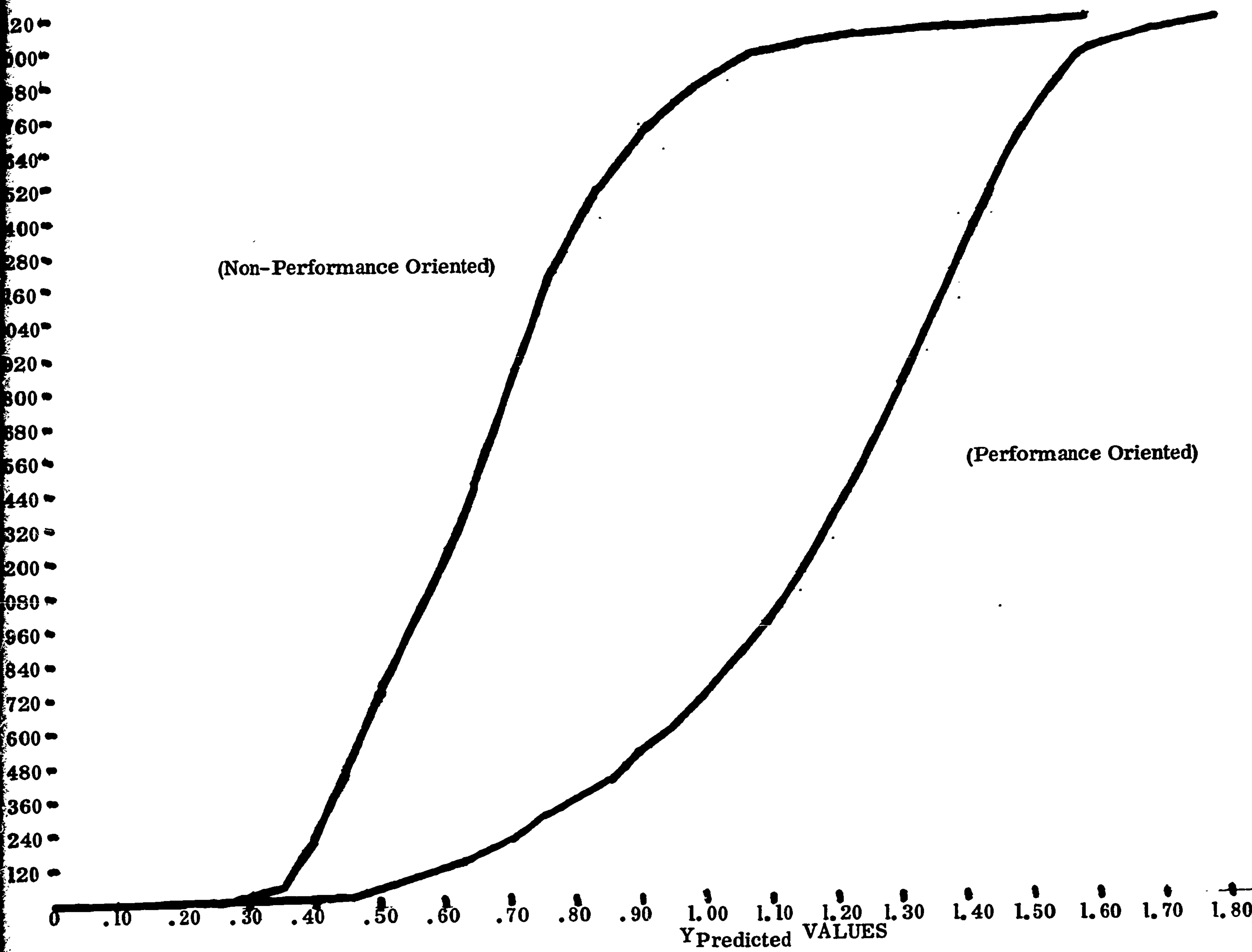


FIGURE K 4

CUMULATIVE FREQUENCY OF NON PERFORMANCE ORIENTED RESPONSES ABOVE AND PERFORMANCE ORIENTED RESPONSES BELOW SPECIFIED ORIENTATION VALUES

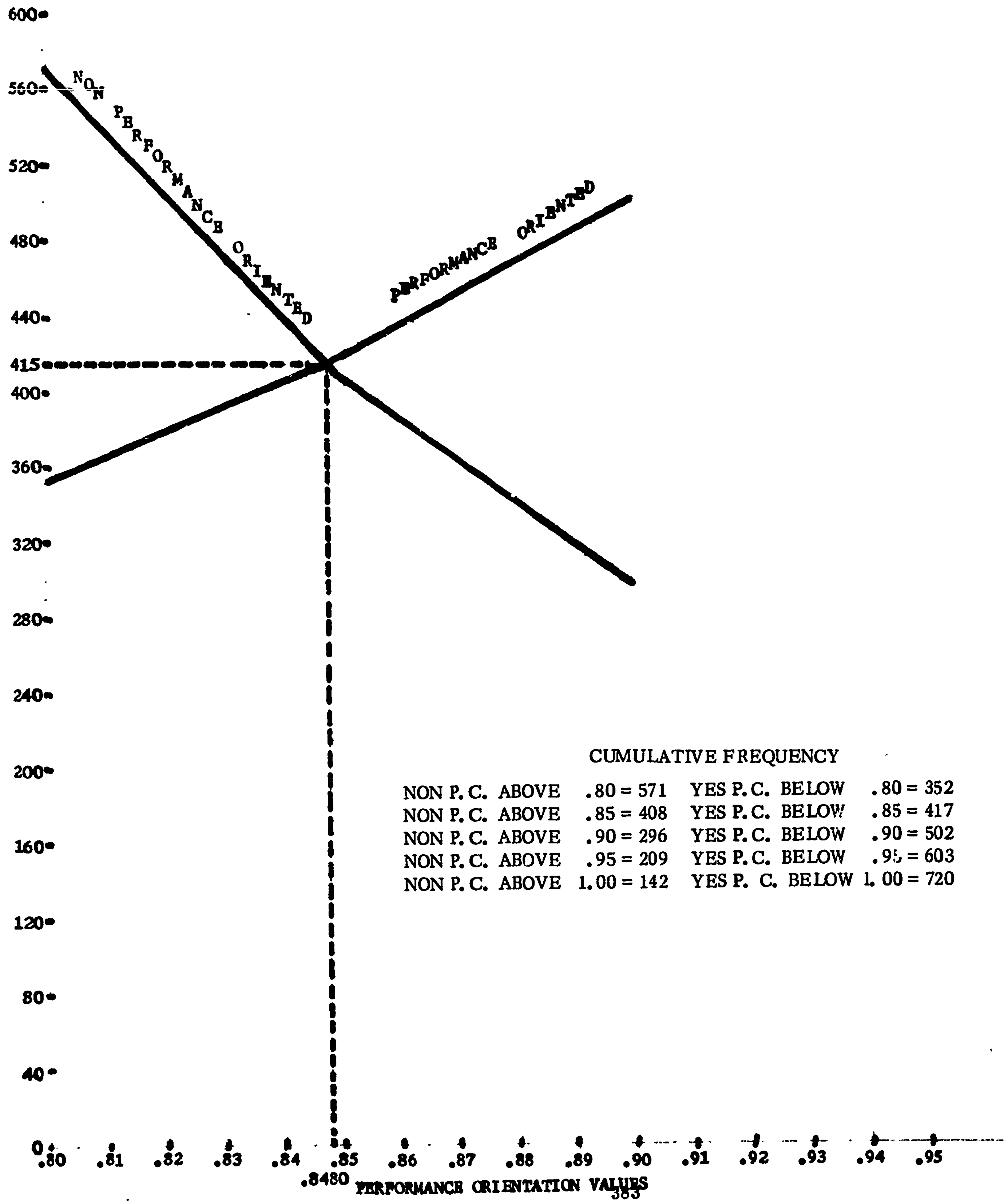


TABLE K 3

PERFORMANCE CURRICULUM ORIENTATION SCORE
YEAR 3—VOCATIONAL COURSES*

SCHOOL A

Course Name & Course Number	Mean	S. D.	N
010 Industrial Arts	.7199	.1352	8
140 Typing	.5920	.1345	37
147 Home Economics	.6482	.1107	46
148 Agriculture	.6863	.0858	9
240 Shorthand	.5248	.1117	41
241 Business	.5747	.1393	40
341 Office Practice	.6939	.1347	32
441 Office Practice	.5440	.1164	14
448 Agriculture	.6162	.1342	9

SCHOOL B

Course Name & Course Number	Mean	S. D.	N
201 Auto Shop	.6497	.1961	30
203 Wood Shop	.7717	.1913	48
205 Radio	.6262	.1725	8
207 Mechanical Drawing	.8306	.1939	13
220 Shop	.7246	.2066	17
305 Home Economics	.7093	.1239	19
401 Typing	.5875	.1224	19
403 Bookkeeping	1.2811*	.1763	27
406 Business	.5621	.1435	10
407 Shorthand	.7118	.2638	12
408 Recordkeeping	1.0613*	.1948	17
413 Business English	.4587	.1113	10

*This course can be considered to be a performance oriented course.

SCHOOL C

Course Name & Course Number	Mean	S. D.	N
630 Bookkeeping	1.0196*	.1261	18
640 Typing	.7389	.1218	28
641 Typing	.7769	.1293	18
644 Office Occup.	.8408	.1693	23
650 Shorthand	.4436	.0849	14
653 Notehand	.7220	.1268	18
660 Business	.4917	.1135	11
671 Data Processing	.4561	.1800	13
814 Drafting	.6307	.1600	22
817 Arch. Drafting	.5870	.1531	12
822 Wood Work	.8478	.1824	16
823 Wood Work	1.0437*	.2033	3
824 Wood Work	1.0320*	.3179	5
980 Homemaking	.7083	.0316	4
981 Homemaking	.6925	.1191	28
983 Homemaking	.6355	.1406	17
990 Distributive Education	.6863	.1356	9

SCHOOL D

Course Name & Course Number	Mean	S. D.	N
546 Business Math	.4293	.0794	24
575 Business Law	.6698	.1862	20
599 Business English	.4509	.1060	58
620 Shorthand	.5163	.0957	12
621 Bookkeeping	.5653	.1301	38
623 Recordkeeping	.7619	.1308	20
625 Typing	.6949	.1471	20
626 Typing	.6622	.1117	15
627 Office Machines	.6436	.1779	24
628 Office Practice	.5051	.0883	19
629 Office Practice	.8041	.1173	17
630 Shorthand	.3965	.0981	21
631 Typing	.6316	.1160	17
640 Sales	.5808	.1019	11

* This course can be considered to be a performance oriented course.

SCHOOL D (CONT'D)

Course Name & Course Number	Mean	S. D.	N
649 Business	.5080	.1004	22
670 Home Economics	.6635	.1235	44
675 Home Economics	.6358	.1737	21
677 Clothing	.8006	.1773	16
687 Agriculture	.6972	.1469	13
689 Agriculture	.7496	.1182	15
690 Graphics	.6308	.1432	44
691 Graphic Art	.7280	.2374	24
692 Graphic Art	.8303	.1143	13
695 Drafting	1.2574*	.1990	18
697 Electronics	1.2297*	.1145	23
701 Woods	.6158	.1837	16
702 Woods	.5987	.1433	11
704 Metals	.7661	.1705	20
705 Metals	.7676	.2107	10
707 Mechanics	.9672*	.1498	8
708 Mechanics	.7014	.1449	14
717 Auto Mechanics	.7113	.1584	20
718 Auto Mechanics	1.0241*	.2370	10
719 Cosmetology	.7919	.0837	9
729 Cosmetology	.6166		
741 Machine Shop	.7369	.1768	18
742 Machine Shop	.8688*	.1235	14
751 Industrial Electronics	1.2649*	.1061	17
752 Industrial Electronics	1.0792*	.2361	12
754 Electronic Mechanics	1.0908*	.1536	9
773 Drafting	1.0094*	.1780	12

SCHOOL E

Course Name & Course Number	Mean	S. D.	N
314 Electronics	.6147	.1562	17
315 Electronics	.4776	.1139	11
601 Business	.5520	.1032	23

* This course can be considered to be a performance oriented course.

SCHOOL E (CONT'D)

Course Name & Course Number	Mean	S. D.	N
602 Bookkeeping	.5342	.1240	8
603 Accounting	.6628	.1220	15
604 Business Law	.4665	.1097	26
606 Typing	.5685	.1110	31
608 Typing	.55[illegible]	.1534	34
609 Shorthand	.8431	.1586	13
610 Shorthand	.8079	.1960	32
611 Office Practice	.7471	.1186	16
614 Coop Sales	.6[illegible]	.1736	19
703 Homemaking	[illegible]	.1749	41
710 Auto Mechanics	[illegible]	.1347	6
712 Vocational Auto	1.0[illegible]	.2459	22
714 Drafting	.7296	.1537	40
718 Electricity	.7361	.1774	34
720 Shop	.7991	.1485	33
723 Metals	.8316	.1916	35
726 Machine Shop	.7580	.1508	8
729 Printing	.9905*	.0008	15
733 Agriculture	.7249	.1654	25
737 Wood	.7483	.1928	48

SCHOOL F

Course Name & Course Number	Mean	S. D.	N
635 Ag. Science	.7105	.1139	3
643 Farm Power	.9547*	.1577	8
650 Shop	.9061*	.1239	10
730 Typing	.7460	.1379	19
735 Typing	.8872*	.1653	6
740 Business Machines	.9191*		
742 Business Law	.6083	.0839	3
747 Bookkeeping	.7680	.2193	2
752 Office Practice	1.0545*	.1405	7
755 Shorthand	.9052*	.1158	5

* This course is considered to be a performance oriented course.

SCHOOL G

Course Name & Course Number	Mean	S. D.	N
022 Homemaking	.6789	.1416	27
023 Homemaking	.7347	.1533	8
025 Homemaking	.7318	.1613	25
103 Business English	.8262	.0810	6
110 Typing	.6968	.1764	37
130 Business	.7062	.2227	34
140 Bookkeeping	.5279	.1607	10
145 Recordkeeping	.6991	.1424	10
150 Shorthand	.4370	.1072	12
156 Transcription	.7251	.1741	6
160 Office Practice	.8253	.1236	5
165 Clerical Practice	.6757	.1121	20
167 Office Machines	1.1[illegible]5*	.0836	8
175 Merchandising	.5575	.0767	7
191 Business Law	.9380*	.2650	6
192 Business Math	.5871	.1516	10
316 Woodshop	.7031	.1640	35
317 Woodshop	.7719	.1103	29
325 Drafting	.7779	.1649	30
326 Drafting	.7265	.1403	12
327 Drafting	.8699*	.0881	7
336 Electronics	.7532	.1303	18
337 Electronics	.7594	.1606	9
340 Electricity	.7695	.1926	14
346 Auto Shop	.8121	.1362	11
347 Auto Shop	.7717	.1972	16
348 Auto & Home	.8238	.1863	16
356 Metals	.9535*	.1939	47
357 Metals	.8802*	.1396	12

* This course is considered to be a performance oriented course.

SCHOOL H

Course Name & Course Number	Mean	S. D.	N
501 Typing	.6161	.1539	17
502 Typing	.5479	.1528	23
508 Recordkeeping	.6147	.1367	12
512 Briefhand	.5409	.1895	15
515 Shorthand	.5147	.0883	24
518 Shorthand	.5603	.1437	21
520 Bookkeeping	.5165	.1017	15
523 Business Law	.5649	.1324	31
525 Business	.4841	.1243	20
535 Office Practice	.8550*	.1351	13
850 Industrial Arts	.9283*	.1571	19
856 Woodwork	.7377	.1995	10
858 Woodwork	.7494	.1849	7
861 Metals	.7853	.1159	9
862 Metals	.8858*	.1702	9
871 Electronics	1.0968*	.1724	18
872 Electronics	1.0341*	.2174	10
891 Drafting	.8810*	.2077	16
892 Drafting	.7434	.1574	26
901 Home Economics	.6643	.1250	29
904 Home Economics	.6632	.1417	19
906 Home Economics	.7283	.1613	10
911 Home Economics	1.0023*	.0704	11

SCHOOL I

Course Name & Course Number	Mean	S. D.	N
010 Typing	.7365	.1986	16
011 Typing	.7345	.1483	28
017 Bookkeeping	.9827*	.0664	8
019 Stenoscript	.6419	.1209	15
020 Office Skill	1.3026*	.1857	15

*This course is considered to be a performance oriented course.

SCHOOL I (CONT'D)

Course Name & Course Number	Mean	S. D.	N
021 Business	.7831	.1865	15
022 Business Law	.6961	.1704	14
026 Merchandising	.7933	.2217	12
046 Home Economics	.8001	.2056	16
056 Shop	.8081	.1612	11
058 Woodshop	1.0107*	.1183	31
064 Mechanical Drawing	.9561*	.1281	15

SCHOOL J

Course Name & Course Number	Mean	S. D.	N
450 Typing	.7545	.1574	31
460 Business Math	.6263	.1699	42
463 Bookkeeping	.8139	.1574	32
465 Stenotype	.5608	.0972	18
469 Stenotype	.6638	.1785	14
471 Office Practice	1.0294*	.2118	12
475 Advertising	.6691	.1923	13
480 Marketing	.5452	.1480	10
505 Homemaking	.7284	.1307	44
510 Homemaking	.6905	.1055	40
515 Homeliving	.6280	.1257	39
520 Foods	.6826	.1207	35
525 Clothing	.7464	.1136	43
530 Clothing	.8758*	.1692	22
701 Industrial Arts	.7463	.1351	15
713 Woodwork	.7425	.1212	15
715 Carpentry	.7745	.1843	14
725 Auto Mechanics	.8405	.1496	15
733 Metals	.8105	.1604	34
743 Drafting	.6028	.1066	21
745 Drafting	.8068	.1685	10
753 Electricity	.8409	.1731	26
755 Electricity	1.2475*	.1567	21
760 Ag. Science	.8896*	.2024	18
765 Ag. Science	.9712*	.1429	17

*This course is considered to be a performance oriented course.

SCHOOL K

Course Name & Course Number	Mean	S. D.	N
405 Typing	.5398	.0886	9
415 Typing	.6093	.1326	36
425 Shorthand	.6070	.1529	35
453 Computer Science	.7255	.0951	30
455 Bookkeeping	.5530	.1543	36
459 Business	.6919	.2422	26
650 Family Living	.6739	.1666	37
705 Clothing	.7048	.0904	10
710 Home Planning	.6095	.0883	13
719 Art Survey	.7117	.1307	10
756 Homemaking	.6897	.1340	18
760 Homemaking	.7221	.1231	27
762 Drafting	.5718	.1402	23
847 Electricity	.6348	.1884	23
849 Electricity Lab	.5735	.1156	9
865 Wood	.7391	.1573	19

SCHOOL L

Course Name & Course Number	Mean	S. D.	N
511 Shorthand	.6028	.0389	5
512 Shorthand	.7197	.0062	2
534 Occupations	.8272	.1263	15
810 Home Economics	.9137*	.0743	7
816 Home Economics	.8364	.0814	11
819 Home Economics	.8659*	.1268	6
864 Home Economics	.7464	.1664	7
869 Agriculture	.8803*	.1880	13
876 Agriculture	.8356	.0969	6
878 Industrial Arts	.9328*	.1245	9
882 Agriculture	.8478	.0871	5

* This course is considered to be a performance oriented course.

PERFORMANCE CURRICULUM ORIENTATION SCORE
YEAR 3—ACADEMIC

SCHOOL A

Course Name & Course Number	Mean	S. D.	N
038 Science	.6694	.1455	25
101 English	.6800	.1271	46
102 Latin	.5943	.1293	25
104 Spanish	.6778	.1697	27
106 German	.6008	.1283	24
120 Biology	.6500	.1324	49
121 General Science	.7673	.1355	47
130 Cultural Geography	.7628	.1278	36
201 English	.7494	.1361	23
204 Speech	.5466	.1577	44
207 Journalism	.6969	.1550	8
210 Geometry	.6009	.1531	51
230 World History	.6398	.1470	45
302 English	.6974	.1331	28
320 Chemistry	.6570	.1201	50
330 American Histroy	.6716	.1534	50
401 English	.6001	.1108	28
410 Trigonometry	.6936	.1092	16
411 General Math	.6939	.1427	21
420 Physics	.7254	.1768	17
421 Senior Science	.6875	.1266	9
430 American Government	.6070	.1277	33
431 Sociology	.6364	.1293	37
434 Modern Problems	.7113	.2026	46
435 Economics	.7009	.2229	29
440 Bookkeeping	.8102	.2214	48
710 Math	.9875*	.1660	48
801 English	.7226	.1557	50
802 English	.7619	.1495	46

SCHOOL A (CONT'D)

Course Name & Course Number	Mean	S. D.	N
810 Science	.8568*	.1612	40
830 American History	.6016	.1519	32

SCHOOL B

Course Name & Course Number	Mean	S. D.	N
501 Health	.7086	.1843	15
503 World Geography	.5337	.1712	45
505 World History	.5015	.1265	29
507 U. S. History	.9119*	.1211	13
509 U. S. History	.7137	.1922	43
514 American Government	.7587	.1718	11
515 American Government	.6208	.1836	24
517 Psychology	.6114	.1375	12
518 Social Studies	1.2993*	.1292	13
601 English	.7995	.1546	21
603 English	.7563	.1668	9
604 English	.7247	.1317	21
607 English	.7202	.2625	17
611 English	.6512	.1288	17
614 English	.6752	.1134	37
615 English	.4944	.1117	23
617 Public Speaking	.9400*	.1440	4
619 Reading	.9555*	.0984	4
621 Journalism	.5834	.1900	6
624 Basic English	.7788	.1840	12
702 Biology	.5132	.0996	28
704 Chemistry	.5704	.1579	11
705 Physics	.6169	.1357	14
706 Physical Science	.7142	.1468	27
801 Basic Math	1.2763*	.0696	13
802 General Math	.6122	.1627	12
803 Pre-Algebra	.5468	.1240	21

SCHOOL B (CONT'D)

Course Name & Course Number	Mean	S. D.	N
804 Algebra	.5753	.1807	16
806 Geometry	.5173	.0888	16
807 Trigonometry	.5571	.0913	8
902 Spanish	.6735	.1340	19
906 Spanish	.5694	.1157	13
907 Spanish	.4664	.1176	18
908 Spanish	.5881	.1238	9
909 French	.5749	.0999	14
910 French	.6435	.0735	13
911 French	.5696	.1010	5

SCHOOL C

Course Name & Course Number	Mean	S. D.	N
117 American Authors	.7672	.1297	29
128 World Literature	.7480	.1755	19
145 Speech	.7874	.1671	21
205 American Gov't. & Bus. Law	.6334	.1892	19
233 American History	.6518	.1236	14
234 World History	1.0770*	.1106	22
250 Senior Social Studies	.6639	.1254	17
321 Biology	.6519	.1317	15
323 Advanced Biology	.7720	.1516	10
331 Chemistry	.5478	.0777	23
341 Physics	.4602	.1272	16
409 Modern General Math	.6136	.2057	15
412 Algebra	.4430	.0921	27
420 Geometry	.4866	.1032	38
441 Algebra-Trigonometry	.4666	.1644	18
445 Trigonometry-Math Analysis	.4901	.0932	24
451 Math Analysis	.5514	.1165	12
504 French	.7183	.1856	10

SCHOOL C (CONT'D)

Course Name & Course Number	Mean	S. D.	N
514 German	.5011	.1214	16
533 Latin	.5545	.1259	15
554 Spanish	.7176	.1624	10

SCHOOL D

Course Name & Course Number	Mean	S. D.	N
208 Sociology	.5790	.1512	43
433 Social Studies	.5751	.1200	8
510 English	.5862	.1226	41
511 English	.5520	.0779	8
513 English	.5405	.1288	39
517 English	.5369	.1107	38
519 English	.6482	.1302	15
520 World History	.5349	.1392	63
525 Honors English	.5825	.1157	15
526 Government & Economics	.5431	.0957	38
529 Chemistry	.4336	.0969	48
530 Biology	.5060	.0917	49
536 Physics PSSC	.7115	.1785	49
538 Biology	.6750	.1493	45
542 Math Applied	.4963	.1240	12
547 Trigonometry	.4396	.0535	13
552 English	.5858	.1395	40
557 Math Analysis	.6460	.1227	25
558 Analytical Geometry	.4782	.1463	23
560 Algebra	.4948	.1689	35
564 Physical Science	.7717	.1986	41
570 World History	.5698	.1161	11
579 World Geography	.5313	.1322	44
594 Creative Writing	.5785	.0932	15
595 Mythology	1.0942*	.1528	14
596 World Literature	.6711	.1691	18

SCHOOL D (CONT'D)

Course Name & Course Number	Mean	S. D.	N
598 Vocabulary	.6072	.1107	23
600 French	.6751	.1335	30
601 French	.5921	.1524	26
604 German	.6799	.1503	21
605 German	.5693	.1491	17
610 Latin	.7066	.1127	16
611 Latin	.6956	.1516	17
614 Spanish	.5937	.1284	23
615 Spanish	.4417	.0767	38
779 Geometry	.6055	.1399	35
782 English	.1171	.0831	14
793 Russian	.5836	.1362	15

SCHOOL E

Course Name & Course Number	Mean	S. D.	N
001 English	.7041	.1583	35
002 English	.6426	.1406	45
003 English	.6808	.1558	44
004 English	.6411	.1697	41
006 English	.6484	.1105	37
008 English	.6405	.1264	46
010 English	.6732	.1468	40
012 English	.7501	.1451	44
013 English	.7276	.1624	32
074 English	.6964	.1863	9
101 French	.6096	.1372	28
103 French	.5582	.1562	38
108 Latin	.5784	.1218	28
112 Spanish	.5488	.1214	15
116 Spanish	.5322	.1271	20
201 General Math	.5081	.1199	25
202 Algebra	.5292	.1113	36

SCHOOL E (CONT'D)

Course Name & Course Number	Mean	S. D.	N
203 Geometry	.5839	.1256	18
204 Geometry	.6327	.1055	25
207 Math Analysis	.5429	.1035	24
208 Senior Math Review	.6335	.1736	24
209 Math Analysis	.5894	.1063	22
304 Biology	.5978	.1446	49
307 Biology	1.1229*	.0448	14
308 Chemistry	.5659	.1516	40
310 Physics	.5731	.1210	33
401 Social Studies	.6578	.1624	35
402 World History	.6218	.1154	34
405 American Gov't. & Mod.Prob.	.5146	.1790	40
406 American Gov't. & Economics	.6172	.1166	21
407 Social Studies Senior Seminar	.6521	.0778	12

SCHOOL F

Course Name & Course Number	Mean	S. D.	N
100 Composition	.6490	.0705	8
107 English	.7494	.1129	3
110 Survey Literature	.6890	.1263	7
120 English	.5461	.1008	16
145 Advanced Composition	.5839	.1132	16
150 Remedial Reading	1.0373*	.1855	11
410 Spanish	.6457	.1200	10
900 Math	.5762	.1368	19
901 Algebra	.7069	.2290	16
903 Geometry	.5902	.2042	28

SCHOOL G

Course Name & Course Number	Mean	S. D.	N
210 English	6382	.1274	17
223 English	.7144	.1169	32
230 English	.8290	.1666	6
240 English	.6975	.1025	7
261 Reading Lab	.7284	.1175	10
411 Spanish	.6100	.1907	14
421 French	.6893	.1765	26
428 German	.5549	.1437	19
510 Introduction to Algebra	.5264	.2069	26
511 Algebra	.4584	.1338	6
522 Geometry	.4800	.1869	11
533 Math	.5723	.0853	10
572 Basic Math	1.0020*	.3257	22
820 General Science	.7961	.1474	33
832 Basic Science	.8414	.1628	30
841 Biology BSES	.5739	.1498	37
842 Biology	.5267	.1367	34
851 Chemistry	.4955	.1000	31
871 Physics	.7735	.1547	5
891 Physiology	.5499	.0752	7
910 Social Science	.8350	.1791	35
923 World History	.6923	.2223	15
933 U. S. History	.5504	.1281	30
940 Current Problems	.7330	.1367	29
950 Economics	.7668	.1696	5

SCHOOL H

Course Name & Course Number	Mean	S. D.	N
007 English	.6709	.2163	19
015 English	.6649	.1227	16
024 English	.5610	.1215	22
101 Social Studies	.7741	.1800	26
119 Social Studies	.5316	.1478	14

SCHOOL H (CONT'D)

Course Name & Course Number	Mean	S. D.	N
124 Social Studies	.6465	.1059	14
130 Social Studies	.7776	.1562	12
134 Psychology & Sociology	.5140	.1325	11
201 Math	.7361	.2454	24
204 Algebra	.4893	.1783	33
205 Algebra	1.3692*	.1162	27
207 Algebra	.4216	.1025	22
211 Algebra	.5646	.1175	15
219 Geometry	.4357	.0995	39
225 Math	.3982	.0812	25
227 Math	.6688	.1208	9
231 Math	1.1711*	.1938	22
233 Math	.5779	.1016	19
300 Science	.6893	.1377	19
312 Science	.7203	.1265	14
314 BSCS	.5273	.1650	20
320 BSCS	.5027	.1647	14
331 PSSC	.7474	.1161	14
341 Science	.6881	.1378	28
345 Physics	.5517	.1203	16
401 French	.5641	.1589	19
411 German	.5598	.1407	18
414 German	.6739	.1563	23
430 Spanish	.4722	.1089	13

SCHOOL I

Course Name & Course Number	Mean	S. D.	N
030 Spanish	.6603	.1611	23
032 Spanish	.6547	.1612	19
034 Spanish	.8833*	.1459	9
035 French	.5851	.0928	9
038 Latin	.6541	.1086	9
039 Latin	.6218	.1739	26

SCHOOL I (CONT'D)

Course Name & Course Number	Mean	S. D.	N
047 Math	.9377*	.1240	5
055 Math	1.0571*	.2164	7
071 Basics of Math	1.0477*	.2124	16
072 Found. of Math	.6769	.1510	21
073 Mod. Algebra	.5900	.1377	32
074 Mod. Geometry	.5568	.1483	26
082 Basic Algebra	.7494	.1543	12
121 Physical Science	.5181	.1453	31
123 Science	.7437	.2206	35
125 Chemistry	.5872	.1321	32
142 Driver Education	.5336	.1515	30
144 World History	.5262	.1456	56
145 American History	.8640*	.1840	18
147 Civics	.5944	.1310	13
171 Reading Skills	.7336	.1510	42
176 Oral Communication	.6654	.1698	14
177 Advanced Oral Communication	.8167	.1053	8
180 Debate	.8624*	.2296	8
181 Journalism	.5718	.1880	15
182 Journalism	.8275	.1412	4
185 Mod. English Literature	.7419	.1732	14
188 Drama	.6784	.1213	14

SCHOOL J

Course Name & Course Number	Mean	S. D.	N
100 English	.7569	.1473	50
105 English	.9608*	.1744	52
110 English	.9669*	.1418	50
115 English	.7916	.1413	20
125 Advanced Pl. English	1.0631*	.0716	8
160 Remedial English	.9282*	.1207	10
200 World History-Geography	.8528*	.1587	38

SCHOOL J (CONT'D)

Course Name & Course Number	Mean	S. D.	N
203 World History-Geography	.8142	.1681	42
205 American History-Prob.	.8848*	.1378	43
207 American History-Prob.	.9365*	.1943	39
221 American History	.7813	.1524	33
222 Social Psychology	.7468	.1569	25
250 French	.8602*	.1232	14
260 German	.4568	.0701	18
270 Spanish	.7119	.2012	22
301 Basic Math	.9103*	.1884	27
303 Practical Math	.5640	.1712	47
305 Geometry	.5876	.1719	43
307 Algebra	.8135	.1771	47
311 Pre-Algebra	1.2353*	.1569	34
315 Trigonometry	.6593	.1378	26
330 Advanced Pl. Math	.9777*	.7302	16
351 Biology	.5089	.0842	20
355 Biology	.8175	.0900	12
401 General Science	.6475	.1942	22
403 Expl. Science	.6469	.2036	12
411 Chemistry	.5123	.1244	58
421 Physics	.5644	.1057	16

SCHOOL K

Course Name & Course Number	Mean	S. D.	N
105 English	.7272	.1546	28
110 English	.6459	.0844	30
115 English	.7588	.1170	33
120 English	.7095	.1107	32
130 Humanities	.7250	.1554	33
160 French	.6112	.1981	26
180 German	.5841	.1378	31
195 Spanish	.6227	.1774	13

SCHOOL K (CONT'D)

Course Name & Course Number	Mean	S. D.	N
260 Economics	.5218	.1719	32
265 Pres. in Per.	.6781	.1871	36
303 Trig. & Elem. Functions	.6047	.1299	23
308 Math	.6380	.1361	18
321 Geometry	.5575	.1583	31
343 Algebra	.6498	.1939	30
375 Advanced Senior Math	.5684	.1200	16
403 Chemistry	.5612	.1082	39
430 Physics	.7149	.1753	20
433 Biology	.5677	.1773	20
438 Science	.6903	.1473	18
439 Science	1.0866*	.1115	5
535 History Government	.5814	.1896	39
640 Special Problems	.9533*	.1228	4

SCHOOL L

Course Name & Course Number	Mean	S. D.	N
001 English	.5896	.1492	19
002 English	.6254	.1478	18
004 English	.7167	.2207	25
005 English Remedial	.8014	.1494	17
007 English	.7709	.1674	21
008 English	.7682	.1865	19
108 Reading & Spelling	.8088	.1520	36
200 Algebra	.6405	.2197	21
215 Geometry	.7828	.1635	11
278 Modern Math	.7178	.1729	20
281 General Science	.6935	.2183	15
388 General Science	.5276	.1735	21
415 American Government	.7917	.1819	12
417 U. S. History	1.3269*	.1187	20
428 Nevada History & Geography	.5385	.1239	22
449 World History	1.2231*	.2648	27

APPENDIX L

DAY PATTERNS

Form A1 was designed to provide information on the day and time pattern specifications per school. Data for year three may be found in Table L2. Table L1 offers a sample of form A1 on which the data was collected.

It is of interest to note that only two pairs of schools have the same time patterns (20 periods of 20 minutes each per day, and 24 periods of 18 minutes). Yet, these schools differ in provisions for passing time between periods. The unique nature of each school's schedule is readily inferred from Table L2.

The length of a period varies from 15 to 30 minutes per period. Twenty minute periods appear to be the most popular, for five schools are operating with that as their standard.

The hours in the school day vary from 5.50 at school G to 7.67 at school D. Passing times are not included in percentages.

Table L3 indicates little change in basic time patterns for two schools, a decrease of six minutes per module in another school, and an increase of ten minutes per module in the other school. All four schools were modularly scheduled during all three years of the project.

TABLE L1

Stanford University

School of Education

Voc. Ed. - Flex. Sched.
(Form A 1)

Date ____________________

Name of School ____________

SCHOOL SPECIFICATIONS

1. Number of periods in the school day ____________

2. Are all periods of the same length? ________ Yes _____ No _____

   If "Yes", what is the length of the period? minutes

   If "No", please complete the following:

Period	Length
1	______
2	______
3	______
4	______
5	______
6	______
7	______
8	______
9	______
10	______

3. What is the length of passing time between periods? minutes.

4. If there is no passing time as such, how long do students have to reach class after dismissal from another class? minutes.

TABLE L 2

DAY PATTERN SPECIFICATIONS FOR PROJECT SCHOOLS, YEAR THREE

SCHOOL	PERIODS IN DAY	LENGTH PER PERIOD	PASSING TIME	HOURS IN SCHOOL DAY
A	17	20	5	5.67
B	24	18	5	7.20
C	20	20	*	6.67
D	23	20	4	7.67
E	20	20	4	6.67
G	22	15	4	5.50
H	21	20	5	7.00
I	14	24	4	5.60
J	24	18	*	7.20
K	13	30	*	6.50
L	28	15	3	7.00

* No passing time specified for these schools. Students are given a maximum number of minutes to arrive in class if they are being dismissed from another class as a new period starts. For school C, the time is 3 minutes. For schools J and K, 5 minutes are permitted. Passing times are not included in the hours of the day.

TABLE L 3

TIME PATTERN SPECIFICATIONS FOR FOUR MODULARLY SCHEDULED SCHOOLS, YEARS ONE AND THREE

SCHOOL	YEAR	PERIODS IN DAY	LENGTH PER PERIOD	PASSING TIME
G	1	22	15	4
	3	22	15	4
H	1	21	20	*
	3	21	20	5
I	1	13	30	5
	3	14	24	4
K	1	22	20	*
	3	13	30	*

* No passing time specified for these schools. Students in school H were permitted up to 4 minutes to reach a new class in year 1, but a 5 minute passing time was scheduled in year 3. Students in school K were permitted 5 minutes in both years.

APPENDIX M

LIBRARY DATA

Table M 2 summarizes descriptive information on library resources and utilization reported by three schools, for their last traditional and first modular years. Incomplete data obviated similar comparisons in other schools. There are noticeable variations in volumes in the library, but all schools show an increase in both volumes in the library and periodicals received. Table M 3 contains the same information for three schools that were modularly scheduled during all three years of the project. Again, inconsistency in reporting invalidated such data for other schools.

There are wide variations in first year data on numbers of books in the library, with noticeable increases in all schools over the three year period. By the third year, there is little variation in the numbers of books in the libraries of the three schools.

TABLE MI

Stanford University,
School of Education

Voc.E . - Flex. Sched.
(Form B 2)

Date ____________

Name of School ____________

Librarian ____________

Interviewer ____________

SCHOOL LIBRARY QUESTIONNAIRE

1. Staff:

Number of professional librarians: ________

Number of secretaries and/or clerks: ________

Number of student assistants: ________

2. Library Materials:

Total number of volumes in the school library: ________

Number of periodicals regularly received: ________

Is the Library the only center for library materials in the school?

_____ Yes _____ No

If the answer is "No", describe the location and types of materials that can be found elsewhere.

3. Budget:

Budget for the present school year ________

Budget for the previous school year: ________

4. Use of Library:

The Library is used as a study hall during the school day:

_____ Yes _____ No

The Library is available for student use

_____ before school _______ at noon

_____ during the day _______ after school

Students are excused from class by teachers to use the Library:

_____ never _____ occasionally _____ frequently

Teachers bring classes of students into the Library:

_____ never _____ occasionally _____ frequently

Students need a pass or other authorization from a teacher to use the Library during the school day:

_____ never ______ most of the time

_____ some of the time ______ always

Students use the Library (please rank those items that apply according to amount of usage, 1 = high)

(a) _______ as a place to study and work on assignments

(b) _______ to find information relating to classroom assignments

(c) _______ to undertake recreational reading

(d) _______ to find information or do research on projects they are undertaking on an individual basis

(e) _______ to read in greater depth about topics that have been covered in class

(f) _______ other (please specify)

5. Describe the method used to determine total Library circulation. Then give the total Library circulation for the previous school year and for the present school year to date.

6. Describe the method used to determine the number of students who use the school Library. Then give the total number of students who used the Library during the previous school year and for the present school year to date.

TABLE M 2

A COMPARISON OF LIBRARY RESOURCES AND UTILIZATION FOR TRADITIONAL AND MODULAR YEARS IN THREE SCHOOLS

ITEM	SCHOOL D		SCHOOL B		SCHOOL E	
	Trad.	Modular	Trad.	Modular	Trad.	Modular
1. Number of Professional Librarians	4	4	0	0	2	2
2. Number of Secretaries and/or Clerks	1	1	2	2	1	1
3. Number of Student Assistants	8	22	22	14	85	20
4. a. Volumes in library	24,469	30,000	8,760	12,541	15,000	18,526
b. Volumes per student	7.09	9.10	8.52	11.81	5.71	7.67
5. Periodicals Received	110	125	126	135	96	151
6. Budget for this year*	9,493	13,000	6,000	9,152	6,000	14,129
7. Library used for Study Hall?	yes	yes	no	no	yes	yes
8. Students Use Library**						
A. study & work assign.	1	1	3	3	1	--
B. find info. related to assignments	2	2	1	1	2	--
C. for recreational reading	4	5	2	4	4	--
D. individual or research projects	5	3	4	5	3	--
E. read in depth about topics from class	6	4	5	--	5	--
F. other	3	6	--	--	--	--
9. Circulation per year***	21,522	14,099	10,527	9,488	13,205	27,393
10. Circulation per student per year (average)	3.82	8.31	10.25	8.93	8.19	5.83

* Budgets in some years include additional grants from sources other than local funds.

** Code is in order from 1 to 6, with 1 = high. School E did not furnish code data for its modular year.

*** School D indicates that many materials were placed in classrooms and study areas but has no record of circulation for those materials during the modular year. School B shifted materials to four resource centers during its modular year, but did not provide information on circulation of those materials. School E, created 5 resource centers, and yet had a dramatic increase in circulation of library materials.

TABLE M 3

A COMPARISON OF LIBRARY RESOURCES AND UTILIZATION FOR THREE YEARS OF MODULAR SCHEDULING IN THREE SCHOOLS

ITEM	SCHOOL I			SCHOOL G			SCHOOL K		
	Yr. 1	Yr. 2	Yr. 3	Yr. 1	Yr. 2	Yr. 3	Yr. 1	Yr. 2	Yr. 3
1. Number of Professional Librarians	1	1	1	1	1	1	1	2	4
2. Number of Secretaries and/or Clerks	1	1	1	4	6	6	2	1	2
3. Number of Student Assistants	4	3	8	18	9	10	20	38	7
4. a. Volumes in library	5,000	8,000	10,000	2,000	7,638	9,552	6,157	8,000	12,000
b. Volumes per student	---	9.40	----	1.59	5.67	6.64	2.69	3.88	7.39
5. Periodicals Received	100	---	125	65	128	141	130	137	160
6. Budget for this yr.*	2,600	7,154	7,629	29,000	7,100	8,700	65,000	27,000	8,900
7. Library used for Study Hall?	no	no	no	no	no	no	no	no	yes
8. Students Use Library**									
A. study & work assign.	4	1	--	3	1	1	1	2	--
B. find info. related to assignments	2	2	--	4	2	2	2	3	--
C. for recreation reading	5	4	--	1	3	3	3	1	--
D. individual or research projects	1	3	--	2	5	4	6	4	--
E. read in depth about topis from class	3	5	--	5	4	5	5	5	--
F. other	6	--	--	--	--	--	4	--	--
9. Circulation per yr.***	17,681	13,868	--	2,684	4,137	8,132	5,060	3,417	6,410
10. Circulation per student per year (average)	--	16.30	--	2.14	3.07	5.66	2.14	1.66	3.95

* Budgets in some years include grants from sources other than local funds.

** Code is in order from 1 to 6, with 1 = high. Schools I and K did not furnish code data for year 3.

*** School I lists 5 resource centers for all three years, where other circulating materials are located. School G lists 4 such areas for all 3 years, yet also lists a dramatic increase in library circulation. School K lists 6 such areas for year 1, but only 2 for year 2 and 1 for year 3.

APPENDIX N

DISSERTATION ABSTRACTS

Attached are abstracts of dissertations submitted by two of the project staff members in 1968. Both studies were undertaken in project schools and are directly related to modular scheduling. Dissertations are on file in Cubberley Library, School of Education, Stanford University.

THE EFFECTS OF THREE LABORATORY ARRANGEMENTS ASSOCIATED WITH ONE TYPE OF LARGE GROUP INSTRUCTIONAL ARRANGEMENT IN THE LEARNING OF TYPEWRITING

by

Atilano A. Valencia
Stanford University, 1968

Statement of the Problem

The purpose of this study was to compare the relative effects of three laboratory time arrangement, all associated with a similar type of large group instructional arrangements on typewriting achievement. Specifically, this study proposed to compare the typewriting speed, accuracy, and production scores of three treatment groups. The first laboratory arrangement followed a fixed-time plan, with Treatment Group I attending three 24-minute laboratory sessions per week. The second laboratory arrangement was scheduled according to a partially-opened time plan, with Treatment Group II attending three 24-minute laboratory sessions per week, plus an optional 28 minutes per session. And the third laboratory plan operated with no fixed time pattern, which allowed Treatment Group III unrestricted laboratory attendance with respect to laboratory time availability. The closed (fixed) laboratory arrangement and the partially-opened laboratory plan followed a Monday, Tuesday, and Thursday weekly schedule. Large group instruction followed a Monday, Tuesday, Thursday, and Friday weekly schedule.

Importance of the Study

Numerous studies have compared the effects of distributed versus concentrated practice and of double versus single periods relative to typewriting achievement. More specifically, there are several research studies which compare the typewriting achievement of students in different, specified period-lengths. Other studies have compared the relative effects of two, three, and five meetings per week on beginning typewriting achievement among students exposed to a completely flexible laboratory time arrangement. Further, there is no research which compares the typewriting achievement of students exposed to different types of instructional strategies associated with flexible time arrangements.

In view of the foregoing observations, it was believed that a study of three types of typewriting laboratory time arrangements, coupled with one type of large group instructional arrangement would generate conclusions and recommendations that would be of value to teachers, administrators, and educators who are exploring and applying different types of instructional strategies through variable-modular scheduling. Further, it was believed that the findings in this study would suggest flexible time patterns and instructional strategies that would spur the learning of typewriting in large group and laboratory type situations. Finally, it was expected that this study would give indications of the general effectiveness of the open laboratory in the high school independent study program.

The Underlying Rationale in Formulating the Research Hypotheses

The rationale in formulating the research hypotheses was presented in Chapter I of this study. The most relevant underlying principles are herewith summarized.

Since it is conceivable that learning time varies from student to student at different times within the total time-length of the instructional program, two flexible laboratory time arrangements are among the treatment conditions in this study: the open laboratory and the partially-open laboratory. And because the closed-laboratory time schedule is traditionally found in the high school instructional program, it is included among the three laboratory conditions examined in this research study.

The closed-laboratory time arrangement assures a predetermined, fixed-quantity of laboratory time for all students in a course; however, it has the disadvantage of restricting learning within a fixed time schedule. Because all of the students in the group must remain in the laboratory for a prescribed period of time, the length of the period may be excessive for some students and not long enough for other students.

The open-laboratory condition allows greater flexibility in time and instruction as compared to the closed- and partially-opened laboratory arrangements. One notable drawback in using the open laboratory is the possibility of students concentrating typewriting practive to one or two days of the week. Research has indicated the desirability of daily practice in the learning of typewritng.

On the other hand, the partially-opened laboratory conditions has the advantage of assuring that all students in the typewriting group are assembled for a minimum segment of time at different intervals during the week, while also allowing some time flexibility as part of the total instructional arrangement. In this type of an arrangement, students are free to leave at the termination of the minimum fixed-time block or remain for any portion of the optional laboratory time. The partially-opened laboratory minimizes the possibility of student postponing and concentrating their learning activities to one or two days of the week; at the same time, this type of laboratory condition allows additional time in respect to individual growth patterns in the learning of typewriting.

It was therefore hypothesized that the partially-opened laboratory condition, associated with large group instruction, would show a significantly higher level of typewriting speed achievement, accuracy achievement, and production performance as compared to the opened- and closed-laboratory conditions with a similar type of large group instructional arrangement.

The Sample

This study was conducted at Poway High School, Poway, California with an enrollment of approximately 1,000 pupils. Poway High School has been operating with the Stanford School Scheduling System for the past five years. From a population of all the ninth grade students enrolled in beginning typewriting for the year 1967-68, a proportional number of male and female students were randomly selected and randomly assigned to each of the treatment groups. A table of random numbers was used in assigning 25 pupils to each group, with a ratio of 15 girls to 10 boys.

The Teaching

One teacher was assigned to all of the large group sessions and the laboratory conditions in the study. Further, all of the treatment groups used the same textbook materials.

The Post-Test and Criterion Measures

The first semester, United Business Education Association Students' Typewriting Test, was administered to all of the treatment groups at the conclusion of fourteen weeks of instruction. The test was given by the experimental teacher, with advice and assistance from the researcher. The test results were scored by the researcher in accordance with the directions provided with the test instrument. The scores from the post-test were used to compare the typewriting achievement of the three groups on four criterion measures: speed in gross-words-per-minute, speed in mailable-words-per-minute, accuracy achievement, and production performance. Analysis of variance was applied to determine the significance of difference among the treatment conditions on the aforementioned criterion variable.

Measure of Progressive Group Differences in Speed and Accuracy Attainment

In a secondary observation, the data from six bi-weekly, 3-minute timed writings were statistically treated, using analysis of variance, to determine the significance of difference among the treatment conditions and of differences between the sexes in a given criterion variable. The F ratios showing the degree of difference among the treatment effects on each of the criterion variables of speed in gross-words-per-minute, speed in mailable-words-per-minute, production performance, and accuracy achievement were all below the .05 level of significance. It was also noted that no significant interaction between the sexes and the treatment were present in the four criterion variables. However, a significant sex difference was indicated in speed in mailable-words-per-minute and production performance, with F readings at the .05 and .01 levels respectively. That is, girls scored higher than boys on the criteria of speed in mailable-words-per-minute and production performance.

Further, the secondary analysis of the six 3-minute, bi-weekly tests revealed a very close relationship between the treatment groups in mean speed and accuracy achievement. Again, the F test indicated no significant difference, based on the .05 level, among the treatment groups on the 3-minute speed and accuracy criterion variables.

In view of the foregoing statistical analyses, which indicated no significant difference among the three types of laboratory conditions on the criteria of speed, accuracy, and production achievement in beginning typewriting, it is apparent that the findings fail to support the research hypotheses given in this study.

Recommendations and Suggestions for Further Study

Although the statistical findings do not support the three research hypotheses given in Chapter I of this study, several recommendations and suggestions have been formulated which may be of concern to teachers, administrators, and researchers in education.

In view of the experimental findings given in this study, it cannot be concluded that any one of the three laboratory conditions is significantly superior to the others in speed, production, and accuracy in beginning typewriting. Yet, it is possible to draw two opposing views from the findings: (a) since students in a closed-laboratory arrangement, with a maximum of 24 minutes per session, achieve as well as students in an opened or partially-opened laboratory arrangement, the necessity to provide opened and optional laboratory time beyond 24 minutes can be dismissed; (b) on the other hand, because students in an opened and optional laboratory time arrangement learn as well or nearly as well as students in a 24-minute closed (fixed) laboratory condition, the scheduling of a predetermined segment of laboratory time can be conceived as unnecessary.

Apart from the foregoing contentions, two considerations for selecting a type of typewriting laboratory arrangement in the high school curriculum are proposed. First, the three types of laboratory conditions used in this investigation are recommended as applicable arrangement in the learning of typewriting in a high school curriculum. Second, it is proposed that the specific type of laboratory condition to use in the high school instructional program is dependent on instructional strategy. For example, where individualized instruction, as part of an independent study program, is given special emphasis, either the partially-opened laboratory or the opened laboratory is recommended.

Based on the experimental observations and related research disclosed in this research study, two considerations for further experimentation are highly suggested.

It is proposed that experimental research involving the three types of laboratory conditions in this study, with larger sample sizes and longer treatment exposures, can generate additional indications on the types of flexible laboratory time arrangements to consider in learning typewriting and other skills.

Related studies reviewed in Chapter I give evidence in support of teacher-directed activities in the early stages of typewriting skill development. Because this experimental study involved students in beginning typewriting, directions, illustrations, and demonstrations by the teacher were a part of large group instruction through fourteen weeks of treatment exposure. However, the continuous application of this type of strategy at more advanced levels of typewriting development is a researchable question. In this final perspective, it is suggested that further research is needed to ascertain the effects of reducing or discontinuing large group instruction in favor of opened-laboratory instruction at more advanced levels of typewriting skill development.

PREDICTION OF INDEPENDENT STUDY PERFORMANCE IN SECONDARY SCHOOL

by

Jack D. McLeod
Stanford University, 1968

Purpose

The purpose of this study was to examine student performance on independent study tasks and to seek answers to the following questions:

First, what is meant by student responsibility for independent study?

Second, can student responsibility be measured? Can this measurement be made by a nationally-normed test, by student self-report, by teacher rating, or by a combination of these three approaches.

Third, is measured student responsibility an effective predictor, singly or in combination with other variables, of those students who are likely to undertake and complete, at an acceptable level, independent study tasks?

Fourth, is there a significant correlation between measured student responsibility and measured general mental ability?

Fifth, is there any significant difference between the scores of girls and boys on measured student responsibility?

Sample

The sample for the major study was the ninth-grade class at John F. Kennedy High School in Fremont, California. The school, located in a suburban area, was in the second year of operation. The instructional program utilized independent study. Typically, 30 percent of the students go on to college. Among the 300 Ss, there were 159 boys and 141 girls.

Procedures

Eight independent variables were chosen for use. They were: sex, California Test of Mental Maturity, and four subscales from the Gordon Personal Profile-Responsibility, Ascendancy, Emotional Stability and Sociability. From an instrument designed by the investigator two additional measures of responsibility, teacher-rated responsibility and student-rated responsibility, were obtained. Two criterion variables, task completion and performance quality, were independently assessed by each of three judges trained in the use of the criterion scoring system. The ratings were made for each of four independent study tasks relating to the ninth-grade social studies curriculum. All of the tasks were judged by the investigator and the four-member Kennedy ninth-grade social studies teaching team to be relatively equal in level of difficulty and educational relevancy.

Since the validity of the Gordon Personal Profile as a measure of responsibility in school work has not been established, student responsibility within the context of independent study performance may or may not involve responsibility as represented by the Profile. There has been no prior research aimed at determining the relation between these two concepts.

As a beginning toward investigating the construct validity of responsibility, another independent measure was designed. A pilot study, involving 90 ninth graders at Wilbur High School in Palo Alto, California, and 14 secondary school teachers enrolled in classes at Stanford University, was conducted to select item which would describe a responsible or an irresponsible ninth-grade student. From the results of this study, a ten item Likert-scale inventory was developed which can be used for self-report, as well as for rating by others.

An additional pilot study was conducted at Marshall High School in Portland, Oregon, prior to the major study to check the adequacy of the tasks and to investigate the reliability of the criterion scoring system. Modifications were made in the tasks and in the scoring system as a result of this study.

For the major study, each S was administered the Gordon Personal Profile, an eighteen item inventory which employs a forced-choice technique. Four aspects of personality are measured by this instrument. Individual Ss were also administered the student self-report on responsibility and were rated by one of four male teachers. California Test of Mental Maturity total scores were available from the school.

Ss were given approximately 100 minutes of independent study weekly for five weeks and were encouraged to complete each of four separate independent study tasks. All Ss received the same four tasks, which they could attempt in any order. While no grades were assigned, Ss were told that a review of each student's work would be made and that the overall results of the five week's work would be used to evaluate the feasibility of an enlarged independent study program for the ninth grade. The average of the judges' ratings for degree of completion and for quality of performance were the scores used as the criterion variables.

The Results

Inter-judge agreement on the two scoring dimensions ranged from .80 - 1.00. Intertask agreement ranged from .55 - .65 for completion and from .05 - .18 for quality. The diversity that existed among types of tasks was reflected in the uneveness of individual performance.

Of the 300 Ss, 48 did not hand in any evidence of work done and an additional 16 did not complete all four tasks. The table below indicates inter-correlations among the three measures of responsibility, their correlation with the California Test of Mental Ability, and relationships of measured general ability and the responsibility scores with completion and quality totals. The three measures of responsibility correlate significantly with each other. However, only teacher-rated responsibility correlates at the .01 level with measured general ability and the criterion variables.

CORRELATION OF MAJOR INDEPENDENT VARIABLES ON COMPLETION TOTALS (ABOVE THE DIAGONAL) AND ON QUALITY TOTALS (BELOW THE DIAGONAL)

	CTMM	R	TR	SR	Completion Total
California Test of Mental Maturity (CTMM)	--	.11	.26**	.10	.22**
Gordon Responsibility (R)	.10	--	.25**	.47**	.04
Teacher-Rated Responsibility(TR)	.34**	.26**	--	.47**	.31**
Student-Rated Responsibility(SR)	.17*	.48**	.43**	--	.05
Quality Total	.36**	.08	.31**	.12	.40**[a]

[a] For the 236 Ss who completed all tasks

* Significant at .05 level

** Significant at .01 level

The stepwise multiple regression using completion and quality scores for each task indicated that teacher-rated responsibility tended to be the best predictor for completion (multiple R ranged from .21 - .35) and that the California Test of Mental Maturity was the best predictor for quality (multiple R ranged from .31 - .35). With the exception of student-rated responsibility, all independent variables significantly entered into one or more of the regression equations. The regression equations for completion and quality totals were:

Completion Total

Y = .22 (Teacher-rated responsibility) + .23 (Emotional Stability) -.18 (Ascendancy) -.17 (Gordon Responsibility) + .05 (California Test of Mental Maturity) + 1.20 (sex) + 25.10

Quality Total

Y = .19 (California Test of Mental Maturity) +.22 (Teacher-rated responsibility) -.14 (Sociability) + 34.54

To determine what predictive value each of the three measures of responsibility added to the ability predictor, multiple regression analyses, with the ability score entered first, were computed. Only teacher-rated responsibility added significantly to the predictive value of the California Test of Mental Maturity. When these two were combined they accounted for only 16 percent of the variability among criterion scores.

A comparison was made between the 236 Ss who completed all tasks and the 64 Ss who did not complete all tasks. Mean ability was significantly lower for "non-completers". However, "completers" and "non-completers" were found in all ability groupings. No significant sex differences on any of the measures of responsibility were found.

Implications of Results

Measured general ability accounted for only a small portion of the variability among completion and quality scores. Ther correlations between general ability and the criterion tasks may suggest that present practices of assigning students to independent study on the basis of general ability are not defensible.

In addition, the small increase in the predictive validity resulting from the three measures of responsibility suggests that there is little basis for using any of these scores for predictions concerning independent study performance. Nevertheless, the construct of student responsibility, particularly as represented by teacher rating, appears to contribute to an understanding of criterion performance in independent study. Until additional investigators supply more precise predictive instruments to guide school faculties, all students might well be included in independent study without *a priori* judgments being made concerning them.

Low predictive validity may be a function of limiting conditions operating in this study. Research utilizing a wider variety of task, environmental, and evaluative variables, in as many combinations as possible, would be extremely helpful and should add significantly to present limited knowledge concerning independent study performance.

APPENDIX O

Articles and Publications by Project Staff Members, School of Education, Stanford University.

Allen, Dwight... "The Continuous Progress School Building"
New definitions of flexibility, school design, facilities designed to encourage change.

Allen, Dwight... "Learning to Lie in School"
A study on the relationship between teacher and student .

Allen, Dwight... "Visuals for Staff Considerations for Team Teaching"
Index on staff uses.

Allen, Dwight... "A Technology and Performance Curriculum: Basis for Humanizing the School"
The advantages to expanding individual freedom, initiative and potential for creativity.

Allen, Dwight... "A Differentiated Teaching Staff"
A study of the role of the teacher in a professional staff with relation to the organization of educational programs.

Allen, Dwight... "Teachers Are Not Interchangeable Parts"
Role Differentiation among teachers

Allen, Dwight... "The Modular Instructional Unit - A New Approach to Individualizing Instruction"
An explanation on how to facilitate the individualization of instruction.

Allen, Dwight
Delay, Donald... "Flexible Scheduling - A Reality"
Opportunities and flexibility in flexible scheduling.

Allen, Dwight
DeLay, Donald... "Stanford's Computer System Gives Scheduling Freedom to 26 Districts"
What computer scheduling can and cannot do.

Bush, Robert N.
DeLay, Donald... "Computer Scheduling - Resources and Design"
An explanation of school scheduling by computer.

Allen, Dwight
Chatterton, Lynne
Oakford, Robert V. ... "School Scheduling - Practice and Theory"
A technical explanation of various programs used in the school scheduling system.

Bergquist, Robert ... "Computer Scheduling of Education Reform"
A detailed description of the SSSS system - its effects on schools.

Coombs, Arthur ... "Development of a Master Schedule"
An explanation on how to build a master schedule with computer scheduling.

DeLay, Donald ... "Visuals for CRAM"
Comprehensive random achievement monitoring - what it does.

DeLay, Donald ... "Small Schools Can Be Good Schools"
A study of small schools, their advantages.

DeLay, Donald ... "Small Group Instruction - A New Challenge"
An explanation on how to encourage greater personal warmth in the classroom and small group instruction.

DeLay, Donald ... "Computer Simulation of an Educational Design"
A case study on technical problems in a computer situation.

Knight, Olan
Sharpes, Donald ... "Stanford School Scheduling System"
Suggested preparation procedure for the SSSS system.

Sharpes, Donald ... "An Introduction to Modular Scheduling with the Stanford School Scheduling System"
A basic definition of computer scheduling.

SSSS ... "Visuals on the Resource Center"
The resource center, definition, functions, advantages and disadvantages, staff and facilities, development of the resource center.

SSSS ... "The Theme of Team Teaching"
A description of multiple personnel.

SSSS ... "Variables in Individual and Independent Study"
A list of propositions in relation to independent study.

Stanford University
School of Education ... "Visuals for the Large Instructional Group"
Large group instruction, the advantages and disadvantages.

Stanford University
School of Education ... "Bibliography on Independent Study"
Index of books prepared for 1967 Stanford School of Education Conference.

Stanford University
School of Education ... "Bibliography on Small Groups"
Index on small group literature prepared for 1967 Stanford School of Education Conference.

Stanford University
School of Education ... "Bibliography on Flexible Scheduling"
Index of literature on flexible scheduling prepared for 1967 Stanford School of Education Conference.

Stanford University
School of Education ... "Bibliography on Team Teaching"
Index on team teaching prepared for 1967 Stanford School of Education Conference.

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TITLE

FLEXIBILITY FOR VOCATIONAL EDUCATION THROUGH COMPUTER SCHEDULING

PERSONAL AUTHOR(S)

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ABSTRACT

This report describes activities and findings of a three year project designed to improve Vocational Education through computer generated modular scheduling. Objectives were to provide flexibility in curriculum and methods of instruction and to examine the impact of modular scheduling on school programs. The Stanford School Scheduling System (SSSS) was used for generating schedules for participating schools. Results included introduction of flexibility into vocational curriculums, expansion of use of performance criteria, changes in course design and modes of instruction, provisions for assumption of responsibility by students for their own learning, use of unassigned time for extended contacts between teachers and students, increased differentiation in staff utilization, and demonstration of the economic feasibility of SSSS as an enabling technology for vocational and general education. Included in the report are copies of data collection instruments, evaluation procedures, a case study containing patterns for individual subjects, a description of Project CRAM, articles concerning performance criteria, and detailed graphs and figures of evaluation findings. Results indicate that modular scheduling can be an effective tool when used by a staff that is genuinely interested in broadening its range of educational alternatives.

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