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Title III Innovations: Implications for the Gifted Student

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TITLE III INNOVATIONS: IMPLICATIONS
FOR THE GIFTED STUDENT

by
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SYNOPSIS

The purpose of the thesis is to analyze several innovative projects instituted by Title III of the National Elementary and Secondary Education Act of 1965 in relation to their effective use with the gifted student; whether the particular characteristics of the intellectually gifted and resultant learning and achievement are enhanced or hindered.

A theory of intellect appropriate for the gifted and their special characteristics, intellectual, emotional, and social is explained. The Aspen Total Exposure Program, a curriculum plan to expose the student to the entire breadth of human knowledge and experience while allowing him to plan his own independent study and achieve mastery of performance criteria to the level of his individual pace and ability, is discussed.

A Computerized Approach to the Individualization of Instructional Experiences attempts to match the unit of instruction to the particular needs of the student and develop a reperatory of these matchings for future reference.
The Proper Utilization of Student Transportation Time project seeks to employ an enrichment program of cultural and community events as well as an expansion of the regular curriculum by electronic means. This is done on the bus to better use the time spent in long bus journeys to school by rural children.

The Developmental Placement Project intends to start children in school according to behavioral age rather than IQ or chronological age. Hopefully, this will facilitate a readiness to absorb each succeeding level of instruction as it increases in difficulty through the school years.

The Random Access Retrieval System hopes to solve the problem of library storage of information and enhance individual instruction and independent study by making available immediately, and in unlimited quantity, audio and visual information to the student.

Implications for the gifted student, for administration, and for further research are discussed.
INTRODUCTION: BACKGROUND AND PURPOSE OF TITLE III

INNOVATIVE PROJECTS

Never in the history of mankind has education been aimed at each member of society as it is in the United States. Our philosophy of government assumes that since each citizen has an equal voice through his vote, all must be educated with the ability and desire to participate. We have long since become an infinitely complex industrial society in contrast to the simple agrarian society existing at the time of our establishment as a nation and the formation of the Jeffersonian ideals of equality of opportunity. Our expansion, prosperity, and world pre-eminence is due in no small part to the fruition of these ideals. The complex organization of a technical industrial society demands individuals qualified to meet the challenges of increasingly automated industry, pure scientific and space research, and the intricate needs of private and governmental administration. Growing affluence allows increased enthusiasm for and support of creative endeavors in the fine arts.
The public has long been aware of the increasing needs in the education of their children and has consistently supported their schools at the local and state level through bonding referendums and ever increasing taxes which they have supported at the polls through their school board members and state legislators. However, the saturation point has been reached in regard to local support, and attention is increasingly turned toward federal aid. The most recent programs funded by the Elementary and Secondary Education Act of 1965 include some of the most novel approaches to persistent problems. This act is the greatest single commitment ever made by the Federal government for the improvement of education throughout the nation.

Title III of this act institutes a program for making grants for supplementary education centers and services, to stimulate and assist in the provision of vitally needed educational services not available in sufficient quantity or quality, and to stimulate and assist in the development of exemplary elementary and secondary school educational programs to serve as models for regular school programs. Guidelines for approval of a program consistently demand that it be innovative and solve persistent problems in order to take a bold new look at educational
needs and to develop programs which illustrate innovative ideas as well as enrich curriculum.

The intellectually gifted student has never been given special treatment in our country's educational systems, because, according to our democratic ideals, no one group is allowed special consideration or favored treatment in our tax supported institutions. By the strength of their own abilities, the gifted were expected to take best advantage of the facilities provided for all. Yet it is from this group that the most effective leaders of industry, government, law, letters, and the creative arts will come. The increasingly serious problems of society looming ahead will demand from them even more inventive and far-reaching solutions.

Here the nature of the intellect and special abilities and talents of the gifted will be discussed. In view of the characteristics of the intellectually able student, five innovative projects of Title III of the Elementary and Secondary Education Act of 1965 will be described. They will be analyzed in the light of the special talents and abilities of the gifted, and ways in which these projects can best be used to their advantage will be indicated.
CHAPTER I

THE NATURE OF INTELLIGENCE:

STRUCTURE OF THE INTELLECT

Many theories of the intellect and the learning process have been advanced, from a theory of one general learning power to a myriad of special abilities or aptitudes, but none of these seem able to encompass the quantitative and qualitative differences of the average and the superior intellect. A relatively recent theory is that of J.P. Guilford, and from the research completed thus far, it would seem that the structure of intellect concept expands to make possible the nature of the gifted intellect as well as the ordinary one.

The discovery of the components of intelligence has been made by means of the experimental application of factor analysis; 

1J.P. Guilford, R.C. Wilson, and P.R., A Factor-Analytic Study of Creative Thinking. Reports from the Psychological Laboratory (Los Angeles: University of Southern California, 1952).
each factor is sufficiently distinct yet classifiable as there is a resemblance of certain facets. One basis of classification is the process or operation performed, and this obtains five major groups of intellectual abilities: factors of cognition, memory, convergent thinking, divergent thinking, and evaluation.

Cognition includes discovery, rediscovery, and recognition. Memory means retention. Productive thinking operations generate new information from cognated and memorized bits and consist of divergent thinking which searches or seeks variety and convergent thinking which finds the correct or best answer. In evaluation we make judgments as to goodness, correctness, suitability, or adequacy of the information produced by cognition, memory, convergent and divergent thinking.

Classification of the intellectual factors according to the kind of material or content involved gives a second direction to a theoretical cubical construct which might portray the abstract relationship among them. Factors of content would include the figural, symbolic or semantic. Figural content is concrete material as perceived through the senses, representing nothing but itself, visually such properties as size, form, color, location and texture, audially; tone, pitch, loudness, and tactily; texture, size, and shape. Symbolic content is composed of
letters, digits, and other conventional signs, usually organized in general systems, i.e., the alphabet or number systems. Semantic content is presented in the form of verbal meanings and ideas.

When an operation from the classification of process is applied to one of the types of content, the third dimension of the cubical construct appears. Experimental evidence thus far demonstrates that, regardless of the combinations of operations and content, the same six fundamental kinds of products and only these as far as can be determined by factor analysis may be found associated. The six basic products are the following: units, classes, relations, systems, transformations, and implications.

In the cubical model each dimension represents one of the modes of variation of the factors, first the various types of operations, secondly the four kinds of operations, and thirdly the several kinds of products. Each cell within the model posits a certain kind of ability that can be described in terms of operation, content and product, as each cell is at the intersection of a unique combination of the three dimensions.

Along the dimension of content, a fourth category is

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added and designated as "behavioral," a purely theoretical general area to represent "social intelligence."³ Tests have yet to be constructed which might ascertain facility in understanding, productive thinking about, and evaluation of human behavior.

Guilford's theory, rather than accepting the learner as a sort of stimulus-response device, considers him as an agent for dealing with information. His own analogy is that of an electronic computer rather than a vending machine. Thus learning is a discovery and an evaluation of information as well as the formation of associations in the form of stimulus-response connections. Therefore, education is a means of training the intellect, and the higher mental processes of thinking, problem solving, and creative thinking which have both specific and general aspects or components rather than simply depending upon the mastery of rather specific habits or skills. The general components may correspond to the factors of the intellect. While we do not know how greatly each factor may be determined by heredity, the most practical position would advance the possibility that each intellectual factor can be developed to a greater facility through the learning process.

Therefore each intellectual factor becomes a goal ability defined by a certain combination of content, operation, and product which would need specific methods to achieve its improvement, and we arrive at the importance of choice of curriculum and teaching methods. Might it be possible to enable students to become more adaptable to increasing technical complexities and fast-moving changes by training the mind rather than by teaching specific skills which may well become obsolete? Can the creative child and the intellectually gifted be better stimulated and encouraged to follow his natural bent without being penalized by a rigid system?

In the following analyses of recent innovations under Title III of the Elementary and Secondary Education Act of 1965, several projects will be viewed in regard to their suitability to meeting the particular needs of the gifted student. It must be kept in mind that they were designed for all the students in the particular districts, but since they are among the most innovative of all the projects, they may well have special application for the gifted. The Aspen Total Exposure Program conforms especially well to Guilford's theory of training the whole mind, while the Random Access Retrieval System is particularly adept at feeding information into the student "computer," there to be organized
and evaluated. The Proper Utilization of Student Transportation Time project as an enrichment program qualifies as an adjunct to training both specific and general components of the intellect. Only the Computerized Approach to Instructional Experiences treats the mastery of specific habits and skills as paramount and is seen to be based primarily on a behavioral rather than a total theory of the intellect.
CHAPTER II

THE GIFTED STUDENT: INTELLECTUAL, SOCIAL AND EMOTIONAL

CHARACTERISTICS AFFECTING ACHIEVEMENT

American education is intended to be democratic, based on
Jeffersonian principles of freedom of the mind, universal educa-
tion, higher education for all the talented, equality of opportu-
nity, and social mobility through education. The American charac-
ter developed an attitude of individualism, a desire for freedom
from organized state control, an aversion to "aristocracy," a
feeling of general equality, and self worth. However, following
the social theory of John Dewey in which the individual became a
microcosm in a macrocosm, the ideal of universal education was
put into practice as mass education wherein the individual might
best learn to adjust himself to the world. The gifted student
who might be creative enough to foresee the possibility and de-
sirability of readjusting the world to better serve men was often
frustrated. At best he was expected to "get more out of" his education due to his own superior abilities alone.

More recently, as the increasing need for highly trained and inventive personnel to man all fields of endeavor from electronics to social work is manifested; the dissemination of this need has stimulated the propagation of studies of the intellectually gifted, from Terman's longitudinal studies to social and emotional health surveys. Concomitantly there has been a significant response to an increasing desire to define the characteristics of and achieve reliable measures of superior intelligence and creativity.

From this research certain general and specific characteristics have emerged which affect the intellectually gifted and creative person and his achievement, both scholastic and productive. In terms of physical and mental health the gifted child shows superiority in these traits as well as the intellectual ones. Large population studies of children of all ages have shown that the intellectually superior are taller, heavier, and mature more rapidly than the average.¹ They also experience fewer emotional problems. Yet there are many adjustments which

they must make as a result of their unique abilities. Those who succeed in making a contribution of their talents also succeed in making the adjustments in a superior manner.²

Early indications of superior intelligence include quick understanding, curiosity, retentive memory, fluency of ideas and information, avid interest in number relations, maps, and encyclopedias.³ Early interest and facility in reading, a large fluid vocabulary, initiative and independence in thinking, ability to see relationships, make associations, adapt abstract principles to concrete situations, and observe and remember details.⁴ Further traits include the ability to generalize, interpret and recognize relationships, the ability to use economy in work methods and general efficiency.⁵ Character traits often noted include self-criticism, very courteous behavior, a keen sense of humour, a desire to excel, an enjoyment of competition, and a strong

²Jacob W. Getzels and Philip W. Jackson, Creativity and Intelligence (New York: John Wiley and Sons, 1962), p. 18.


sense of responsibility. The gifted exhibit a broad attention span and a high degree of insight into problems and are characterized by more frequent use of and greater uniqueness of the products of imagination.

The intellectually gifted may demonstrate qualitative differences in intelligence. Superior learners tend to learn by complex associative methods rather than by simple rote drill, and they seek sophisticated abstract principles which synthesize subject divisions. The average child begins to form his own abstractions at about the age of twelve, and his previous learning has been shaped by stimulus generalization. It can be observed, however, that the gifted child thinks in abstractions much earlier, can apply them to concrete situations, relate them to other areas of learning and experience, reaching the first stages of developing hypotheses.

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Success in the standard schools has been the general rule for the intellectually gifted, and correlations between achievement test scores and scores on IQ tests have been found to be very high. The incidence of underachievers who have high IQs but low production has been discovered to be a result of emotional problems in the home and family relationships which inhibit motivation. The superior mental ability of gifted children appears to be maintained throughout life according to follow-up studies made by Terman and Hollingsworth. The Terman longitudinal studies discovered that "the intellectual status of the average member of the group at the mean age of thirty years was close to the 98th or 99th percentile of the general adult population and far above the average level of ability of graduates from superior colleges and universities." 10

Sex differences in ability appear to be negligible. Though there were minor achievement differences between gifted boys and girls in various subjects tested, they were trifling when compared to the great superiority of gifted over unselected children. 11 Any difference is thought to be cultural, and this opinion is reinforced by a study which showed that girls who had

10 Terman and Oden, op. cit., p. 378. 11 Ibid., p. 28.
been taught to play with scientific toys scored equally high in mathematical and analytical aptitudes. Motivation and consequent achievement increases markedly for boys in the later teens when they realize that preparation for a life's work, its status and contributions are at stake.

Happily, the gifted have abilities in social and emotional areas as well as strictly academic and intellectual ones, contrary to indications from early studies and studies of some few famous creative geniuses. In the late nineteenth century Lombroso and Nisbet attempted to show that insanity was closely related to genius, but from controlled research studies beginning with Terman, the indications are that, if anything, the opposite is true; and the gifted are more emotionally stable than ordinary men. While creative poetic geniuses such as Edgar Allen Poe, Lord Byron, and Oscar Wilde have been victims of nervous instability while they produced their great works, this is not the


15Terman and Oden, op. cit., p. 57.
rule for the profession of the arts and does not hold true in other fields. 16

The highly creative child may not be well-rounded, preferring to concentrate his efforts toward the interests of his own imagination. These students may not do particularly well on achievement and intelligence tests yet may have great stores of information in specific areas, great imagination in solving problems and developing ideas in a highly inventive, flexible, and original manner. 17 They often try the teacher's patience and indeed prefer to learn on their own. Creatively gifted students like to attempt difficult tasks, and a common experience in the lives of outstandingly successful creative individuals has been their ability to cope with failure and frustration. Consistently they have attempted tasks with intense persistence which would have patently seemed too difficult, but to the creative intellect fulfill a demand for originality and a satisfaction for an absorbing curiosity on the fringes of human knowledge. The creative achievers are motivated by a search for a purpose which will

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enable them to fulfill their feeling of destiny and be worthy of the enthusiastic devotion of which they are capable. In discovering their potentialities, how much better it is to help them achieve their self-concepts creatively rather than to attempt to mold them by authority.

Happily, the gifted and creative individuals search for their own ways of expressing their uniqueness. Yet they often feel it necessary to reject the demands of society to conform rather than surrender their individuality. They do not intend to be poured into a mold of "normalcy" or conformity expected by society of its members. Attitudes toward success differ too, and the creatively gifted person is less concerned with conventional standards and more interested in intrinsic merit and accomplishment. The choice of a greater variety of vocational occupations and those of a more unusual and rare nature is a further indication of their propulsion toward uniqueness.  

In daily school relationships highly creative students are known by their "wild and silly" ideas. Their work produces "off the beaten track" ideas, and since they do not conform to standardized dimensions, behavioral norms, and expected answers on

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which ordinary responses are judged; both fellow students and their teachers are often at a loss in evaluating them. The resulting psychological estrangement is fortunately tempered by characteristics of humor and playfulness on the part of the creatively gifted individual. Fortunately, they are usually patient with the rest of the world.

In the area of social interaction, close friendship involves a personal, mutual awareness, a liking and confidence, and a secure satisfaction in interchange. The one to one relationship of friendship differs greatly from the more general status of "popularity" and is a great deal more important for developing human beings, gifted students as well as others. It is necessary for each of us to have close friends to be complete persons. Educational and clinical evidence shows that the individual must be complete and contented within himself to be of maximum benefit to society as well as to achieve the greatest measure of accomplishment and happiness for himself.

Gifted children have long been encouraged to "get along" with those of the same chronological age "because the world is full of average people, and it is necessary to get along with everyone." Originally a child's choice of playmates is limited to those close geographically and those in the same narrow range
of chronological age found in his school class. The child with a higher mental age than his chronological age group has very little chance to find anyone of like mental age, even if he would take greater pleasure in such a relationship. Yet it is only those persons who have experienced closeness and mutual trust and who have been successful in achieving understanding of others throughout the years of childhood who can display sympathy and understanding and who can achieve closeness as adults. Perhaps the reputed aloofness of the "egghead" is the result of his inability to have "practised" friendships as a child.

One can guess the discouragement of the intellectually gifted child as he tries to talk and play with the average child in the same chronological age group who keeps missing the point, confusing issues, and requiring endless explanations to get him into action at all. Conversely, it can be seen what a joy it can be when the gifted children's abilities are similar, and one's companion sees instantly what one is talking about and says and does things that seem interesting, clear and important, even when he disagrees. Ability grouping and partial separation into gifted sections for part of the school day have enabled some gifted students to find friends of their own level, but for the

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19 Ibid., p. 334.
most part they are left to their own devices to seek meaningful relationships.

Thus the intellectually gifted student is seen to have not only greater abilities than those in the normal range, but special needs and problems as well. The following analyses of five innovative projects will indicate the specific ways in which they will aid the intellectually gifted to expand their abilities, quantitatively and qualitatively, intellectually and socially.
CHAPTER III

ASPEN TOTAL EXPOSURE PROGRAM

Secondary education is the last chance for all students to obtain a liberal education and to sample all the possible fields of endeavor. Indeed, it is the only chance where both a mastery of the fundamentals of learning is assumed and many broad areas can be experienced in some depth. Yet we presently narrow this experience by fragmented areas of study, proliferating course offerings, insisting the student reject possible areas of interest by selecting others, and then force him to spend prescribed, rigid blocks of time in each course. He may spend a semester in trigonometry or algebra but never relate it to music or woodworking or experience the joy of both theoretical and applied knowledge. He may successfully complete three years of science but never study human behavior, because this aspect occurs only in an "elective" course.
Therefore, in order to develop greater self and social awareness, an increased desire and ability to improve one's self and society, the Aspen Total Exposure Program will offer a curriculum devoted to total meaning and relevance to the world of human experience and knowledge. The Forum program will be a year long, four year examination by each student of the power of authority, society, love, mind, energy, economics, religion, government, family, and ideals. Fifteen to twenty per cent of each student's time per week will be devoted to this endeavor.

Increasingly, year by year, the Forum will enlarge its scope so that eventually courses such as geometry, algebra, chemistry and physics may "disappear" into a more comprehensive study of thought and problem solving processes. The fundamental elements of these areas would then become the vehicles for a higher and more relevant goal. Until traditional courses can be transformed, the Forum intends to expose the relevance and significance of the other regular course work. In investigating the power of the mind, for instance, the student will study types of thought processes which lead to problem-solving techniques. This will lead to a study of how algebraic, geometric or other scientific methods develop patterns for problem-solving, and thus, patterns for self-improvement.

Eventually all areas of activity and study will be gradu-
ated into elements of performance criteria rather than as pres-
ently ordered, blocks of time. Then, student exposure to the
total curriculum would be required at the basic levels of cri-
teria. Future phases of the project will concentrate on the fu-
sion of major areas of study and the development of performance
criteria.

Only when the accomplishment of a performance criterion,
rather than a time requirement, is used to determine student pro-
gress will a program be individualized. Now a student must spend
the entire semester in a calculus course, although he might com-
plete the requirements or reach his intellectual ceiling in one
month; or he might be barred completely from the course if he
does not have a reasonable chance of success in the entire course,
though he might profit from exposure to some segments. The total
exposure plan intends to allow student progress to be measured by
performance criteria according to levels commensurate with indi-
vidual ability in any area of activity or study.

Independent study and honors courses are becoming in-
creasingly important and prevalent in colleges and high schools,
but in most cases the schools arbitrarily limit independent study
experiences to those who are academically and socially sophisticated,
thus benefiting only a small percentage of students, who have often been arbitrarily pre-selected as well. The Aspen plan for total exposure would eventually provide all students with a sufficiently broad range of alternatives from which they can more intelligently select, and more enthusiastically and profitably pursue, areas for independent work. By leaving fifty to sixty per cent of all students' time unscheduled, it has committed itself to bear the trials associated with the development of self-discipline and responsibility. A major buttress of the total exposure program will be a strong advisory system which asks each staff member to be personally responsible for approximately twelve students during their entire high school experience.

The program as a whole intends to be a new model for secondary schooling which would reinstate intimacy in public education, remove the abstractness of subject matter which has deadened school experience for so many students, one that broadens the student's choices of alternatives for learning and life planning, a model which provides more than a theoretical basis for the role of the student himself in the order of societal development.

From the theoretical and structural framework of the total exposure program, it seems that it will hold the greatest appeal and benefit for the gifted student, as well as being most
efficiently and effectively administered for them.

Intellectually, those generalizations and correlations which are fundamental in the operation of the gifted intellect are encouraged and fostered in both greater breadth and depth here than in a traditional curriculum. Indeed, many associations and integrations which the student must make for himself in a time-subject oriented course are the standard basis of the total exposure program. The comprehensive spectrum will inspire the gifted student into more areas of specific interest, and his intellectual ability will enable him to reach the accomplishment of the basic performance criteria early enough to allow him to investigate more fields of endeavor and those in greater depth than is possible in an ordinary high school program. Even the gifted underachiever may find his interest piqued during the basic exposure, and because the performance criteria are individual and the further effort is independent, he may try harder when he is not being constantly reminded that "he should be doing better."

The most significant advantages seem to be for the scientifically gifted and those who will eventually choose fields in mathematics and engineering. Prerequisites for basic and advanced degrees in these fields are so stringent that students rarely have time for the study of the humanities, or the liberal
and fine arts. If it is possible for them to explore these fields in the total exposure program while achieving the necessary competence in the fundamentals of their own demanding field, they will not only achieve more well-rounded personalities and enjoy more versatile interests, but creativity and ingenuity in mathematics and the sciences may be enhanced individually and collectively. The associations, correlations, and inspiration from fields far from the major interest may stimulate discovery and invention in the future through these deliberate means as it has by chance in the past.

The social interaction among gifted students may easily be provided in the total exposure program. Group efforts may result from an independent study experience; perhaps a play written and acted, an experiment conceived singly which takes several investigators, language dialogues with ad lib responses. The intellectually able would have the stimulation of other similar minds and the opportunity to forge deep friendships. There is plenty of room for the creative mind to maneuver, yet there is the assurance that broad competence will be assured.

The gifted student is tailor-made to take advantage of the independent opportunity to select the alternatives and responsibly pursue the areas of independent work, and he will be readily able
to plan for the fifty to sixty per cent of his unscheduled time. Indeed, it is in this area where the intellectually able students are severely penalized in a regular curriculum planned for the average student, not only because time is wasted which he could be using to better advantage intellectually and creatively, but because he is usually prevented from assuming personal responsibility and thus is hampered socially. Here he would be given an opportunity for the exercise of social and personal maturity in decision-making commensurate with his intellectual ability. These decisions may include pre-vocational choices and assist him in planning his life. In an ordinary situation, an advisor often feels at a loss to direct the gifted student toward a vocational choice, and even with a good testing program, the counselor often disclaims the responsibility of encouraging a choice of one field where there are many for which the student may exhibit exceptional aptitude. Saddest of all are those whose tested achievements and ability are so remarkable that choice is postponed, education is fragmented, and later lives of unrealized possibilities are endured. Here the student himself will have more information to bring to the counselor of the greater variety of fields to which he has been exposed in greater depth than is the current situation.

In the total exposure program, if the ratio of one
advisor to each twelve students is maintained, personal intimacy and interest will be fostered, particularly if the student develops rapport and can continue to see the same advisor during his entire high school career.

The possibility of problems exist if the staff member would be unable to give the caliber of direction, information and advice necessary, if he is not more than cursorily familiar with the areas of endeavor and possible interest for the gifted student, if he might be subconsciously jealous or resentful of an intellect superior to his own, and if he is impatient with a fluctuating need of his support. However, if particular care is taken to match the gifted students with those advisors best suited to their special abilities and needs, and if perhaps guidelines are issued to the advisors which point out the intricacies in counseling the gifted, superior results can be anticipated. This aspect of the total exposure program may be most valuable in making the other sections of it meaningful to the gifted student.

Generally, by an a priori analysis the Aspen Total Exposure Program has many advantages to recommend it for special application to the gifted and fills many of their particular needs and conforms to their special characteristics and abilities demonstrated by the research studies. A posteriori further
analysis is indicated, hopefully to examine successful results of objective measurements of student learning achievement and attitudes.
CHAPTER IV

THE DEVELOPMENTAL PLACEMENT PROJECT

The developmental placement program will be a model functioning program which will work towards the proper placement of students in selected schools, an action research project which will demonstrate that children best work at their proper developmental level. Implemented with a typical cross section of the children in the school district, the important factor is to attempt to insure each child's readiness for a given educational program, be it a particular kindergarten group or farther along into the elementary grades and regardless of educational or cultural backgrounds of their families. The main needs are to determine a child's "school readiness" at the beginning of his educational career, or, for those already moving through the grades, proper "replacement" if the child is struggling at a level for which he is not ready developmentally. Thus the program assumes
behavioral age to be more important than I.Q. or chronological age.

Use of the vast amount of research spanning over fifty years from the Gessell Institute of Child Development and the extensive study and experience in child behavior in the school will be utilized by Frances L. Ilg, M.D., Director of the Institute, and other qualified staff members who will instruct, supervise, and oversee the model program and train its developmental examiners. Since the individual test of behavioral age will be crucial to each child's placement, the developmental examiner is the cornerstone of the program; and evaluation of his training as well as the general program and its effect on the children is planned.

The program is innovative in that it makes actual use of research and experience from the Gesell Institute focused on individual children to determine developmental readiness to approach the learning and living situation. It is exemplary in that it will be simultaneously a model program at work and an instructional internship program for Developmental Examiners. Five schools will participate, each requiring four kindergarten sections, A.M. and P.M. sessions, meeting in two rooms. Sixteen to twenty developmental examiners will be trained.

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In their clinical work, the Gesell Institute found that many children referred to them were often suffering from the stress of overplacement in school. Most frequently this was on the simple basis of being too young for the grade in which they were expected to function. Consistently, reports funneled into the institute from educators indicated that the older children right up through high school were those who were achieving and adjusting best. The sex of the child also seemed to make a difference; boys needed about a six-months delay in starting school.

Thus for a student to have the greatest chance for success in school, a boy should be five by March 1st and a girl by September 1st to start kindergarten that September. However, with arbitrary cutoff dates, though the majority of children might be properly placed, the individual child might not be; so each child should ideally be appraised. The developmental examination is used for this purpose and is applicable for children between the ages of approximately five to ten.

The series of school readiness tests consists of the well-known Gesell Incomplete Man Test, a developmental interview, copy form tests, Monroe Visual I and Visual III, right and left tests, and the Lowenfeld Test. The children are also asked to write their name, address, letters, and numbers: to name animals, and
to give home and school preferences. The most popular of the
tests with children, and perhaps the most illuminating for inves-
tigators, is the Incomplete Man Test which consists of a letter-
size sheet of green paper on which the partial figure of a man is
drawn in blank ink, having one arm and hand, one leg and foot,
one ear, a nose, a half-head of hair, and half a bow tie at the
neck. Firstly, the identification answers tend to vary with the
age of the child; four-year-olds calling him a "snowman," "Santa
Claus," and older children identifying him as "part of a man" or
"man without" certain parts. Thus as the child is directed to
finish the figure, the examiner records the order and method and
his comments such as "now he can walk." The level of maturity is
indicated by the manner in which he completes the man. As the
child matures, he places the arm higher on the body line, turns it
upward, and makes it shorter. The leg moves from too far out on
the body line to the correct position and becomes shorter. The
scribbled eyes made by the very young child change to large open
circles, to small open circles, to filled-in circles, to dots,
and finally to an oval shape with pupils. Ears are first placed
too low, then too high. The neckline area, which demands most of
the child, is seldom drawn with any degree of accuracy until age
seven. When the drawing is finished, the examiner asks, "How
does the man feel, happy, or sad? How can you tell?"

Because the partly finished printed figure is the same for every child, artistic ability is not a significant factor in the response. Details and placement indicate maturity.

The developmental interview also tells investigators a lot about the child's level of maturity. Five-year-olds, when asked, "What does your daddy do?," will often answer with a simple "He works." A further inquiry will reveal that daddy "works down in the cellar," or "digs in the yard" or "eats dinner." When the child is five and a half, however, he is much more aware of his father's occupation. He may say that his father "makes telephones" or "prints things" or "fixes things."²

This is followed by a more thorough examination of each child during the school year and coupled with teacher recommendations will include any necessary adjustment for proper placement. An improperly placed student has a difficult time experiencing success in a regular school program, and as long as he remains in the wrong place, no matter how much of a remedial program or special help is given, generally he will make little, if any, improvement. Conversely, a properly placed student will experience

success and will automatically generate his own enthusiasm for learning. Consequently, both teacher and student can direct more time and energy to the real creative aspects of learning rather than the "patching up" process inherent in so many present programs. Currently the kindergarten teacher has little preliminary informational material about the child and must work through trial and error. Much "busy work" could be rendered unnecessary, and individual learning could be made more effective if she were aided by a developmental appraisal of each child. When the children are grouped together in the beginning, they can achieve together; and an effective class program can begin to move earlier in the school year.

Teachers have not only had to put up with the misplaced child and with the child who is hard to teach, but also with the disruptive child, often a burden too heavy for the welfare of the group. The time a teacher spends during a morning with a disruptive child has been clocked in research studies and has been found to extend to as long as 25% of the total time the teacher spends with the class. Furthermore, this is not teaching, but custodial care; and the class is not only being disrupted but being deprived of the teacher's attention, which they who are attentive are entitled to receive. A solution of proper placement of
disruptive children needs to be found, not only for the sake of the teacher and class, but for their own behavior and education.

If a group is really ready for the work of a grade, then the teacher can use her energy constructively, and her otherwise wasted energy formerly needed to combat discipline is now available. Much creative potential of teachers has barely been tapped heretofore, partly because their energy was used in dealing with disruptive or unready children or because a rigid programming was needed to hold a group together. Not only do a creative teacher's forces become available, but those of the group itself are liberated. The group, when working well together, can generate its own energy and ideas even at the primary level.

The recommended grouping itself differs from traditional grouping in that the basis is behavioral age rather than chronological age and/or intelligence quotient. The Gesell Institute experience suggests that if all children who are behaving at a five-year level, or a six-year level, are grouped with their developmental peers, all will be ready for the kind of instruction being given. There may be many levels of intelligence represented by the children in any one class, and thus the class will exhibit individual differences in this and in special interests as well, so there will be no danger of the children being too much alike.

This kind of grouping, based on behavioral age, seems
tp be preferable to grouping on the basis of intelligence alone, which so dangerously penalizes the superior immature child by putting him with children whom he equals intellectually, but whose behavior and general ability and functioning level are far ahead of him. If the groups could be divided into A and B groups or different quality levels, the intellectually advanced and high achieving child would no longer need to be accelerated an entire grade. He could stay with the age group whose developmental level is comparable to his own, but receive the stimulation needed from a more demanding curriculum and enrichment projects.

By proper placement originally, the slower developing child will be spared the discouragement of failing an entire year and the heartbreaking social stigma attached, particularly in the intermediate and upper grades. The intellectually gifted child, if properly placed at the outset, will be spared a whole year's acceleration which inevitably means he must miss a thorough exposure to some fundamentals and a forced association with those who may be intellectually his closer peers but socially and behaviorally ahead of him.

In evaluating the developmental placement project in regard to the gifted, a salient feature must be its simplicity. With little complex equipment or expensive facilities the concept
would seem to be feasible for the great majority of school districts which are limited in funds and where any program must rest on a structure consisting of a teacher and a classroom of thirty pupils. This least expensive method may be of great benefit to the gifted student where he is able to associate with others of his own developmental level, and if a challenging curriculum is introduced, he will be exposed to the creative interchange of ideas among his peers. Secure and meaningful friendships will be possible among the gifted with their behavioral equals; deep friendships are usually a problem for the creative child when only associations with normal children of his chronological age are possible.

There may also be a fruitful field for research in Guilford's fourth area in the structural model of the intellect. It may be possible through research and study of the characteristics of the children in specially gifted sections of developmental placement, to identify and refine the particular contents, products, and operations along the behavioral dimension and to institute teaching methods which might enhance their functioning. Not only would such research, if successful, aid in increasing the social intelligence of the gifted, but would certainly enable some transfer to the training of all children.
A possible corollary benefit to developmentally placing the gifted might be the successful avoidance of the problems of some gifted underachievers. Those children who are immature and dependent although intellectually gifted would be able to progress at a slower pace in order to "catch up" behaviorally. Frustration and discouragement might be avoided, and these children could begin with achievement and enthusiasm, developing socially commensurate with their intellectual capacity. As they gain motivation and a sense of responsibility, the tendency to underachieve would probably be dissipated.

It would seem that this concept might be used effectively in conjunction with other programs for the gifted in order to enhance the total benefit. If developmental placement were practiced initially, a total exposure program and a random access retrieval system would have even greater assurance of successful results.
CHAPTER V

PROPER UTILIZATION OF STUDENT TRANSPORTATION TIME

The Gunnison Watershed School District is quite isolated in many respects, being surrounded by high mountains and lying two hundred miles southwest of Denver, the closest large city. Although served by an airline with daily flights and a daily bus schedule, travel is quite often limited during several months of the year. On cold nights in winter it is not unusual for temperatures to drop to thirty-five or forty degrees below zero, so that many students and families are discouraged from attending events of a cultural or educational nature from the outlying areas. Facing long bus rides, many students must get up much earlier in the mornings and return home later than students for whom transportation is a relatively minor problem. Thus, since these students live a considerable distance away from Gunnison, they are frequently denied the opportunity of observing, or the
privilege of participating in many of the cultural, recreational, and educational projects that are carried on within the nucleus community as well as the extra-curricular activities at school.  

Furthermore, under ordinary conditions, these children have relatively little choice in the use of the forty minutes to two and a half hours each day while they are being transported to and from school. By utilizing this previously unplanned student transportation time through the use of enrichment programs and individualized activities on the bus, it is hoped that these students will be provided an opportunity to experience a variety of cultural, recreational and educational experiences.

The electronic equipment for the utilization of student transportation time project will include a headset and selector switch for each student on the seventy-eight passenger bus. This switch will make it possible to tune in one of the three audio tape channels or the AM radio programs. In addition, there will be four individual cartridge tape recorders that students may utilize for independent study. This would allow at least one audio program for each student of the three ability level groups, plus one radio program and four individual audio programs. Any student would have the option of not listening to the programs.

and could sit idle, talk with friends, study, or rest.

In general the programs are designed to incorporate the following objectives: maximum use of the natural curiosity and interest of the student, provision for individual differences in which the students may work independently, encouragement in developing habits of self-discipline and attitudes favorable to independent student effort which will carry over to the students' regular work and to their future lives as well. It is hoped that the programs will aid the students in developing their own profitable use of leisure time. In regard to the program material itself, the most important consideration is that it must in itself compel the students' attention and interest. It should require little or no help from others.

There is at least one program for each of the three levels of students who are on the bus: juvenile (grades one through four), intermediate (grades five through eight), and high school (grades nine through twelve). However, individual experimentation will be allowed, and any student may participate in any program regardless of actual grade level in school.

The offerings are categorized into five major areas: social studies, English, science, recreation, and fine arts. The single concept idea is to be presented that can be encompassed in
programs ranging from three minutes to the time limit of one hour, the latter for those students riding the bus the longest length of time. The student is able to select a program from those which may be on the bus at any given time with provisions made for requests. They run continuously throughout the duration of the bus ride.

An instructional materials center includes a program development studio for all kinds of materials which can be adopted to sound tape recordings. Programmed materials come from three sources, rental, loan, purchase and those created at the center. Work and storage space accommodate one tape recorder, an AM radio, one record player, supplies and materials. All programs are reviewed, edited, and developed in the center, are stored here and made available for distribution to the bus. After they have been prepared and used, those programs judged most worthwhile are saved and stored for future use, in this way building a collection from which students and teachers could request programs to be repeated.

Appropriate special events of school and community activities could be taped by audio and placed on the bus for students who had not attended the program, thus giving them an opportunity to hear some of the activities they would otherwise miss. Special programs from the local radio station could be placed on tapes for
students to hear later. Current events, biographical and historical sketches of famous people, places and events could be made available in a dramatically interesting manner. Students would have an opportunity to study the local area they traverse, business and economic implications of the community, interesting geological formations, plant life, changes of seasons, and weather. Units on hunting, driver training and safety, home safety and topics of related importance can be made available. Famous plays, readings, poems, and music can be presented in a dramatic way that would compel students' attention. Programs on the significance of special holidays could also be added. The bus could be used not only for transportation of students to and from school but could be employed with great advantage for field trips, trips between schools where students are being transported. It might also be used as a supplementary classroom designed for audio communications for short periods of time during school hours.

The proper utilization of Student Transportation Time project is innovative in these concepts: the school bus is a mobile classroom, providing enrichment simultaneously for group and independent study, providing for efficient use of transportation time previously wasted. Its flexibility and versatility may lend itself to other types of community application, and other school
districts may find the project applicable to their own situations. A corollary and beneficial result may be a great improvement of discipline on the bus leading to great driver tranquility and a generally safer operation of the entire student transportation system.

In the early stages of evaluation, it has been found that the project is meeting with a great deal of success. From random samples it was found that most students involved do listen to the tapes and find them interesting, and their parents are highly pleased. Behavior has improved, and there are not nearly as many disciplinary problems as there were. This is a natural result of the estimate that about two-thirds of the earphones are in use at all times.

The most important implication for the gifted in this particular project is that it is offered to rural children whose gifted population has previously been largely ignored. Though an increasingly dwindling proportion of the total population remain in rural environs, nevertheless these areas of our nation contain gifted students whose special needs and abilities have not been met or recognized partly due to the high cost of special facilities for small numbers.

Although the Proper Utilization of Student Transportation
Time project is an enrichment program available to all the bussed students, the gifted will be able to take best advantage of it. They will be able to explore broadly areas which the limited hours of their school day do not permit and subject areas which the course offerings do not include. They will be aided in developing a superior mastery of the basic disciplines of their regular academic program in depth and commensurate with their abilities. Although these expanded horizons may open new vocational choices for some, many will continue to prefer entering the traditional occupations of their fathers, farming and ranching. Here too, a desire for higher education and increased competencies may be engendered by the enrichment program in the areas of mathematics and science. Equally important, these gifted students will have become more culturally well-rounded through their exposure to the humanities and fine arts and will become more effective rural community leaders.

While many communities with large transportation commitments might profitably adapt a utilization of student transportation time enrichment program, a most important experiment with urban students could possibly be successful as well. If there will be large numbers of culturally deprived children transported long distances in order to foster school integration, an audio
enrichment program might be a significant aid in helping them attain the expected grade level. It might be of inestimable value to the potentially gifted in sparking their interest and giving an introduction to common cultural ground to share with the gifted students with whom they are being integrated. Many discipline problems, inherent in this difficult situation where disadvantaged children ride long distances, may be minimized.

Not only does the student transportation time project provide for proper utilization of long periods of time previously wasted each day, but it offers an enrichment program to rural children who were formerly unable to experience many cultural activities. It suggests the possibility of other adaptations in other sections of the nation. The gifted will be able to take best advantage and profit most from these efforts.
CHAPTER VI

A COMPUTERIZED APPROACH TO THE INDIVIDUALIZING OF INSTRUCTIONAL EXPERIENCES

Each year research adds to the reservoir of knowledge in the field of education relating to curriculum, the learning process, and the nature of individual students and teachers. Sound decisions concerning specific learning experiences become increasingly difficult as this body of knowledge spirals. Now instructional decisions are made by the teacher based on his own previous experience and his ability to recall; but due to human limitations, the amount of information used is fairly constant and relatively small.

Recently computers have become available to expand our capacity to utilize this ever increasing reservoir of information. They can be a tool which will be able to rapidly and

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tirelessly sort, categorize, search, retrieve, and display information. This project will compose programs and use computers to organize appropriate information for designing programs for individual learners.

The teaching-learning process, according to the philosophy basic to this project, is a very complex set of interactions between the individual student and his learning environment. This might be described as the interaction of two dynamic systems, one representing the learner, the other representing the teaching-learning environment with which he interacts. The teaching-learning environment is a composite of instructional variables which includes objectives, learning content, and processes. The individual learner is a composite of variables, many of which can be identified and quantified. These variables can be controlled to provide learning alternatives which are tailored to more nearly match the individual learner variables; and they, with few exceptions, continue to be modified as a result of growth and experience.

A conceptual model has been developed which will accommodate the component parts of the two systems and their interaction and allow the use of the computer to assist with the decision-making process of the instructional program. The component parts
are each broken down into the smallest segment or "module" that can stand alone and be dealt with in some relationship to the other "modules" of the system.

The focus of the two systems is provided by a series of systems "organizers" which are statements of expected outcomes or broad general goals of education. The specific behavioral objectives would define those concepts, skills, and knowledge which must be acquired by an individual as a step toward the attainment of the general objective as stated by the organizer. The specific behavioral objective indicates what behavior the individual must be able to perform, if he has achieved it, under what conditions performance can occur, and to what extent performance will be manifest. The great number of behavioral objectives relating to the organizer will be both sequential and non-sequential in nature, and it is important that the relationship of one specific objective to another be identified.

Individual content may vary, as adequately defined behavioral objectives will allow the use of a variety of learning content. No longer must all children read the same stories in order to achieve the skills of reading. Alternatives will make possible more relevant learning experiences for individuals by providing materials of different levels.
The process variables will define types of learning activities, media, grouping patterns, and teaching strategies to be used with learning content in order to achieve specific behavioral objectives. In identifying process variables, provision will be made for alternatives at the various levels of abstraction. These include primarily experience-based alternatives such as direct, purposeful, dramatized, contrived experiences, field trips, demonstrations, and exhibits. Primarily symbol-based alternatives include the use of records, tapes, verbal symbols, and still and motion pictures. T.V. contains elements of both.

The curriculum modules for each organizer will be filed on a three dimensional curriculum map. Its objective will determine its location, the vertical dimension being the sequence of difficulty and the horizontal dimension being the sequence of depth or level of learning. Modules containing alternate learning content and learning process for each cell will be accommodated by the third dimension. Thus modules will be constructed to enable students to pursue learning activities at various levels of learning as they move up the vertical sequence of difficulty.

In instructional decisions there are two aspects to be considered in providing a better match between the learner and his environment. The first is the selection of behavioral objectives
for the student at any point in time relevant to his capabilities and level of development. The second decision is the selection of learning content and process which best aids him in acquiring the specific behaviors as described by the objective. The curriculum modules will provide information about teaching-learning alternatives for these decisions, and the teaching-learning cycle will provide a framework in which these decisions can be made and implemented.

The selection of behavioral objectives in a performance-based system for individual students will be much more precise than in a traditional system, particularly where the objectives are highly sequential. Originally, specific diagnostic tests will be needed to help identify where each student should enter on the curriculum map, and records of students' past performances and teacher judgments will assist in placement. Errors can be remedied by moving the child up, down, or to the right or left, using the other alternatives until an apparent match in student ability and objectives is reached. Information concerning the student's reading level, interests, and concerns will provide the initial basis for selecting learning content variables. The process variables will be based on information about the student's learning style and ability to cope with various levels of abstraction. A
critical record of types of experiences engaged in by the individual student will be helpful in determining the level of experience where he can best operate and will also suggest the media and mediating conditions to which the student can best relate.

The requirement which the use of a computer imposes on a system for breaking down the information into its smallest component parts will provide the opportunity to gain new insights into the teaching-learning process. The capability of the computer to handle many variables can assist in the analysis of the interaction of these variables and will provide the opportunity for a systematic refinement of the instructional program.

The computer will be used initially for the retrieval of the information from two data files, the first made up of the curriculum modules of the teaching-learning environment. Its structure will be determined by the curriculum maps, each of which is built around a system organizer. The second data file will contain information about the specific characteristics of the individual student which will assist teachers in making instructional decisions. As the two data files are used, a record will be kept of the "matches" made between the curriculum modules and the characteristics of the individual learner. If it is a good one, and the individual acquired the specific behavior, a record
of this "match" will be stored in the computer, building a reper­
tory of them, so that instructional decisions will not just be
based on one teacher's best judgment but be founded on a compo­
site of the best judgment of all the teachers who have used the
system.

Eventually the computer will provide the teacher with in­
formation about the student's progress and capabilities which will
assist in the selection of specific objectives as well as his in­
terests, reading level, and style of learning which will all sug­
gest the best learning content and procedures to be used. Capa­
bilities must include easy updating of student information. Al­
though the individual learner will provide the focus for the com­
puter-teacher guidance system, this does not mean that all in­
struction will be on a tutorial basis. In any group of students
there is the possibility that more than one student is ready to be
involved in a given learning situation. The computer will be pro­
grammed in such a way that the teacher is kept aware of the pro­
gress of the students and can group for economy and efficiency
where it does not conflict with individual student progress.

This project is most prominently of a technical and ad­
ministrative nature and does not offer interesting or challenging
content to the degree necessary for the gifted. Indeed, it would
seem to be geared more effectively for the slow learner where special procedures in teaching methods must be fitted to his particular learning problems. The intelligent student is noted for his flexibility and can accomplish specific ends through a variety of means, but the largely sequential and structure nature of this project does not allow the interplay of these abilities. The methods seem quite mechanical and lock step and do not appear to allow the student's pursuit of the subject himself at his own greater breadth and depth. The individualizing of instructional experiences is definitely based on strict behavioral theory with the addition of some original vocabulary terms. The segmentation of learning into minute parts or "behavioral objectives" indicate a compartmentalization of the mind in opposition to Guilford's theory of training the whole intellect. In this project the emphasis is on specific habits or skills to be accomplished, and the generalizations and correlations between subject areas, special characteristics in which the gifted excel, are ignored. The ability of the intelligent student to perceive relationships is not given room to mature. The mark of creativity, the spark of trying to do something beyond the ordinary scope, or unique and original is discouraged by not being encouraged. Indeed it is entirely ignored in the setup.
Although the student-teacher ratio in this program would seem to be necessarily high, there is no provision for guidance and counseling of a personal or vocational nature from a professional level. There does not seem to be any provision for student independence of choice; in regard to the gifted, motivation for such self-determination exists to a high degree. Here the computer-teacher decisions dominate the individualizing of instructional experiences completely.

Most significantly, the fatal flaw of this project is that it rests on a particular, aberrant type of behavioral theory, and one which we have seen is most complicated and difficult to explain.
CHAPTER VII

RANDOM ACCESS RETRIEVAL OF
INSTRUCTIONAL MATERIALS

Confronted by enormously expanded technical complexity, we are experiencing an information explosion being compounded so rapidly that one observer estimates that we are approaching the time when our publications will weigh more than the planet. There is more significant information available to our school libraries than can even be presently used effectively, and the physical problems of storage alone are prohibitive. Secondly, the possibilities of truly individualized instruction are finally being realized on a large scale with flexible scheduling, independent study programs, and other innovations. To enhance these efforts a random access retrieval system is an innovation having a significant impact on individual instruction and the library system.
Originally the system will be audio and will consist of a master storage bank, a program center, and twenty-five student carrels or stations, from which the student will select the item desired or assigned from the storage banks, and within thirty seconds will be able to begin listening to that program.¹ Unlike a language laboratory, this system will have random access. No school or college is now able to provide random access to the material subject to retrieval, the systems now in operation all being handicapped by a basic lack of flexibility. Scheduled programming must be employed or any one program is out of circulation in response to a request from just one student. If assistance in math is offered at ten A.M., but the student is in class until eleven, he misses it. If one student requests a thirty-minute German lesson, no other student will be able to start that lesson until he has heard it entirely. The innovative retrieval system described here will eliminate such problems through the remarkable addition of random access. Because this system will contain this facility, each student will be able to select the program he needs at any time. Regardless of how many students are selecting programs, and regardless of how many programs are

available in the storage bank, each student addressing the system will be able to start his individual lesson in less than one minute.

The random access will be made possible by a combination of recording devices. The storage bank will contain several multiple-track master tapes on which individual fifteen-minute lessons or programs will have been recorded. Each student carrel will be equipped with a high-speed recording device which will be able to copy any one fifteen-minute program in the storage bank, make the copy available to the student, and free the master tape for another student within thirty seconds. The master tapes, the carrel control panels, and the high-speed recording devices will be directed by a computer. The first stage system will include a storage bank capacity of 224 fifteen-minute programs and twenty-five student carrels, but the random access capacity makes possible an expansion to a literally unlimited number of programs and carrels in the future. Thus, random access will provide the flexibility in use and storage capacity required to cope with increasing information and individual instruction.

Yet the most important aspect of this elaborate electronic hardware will be the instructional material, the software, available in the storage bank. This library-located retrieval system
will be used to supplement and enrich classroom instruction, and will not function strictly as a programmed instruction center. The goals defined by the classroom teacher will be served by the electronic facilities of this resource center. If the mathematics teacher is demonstrating the factoring of a binomial equation by completing the square, the following may occur: two of his students are absent, four students have considerable difficulty and do not grasp the concept as rapidly as others, and five students readily understand the procedure. The five advanced students can be referred to a lesson in the retrieval system demonstrating another method of solving a binomial equation. The four students having difficulty can be directed to a review lesson in the storage bank, where the tape might include several sample problems for use in conjunction with work sheets. The absentees can be sent to the retrieval center during study hall or after school for a make-up lesson and may not need the teacher for after school time.

Each teacher will be able to use the services in his own subject area in the manner best suited to its content. The history teacher will be able to give his students a wide selection of specialized topic presentations either for individual or class assignments. Recordings of the actual sounds of history,
including the voices of leading personalities both past and present, and interpretive commentary by prominent historians can be readily available to the individual student. For the English teacher, the retrieval system can be used to provide additional emphasis, explanation, and reinforcement on selected points of grammar. With a near maximum of convenience, students can listen to recorded readings of poetry, prose, or drama by truly great performers. The speech teacher might ask his students to record responses on a separate tape tract while listening to a program track. Speech skill exercises will also be possible. Much of the work of the foreign language laboratory can be handled by the retrieval system.

While the first stage of the retrieval center will include random access to audio presentations only, visual materials can be coordinated with the taped lessons. Thus, the art department will gain a means by which to widen student access to pertinent subject matter through joint tape and photographic slide programs. So too, foreign language instruction based on tape-slide tours can be introduced. Work sheets, slides, and loop films are only some of the visuals which can be used in conjunction with the audio programs.

Members of the faculty will also gain opportunities to
share and use each other's special talents, the English and history teachers will be better able to draw the work of the art and music teachers into their respective courses of study. Material on the Chicago school of architecture prepared by the architectural drawing teacher will be readily available to history students. Improvements in teaching methods and learning are the goals sought. Enrichment and supplementary materials will be used. Dramatically increased in flexibility of access to instructional materials will be achieved, and opportunities for individualized instruction and independent study will be expanded. A number of mechanical and time problems which currently drain teacher energy will be eliminated. The materials of the library and the activities of the classroom will be combined much more thoroughly for both teachers and students allowing for a more creative integration of instruction than has been true or possible in the past.

The second and third stages of the projects are necessarily less well defined. While no random access audio retrieval system currently exists, the devices to make it possible do. However, the devices and techniques for the second and third stages do not now all exist, making this aspect a research and development project. To qualify for Title III funds, innovation
must be accomplished, and random access to audio material will meet this demand. Progress in the direction of random access to video programs will be a significant inventive response to it.

In the second stage an expansion of the capacity of the storage bank and the addition of one hundred and fifty more carrels are planned. The introduction of a video storage and random access capacity and the addition of a video screen to the student's carrel to take full advantage of the resources of the library are also planned for this stage. Video random access of still material is now possible on a device called a video file. This device can store and program random access to 500,000 single, still pictures of objects or printed pages. No motion is currently possible in true random access, however, because our technology has not advanced to the point of high speed reproduction of motion pictures or video tape materials. A video random access capacity truly useful for education must include motion and color. Such a capacity is part of the goal for the second stage.

The third stage will involve continued development of the audio and video facilities. It will also include the addition of audio and video retrieval in each of two hundred classrooms in the high school. This facility will enable the individual
teacher to employ the audio and video materials of the library within his classroom as part of his basic instruction. By simply selecting the correct number, the English teacher will be able to present Lawrence Olivier performing *Hamlet* or T.S. Eliot reading his own poetry; the history teacher will be able to present F.D.R.'s first inaugural address or a collection of slides on Pre-Columbian architecture; and the homeroom teacher will be able to show guidance material such as college counseling segments prepared by the senior dean-counselor. These are but a few examples of the type of valuable material which can be made more readily available, or in some cases made available for the first time, for classroom use through a developed random access retrieval system. It will be in this third stage that preparations will be made to transmit or broadcast the resources of the retrieval system to the other schools and colleges, public and private, in the nearby areas. Whether this broadcasting will be done by closed circuit, microwave, or U.H.F. channel is not now known. Whatever method is selected, it will be possible for other schools to draw upon the resources of this library without in any way limiting the high school program or individual instruction because of the flexibility and unlimited capacity which random access makes possible.

As an added bonus, permission has been given recently
by the telephone company to enable the public lines to be hooked up with the system, enabling all the homes of the subscribers in the high school district to receive the audio random access retrieval material over their family telephones. This opens vast possibilities for adult education as well as extending the use to reinforcement of individual student study.

Inherent in this project, to develop a random access retrieval system, are many exciting possibilities. Yet it must be remembered that the electronic devices on which the project rests will only be tools in the hands of teachers and students. These tools will not make trivial material significant, nor will they make poor teaching meaningful. Even electronic marvels will not convert the contrary, dull or listless student into a cooperative, perceptive, or inspired paragon of academic virtue. They cannot make the basic resource for learning, the individual student, different tomorrow than he was yesterday. But these tools can serve the most effective dissemination and utilization possible of the knowledge, understanding, and accomplishments of our heritage.

It would seem that the gifted student can most benefit from this vast storehouse of knowledge readily available to him. He has the greatest intellectual curiosity about many and varied areas, and his interest will be piqued just by the wealth of offerings in the catalogue. Since he can absorb the retrieval
material faster, he will be able to explore a subject in greater length, possibly allowing a telescoping or acceleration of traditional semester-subject continuity, and consequently experience a broader, more rapid preparation for higher education and the choice of a profession. He may find time here to explore fields on his own for which he would not have had the time in his regular curriculum program. These are the students who will ask to go to the library during study hall, and who will drop in after school to hear or see a program a friend had mentioned was enjoyable in another class. The gifted student whose abilities are superior to his own subject level can plug in at a more advanced level and gain greatly in knowledge and enjoyment. Because the use of this system is highly individual, and some intellectually gifted students tend to be introverted, great care should be taken to encourage them into extracurricular activities relevant to their areas of interest. The general curriculum itself might be planned to allow for the interchange of ideas and opinions of the retrieval material individually experienced, so that the student can become an active not a passive participant in his education. The gifted student particularly will use his creativity and originality in making associations, adapting abstract principles, and interpreting generalizations, and will have a great deal to contribute to the enrichment of the classroom.
obviously such a large expenditure of funds to institute such a technically complex and expensive system could never be justified for the small proportion of gifted students in even a wealthy school district. The Office of Education has awarded nearly a million and a half dollars for the project, and the local high school district has approved a nine million dollar bond issue for a building addition to enclose it. The innovative project was approved under Title III because it suggests a solution to the growing problem of expanding information and individual instruction, and the taxpayers supported it because it will benefit all the children in the district in a new and imaginative way. Eventually other areas which could not afford the equipment themselves will be able to take advantage of it through transmission. Perhaps the gifted everywhere will have an opportunity to reap most advantage of the system which appears to be tailor-made for their best aptitudes.
CONCLUSION: IMPLICATIONS FOR THE GIFTED STUDENT,
FOR ADMINISTRATION AND FOR FURTHER RESEARCH

It is hoped that these innovative projects under Title III continue to be as successful as they promise to be in the light of the foregoing analyses, and that their novel ideas will have the widest dissemination possible throughout the areas of education where related persistent problems need to be solved.

The Aspen Total Exposure Program gives all students an opportunity to experience a curriculum which will assure a mastery of the fundamentals and yet be devoted to the total meaning and relevance to the world of human experience and knowledge. The gifted can, it seems, take best advantage of the generalizations and correlations inherent in this type of curriculum structure and can achieve a greater breadth and depth of learning than in a traditional program. Social interaction and intellectual interchange between gifted minds can easily be encouraged.
in the total exposure program, and it provides a guidance counseling program as a solid foundation for personal choice and experience. Continuous strict evaluation will illuminate both benefits and areas indicating a need for reconstruction.

The Developmental Grade Placement project shows a great deal of merit, and its intent to insure that the individual child is ready to learn the most fundamentally important material, and that the entire class is equally ready, is to be recommended. Gifted children will benefit by being placed in a class where all can advance at a rapid rate in response to teaching methods geared to their special abilities. Here again, further evaluation would be welcome.

The Computerized Approach to Individualizing of Instructional Experiences seems to be the weakest of the projects in light of the analyses. Based on a completely behavioral approach to learning, a computerized matching of learning tasks with the student would seem to eliminate exploration and creativity on his part. This rigid system would hamper the gifted student most seriously. Although he would be able to learn the material faster, his imagination and originality would be stifled.

The Proper Utilization of Student Transportation Time project is definitely an imaginative and much needed response which fills previously wasted school bus-riding time with cultural,
recreational, and educational experiences. Gifted children whose rural environment keeps them from full participation in the cultural activities of the community are most enthusiastic at the opportunity to enrich and expand their horizons and may be able to explore areas closed to them in the standard curriculum due to their limited hours at school. Here too, the intellectually gifted student will be able to absorb more material faster. All the children on the bus enjoy their enriched ride, the gifted most of all.

The Random Access Retrieval of Instructional Materials project is a truly imaginative and innovative use of computer technology which solves the increasing problem of library information storage and simultaneously makes it available for immediate use. Rather than stifling the varied abilities of the intellectually gifted student into a rigidly systematized mold as does the other computerized project, this system frees him to advance at his own speed and depth within the framework of the traditional academic disciplines and explore others which time does not permit in his curriculum.

Administratively, great enthusiasm has attended these innovative projects. The Developmental Placement project dislocates the traditional structure of the school the least, since with the
addition of the developmental examiners, the formation of the administrative structure of the school will be little changed. Implications for administration of the Computerized Approach to Individualizing of Instructional Experiences would indicate that intricate readjustments would be necessary to correlate daily planning of instruction. The great mechanical "busywork" effort involved in effecting what may be a rigid and stifling system implies that this is not as worthwhile a project as many others.

The Aspen Total Exposure Program demands a first rate administration and faculty for the complex and broad planning of a total curriculum, and cooperation among them is of primary importance. The guidance counseling aspect of total exposure must also be kept in mind. Here, once the curriculum is established, the administration will be responsible for its smooth continuity. However, this type of versatility is at a premium.

Since the Proper Utilization of Student Transportation Time Project will be an accessory to the school itself, it will not change the basic structure of the administration. However, its director must not only be qualified technically in regard to the electronic bus equipment but imaginative in the choice of the instructional material used. Of primary importance is the correlation of student interest and community activities.
Great demands will be made on the school administration for the Random Access Retrieval of Instructional Materials project. A technical assistant with electronic engineering training will be necessary to oversee the vast and complex institution of the retrieval system. Explanation and planning with the classroom teachers is most important to insure the best choice and availability of the software, the content of instructional material to be retrieved. Cooperation and integration of effort among all personnel is vital and the responsibility of the administration.

It is hoped that the administrators of each of these projects do not become so totally involved in their own efforts that they neglect the dissemination of successful results of the other projects. Perhaps as an endeavor is successful in operation, another can be coupled with it. The Developmental Placement Project lends itself particularly well to a combination with the other innovative methods; and administrators in planning the curriculum of the Random Access Retrieval of Instructional Materials project might use the concept of the Total Exposure Program as a base.

Since all of these projects are supported by federal government funds under Title III of the Elementary and Secondary Education Act of 1965, the burden on the local taxpayer is not evident in these efforts. However, to implement similar endeavors in other school districts, local funds will be needed. A tremendous
job of advertisement and effective public relations will be necessary by administrators contemplating instituting these innovations in new areas, but a great asset must be the successful results and public enthusiasm engendered in the experimental school districts. While an expensive program aimed at enriching a small proportion of the school population, the gifted students, would be difficult to persuade the public to support; the great appeal of these projects is their beneficial impact on all students.

The implications for research are many and varied. Once the projects are running smoothly and successfully, they will provide fertile fields for research not only in regard to the achievements of the projects themselves but in areas of general learning theory and the special abilities of the gifted. Efficient records are certain to be kept, so that control groups will be able to be effectively established, enabling comparisons between accomplishments and abilities of students involved in these projects and students in traditional school situations.

Research will not only be able to establish the quality of success of the innovative projects, but extend knowledge of the theory of learning itself. The Total Exposure Program and the Random Access Retrieval of Instructional Materials project will provide fertile fields for research studies in the nature of
intelligence, particularly the structure of intellect theory of J.P. Guilford, which can be continued here by means of the experimental application of factor analysis. It would seem that the new total exposure curriculum and electronic retrieval methods might aid in showing that the higher mental processes of thinking, problem solving, and creative thinking have both specific and general components rather than simply depending upon the mastery of specific habits or skills. It would seem that the intellectually gifted students will demonstrate this most prominently.

In conclusion, it is evident that three of these four projects have great merit, will solve persistent problems, have truly innovative characteristics, and deserve the widest dissemination possible. While creating necessities of readjustment for administration, they will also provide further opportunity for research and development. In view of the analyses of the intellectually gifted and the projects themselves, these models hold out the promise of great stimulation, encouragement, and benefit for those who constitute one of our greatest resources, our intellectually gifted.
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The thesis submitted by Marguerite Giles Durkin has been read and approved by the director of the thesis. Furthermore, the final copies have been examined by the director and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Date: June 5, 1968

Signature of Advisor