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ABSTRACT

This report describes a concept for providing innovative opportunities for Virginia students identified as gifted in the technical arts or other areas. The approach unites the areas of vocational education, programs for the gifted, and career education and guidance in a partnership to: encourage gifted students to pursue offerings in vocational education, present gifted students with more information and experience about potential careers, and eliminate artificial distinctions between vocational and general education. The report discusses: (1) benefits of the approach for students, educators, parents, and communities; (2) procedures involved in identification and placement of gifted students; (3) ways of arranging the learning environment to meet the educational needs of gifted students in technical arts education, including examples of model programs and courses in operation in Virginia; and (4) issues in the area of personnel, such as personnel training, teacher qualifications, and parental and community involvement. Includes a list of 11 suggested readings. (JDD)

GIFTED STUDENTS AND THE TECHNICAL ARTS

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF EDUCATION
RICHMOND, VIRGINIA 23216

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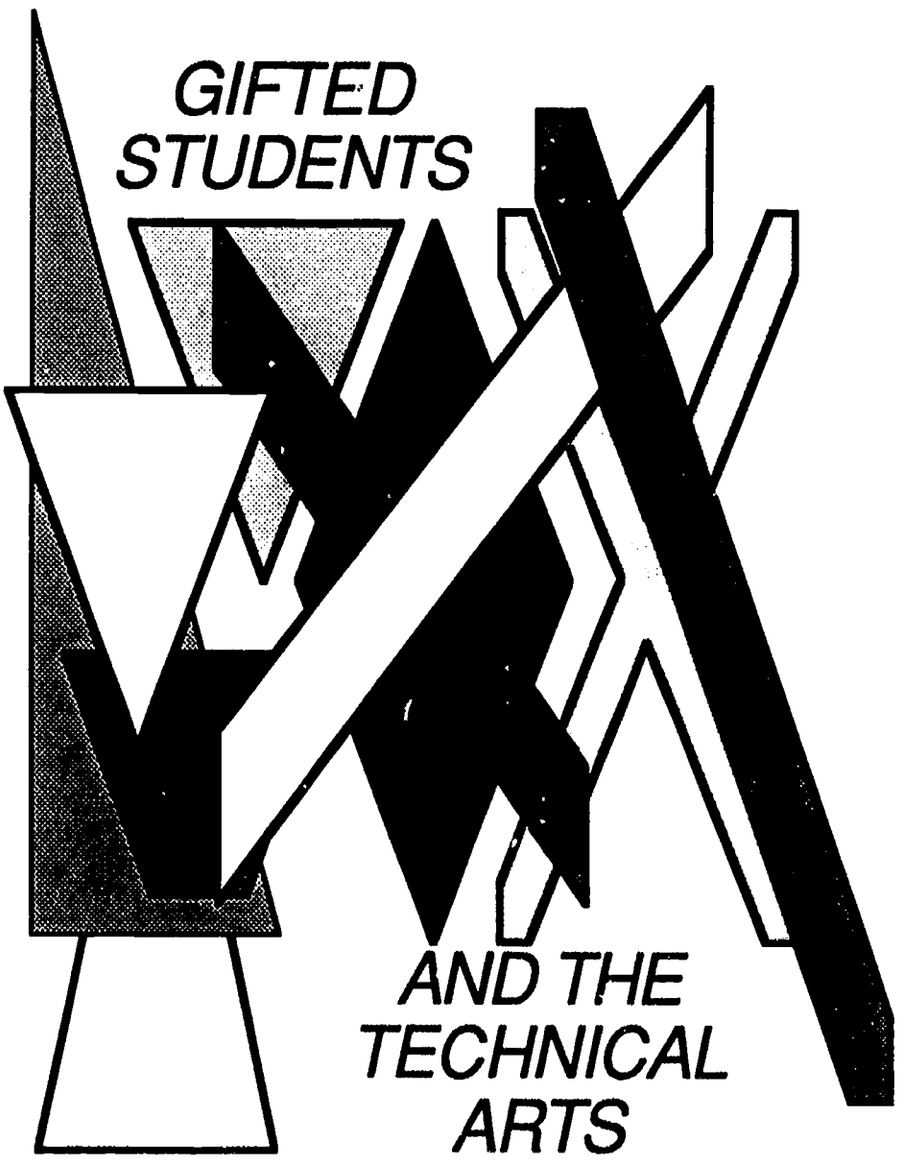

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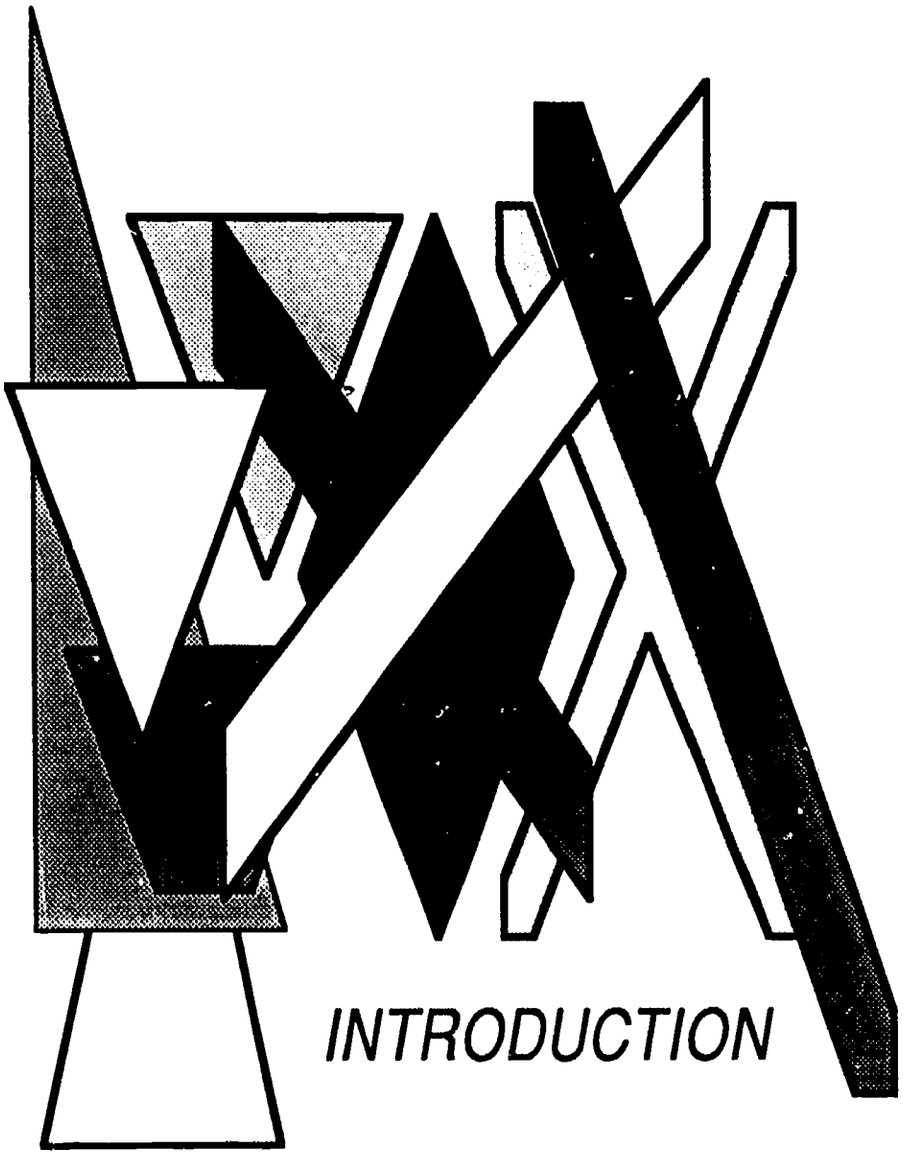

INTRODUCTION

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The Commonwealth of Virginia is developing a new concept of providing superior and innovative opportunities for students identified as gifted in the technical arts and for other gifted students in academics or arts who can benefit from vocational education. The concept, called Gifted Students and the Technical Arts, unites the three vital areas of Vocational Education, Programs for the Gifted, and Career Education and Guidance in a dynamic partnership that may well become a model for the rest of the nation in establishing differentiated programs and curricula for a unique, yet often underserved, segment of the student population.

Gifted Students and the Technical Arts is an initiative designed to increase educational opportunities for gifted students and provide them with expanded options and flexibility in developing their superior creative abilities and in exploring potential careers. The partnership has identified five goals for the initiative:

- To encourage students gifted in any area to pursue offerings in vocational education as a means of expanding their abilities
- To provide gifted vocational students with differentiated career development opportunities, courses, and programs commensurate with their superior abilities
- To develop new course designs for gifted students
- To present gifted students with more information and experience about potential careers
- To eliminate artificial distinctions and unnecessary barriers between vocational and general education.

In short, the concept hopes to link students gifted in any area with the possibilities afforded by vocational education.

The Legal Foundation

The legal foundation for the new venture has been firmly established in Virginia. The *Virginia Constitution* (Article VIII, Section 2) instructs the State Board of

Education to prescribe ". . .Standards of Quality for the several school divisions. . ." The subsequently developed *Standards of Quality*, as enacted by the General Assembly, mandates that each school division ". . . conduct a program acceptable to the Board of Education for the early identification of gifted and talented students." The standard further stipulates that ". . . each school division shall offer differentiated instructional opportunities in accordance with guidelines of the Board of Education for identified gifted and talented students."

Pursuant to the dictates of the *Constitution* and the *Standards of Quality*, the Virginia Department of Education developed a set of regulations to govern the educational programs for gifted students and defined six areas of giftedness:

General Intellectual Ability--Students with advanced general and/or specific information and an advanced aptitude for abstract reasoning and conceptualization, whose mental development is accelerated to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Specific Academic Ability--Students who have aptitude in a specific area such as language arts or math, and who are consistently superior to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Visual and/or Performing Arts Ability--Students who excel consistently in the development of a product or performance in any of the visual and/or performing arts to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Practical Arts Ability--Students who excel consistently in the development of a product or performance in any area of vocational education to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Psychosocial Ability--Students who exhibit keen sensitivity to the needs of others and who not only assume leadership roles, but also are accepted by others as leaders to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Creative and Productive Thinking Ability--Students who exhibit advanced insights, outstanding imagination, and innovation and who consistently engage in integrating seemingly unrelated information to formulate new and positive solutions to conventional tasks. Creativity refers to the students' ability to produce both tangible and intangible end products involving the use of divergent and convergent thinking and problem solving to the extent that they need and can profit from specifically planned educational services differentiated from those generally provided by the regular program experience.

Significantly, Virginia was the first state in the nation to identify practical or technical arts ability as a special area of giftedness and remains one of the few states to do so. Therein lies the special challenge: Virginia educators must provide the same vision and leadership in defining, planning, and instituting programs in technical arts for gifted students that they have shown in identifying vocational education as a special area of giftedness.

Basic Approaches

Differentiated education for gifted students is in itself not a new idea in Virginia. The Commonwealth has long had many programs serving gifted students in a multitude of ways. Gifted Students and Technical Arts does, however, break new ground by building on the existing framework of differentiated education in the following ways:

1. It emphasizes and encourages vocational education for all gifted students who can benefit from vocational offerings.

2. It provides for a concerted movement involving all three partners to identify students gifted in the technical arts.

3. It proposes educational challenges equal to the abilities of the identified students.

4. It represents a commitment on the part of all partners to channel their considerable resources into an integrated plan that will allow school divisions across the state to develop and maintain differentiated curriculum for gifted students.

5. It taps student abilities and capabilities that may have been neglected heretofore.

6. It recognizes the individual learning styles of students and matches them with learning environments appropriate for nurture and growth.

7. It provides an arena for application of theoretical knowledge gained from academically oriented classes.

8. It offers opportunities for motivating and developing the potential of underachieving students.

Development of the Concept

Once giftedness in "practical arts ability" was designated a key area for curriculum development, the State Advisory Committee for the Gifted appointed a Subcommittee on Practical Arts. The term "practical arts" was then changed to "technical arts" because the Subcommittee wanted to convey the increasing sophistication, complexity, and, in most cases, technological orientation required by contemporary vocational programs of study. Later, the Gifted Education Service at the Department of Education began a TAG (Technical Assistance for the Gifted) program for all disciplines, including vocational education. The Subcommittee and the TAG Team, because of similar purposes and an overlapping membership, soon merged into one group and established their primary goals:

1. Identification of students who are vocationally gifted or gifted individuals who can benefit from vocational instruction;

2. Development of guidelines for working with gifted students in technical arts, including methods of providing vocational instructional programs for these students;

3. Specification of curriculum, resources, and equipment that represent "best practice" in serving gifted students vocationally;

4. Creation of a training module on educating the gifted in vocational programs.

Following the establishment of these goals, the new Subcommittee/TAG Team planned and is conducting a series of informational presentations for regional and annual meetings of guidance counselors, gifted education coordinators, and vocational administrators. These meetings have focused on the partnership concept and successful vocational programs for gifted students already operating in Virginia.

One of the most productive of these initial meetings was a four-day workshop entitled "Virginia Guidelines for Gifted Education," held at the Jefferson Hotel in Richmond, December 7-10, 1986. This workshop brought together key teachers

and administrators from the three areas of Vocational Education, Programs for the Gifted, and Career Education and Guidance. Throughout the four days, workshop participants discussed in detail the goals, issues, objectives, and implications of the partnership approach and formulated ideas for two documents:

- An initial "What-is-it?" book to introduce the concept of the partnership to the localities and to present an overview of the issues involved in planning and instituting vocational opportunities, programs, and courses for gifted students throughout the Commonwealth

- A "How-to-do-it" book that will supply detailed "nuts and bolts" information necessary to develop and maintain vocational education and guidance for gifted students.

Evolving Definitions of Giftedness

The concept of student giftedness defies any simple explanation, but, for the purposes of this initiative and the students it hopes to serve, the following definitions offer a starting point. *Virginia Regulations Governing the Educational Program for Gifted Students* provides a general definition of gifted students as those ". . . whose abilities and potential for accomplishment are so outstanding that they require special programs to meet their educational needs." Students gifted in technical arts ability are those ". . . who excel consistently in the development of a product or performance in any area of vocational education . . . ."

The definitions of gifted students and areas of giftedness in the *Regulations* imply, as they should, continually evolving concepts and are necessarily limited and limiting. They are working definitions; they cannot and should not be considered as final. The fact is that each gifted student is unique and may possess a gift in one of the six areas, or in any combination of the six. Moreover, gifted students may be found in any program or course of study in the school.

The Challenge

The combinations and the possibilities for student development are endless, limited only by the imagination of educators formulating programs, courses, and opportunities for gifted students. The responsibility for success in this endeavor, however, is equally divided among the three partners. Personnel in the localities from the areas of Vocational Education, Programs for the Gifted, and Career Ed-

ucation and Guidance must work together in all aspects of the initiative: planning the initiative locally; securing adequate funding*; training needed personnel; screening and identifying gifted students; devising the programs, courses, and opportunities; providing career information and exploration; and evaluating the results.

The Virginia Department of Education believes educators in the Commonwealth are equal to the challenge, and the three partners believe the time to start is now.

State and local funds are available to implement programs for Vocational Education and Programs for the Gifted.


BENEFITS OF
THE INITIATIVE

BENEFITS OF THE INITIATIVE

One of the most rewarding aspects of this new movement to foster technical arts education for gifted students is that it offers many benefits to everyone involved in it. Besides the students themselves, others participating in the initiative--teachers, school administrators, local coordinators for gifted programs, guidance personnel, parents, and employers in the local communities--will all benefit in a variety of ways.

Gifted students, however, are the most important concern in this venture, and they will rightly be the primary beneficiaries. All educators involved in providing these new programs, courses, and opportunities must work together in such a way as to ensure that each student participant receives the maximum number of these benefits.

Benefits for Students

Students will benefit, first of all, by receiving systematic and on-going career development. Career choices are often unusually difficult for gifted students because of their many abilities. If opportunities are available to students early in their education, they will have ample time to become aware of possibilities they never dreamed existed and to explore many career avenues with no sense of haste or pressure. They may develop new career interests and, at the same time, learn what they are *not* interested in pursuing. Challenged by exciting new options in both content and learning environments, students will avoid the all-too-often encountered academic boredom that results from lack of challenge. They will find creative outlets for their ideas and skills and develop a fuller awareness of self.

Students will also benefit through developing specific career-related competencies. They will gain satisfaction from putting their knowledge and skills to practical use in challenging situations. Through cooperative efforts with the world outside the school setting, students will be able to make important contacts, which may increase their chances at successful employment later. Moreover, by working with skilled professionals in the field, students will have a chance to observe and develop career-related attitudes that will contribute to a greater sense of social and occupational responsibility.

Another benefit for students is the chance to work with other gifted individuals in both school and work environments. They will gain a fuller understanding of their own giftedness and develop a keener perspective on their own gifts in relation to those of others.

Benefits for Educators

Teachers will also benefit from the new venture. Academic and vocational teachers will be working with superior students, and the teachers' own creativity will be challenged as they seek to provide new learning arrangements and enhanced content for the gifted. Teachers will increase their own visibility and value in the larger community as they work with community leaders outside the school in developing new opportunities for gifted students. Those teachers who lead the way in this undertaking will enjoy the added benefit of prestige and recognition from their peers.

Likewise, school administrators will share in the prestige and recognition that will come from having provided innovative vocational opportunities for their gifted students. Administrators will be able to foster and enhance cooperative, interdisciplinary approaches among their faculties. They will also strengthen ties with business and industrial leaders in the community. Because of their expertise, community leaders should be invited and urged to participate in all facets of the undertaking, including curriculum planning, career exploration, creation and coordination of mentorships and internships, and advisory council activities. Business leaders may also play a vital role in exploring additional means of obtaining funding for special programs, courses, and opportunities. Technical arts education for the gifted should also result in increased cost and time efficiency for local school divisions as existing personnel and equipment are put to multiple uses.

Local administrators for gifted programs will find both increased responsibility and justifiable pride of accomplishment in finding new avenues for development of programs for gifted students. As the traditional focus shifts, local coordinators will lead in the formulation of new learning arrangements and will themselves receive a heightened awareness of career education.

Guidance personnel will find their responsibilities and rewards similarly increased. They will provide liaison among students, parents, school, and community as they expand career and vocational education to include all

students. They will guide both students and educators toward the realization that vocational opportunities constitute a process, not a fixed set of terminal programs. Because all gifted students benefit from counseling, guidance personnel will act as the synthesizers of this team initiative.

Benefits for Parents

Parents of students often play a role in the career choices of their children. Because parents of gifted students often feel inadequate in matters concerning career choices, they will be aided greatly by the school's expansion of career guidance to all academic and vocational areas. Technical arts education will provide many solutions for parents whose children are intellectually or academically advanced. Intensified training at a vocational-technical school can be beneficial for these gifted students. Such training will assist gifted students in focusing their many abilities on areas of real interest to them. One of the difficulties in providing career edu- cation for gifted students is simply that they are often gifted in many areas and have a hard time narrowing their areas of concentration. Parents themselves can gain a broadened perspective on the many career options open to gifted students, options they may not even know exist or think viable for their children.

Benefits for Communities

Local communities will ultimately reap the rewards of providing technical arts education for gifted students. Localities will discover and nurture people who will provide benefits for the entire society. A corps of highly trained, proficient workers with advanced competencies will be available for the local work force. This work force will be ready to meet and exceed the expectations of future employers. This initiative can also alleviate the school dropout rate and the problem of underachievers in the localities as students find challenges and opportunities suited to their identified capacities. The bonds between school and community will be strengthened and may lead to further cooperative efforts involving the entire local community.

Offering technical arts education for gifted students will provide a continuum along which all elements in the school and the locality will benefit. As gifted students are led from career awareness and exploration to advanced and compre-

hensive career development, teachers, administrators, counselors, parents, community leaders, and the students themselves will know they have achieved a rare degree of self-satisfaction and, at the same time, contributed immeasurably to the general welfare.


IDENTIFICATION
AND
PLACEMENT
OF GIFTED
STUDENTS

IDENTIFICATION AND PLACEMENT OF GIFTED STUDENTS

All the programs, courses, and opportunities in technical arts education for gifted students that Virginia educators can devise will be to no avail unless gifted students themselves are clearly and systematically identified and placed. The identification and placement procedures are ultimately the responsibility of the local school division, and each division must define giftedness with consideration of local conditions, resources, and expectations. Local school divisions, however, must ensure thorough and systematic procedures for screening and identification so that no gifted student is overlooked, and these procedures must fall within state guidelines. Moreover, procedures for screening and identification must be included in the school division's annual plan for gifted education submitted to the Department of Education.

Accurate identification of gifted students is not an easy process, but it is vitally necessary and required by the Virginia *Regulations Governing the Educational Program for Gifted Students*. This section offers some preliminary guidelines to ensure successful identification.

Article II of the Virginia *Regulations Governing the Educational Program for Gifted Students* provides a generally accepted definition of gifted students:

> . . . those students in kindergarten through grade 12 whose abilities and potential for accomplishment are so outstanding that they require special programs to meet their educational needs. These students will be identified by professionally qualified persons through the use of multiple criteria as having potential or demonstrated abilities and who have evidence of high performance capabilities . . . .

This definition is useful as a starting point, but localities must expand the definition with adequate details to cover their unique circumstances.

Characteristics of Gifted Students

No single profile or cluster of charactertistics readily differentiates gifted students from other students. There are, however, certain traits or abilities that are almost always found, in one combination or another, among students identified as

gifted. No student will possess all these characteristics, but most gifted students will exhibit some of these traits. Local educators, therefore, should begin identification by reviewing these leading indicators of giftedness.*

The gifted student generally demonstrates a majority of the following traits:

- Retains more information
- Possesses a more advanced comprehension
- Exhibits great curiosity
- Shows interest in a wide variety of areas, or an intense interest in one or two areas
- Uses an extensive vocabulary
- Synthesizes information readily
- Applies knowledge easily to new situations
- Persists in endeavors
- Shows sensitivity toward others and is sensitive to self
- Exhibits a keen sense of humor
- Expects much from self and others
- Demands much from self and others
- Shows ability for abstract reasoning
- Provides leadership for other students
- Takes risks
- Takes short cuts
- Remains uninhibited in words and actions
- Possesses a vivid imagination
- Does not readily conform to standard norms and expectations
- Questions everything
- Organizes information and processes easily
- Shows aptitude for mechanical, spatial, and numerical analysis
- Possesses a high energy level
- Exhibits a high level of physical dexterity and coordination
- Shows interest in cause-and-effect relationships.

Considering some of the indicators above, the seasoned educator may immediately wonder whether the subject here is giftedness or the origins of disci-

* These indicators of giftedness are listed in no particular order or degree of importance.

plinary problems, and such an inquiry would not be entirely off base. Many of the traits reviewed here contain an element of volatility, especially when they are evidenced in young people, and one component of the challenge in providing for gifted students is to ensure that vital energies are channeled into constructive educational endeavors. These gifts must not lie untended, or they may well reveal themselves in undesirable and negative ways.

Local Identification Committees

Once localities know what kinds of students they wish to identify, they must establish a local identification/placement committee. Depending on the size of the local school division, the number and kinds of offerings in technical arts education for the gifted, and the resources it has, a locality may find it needs more than one such committee to identify participants. The identification/placement committee may function at the local or the division level, or separate committees for each level may be established. The composition of each local identification/placement committee ideally will include the following components:

- Principal (or assistant principal)
- Local coordinator for Programs for the Gifted
- Teachers from general and vocational education (referring teacher when applicable)
- Guidance counselor
- A previously identified gifted student
- A representative from the community.

Of course, more than one representative from each group listed above may be chosen for the local committee.

Committee Guidelines

After the identification/placement committee has been established, it should decide on its own guidelines and procedures for operation. While there is no magic formula to assure the success of local committees, the following five basic guidelines seem to form at least the foundation for success.

1. ***Early Identification***--Every effort should be made to identify gifted students as early as possible. Giftedness exists K-12, and the sooner gifted students are identified, the more they may ultimately benefit from special opportunities. Procedures and

methods of identification should be chosen and modified where necessary so as not to exclude any age group. Early identification is particularly important for culturally or economically disadvantaged students.

2. ***Multiple criteria***--No single criterion is sufficient for identification of gifted students. Local identification/placement committees must use many different criteria before designating students as gifted. Systematic, on-going research into identification methods should be standard procedure for any locality.

3. ***Search for the atypically gifted (handicapped, underachieving, economically disadvantaged)***--Gifted students come from all races, socio-economic groups, sexes, and cultural backgrounds. Identification/placement committees must be sure students of culturally different backgrounds are not overlooked in the identification process. Use of multiple criteria, especially those identification instruments specifically designed to discover giftedness among the atypically gifted, will help guarantee that no student is overlooked.

4. ***Files***--Local school divisions should keep full and complete files on their methods and procedures as well as on students identified as gifted. Article III (Local Plan) of the *Virginia Regulations Governing the Educational Program for Gifted Students* requires the following:

   > Assurances that testing and evaluative materials selected and administered:
   >
   > (i) are neither culturally nor racially discriminatory;
   >
   > (ii) are sensitive to language differences;
   >
   > (iii) have been validated for the specific purpose for which they are being used; and
   >
   > (iv) are administered and interpreted by trained personnel in conformance with the instructions by their producer.

   These required assurances should be kept on file in the local school district.

5. ***Participation of qualified personnel***--Those who participate in identifying gifted students must be academically and professionally qualified to do so. Complete documentation of the qualifications of each member of the identification committee should be current and kept on file at all times.

Planning for Identification

The Programs for the Gifted Service at the Virginia Department of Education has posed four strategic questions for those involved in planning for identification of gifted students. A more detailed discussion of identification and placement will follow in *Gifted Students and the Technical Arts: Handbook for Implementation,* but these central issues should be introduced now as a spur to preliminary creative thinking at the local level. Since there are no "right" answers to these planning questions, the localities should explore many avenues in attempting to provide a variety of responses. The planning questions are as follows:

1. What are the elements of an appropriate student identification process?

2. What are the special problems in identifying the atypically gifted student or the very young gifted child?

3. How can a teacher determine skill or concept levels of students?

4. In what ways might a teacher determine the interests of a gifted student?

Although there are many tradition-validated responses to these questions, the local identification/placement committee should seek to provide new and different answers to these questions, especially as they involve students gifted in technical arts.

Methods of Identifying Gifted Students

The guidelines for the local committee for identification and placement of gifted students call for multiple criteria in determining which students are gifted. No single criterion is sufficient or, used alone, desirable in the identification process. Educators can therefore be thankful so many methods of identification are readily available for evaluating student giftedness. Examples of the various instruments, instructions for using them, and assessments of their appropriateness in individual cases will be covered in Book II. It is advisable, nonetheless, to identify here the major instruments by which gifted students are identified. They are as follows:

- Individual and group I.Q. tests
- Achievement tests

- Creativity tests
- Rating scales/checklists/questionnaires
- Documentation of student's previous accomplishments
- Student products (professionally evaluated)
- Special ability tests
- Interest inventories
- Teacher nominations
- Peer nominations
- Parent nominations
- Portfolios
- Performance
- Interviews.

If Virginia is to fulfill its promise to provide state-of-the-art technical arts education for gifted students, early and accurate identification of the gifted is the first step along the way. Current methods must be improved, and new ways must be found to identify gifted students. Still open to investigation is the issue of how vocationally gifted students differ from the students gifted in other areas, if they differ at all. Educators should also attempt to determine if indicators of giftedness are generic and overlap among students gifted in different areas. Whatever future findings about giftedness may reveal, proper identification and placement will remain perennial concerns of vital importance.


PROGRAMS,
COURSES,
OPPORTUNITIES

PROGRAMS, COURSES, OPPORTUNITIES

Just as Virginia educators led the way in establishing technical arts ability as a major area of giftedness, so must they continue to chart new directions in establishing opportunities in technical arts education for gifted students. Gifted students are unique, and they require special opportunities. Unless educators provide new opportunities for these unique individuals, gifted students may never reach their full potential, thus losing for themselves the highest possible degree of self-satisfaction in their education and careers and denying the larger society benefits such attainment most certainly would bring. Educators, therefore, must devise the opportunities, courses, and programs that will ensure maximum effectiveness in student learning. Those involved in planning must extend their creative thinking to bring about not only programs and courses but also new opportunities outside the traditional curriculum and its accompanying constraints.

Several ways of providing for gifted students in technical arts education are highlighted in this section, which also includes examples of model programs and courses already in operation around the state. These examples, however, provide only the starting point for the creative thinking, planning, and implementing of dynamic approaches required of Virginia educators, upon whose creativity and resourcefulness the success of the initiative depends.

Procedures for Development

Before deciding, however, on any new approaches in programs, courses, or other opportunities for gifted students in technical arts education, the careful planning team, composed ideally of teachers from both vocational and academic areas, guidance personnel, the local coordinator for gifted programs, and community representatives, would be well advised to keep in mind the following considerations:

1. All instructional personnel involved should participate in the planning.

2. Gifted students should be involved in the planning. (Some school divisions allow gifted students to serve on local advisory committees.)

3. Local business and community leaders, whose representation is required on local advisory committees, should be urged to participate in the planning.

4. New or altered programs, courses, or other opportunities should be considered in relation to established programs and courses as a means of making maximum use of all local resources, including personnel, equipment, and supplies.

5. Use of multiple funding sources to finance new programs, courses, or opportunities should be investigated.

6. Necessary equipment and supplies must be available.

7. Necessary personnel must be identified and trained to fulfill the demands of the students, the curriculum, and the continuum of differentiated services.

8. Evaluation procedures should be established.

9. Community support must be sought, maintained, and directed.

10. Any program for gifted students must be included in the state plan for the gifted required by the Virginia Department of Education.

Suggestions for Learning Arrangements

Each of the following arrangements for structuring learning activities for gifted students has advantages and disadvantages. Some approaches may not be suitable for all gifted students or for all areas of study. The point, however, is simply to indicate some of the various possibilities and to stimulate thinking about other alternative learning arrangements for gifted students. The approaches suggested here may, in some cases, be used as they are, used in part, or combined in such ways as to create new approaches. Two things must be remembered:

1. Each gifted student is in some degree different from all others.

2. It is the responsibility of the teacher, the guidance counselor, and the local coordinator of gifted programs, all working together, to devise the right approach for each student and each area of study in individual localities.

The following suggestions, then, should open new avenues of opportunity in the minds of educators for the benefit of very special students, those gifted in the technical arts and those gifted in other areas who have either a desire or a need for vocational instruction. The needs of these students are as vital to society as they are to the students themselves, and they are needs that must be fulfilled.

Basically, what is needed to provide enhanced learning opportunities in technical arts for gifted students is a series of options that will allow them to transcend the limitations and constraints of the traditional educational structure. Such limitations or constraints often include personnel, time, space, and material resources. How many times does one hear a teacher or an administrator say, "Oh, if I only had more (teachers/time/room/equipment/money), I could really do great things!" The challenge for Virginia educators is to begin--where they are and with what they have--to offer supplementary options for gifted students. Once the determination to act is made and the process is under way, additional resources can be added as they are possible. Properly planned and executed, programs, courses, and alternative arrangements for gifted students will begin to grow and multiply.

Two major approaches to enhanced educational experiences for gifted students are individualization of instruction and differentiation of curriculum. In order to individualize instruction, the teacher identifies individual learning styles and capacities, modifies the level and pace of instruction, and tailors supplementary learning experiences to draw upon individual student differences, capacities, goals, needs, and desires. Differentiation of curriculum involves formulating new combinations of content or process--or new ways to present them--in order to increase the knowledge or perfect the skills of gifted students. Differentiation allows for construction of learning units from multiple occupation clusters. The following descriptions of alternatives indicate both individualization of instruction and differentiation of content. These approaches are not mutually exclusive and do not operate in isolation. The careful planner will combine aspects of each as the actual needs of the student and local resources are identified.

Alternative Grouping or Clustering

Grouping or clustering is a traditional method of offering instruction to gifted students. It may be used for a particular course or, in some cases, for an entire

curriculum. Crossgrade grouping or multi-level grouping may also be effective. This instructional approach requires a well designed set of criteria for identifying students gifted in a particular area of study or skill, then channeling them into special classes where they will receive advanced instruction. Although members of the group may differ significantly in levels of interest and aspiration, grouping/clustering is a legitimate method of offering educational experiences commensurate with students' heightened abilities. Since grouping/clustering by ability seems to work best with relatively large groups of students, local planners should make sure that there is a sufficiently large pool of students gifted in a particular area to make this alternative feasible.

Acceleration

Acceleration is a means by which gifted students can progress through their instruction at a faster pace then would otherwise be possible and finish their training well ahead of the normally required time. Students involved in accelerated arrangements simply are allowed to complete work at their own rate. Flexible scheduling is another desirable feature of this method. Since they are usually engaged in learning occupational skills, vocational students might especially benefit from acceleration by advancing to the work force at an earlier age and thus increasing short- and long-range earning potential. An alternative way of using acceleration is to allow students to complete job competencies quickly and then, until they reach the legal age for employment, pursue more intensive development of basic skills or investigate areas directly or indirectly related to their technical skills. For example, a student who wished to work in a financial institution might rapidly master basic and advanced skills through accelerated instruction, then pursue courses in management or other areas that would give the student a competitive edge when the appropriate time came for seeking employment.

Enrichment

Enrichment allows gifted students to remain with their peers in regular programs and courses, but their learning is supplemented by additional activities or assignments beyond the prescribed curriculum. Such an approach seems ideally suited as a means of encouraging academic students to take vocational courses and providing additional, in-depth instruction for the vocationally gifted student beyond what can be found in the normal classroom setting. Perhaps the most

democratic of all the approaches to individualized instruction, enrichment has the flexibility of allowing gifted students to maintain classroom rapport with fellow students from across the spectrum, yet move ahead at their own pace. Enrichment activities can occur at any educational level, K-12.

The normal operating pattern for enrichment activities is cyclical. As the gifted students complete regular classroom work ahead of other students, they spend the extra time on enrichment activities while the others are finishing their assignments. When the subsequent unit of work begins in the regular schedule, gifted students rejoin their classmates and repeat the sequence. Enrichment is a desirable way of providing for gifted students because it can combine individualization of instruction with a differentiated content. The teacher and student are virtually unlimited in what they may design. Enrichment activities can originate in either academic or vocational courses. They may involve exposure to material that is above and beyond what would ordinarily be expected at a given age or grade level, an extension of time for additional investigation in a specified area, a mentorship or internship arrangement, or in-depth development of concepts or skills. Enrichment activities inevitably result in increased knowledge and proficiency, and, consequently, in the marketability of the gifted students who participate in them.

Contract Learning

Contract learning allows students and teachers to plan and conduct a given course of study. Learning prerequisites, requirements, assignments, time, and methods of evaluation are agreed upon by both parties, a "contract" is drawn up, and both parties are required to adhere to the contract for its duration. Besides the obvious advantages of allowing gifted students to participate in the design of their own learning, contract learning impresses upon students the professional and ethical obligations involved in honoring mutually-agreed-upon contracts.

Self-Initiated Learning Activities

Self-initiated learning activities allow mature and able students to formulate learning programs based on their own desires or needs and present them to teachers for approval and guidance. Much as one would put together a grant proposal, gifted students prepare a detailed learning proposal that indicates purpose, objectives, strategies to attain objectives, time and costs involved, needed equipment and supplies, evaluation procedures, and arrangements for final

reporting on the project. This educational alternative may be pursued inside or outside the school, subject to legal or regulatory constraints and the common sense of all parties involved, and requires a high level of achievement and maturity on the part of the student participants.

Correspondence Courses

Correspondence courses allow students to complete work away from the school setting at whatever pace their individual schedules permit. This arrangement allows great flexibility in management of time, and, in many cases, permits students access to institutions of higher education such as community colleges. Access to a supervising teacher is available whenever students require special help with their course work. Some localities also have provisions for dual enrollment, allowing gifted students on-campus enrollment in college courses while they are simultaneously enrolled in secondary courses.

Cooperative Education

Cooperative education is a highly desirable educational alternative well known and well supported in Virginia localities. Making cooperative education agreements for gifted students requires the most conscientious planning and coordination among teachers, students, counselors, and local employers. Employers, especially, must be consulted regularly to ensure on-the-job activities are sufficiently challenging and complex for the gifted students. At the same time, school-based learning must be appropriately sophisticated and advanced in order to prepare student workers for the tasks required by the employers.

Mentorships

Mentorships are an excellent means of allowing gifted students to work one-on-one with an expert in a given area. Suitable mentors can be identified for any vocational area. Communities have resident vocational experts, and enterprising, creative school districts will want to enlist these often overlooked resources. Multiple mentorships, whereby an individual student may have several mentors, provide yet another intriguing variation on the basic theme. Mentors often discover that their responsibility for directing the efforts of students assigned to them sharpens and refines their own skills, and they are therefore more than eager to engage in such a mutually beneficial arrangement. Cooperation and coordination are required of local school divisions in matching gifted students with

appropriate mentors, and school personnel must see that enlisted mentors clearly understand the requirements, needs, and desires of both the students and the local school division.

The list of suggested ways of arranging alternative learning opportunities in technical arts for gifted students can be infinitely expanded. One idea almost inevitably leads to another. Remembering to plan carefully and to take into account national, state, and local constraints on the school division, all Virginia educators who have a part in providing special arrangements for gifted students should begin to compile their own ideas for new and creative opportunities.

Exemplary Programs

Local educators, because of their expertise in subject areas, their knowlege of and concern for their own students, and their awareness of local resources, opportunities, and constraints, are the key to the success of the entire movement to provide opportunities in technical arts education for gifted students. The following look at some exemplary model programs now operating across Virginia shows clearly just how effectively localities can handle the challenge.

Arlington Career Center

The Arlington Career Center, under the auspices of the Arlington Public Schools, has developed and manages a series of remarkable opportunities for gifted students. One of the most noteworthy is PRIME (Professional Related Intern-Mentorship Experience), an intern/mentor oriented program designed for gifted high school students who desire both hands-on-experience with a professional person in the "real world" and the chance to "test the waters" of a possible career. This program offers opportunities for internships or mentorships in both general and vocational areas such as law, medicine, public relations, research, veterinary science, banking, government, and journalism. PRIME places students according to their interests and abilities. Students spend an average 10 to 15 hours a week with their mentors, attend a two-hour seminar twice each month, and earn one credit toward high school graduation. While working with their mentors, students gain knowledge of the job, professional instruction and practice in necessary skills, and opportunities to participate in making professional decisions. They also learn necessary and desirable

personal characteristics and traits suited to particular vocations.

The animal science program at Arlington provides students in grades 7 through 12 with the opportunity to combine learning not ordinarily available in regular classrooms with career exploration. Designed to introduce students to the field of animal science, this program offers a broad overview of careers in animal science and veterinary medicine and features units covering large and small animals, exotic and domestic breeds, and pet care. Additionally, students receive training from veterinarians, wildlife experts, and zoo personnel and participate in field trips and laboratory work.

Another Arlington-developed opportunity for gifted students is a partnership arrangement between the Arlington Career Center and the University of Virginia. Part of an honors program for gifted secondary students, Introduction to Architecture and Introduction to Engineering Design, Analysis, and Manufacturing are one-week intensified residency programs combining academic and technical approaches and are conducted at the University of Virginia. Students go to Charlottesville for one week in the summer and attend classes 9:00 to 5:00 each day. They earn one semester-hour of college credit for successful completion of the program and gain an introduction to college campus life and to the professional arenas of architecture or engineering design. In the architecture program, students spend early mornings in lectures; the remainder of the day includes technical, hands-on activities in graphics and design studio activities. The engineering design, analysis, and manufacturing program emphasizes the computer graphics systems now used in all engineering fields and incorporates both theory and technical application. Prerequisites for the program include completion of algebra and knowledge of or experience with computers.

Other summer enrichment programs in technical arts for gifted students from grades 7 through 12 at the Arlington Career Center include advanced studies in robotics, computer programming and languages, veterinary science, artificial intelligence, and ground school aviation. All these offerings for gifted students provide challenging alternatives to standard curriculum and instruction methods and show a locality dedicated to innovation in technical arts education.

The Governor's School

James Monroe High School in Fredericksburg provides the setting for an out-

standing regional summer program for students gifted in vocational/technical skills--the Governor's School. Students from the school divisions of Caroline, Fredericksburg, King George, Spotsylvania, and Stafford spend 60 hours in intensified, concentrated mini-courses, internships, and mentorships not availiable to them during the regular school year. Courses of study include laser/optics technology, robotics, computer-assisted drafting, and artificial intelligence. Internships and mentorships, designed to incorporate student training in basic job functions, leadership, and participation in the decision-making process inside professional organizations, involve cooperative efforts between the local school division and area banks, restaurants, architects, the Naval Weapons Lab, and other businesses and industries in the area. Students generally cover one semester's work in each mini-course.

Other Governor's School programs and summer regional programs throughout the Commonwealth offer fertile ground for the growth of similar opportunities in technical arts education, which could also be offered during regular academic year programs.

"2 + 2" Master Technician

A comprehensive, area-wide approach to technical arts education that is appropriate for gifted and other qualified students is exemplified in the "2 + 2" Master Technician program now in operation on the Virginia Peninsula. Designed to produce master technicians skilled in all aspects of modern complex systems, the program combines the last two years of high school training with two years of postsecondary technical education in electronics and electromechanical technology. The "2 + 2" approach emphasizes mathematics, physics, and electrical theory as the foundation for a practical understanding of engineering principles and the proficiency in systems operation and maintenance required of today's master technicians. Joining in this collaborative program are Thomas Nelson Community College; New Horizons Technical Center; the school divisions of Hampton, Newport News, Poquoson, Williamsburg/James City County, and York County; and the Virginia Peninsula Vocational Training Council.

Richmond Technical Center

The Richmond Technical Center's one-year pre-engineering electronics program offers a chance for students gifted in mathematics and science to explore

engineering careers as they develop competencies in electronics. Students work independently and in large and small groups to master skills in design and application of electronic circuits, robotics, and computer use while simultaneously engaged in career exploration. The career education component of the program includes exploring engineering careers, qualifications, earnings, advancement, employment outlook, and the nature and conditions of engineering work. Revolving mentorships involving engineers at Dominion Resources allow students to observe and interact with professionals on the job. Field trips to engineering firms and to colleges and universities offering engineering degrees provide students with first-hand observations and information invaluable to them in making enlightened career decisions. The program allows flexibility in student scheduling, and participants earn two units of credit for the course. The Richmond Technical Center General Advisory Council approves the operation of the program.

These representative examples of technical arts education for gifted students are indicative of both the scope and excellence of current efforts statewide. They involve creative thinking, careful planning and coordination, collaboration, use of all community resources, and, perhaps most important of all, the commitment of Virginia educators to provide the very best education possible for gifted students.

But more such initiatives are needed. Unlimited opportunities exist for additional "2+2"-type articulation efforts in advanced fields, career exploration opportunities, occupational mix curricula development, and advanced courses in all vocational areas. The regional concept of magnet schools serving a number of local school divisions merits further investigation and expansion. Regional centers could provide opportunities for academic year programs as well as summer activities. Each school division in Virginia must initiate its own opportunities for its gifted students, providing them with every resource possible to help in developing their unique abilities.


PERSONNEL

PERSONNEL

Localities wishing to provide technical arts education for their gifted students are urged to begin immediately, starting where they are and using what they have. This injunction applies to personnel as much as it does to equipment and other resources. While certain traits and abilities are highly desirable in those educators who work with gifted students, there are few absolute requirements, and qualified personnel can be trained to work effectively with superior students. Local coordinators of programs for the gifted will need to guide the selection and training process since they have the ultimate responsibility for all gifted students in the local school divisions.

One matter relating to personnel is essential; local administrators must provide adequate time and opportunities for training for all who will be teaching or counseling gifted students. The commitment of the localities to innovative new opportunities must be firm, and it must be realistic. Half-measures will not work, nor will progress be served by heaping more responsibilities onto the shoulders of teachers already overburdened with a multitude of duties. Those teaching gifted students must have time to plan, to create, to reflect, and to evaluate. If the goal is individualized opportunities tailored for each unique student, assembly-line methods are doomed to frustration and failure.

Personnel Training

Training in working with gifted students must be made available to all local educators on an on-going basis. Those who have not been previously trained in working with gifted students must receive the necessary training. Teachers, counselors, and coordinators who have been previously trained will need periodic in-service activities and may require additional formal training through course work, summer seminars, or other means. Counselors may need additional training in the following areas: working with gifted students and their parents; community involvement; career education; and contemporary business/industry practices and requirements. Any additional training necessary or desirable for improving technical arts education for the gifted should be made available to the local educators.

Because of the great diversity of programs, courses, facilities, and personnel among the local school divisions in the Commonwealth, it would be impossible as well as foolish to prescribe a magic combination of professionals necessary to begin enhanced opportunities in technical arts for gifted students. Local educators must put together their own teams who will know best what is needed for local circumstances. There are, however, certain professional qualifications and personal characteristics that seem to indicate success in working with gifted students.

Teacher Qualifications

Professionally, a candidate for working with gifted students in technical arts education should have a demonstrated record of knowledge and expertise in the content area and in the teaching of gifted students. A sound educational background and experience in business or industry would also be highly valuable. Experience with cooperative education, business, and the local community would be helpful in making arrangements for students to work in business or industry. Experience working with gifted students in other contexts would be beneficial. The teacher would also need the sensitivity, creativity, and analytical ability to determine what opportunities beyond the traditional curriculum each individual student needed and be able to tailor these opportunities accordingly. A teacher who had demonstrated innovations in classroom activities over a length of time might work productively with gifted students. Finally, the teacher must, of course, have a strong desire to work with gifted students.

From this list of professional qualifications, it follows that foremost among the personal qualities needed in those who work with gifted students are flexibility and innovation. These educators must be firmly committed to the concept, confident of its success, and able to articulate it clearly to all segments of the community, including parents, with whom school-based personnel must make every effort to maintain rapport.

All educational personnel involved in technical arts education should exhibit the confidence that results from a high degree of self-esteem. Those who are apologetic about what they do or do not place a high value on the worth of what they are doing would be better off not participating in this initiative. Independence of thought and action is also a desirable quality, especially if it is coupled with a cooperative spirit. Technical arts teachers must establish rapport with academic

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teachers, guidance personnel, and administrators so that all necessary components of the program work together harmoniously and productively.

Parental Involvement

Parental influence on children is unmatched, and therefore the success of offering enhanced opportunities in vocational education to gifted students requires parental support. Professional educators must make every effort to involve parents in the planning, operations, and evaluation of the new programs, courses, and other innovative arrangements. Parents must be kept informed and encouraged to assist in the total process. Frequent individual conferences or group meetings between parents of gifted student participants and educational personnel will provide the necessary academic and emotional support so crucial to success.

Community Involvement

The importance of securing and maintaining the support and involvement of local community and business leaders cannot be overemphasized. Local leaders can be instrumental in many aspects of providing technical arts education for gifted students, including planning activities; securing the necessary funding; screening and identifying gifted students; arranging mentorships, internships, and cooperative education agreements; providing in-depth career exploration; and serving on advisory boards.

Personnel requirements for offering technical arts education to gifted students will be determined by local school divisions according to local conditions. The objective common to all personnel arrangements in any locality, however, is to find and engage the best people available in the community, including administrators, teachers, guidance personnel, parents, and community leaders.

SUGGESTED READINGS

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