DOCUMENT RESUME

ED 318 869 CE 054 649

TITLE	Proceedings for Forum on Integrating Occupational and Academic Education.
INSTITUTION	National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE	Nov 89
GRANT	V051A80004-89A
NOTE	28p.
AVAILABLE FROM	National Center for Research in Vocational Education Materials Distribution Service, 46 Horrabin Hall, Western Illinois University, Macomb, IL 61455 (Order No. MDS-118, $2.50).
PUB TYPE	Collected Works - Conference Proceedings (021) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Academic Education; *Academic Standards; *Career Guidance; *Cooperative Programs; *Integrated Curriculum; Secondary Education; *Vocational Education
IDENTIFIERS	Pittsburgh School District PA; West Virginia

ABSTRACT

The papers in this document include the following chapters: "Improving the Collaboration of Vocational and Academic Educators" (Owens); "Subject Matter of Vocational Education: A Look toward the Future" (Copa); "Strengthening Academic Competencies of Vocational Students in West Virginia" (Burdette); "Blueprint for Career Preparation" (Howell); "Implementing Change for Strengthening Academic and Vocational Skills: Pittsburgh's Successes" (Monaco); and "Implementing Change for Strengthening Academic and Vocational Skills: The National Center Study" (Russell). (CML)

PROCEEDINGS FOR FORUM ON INTEGRATING OCCUPATIONAL AND ACADEMIC EDUCATION

Sponsored by

In-Service Education Project
National Center for Research in Vocational Education
University of California, Berkeley

Division of Vocational and Technical Education
Virginia Polytechnic Institute and State University
Blacksburg, Virginia

National Center for Research in Vocational Education
University of California, Berkeley
1995 University Avenue, Suite 375
Berkeley, CA 94704

November 1989 MDS-118

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education
Grant Number:	V051A80004-89A
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act P. L. 98-524
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, D.C. 20202
Grantee:	The Regents of the University of California National Center for Research in Vocational Education 1995 University Avenue, Suite 375 Berkeley, CA 94704
Director:	Charles S. Benson
Disclaimer:	This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view of opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." Therefore, the National Center for Research in Vocational Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

TABLE OF CONTENTS

PREFACE

As the work of our nation becomes more and more technical, even jobs that have typically been filled by individuals with limited skills and education now require workers with basic academic competence. Thus, helping students develop this competence has surfaced as a major concern for educators, one that requires a collaborative commitment of both occupational and academic faculty. Preparing today's students without academic basics can be compared to attempting to use a car without fuel or, in times past, a carriage without a horse. Both college bound and noncollege bound students need occupational as well as academic preparation to meet workplace demands.

However, recent educational reforms have, by and large, focused on strengthening the curriculum and instruction of college bound students, with an ever increasing emphasis on academic learning. For the half of our students who do not attend college, often referred to as the "forgotten half," job requirements are continually rising. For example, the June 26, 1989 issue of *U.S. News and World Report* reports that an auto mechanic in 1965 needed to read and understand five thousand pages of service manual text to fix any automobile; today, the same mechanic must be able to decipher and use four hundred and sixty-five thousand pages of technical text. As noted in the article, strengthening the academic preparation of the forgotten half of our students is critical since our ". . . economy will depend as much on the contributions of this less schooled group of workers as it will on the nations software programmers and rocket scientists."

The need for combining academic and occupational preparation for individuals in our workforce is becoming abundantly clear and surfaces over and over in current literature. Further, the concept of integrating occupational and academic education is a major premise of the recently passed reauthorization of the Carl D. Perkins Vocational Education Act. Thus, these Forum proceedings feature papers from a number of individuals who have spearheaded exemplary programs that do, in fact, integrate occupational and academic education. In addition, future subject matter of vocational education is examined.

B. June Schmidt
Principal Investigator
In-Service Education Project

IMPROVING THE COLLABORATION OF VOCATIONAL AND ACADEMIC EDUCATORS

Thomas R. Owens
Associate Program Director
Education and Work Program
Northwest Regional Educational Laboratory

The challenges facing American education today have been described clearly in numerous reports dealing with school reform ever since *A Nation at Risk* in 1983. One of the latest to state the challenge from an international perspective is the recent report by the American Society for Training and Development entitled *Training America: Learning to Work for the 21st Century*. The report states that

> Our school systems teach too few of today's most necessary work skills, and the teaching is too far removed from its application to real work. Moreover, the education system does not provide adequate work skills to the sixty-one percent of students who do not go on to college. Of these, many fall completely from the life and prosperity of the nation because that nation has not prepared them to participate. (p. 2)

Overview

This presentation focuses on challenges existing in secondary education; the need to integrate academic and vocational education; a framework for viewing collaboration; some barriers and factors that facilitate collaboration; examples of effective practices; and recommendations for local, state, and national leaders, as well as for teacher educators.

The Need

In a recent study of eight hundred and ninety-three vocational classrooms in one hundred and twenty high schools across twenty-four states (Weber, Puleo, & Kurth, 1989), it was found that although basic academic skills were observed as part of the ongoing instruction in sixty-two percent of the cases, explicit attempts to enhance basic skills were noted in only two percent of the cases. The recently completed National Assessment of Vocational Education (Wirt, Muraskin, Goodwin, & Meyer, 1989) concluded that "an objective of federal policy in vocational education should be to encourage the expansion of

academic learning in vocational education and the integration of academic and vocational curricula" (p.83).

Framework

A conceptual framework will be presented that identifies factors that influence co-operation between academic and vocational teachers as well as student and teacher benefits resulting from it.

Based on case studies conducted by the Northwest Regional Educational Laboratory (NWREL), a set of factors have been identified that facilitate or inhibit collaboration between academic and vocational education teachers. These factors will be described and illustrated. The three most commonly mentioned obstacles to collaboration reported by teachers are lack of administrative and community support, lack of adequate time for teachers to prepare together and share experiences, and the lack of training in ways to implement integration.

Examples

The presentation focuses on examples of effective practices that have been observed or reported to facilitate collaboration. Examples include practices at five levels: (1) within a classroom, (2) between two classes, (3) across a school, (4) beyond the school, and (5) at the state level.

One approach by NWREL to promoting academic and vocational integration in schools and colleges in the Northwest has been an informal Applied Academic Exchange newsletter designed to inform and build a network of interested educators. This newsletter is sent to a number of teachers and administrators in the Northwest states and others around the nation who request to be on the mailing list. A major part of the Applied Academics Exchange focuses on new developments and comments regarding national curricula such as Principles of Technology and Applied Communications.

Recommendations

The presentation concludes with specific recommendations at the district, state, and national levels. For example, at the local level we recommend that teams of academic and vocational educators be encouraged to use professional development days for exploring local employer sites to learn of changes in the workplace and of industrial examples to apply in their classrooms.

Colleges teaching educational leadership courses need to assure that master teachers and administrators are being trained in skills of helping vocational and academic teachers to work together. An understanding of change theory, conflict resolution, and team work skills is becoming essential and should be reflected in certification criteria.

States can play a major role in encouraging innovative and effective applied curricula by approving such curricula for vocational credit. In cases such as applied math where there is adequate academic content, they can also encourage districts to award math credit for students completing such courses.

The Clearinghouse on Adult and Vocational Education has initiated an ERIC synthesis report on integrating academic and vocational education which should be useful to the field. This clearinghouse could also initiate a special multi-year effort to collect and disseminate reports and promising practices in this area.

References

American Society for Training and Development. (1989). *Training America: Learning to work for the 21st century*. Alexandria, VA: Author.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: Author.

Weber, J., Puleo, N., & Kurth, P. (1989, Winter). A look at basic academic skills reinforcement/enhancement efforts in secondary vocational classrooms. *Journal of Vocational Education Research, 14*(1), 27-47.

Wirt, V., Muraskin, L., Goodwin, D., & Meyer, R. (1989, July). *Summary of findings and recommendations*. Washington, DC: U.S. Department of Education, National Assessment of Vocational Education.

SUBJECT MATTER OF VOCATIONAL EDUCATION: A LOOK TOWARD THE FUTURE

George H. Copa
Professor and Chairperson
Department of Vocational and Technical Education
University of Minnesota

Vocational education means education that is focused toward vocational development. It is a major component of human development. Other components of human development include academic, social, and personal development. These latter components can have a bearing on vocational development and vice versa. Academic development is foundational to vocational, social, and personal development. All of these components overlap in significant ways, calling for an integration of experiences designed to enhance learning.

The capacity for vocational responsibilities is the focus of vocational development. Vocational roles and responsibilities especially imply those characterized by a commitment to improving the state of affairs in the workplace and at home through the services and products being provided or produced. Full achievement of human potential in the ability to perform vocational responsibilities is critical to our social and economic progress.

A vocational development perspective includes attention to both short term (i.e., introductory skills) and long term (i.e., a continuation of the learning process) needs. Vocational responsibilities include the full range of work (i.e., paid and unpaid, unskilled to very skilled) and family (i.e., child to grandparent) roles. Vocational responsibilities include the ability and desire to change work and family environments to enhance their effectiveness.

Uniqueness of Vocational Education

Learning that enhances vocational development takes place in home, school (i.e., pre-kindergarten, elementary, secondary, and postsecondary), workplace, and other community settings. The degree of vocational responsibility in an educational experience can vary from general to specific and tangential to central. In some degree, all learning leads to

vocational development. However, for some educational experiences (i.e., those typically labeled professional, technical, and vocational education), the focus towards preparation for vocational responsibilities is more central and specific.

Since vocational development is a component of human development, vocational education should be a part of everyone's common education. Some aspects of vocational education would be the same for all individuals while, at the more specialized levels, attention to vocational education would be common, but its curricular content would be different depending on the vocational responsibilities of interest to the individual.

Content of Vocational Education

The content of vocational education is made up of the learning which promotes success in resolving problems encountered in performing vocational responsibilities. Since vocational responsibilities consist for the most part of work and family responsibilities, the problems of most interest are those that are continuously encountered in work and family life. Having identified these concerns, the content of vocational education is the learning that enhances their successful resolution.

The following is a tentative categorization of the problems encountered in taking vocational responsibilities (the listing is tentative because no acceptable taxonomy has been found in the literature):

1. **Understanding work and family life.**
   Anticipating and making sense out of the problems encountered at work and at home (i.e., How does work and the family fit into our culture? Why does this problem have to be dealt with now? What is the desired state of affairs in the workplace and at home? What is the present state of affairs?).

2. **Rights and responsibilities in work and family life.**
   Distribution of power and authority encountered in work and family life (i.e., What are my responsibilities at work and at home? What rights should I have?).

3. **Relationships in work and family life.**
Interrelationships among individuals in work and family life (i.e., How should I relate to peers? How should I relate to subordinates?).

4. **Technology in work and family life.**
Dealing with technology and technological change in work and family life (i.e., How should I cope with technological change at work and at home? Is this technology helpful?).

5. **Generic work and family life specific competence.**
Concerns which are procedural in nature, but general across various vocational responsibilities (i.e., problem solving, communications, learning to learn, computation, creative thinking, and leadership).

6. **Work and family life specific competence.**
Concerns which are procedural in nature, but specific to selected vocational responsibilities (i.e., adjusting a carburetor to an automobile mechanic, balancing a budget statement to an accountant, disciplining a child to a parent).

7. **Managing work and family life.**
Managing one's own work and family life (i.e., selecting preferred type of lifestyle, using resources appropriately, considering needed changes).

These categories of concerns encountered in vocational life appear over and over again. Specific problems are resolved, only to develop again as individual interests and needs change. Hopefully, through life experience and continuing vocational education, individuals will become more competent in resolving problems faced in each category.

The specific learning content of vocational education is identified by starting with the vocational responsibilities and roles, identifying the concerns needing to be addressed, and "backing into" the needed learning to resolve these concerns. As such, the content of vocational education "backs into" the various academic disciplines and professional fields of study. The relationship to the academic disciplines provides the foundational content of vocational education and the relationship to the professional fields of study provides its specialized content. The foundational and specialized content is integrated around the

following components of problem solving: aims, context, alternatives, consequences, judgments, and actions.

Methods of Vocational Education

The methods of vocational education stress sustained thinking about difficult problems that have real consequences in the context of vocational responsibilities. Attention is made to the application of basic skills (i.e., communications and computation) and higher order skills (i.e., decision making and creative thinking), which require experiential activities. A facility at problem solving is a central, valued end to be encouraged through vocational education. As noted earlier, learning occurs in a variety of settings including home, school, workplace, and in the wider community. The content and method of vocational education interact synergistically thereby making any separation artificial and limiting in considering the curriculum of vocational education.

Structure of Vocational Education

The educational process must be structured so that learning which focuses on work and family life does not stratify individuals economically or socially. A powerful means for preventing stratification is to insure that vocational education is part of the common education of all individuals and that it gives equal status to all levels of vocational responsibility. This aim will be particularly difficult since all vocational responsibilities are not given equal status in our culture.

In order to prevent "ballooning" of the content of vocational education to the point where it does not fit in a given learning environment, it must be appropriately articulated with learning which has come before and which will come after, and integrated with other learning which is occurring at the same time. In the process of articulation and integration, care must be taken so as to insure the integrity of vocational education as a unique area of study. At all times, the structure must insure that vocational education is part of the "mainstream" of education.

STRENGTHENING ACADEMIC COMPETENCIES OF VOCATIONAL STUDENTS IN WEST VIRGINIA

Clarence E. Burdette
President
Human Resources Development and Training International, Inc.
Retired State Director of Vocational Education
West Virginia

The period of the 1970s and up through the early 1980s was a period of rapid development for vocational education in West Virginia. It was a period of numerous construction projects, the development and implementation of the competency-based instruction concept, the development of a vocational education curriculum and instructional materials center for the state, rapidly expanding enrollments, the development of a statewide computer network, and the improvement of teacher education programs.

In the mid 1980s, West Virginia vocational education professionals began to recognize that the changing characteristics of the workforce, changes in the economic stability of the state, and the continuing and rapid technological changes which were taking place were creating a tremendous need for change in the vocational education program.

A major effort was begun to involve vocational educators, academic educators, persons from business and industry, and the general public in determining the future direction for vocational technical education in the state. Public forums were conducted in forty-three locations throughout the state and a twenty-seven member state committee was appointed by the State Board of Education to assist with this redesign and refocus of vocational education.

Vocational administrators, superintendents, principals, counselors, and teachers were surveyed. National and regional studies and position papers were reviewed, and an analysis of state policies and statistical reports was performed.

One of the major outcomes of this endeavor was the recognition that vocational education completers would need better academic and basic skill competencies in order to succeed in the workplace of the future.

The West Virginia Board of Education gave additional impetus to the recognition of this need with the publishing of a "Plan for Redesign and Refocus of Vocational Technical and Adult Education in West Virginia." A major part of this plan focused on improving the academic competencies of vocational education students and completers.

With the recognition of the problem, vocational educators throughout the state began to identify methods through which academic proficiency could be increased or improved. A wide variety of approaches were utilized. Efforts were begun to identify specific mathematics, science, and communications competencies needed in each area of occupational instruction. Many vocational centers added math and English teachers to their staff, utilizing them to teach those skills to vocational students and to assist vocational teachers in emphasizing those competencies in their occupational instruction.

One problem which soon became apparent was the lack of math competency on the part of vocational education teachers. At West Virginia Institute of Technology (WVIT), a teacher education institution for industrial, technical, and health occupations, instructors reacted quickly to this need. Mathematics classes for vocational teachers were organized throughout the state. Emphasis was placed on the math skills needed in industrial, technical, and health occupations, and in helping the vocational teacher to recognize the importance of capitalizing on the teachable moment for mathematics. In other words, the vocational teacher is helped to recognize that the time to teach a math skill is when it is needed in the occupational instruction.

Other approaches to improving academic skills were also implemented in the state. Several hundred academic math teachers were provided training in utilizing instruments of measurement relative to vocational classes in their math classes and in teaching the math needed from the practical aspect.

The West Virginia Department of Education, capitalizing on the computer network already in place in vocational education centers throughout the state, implemented a statewide computerized evaluation and instructional program called BASE (Basic Academic Skills for Employment). The computer program allows each student to be tested individually to determine the level of academic proficiency, and the test score is recorded on that student's individual computer disk. The student is then provided instruction in those competencies which the test indicates as deficiencies. The teacher has a record of the work each

student has done on an individual disk along with the time spent in remediation at any point in time. Other academic skills programs were purchased by individual school systems throughout the state.

Numerous staff development institutes have been conducted throughout the state to assist vocational teachers in recognizing the importance of academic skills and in techniques of integrating academic skills into vocational instruction. Similar staff development programs have been provided to academic teachers in an effort to assist them in incorporating practical approaches in teaching academic skills.

The West Virginia Board of Education has adopted a policy for identifying vocational education completers which requires that those appropriate and identified academic courses relative to the student's occupational education programs be completed in order for a student to qualify as a vocational completer. Planning is in process for the implementation of both an academic skills and occupational testing requirement for vocational completers.

West Virginia was one of the founding states in the formation of the Southern Regional Education Board-State Vocational Education Consortium which has as its goal improving the communications, mathematics, and science competencies of students enrolled in vocational courses. The state has three local sites participating in the initial project.

While it is too early for the statewide academic testing program to show definitive results, discussions with both vocational and academic teachers and administrators indicate that we are moving significantly toward our goal of raising the academic competency level and, therefore, the vocational competency level of our students.

BLUEPRINT FOR CAREER PREPARATION

Robert S. Howell
Director
Division of Vocational, Adult, and Community Education
Florida Department of Education

In the *Blueprint for Career Preparation* (Florida Department of Education, 1989), Betty Castor, Florida Commissioner of Education, states: "We must change the way we do business in education . . . because business is depending on it. In fact, our entire economic survival is depending on it" (p. 1).

David Kearns, Chairman of Xerox, supports this: "The American workforce is running out of qualified people. If current demographic and economic trends continue, American business will have to hire a million new workers a year who cannot read, write or count" (Florida Department of Education, p. 2).

Education and economics—they are intertwined . . . and interdependent. Never before has it been more important to recognize the relationship between the way we educate our young people and the future jobs available. These jobs will call for persons who can read, write, compute, communicate, and understand the workplace.

What is the Blueprint for Career Preparation?

The Blueprint is the new direction in which we need to go. Just as a builder needs a blueprint before starting construction, an enterprise as large as education in Florida needs a unified vision of where it is heading. This Blueprint provides that vision.

It is designed to address the increasing gap between emerging job requirements and the ability of Florida's workforce to meet them. It is designed to prepare students for the world of work, a competitive global marketplace that is changing everyday. It is designed to enable all high school graduates to get a job.

The driving force behind this Blueprint is a major policy of the Florida Department of Education embodied in the following statement:

> Students graduating from Florida's public schools shall be prepared to begin a career and continue their education at a postsecondary technical school, community college, or university. (p. 9)

While everyone agrees it cannot be achieved quickly, this Blueprint describes the steps to get there.

Why Do We Need Change?

The evidence is overwhelming. Scores of business publications and research documents conclude that America is losing its competitive edge in a global economy. The reason: A workforce unprepared for the changing workplace.

If recent trends continue, up to three-quarters of the new employees through the year 2000 will have insufficient verbal and writing skills. The nation is facing a monumental mismatch between jobs and the ability of Americans to do them. That's because technology is changing the work required in most jobs, and growth areas will be mainly in high-skill operations. The tools we use are more complicated, each requiring more flexibility and more knowledge. In addition, we're changing the way work is organized and requiring far more communication skills.

Demographics also have changed. This has had a tremendous impact on Florida's ability to train the students whose numbers grow every day. Eighty percent of new workers at the turn of the century in Florida will be minorities or women. Young students who are currently economically or socially disadvantaged will make up a large portion of tomorrow's workforce.

Unfortunately, corporate America has been forced to spend $200 billion a year on training and retraining its workforce, and at least $35 billion on remedial training. A third of Florida's small businesses say that their new workers usually need some remedial training. Business and industry are demanding a more qualified workforce.

How Do We Get There?

The Blueprint touches all levels of education, taking the core curriculum of basic skills and making it relevant to today's workplace. The key is providing each student with guidance and opportunity. Schools must integrate academic and vocational education, making them both meaningful to the student's career development. Curriculum should relate to careers, and vice versa. This does not mean that the teaching of basic skills and graduation requirements will be changed, or that students must choose between an academic track or vocational track. The integration of the two approaches means the students will get both academic and career training. The following six steps to career preparation are essential:

1. Begin in kindergarten through fifth grade by developing in students an awareness of self, the value of work, and exposure to career and technology.

2. By grade six, students—with the help of their teachers and parents—should assess personal aptitudes, abilities, and interests, and relate them to careers. They should also learn the role of technology in the world of work.

3. In grades seven and eight, students should set career-oriented goals and develop four-year career plans for grades nine through twelve. These plans may change as they are reviewed annually, but they set students on a course and provide a basis for curriculum selection. Planning also gets parents involved.

4. During high school, a new "Applied Curriculum" will make academic concepts relevant to the workplace, especially in communications, math, and science. Vocational courses are coordinated with academic instruction.

5. Students choosing postsecondary programs should be able to successfully gain employment, advance within their fields, or change occupations. These programs include vocational technical centers, community colleges, and universities.

6. Educators should intensify efforts to share information and to involve parents, businesses, and the entire community in this process. Partnerships and the involvement of people beyond education are critically important.

Along the way, it is important to evaluate our progress. We must measure results through the ability of future graduates to succeed in the job market and the ability of employers to find qualified workers. This will be accomplished through the Florida Employment Training Placement and Information Program, in the Department of Education, and the appointment of an external advisory group.

Where Do We Begin?

We have already begun, with twelve Florida school districts and their postsecondary partners committed to implementing the Blueprint. Fortunately for Florida, the key elements are already in place. Three major components—secondary schools, vocational centers, and community colleges—all have programs to prepare Florida's workforce. This Blueprint proposes no major structural changes within the system.

But it does propose better coordination, more resources, more training, and a healthy dose of attitude adjustment among educators concerning the role of schools. The Department of Education plans to play a leadership role, seeking legislation, expanding partnerships, and providing technical assistance. This Blueprint proposes activities over the next six years, including pilot projects, curriculum changes, scholarship programs, training, and evaluation.

The education of our children is a serious business. Our state, more than most, must compete in a world marketplace. Florida's unique composition is a challenge as well as an opportunity. We're taking on that challenge. We're changing the way we do business in education because business—and economics—depend on it.

IMPLEMENTING CHANGE FOR STRENGTHENING ACADEMIC AND VOCATIONAL SKILLS: PITTSBURGH'S SUCCESSES

Fred Monaco
Director of Career and Vocational Education
Pittsburgh Public Schools

America's urban centers face many similar problems: unemployment, teenage pregnancy, illiteracy, and rising school dropout rates. Pittsburgh is no exception. As with other urban areas, many problems arise from a changing economy. As Pittsburgh's steel mill jobs have disappeared, many dropouts have lost this source of employment and have found themselves on welfare rolls or in prison. Statistics show that youth from poverty are three times as likely to drop out of school as nonpoverty youth. Among the Pittsburgh school district's forty thousand students, more than eighty-seven percent are disadvantaged enough to qualify for a free or reduced-cost lunch. In spite of these statistics, Pittsburgh schools have found that potential dropouts can learn valuable job acquisition and survival skills. The learning process is enhanced when the school system, the community, and the students work together to identify problems and develop solutions. The Pittsburgh vocational programs have been successful, in large part, because of this type of cooperation.

This cooperative effort has provided reinforcement for the notion that if the educational setting encourages students to see the connection between what they're doing in school and what they might do later in life, more of them may be interested and motivated enough to stay in school. Pittsburgh has successfully implemented several initiatives which are based upon this notion of reinforcing related academic and vocational skills. These programs are listed below:

1. **OASES (Occupational and Academic Skills for the Employment of Students)**
   This program is a prevocational training and dropout prevention effort which emphasizes academics while teaching construction theory through hands-on laboratory and community projects.

2. **SET (Select Employment Training)**

This is a career development program for at-risk youth. It has been noted as an exemplary cooperative education effort by the Pennsylvania Department of Education.

3. **High-Tech Magnet**

High-Tech Magnet is a program operated at Schenley High School. The classes begin with basic electricity and progress through advanced digital electronics and robotics. This program piloted the practice of infusing a vocational focus in all academic subject areas. For example, a recent activity involved measuring the school hallways with a laser. Schenley is a triangular-shaped building permitting mirrors to be placed for reflection of the laser beam around the interior of the building. The science class set up the laser and mirrors. The electronics class attached an oscilloscope to the laser. When the beam was sent around the hallway, it was viewed on the oscilloscope, and the wave patterns at the start and at the return were noted. The difference in the wave patterns was computed by the mathematics class to determine the hallway distances. To verify the distance, the drafting class physically measured the hallways and drew the floor plan on a CAD system. The English class wrote the project in a field report format, and the computer literacy class prepared the written report on word processors.

4. **Business and Finance Academy**

Westinghouse High School's Business and Finance Academy provides marginal and disadvantaged students with mentors from the business world. The Academy provides a strong cross-discipline curriculum emphasis on finance, summer and part-time jobs, and entry level jobs after graduation.

The success of interdisciplinary cooperation is not limited to special programs, but is evident throughout the school system. For example, at Allderdice High School, the electronics teacher spent a week teaching scholars physics students how to read a V.O.M. They had been taught the theory of voltage resistance, but had never proved it practically until this experience. While the physics students were working with the electronics teacher, the electronics students were taught electrostatics by the physics teacher.

Over the past several years, programs such as these have resulted in an average of five thousand students (three-fourths of whom are at-risk and ten percent of whom are

handicapped) earning a total of $10 million per year and remaining in school. Even so, Pittsburgh continues to develop new programs such as the establishment of an atypical vocational program entitled Public Safety Academy, which prepares youth for careers in police, fire, and paramedic work.

Most recently the efforts have involved the New Futures Initiative, which is a school-community partnership developed as a result of a grant from the Anne E. Casey Foundation. The initial focus of New Futures is a career initiative which involves the following:

1. The Pittsburgh school district will eliminate the general education program as a graduation option. Students will decide whether to work toward a vocational or an academic diploma.

2. Formalized career education will be infused into all subject area curricula in grades 1 through 12.

3. The Pittsburgh Promise will fill the gaps between the vocational experiences now available and the optimal range of work experiences students need.

These changes will provide the beginnings of a continuing effort to ensure that Pittsburgh's students have systematic opportunities to see the ways in which education can be applied in real life situations.

IMPLEMENTING CHANGE FOR STRENGTHENING ACADEMIC AND VOCATIONAL SKILLS

Ellen S. Russell
University of Illinois at Urbana-Champaign
Department of Educational Psychology

My presentation is divided into two parts. The first is a description of a study conducted by the National Center for Research in Vocational Education in which I was one of three researchers who visited schools that have been successful in integrating academic and vocational education. The second part is a more specific account of the curriculum development process at the Chicago High School for Agricultural Sciences, which I helped initiate.

National Center Study

The research was designed to document key factors in nine urban high schools that were experiencing success both in educating students for specific occupational fields and for college entrance. The study followed the effective schools research model by identifying successful schools and then describing them, hoping to find some common characteristics that would be useful in encouraging further development of such programs. New York, Chicago, and Metropolitan Los Angeles were selected for the study because they are large urban centers with significant numbers of disadvantaged minority students and alarmingly high dropout rates. Nine schools were identified as successful in motivating students to stay in school and graduate by integrating academic and vocational education.

Our research yielded nine factors that seem to be associated with the success of the schools. We found many, if not all, of these characteristics in the schools we visited:

1. **A safe and orderly environment conducive to teaching and learning is evident.**

   Many of the schools we visited are located in very depressed urban areas with the attendant problems of unemployment, drug and alcohol abuse, and vandalism. The schools are islands of order and calm—places where students are safe and where learning can take place. Behavior problems in these schools are minimal.

2. **Students and teachers exhibit a businesslike attitude which creates an atmosphere of constructive energy in the school.**

Students move through the hallways in an orderly manner and with a sense of purpose. Homework is done on time, and students keep well-organized notebooks for each class. Teachers serve as role models and they have high expectations of students. In many cases, students and teachers dress as they would in the workplace—for example, lab coats in science labs and suits in business and banking.

3. **The school climate is warm and caring.**

Teachers and students have mutual respect for one another. They describe their schools as places that nurture the individual. Principals know many students by name. Teachers interact with students before and after classes, and many teachers continue to keep in touch with their students after they graduate. The leaders in these schools provide a positive socioemotional climate, where appropriate recognition and rewards result in high levels of commitment and productivity. Commitments are reflected in high attendance rates of teachers and students, student engagement in classroom learning, and voluntary participation by teachers and students in school-improvement efforts.

4. **The schools have an established admissions process based on student interest in the career specialty or set of subjects.**

These schools have a selection process that recognizes the unique set of experiences each student brings to the program. Acceptance into the school is a vote of confidence for the individual. Student interest, not achievement test scores, is the basis for admission. As a result, students of all ability levels are enrolled in these schools.

5. **The schools recognize and accept a dual mission—to prepare students for an occupation and for college.**

These schools offer students a range of choices for life after high school: four-year college; a professional institute; two-year college; a job with career prospects; or a combination of college and work. The last option is an interesting one. To succeed in college, some low-income and minority students may need the self-confidence that comes from knowing that one has a set of skills, that one is "good at something." Also, the income from a good part-time job can be used to help meet college costs.

6. **High expectations are maintained for all students; grouping by ability is minimized.**

These schools try to achieve the American dream of equal opportunity by accepting students of all ability levels. Segregating students by achievement serves to lower expectations of students at the low end of the scale. In these schools, high standards are set for all students. Tracking of students by ability is eliminated or minimized.

7. **The curriculum is organized around an industry or a discrete set of subjects.**

Specialization in high schools allows greater opportunity to design a coherent, sequential, and comprehensive curriculum; and allows better articulation between its offerings and what is taught in postsecondary programs and in on-the-job training. The specialized high school is better able to afford expensive equipment because it can reap the benefits of economies of scale. Also, when schools appeal to the different interests of students, one may postulate that students will display a higher motivation to study and learn. Likewise, specialized high schools appeal to the specialized interests of faculty, and this should promote collegiality among faculty members. Finally, having a single focus also helps the school gain the support of the industry that identifies with it.

8. **The schools foster the integration of theory and practice in the courses of instruction.**

In the typical high school, academic and vocational courses are isolated from each other. In these exemplary schools teachers of academic subjects provide real life examples of symbolic ideas and mathematical abstractions. Teachers of vocational subjects use practical applications to teach theory. The transferability of skills learned in school to life outside school is likely to be enhanced as theory and practice are linked.

9. **Strong linkages with business and industry and sometimes with local institutions of higher education exist.**

Advisory groups are a primary source of linkage between theory and practice in these exemplary schools. Most of the schools have an active advisory committee composed of business, industry, and (often) university leaders who support the programs and offer internships and other work experience to students. The strength and power of these advisory committees cannot be underestimated. These

groups become advocates for the school, give advice on curriculum matters, and help teachers and students see real connections between school and work.

The schools in this study are not "vocational" high schools in the traditional sense of the term. They are attempting to blur the lines between vocational and academic education by providing both career and college preparation for all students. They are defining vocational education in a new and broader way than it has been defined in the past.

The Chicago High School for Agricultural Sciences

In September 1984 I was appointed principal of the newest magnet high school in Chicago. I was given a seven-room building (formerly an elementary school) located on a seventy-two acre campus situated at the southwest edge of the city. This land, owned by the Chicago Board of Education, had become known as "Chicago's Last Farm." Local residents fought to keep it as an operating truck farm when the School Board threatened to sell it. Their efforts resulted in the Board establishing the site as the location for a new high school. The farm would later become the school's land laboratory.

The only other school of this type in the United States was the Walter Biddle Saul High School in Philadelphia. When I visited that school, the principal gave me a very important piece of advice. He said, "If you do nothing else this year, be sure you set up a business advisory council." I went back to Chicago and did just that.

The Agribusiness Advisory Council played a critical role in the development of the school's curriculum. The thirty-one member group consisted of business leaders, university faculty and administrators, state and local Board of Education leaders, and a parent representative. Two student leaders also sat on the council as ex-officio members.

The Council's chairman financed a labor market study in the Chicago area that showed a need for qualified employees in food science, horticulture, and agribusiness. The jobs in food science and agribusiness required applicants to have at least a Bachelor's degree. The University of Illinois provided us with additional information on national employment needs in plant and animal research and biotechnology. These careers would

require advanced degrees. Consequently, the traditional vocational school model of preparing students for entry level employment after high school needed to be re-examined.

We then set up subcommittees of the Advisory Council so that teachers who were selected for the new school could get advice in each of their areas of specialization. In each subcommittee there were academic and vocational teachers interacting with business and university experts. For example, the Animal Science subcommittee had Advisory Council members from the Lincoln Park Zoo, the Humane Society, and the University of Illinois, as well as our biology and agricultural science teachers. Subcommittees began to meet before the school opened in August of 1985 and continued to schedule regular meetings each year as a mechanism for designing, evaluating, updating, and revising the curriculum.

The Advisory Council recommended that all students be required to take a full program in the agricultural sciences in addition to all of the courses they would need for college entry. As a result, we needed to rethink our school day. The teachers came up with a new schedule that would allow students to concentrate on four classes each day—eight courses each week—by implementing a college-type schedule of double period courses meeting on alternate days. Eliminating study periods and shortening the lunch period also allowed students to take more classes.

Students of all ability levels attend the Chicago High School for Agricultural Sciences. Many teachers were concerned that some students would have difficulty meeting the demands of a program that required all students to take both college preparatory and vocational courses. As a result, the counselor paid close attention to student progress each ten-week marking period and provided peer tutoring and other special help to those having difficulty. In some cases students were allowed to drop a difficult course and take it during the summer when they could focus on it alone.

All students who graduate from the high school have a multitude of options available to them. Over seventy percent of the June 1989 graduates (the school's first graduating class) are now enrolled in postsecondary education.

The key to integrating vocational and academic education at my school was the active Advisory Council and the willingness of academic and vocational teachers to be innovative and to work together. Teachers met to plan curricular offerings at weekly

inservice meetings and at Advisory Council subcommittee meetings. Summer trips to the University of Illinois provided additional opportunities for interaction, as well as chances to visit agribusiness sites and laboratories.

Summary

The schools in the National Center study (which included the Chicago High School for Agricultural Sciences) are redefining vocational education. Educators in these schools realize that the world is changing rapidly and the occupational needs of the future will require students to obtain additional formal education as well as on-the-job training. Traditional definitions of vocational education as preparation for entry level employment are too narrow and limiting for the people who teach and the students who learn in these classrooms. Policymakers must join the schools in this endeavor to develop and disseminate broader, more appropriate definitions of vocational education for the 1990s and the twenty-first century.

Schools that are integrating career and college preparatory education often have longer than normal school days. Funds are needed to support lengthened days, as well as to provide time for faculty to meet and plan together.

Successful schools such as these need more resources and more control over decisions that affect classroom learning. Principals need to be able to interview and select their own teachers, hire part-time teachers for their vocational classes, and provide opportunities for staff development within industry for both academic and occupational teachers. Laboratories and equipment must be continually updated. Teachers and students must actively participate in the decision making processes in their schools. Often the support for such change and for innovative schools and programs is lacking at higher levels of administration. Large bureaucratic structures at the local and state levels and/or traditional attitudes prohibit the generation of new ideas and unique solutions to educational problems. Funding initiatives should support and encourage innovation.