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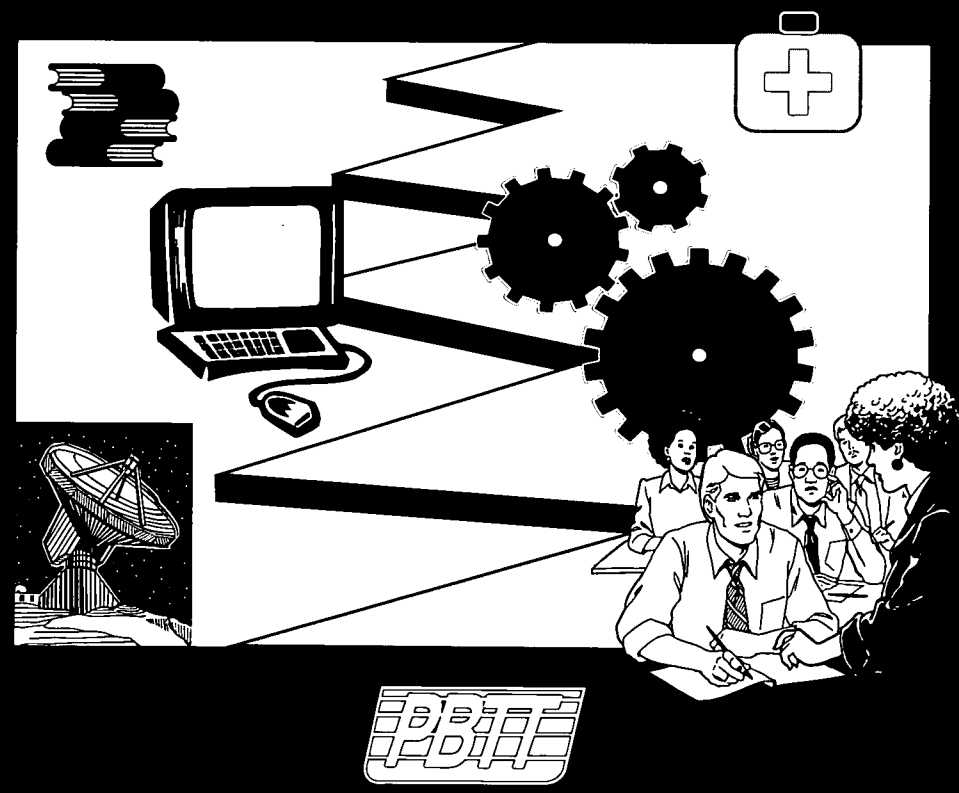
ABSTRACT

This module is a performance-based teacher education learning package focusing on preparing better teachers for tomorrow. The module addresses new professional competencies needed by tomorrow's vocational-technical and other career-related teachers and instructors. It provides four learning experiences that integrate theory and application: (1) explain why all teachers should relate their instruction to the world of work and everyday life; (2) describe the characteristics and features of high-quality, integrated academic and vocational education programs; (3) identify the important roles of teachers, administrators, and others in implementing integrated curriculum; and (4) demonstrate readiness to begin integrating academic and vocational curriculum. Each culminates with criterion-referenced assessment of the learner's performance of the specified competency. This module is designed to prepare both academic and vocational teachers to work together to integrate their curriculum. Each of the four learning experiences includes an enabling objective based on the module's performance objectives; several activities; feedback; and a list of resources. The readings and activities are intended to help prospective or inservice teachers understand why it is important for all teachers to relate their subject matter to everyday life and the world of work. Case studies and program summaries present the characteristics of high-quality integrated educational programs. (KC)

PREPARE TO INTEGRATE ACADEMIC & VOCATIONAL CURRICULUM



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Forward

Preparing Better Teachers for Tomorrow

This module is one of a new series of performance-based teacher education learning packages focusing on PREPARING BETTER TEACHERS FOR TOMORROW (PBTT). The PBTT modularized learning packages address new professional competencies needed by tomorrow's vocational-technical and other career-related teachers and instructors. The modules can be used in preparing teachers and other occupational trainers in all career areas.

Research and Development Process

PBTT draws from nearly thirty years of sustained research and development effort by the Center on Education and Training for Employment. Modules in this series are based on the national identification and verification of the professional development competencies important to vocational and other career-related teachers. A 1995 DACUM occupational analysis workshop was sponsored by Illinois, Ohio, and Pennsylvania to identify the duties and tasks believed to be important to career-related teachers. These competencies were verified by a stratified national sample of 215 career-related teachers.

Development of the initial three modules (of which this is one) in the PBTT series was sponsored by the State Departments of Education in Illinois, Ohio and Pennsylvania. These modules focus on procedures for the successful integration of vocational and academic education. Additionally, the publisher, AAVIM, and the developer, CETE, produced a fourth module on computer-based instruction.

Module Design and Use

The structure and design of modules in the PREPARING BETTER TEACHERS FOR TOMORROW series follows that of the Performance-Based Teacher Education (PBTE) Series of modules, which addressed the professional competencies needed by vocational-technical teachers during the 1980's and 1990's. Each module provides learning experiences that integrate theory and application; each culminates with criterion-referenced assessment of the learner's performance of the specified competency. The materials are designed for use by teachers for teachers-in-training who work individually or in groups under the direction and with the assistance of teacher educators or others acting as resource persons. Resource persons should be skilled in the teacher competencies being developed and should be thoroughly oriented to PBTT concepts and procedures before using these materials.

The design of the materials provides considerable flexibility for planning and conducting performance-based training programs for preservice and inservice teachers, as well as business-industry-labor trainers, to meet a wide variety of individual needs and interests. The materials are intended for use by universities and colleges, state departments of education, post-secondary institutions, local education agencies, and others responsible for the professional development of teachers and other occupational trainers.

A Brief History of PBTE

The PBTE curriculum packages were products of an 18-year sustained research and development effort by the Center on Education and Training for Employment (CETE). Many individuals, institutions, and agencies participated with the Center and made contributions to the systematic development, testing, revision, and refinement of those training materials. Calvin J. Cotrell directed the vocational teacher competency research study upon which the first modules were based. He also directed the curriculum development effort from 1971-72. Curtis R. Finch provided leadership for the program from 1972-74. James B. Hamilton provided program leadership from 1974-1985. Over 40 teacher educators provided input into the development of the modules; over 2,000 teachers and 300 resource persons in 20 universities, colleges, and postsecondary institutions used the materials and provided feedback to the Center for revisions and refinement. The first published edition of the modules found widespread use nationwide and in many other countries of the world.

Acknowledgments

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PREPARE TO INTEGRATE ACADEMIC & VOCATIONAL CURRICULUM

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INTRODUCTION

Educators are trained to instruct students in their individual areas of study. Academic teachers are taught to help students learn about academic subject matter. For example, English teachers learn how to effectively teach students to interpret literature and employ the rules of grammar. Mathematics teachers learn how to effectively teach students to make calculations and use formulas. However, academic educators are not trained to help students to apply what they are learning to situations that they encounter in their vocational studies. As a result, many students do not believe that the academic subject matter is relevant to their success in the workplace.

In addition, vocational teachers are taught, through hands-on methods, to help students gain specific vocational competencies. For example, electronics teachers help students learn to effectively construct and analyze circuits. Culinary arts teachers help students learn to plan and prepare meals. Vocational teachers are not, however, trained to reinforce academic concepts that are required for success in the workplace. As a result, many vocational/technical students do not believe that they need to be proficient in academic skills in order to succeed in the workplace.

In spite of this, there is strong evidence that the integration of academic and vocational curriculum is precisely what needs to happen if students—both vocational/technical and college bound—are to be well-prepared to enter the workforce.

That is why many schools are supporting teachers to integrate academic and vocational curriculum. They are encouraging academic and vocational teachers to work together on teams in order to modify curriculum, develop interdisciplinary activities, and share ideas and resources.

This module is designed to prepare both academic and vocational teachers to work together to integrate their curriculum. The readings and activities will help you understand why it is important for all teachers to relate their subject matter to everyday life and the world of work. Case studies and program summaries will present you with characteristics of high-quality integrated educational programs. Finally, it will become apparent to you that one of the chief characteristics of successful curricular integration is the cooperation of teachers, administrators, students, parents, members of business and industry, and the community.

About this module

OBJECTIVES

PERFORMANCE OBJECTIVE

Demonstrate your readiness to begin integrating academic and vocational curriculum. Your performance will be assessed by your resource person using the criteria in the Teacher Performance Assessment Form, p. 45 (Learning Experience IV).

ENABLING OBJECTIVES

1. Explain why all teachers should relate their instruction to the world of work and everyday life (Learning Experience I).
2. Describe the characteristics and features of high quality, integrated academic and vocational education curricula (Learning Experience II).
3. Identify the important roles of teachers, administrators, and others in implementing integrated academic and vocational curricula (Learning Experience III).

RESOURCES

A list of the outside resources that supplement those contained within the module follows. Check with your resource person (1) to determine the availability and location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observations of skilled teachers, if necessary. You may contact your resource person if you have any difficulty with directions or in assessing your progress at any time.

Learning Experience I

Optional

Further reading:

Andrew, E. N. & Grubb, W. N. (1992). *Making High Schools Work: Patterns of School Reform and the Integration of Vocational and Academic Education.* Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Douglas, A. "Mending the Rift Between Academic and Vocational Education," *Educational Leadership.* 49, (March 1992) 42-43.

Gray, K. C. & Herr, E .L. (1995). *Other Ways to Win: Creating Alternatives for High School Graduates.* Thousand Oaks, Calif.: Corwin Press, Inc.

National Center for Research in Vocational Education. (1992). *Establishing the Integration of Academic and Vocational Education in Urban Schools: Plans Developed at the NCRVE 1992 Summer Institute.* Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Learning Experience II

Optional

Visit(s) to fully operational academic and vocational integrated program(s)

Further reading:

Fogarty, R. (1989). *How to Integrate the Curricula.* Palatine, IL: IRI/Skylight Publishing, Inc.

Gloeckner, G.W. & Love, C.T. (1992). *Integrating Basic Skills into Vocational Teacher Education Curricula: Book 1- The Initial Steps.* Ft. Collins: Colorado State University.

Grubb, W .N., Davis, D., Lum, J., Plihal, J., & Morgaine, C. (1990). *The Cunning Hand, the Cultured Mind: Models of Integrating Vocational and Academic Education.* Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Jacobs, H. H. (1989). *Interdisciplinary Curriculum: Design and Implementation.* Alexandria, VA: Association for Supervision and Curriculum Development.

Learning Experience III

Optional

Interviews with teachers, administrators, students, and / or business people.

Learning Experience IV

Required

A resource person to assess your readiness to begin academic and vocational integration.

Learning Experience I

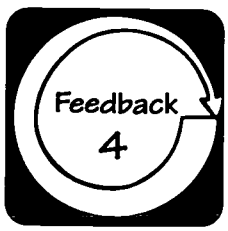
OVERVIEW

Explain why all teachers should relate their instruction to the world of work and everyday life.

You will read the information sheet, The Rationale for Integrating Academic and Vocational Curriculum, pp. 6-8.

You will read the information sheet, Moving to an Integrated Curriculum: A Case Study of Central High School, pp. 9-10.

You will demonstrate your knowledge of integrated academic and vocational curriculum by completing the Self-Check, p. 11.



You will evaluate your competency by comparing your completed Self-Check with the Model Answers, p. 12.

Activity 1

Read the information sheet, The Rationale for Integrating Academic and Vocational Curriculum.

The Rationale for Integrating Academic and Vocational Curriculum

INTRODUCTION

When most teachers are asked what they teach, they frequently describe their duties by the content discipline they teach (e.g., algebra, electronics, business English, physics, or carpentry). Teachers are now recognizing their responsibility to teach more than their own discipline. For example, the algebra teacher must demonstrate how algebraic principles are used in the workplace; the carpentry teacher must emphasize the importance of good communication skills on the job; and the power mechanics teacher must share the scientific principle of *moment of inertia* when teaching about small engine repair.

Educators, business leaders, parents and students now realize the importance for all students to learn not only rigorous academic concepts, but also how these concepts apply to the world of work. Students must master skills such as problem-solving, decision-making, and communication to move effectively on to further education or training and to the workplace. No one teacher can be responsible for all these related skills—it is the responsibility of *all* teachers.

"No one teacher can be responsible for all these related skills – it is the responsibility of *all* teachers."

DEFINING CURRICULUM INTEGRATION

Integrating curriculum is often seen as a method for—

- improving the teaching of academic subjects by offering a practical context
- improving instruction in vocational subjects by emphasizing and upgrading their academic content
- providing students with opportunities to participate in interdisciplinary activities and projects

There are many definitions of curricular integration. Those that follow will help you to understand what the integration of curriculum is.

Integration is defined by the Pennsylvania Department of Education as the process of blending academic and vocational education content and utilizing vocational education applied methods to more fully develop the academic and occupational competencies of all segments of the student population.

Andrew and Grubb (1992) suggests that, "integrating vocational and academic education provides a way of overcoming some deficiencies in the American high school including those that developed from the original division between vocational and academic subjects and between college-bound students and those bound for work. It provides a way likely to make sense to many students—of 'contextualizing' instruction or clarifying the applications of what might otherwise be considered merely academic material" (pp. 97-98).

During the 1992 Summer Institute at the National Center for Research in Vocational Education (NCRVE), several urban schools participated in planning integrated curricula. Each school created their own working definition of integration as follows:

Lake Clifton-Eastern High School,
Baltimore, Maryland
A method for incorporating more academic competencies into vocational courses and the changing of academic courses to be more applied or vocationally relevant.

Somerville High School,
Somerville, Massachusetts
Integration is the combination of vocational and academic education reinforced through an applied learning process. The acquisition of vital learning skills is enhanced by educational experiences over a wide range of applications.

Harrisburg Steelton-Highspire,
Harrisburg, Pennsylvania
The intertwining or blending of vocational and academic components. This integration allows students to creatively apply their learning and brings to the classroom a relevancy to the world of work.

Gateway Institute of Technology,
St. Louis, Missouri
Integration activities include the infusion of technical topics in academic courses, infusion of academic topics in technical courses, and new courses which address the combined academic and technical topics. Other integration activities include career exploration, project work, and internships.

Fred N. Thomas Career Education Center,
Denver, Colorado
Integration is the blending together of concepts, principles, and content from academic disciplines (e.g., English, mathematics, science) with context, applications, and/or skills from vocational areas (e.g., industrial technology; agriculture; home economics; business, marketing, and management; health occupations). Academics are to be reinforced in the vocational classes and academic classes will incorporate practical examples.

According to the NCRVE, curriculum integration brings together in a logical and effective way the instruction students receive from both their academic and their vocational teachers. Integration is a *process* of blending content and methods. It is also an *attitude*. Teachers must be willing to look beyond their specific disciplines to find applications for the content they teach. If they find content that is no longer necessary, teachers should be willing to alter their curriculum to reflect current trends. The world our students will face in the future will invariably be different from any we can imagine. We must prepare them with the skills to learn throughout their lifetimes.

Benefits of Integrating Curriculum

The following improvements may result from integration efforts:

- Teaching team members often become more united, enhancing their ability to jointly develop an integrated curriculum.
- Teaching team members are more likely to collaborate in planning, preparing, and delivering academics that are integrated with occupationally specific education.
- Student motivation to learn is likely to increase. By having opportunities to apply academic skills to real-life experiences, students understand why these skills are important to learn.
- Students are more likely to understand the connection between academic and vocational studies—because they used a combination of skills in both vocational and academic classes and participated in interdisciplinary activities.
- Students may be helped to make informed career choices because they may be exposed to many career options.
- School-community relations may be improved as educators and students reach out to the community to ask for their input and to provide opportunities for community-based or work-based projects and activities.
- Business and industry will have employees who are better prepared for the work that they need to do.

> "Integration is a *process* of blending content and methods."

WHY IS CURRICULAR INTEGRATION CRITICAL?

The world our students face today, and must be prepared to enter in the future, is changing rapidly. Every discipline is growing in knowledge, technology, and global impact. The school itself is being asked to deliver content and services never before imagined. The students we educate must be prepared to enter a multi-faceted work setting with a broader range of skills than in the past. They will not be able to learn everything they must know before leaving school. We must help them learn how to learn, make decisions based on previous study, and be able to solve problems with co-workers. Although, as educators, we must recognize that preparing students for work is not our sole purpose, students are better able to transfer problem-solving skills to out-of-school settings when theory is taught in context. The *process* of solving problems with other students will prepare them for the demands of the workplace.

Should we assume, therefore, that only vocational students could benefit from this integrated curriculum? Absolutely not! According to Douglas (1992), it is time for educators to realize that almost all education is vocational, even high-level mathematics and science. Our future engineers, pharmacists and business leaders will need to function effectively in a highly competitive world, with a balance of technical skills and academic skills. Whether students go directly from high school to employment, or continue their education at a 2-year or 4-year postsecondary institution, we hope they will all eventually join the workforce. It is time for academic and vocational teachers to recognize that a student taking advanced placement math will eventually need to find a job, and the auto mechanics student will need higher level math in the workplace. Both the engineer and the auto mechanic will need to communicate effectively in the workplace. Why not combine the theory with the application and help both students see the theory in action?

> "The students we educate must be prepared to enter a multifacited work setting..."

Gray and Herr (1995) found that people in our society have believed that the only way to be a success is to go to a 4-year college. Unfortunately, data show that college graduates do not necessarily find employment in their fields and that many students do not complete their degrees at all. Some students come out of the experience with no final degree and with no marketable skills. In high schools today, 80% of the students are in the college prep track; 70% of these will go to college but only half will graduate. One-third of these graduates will be under-employed, (e.g., in occupations not requiring a college degree). Since the majority of college freshmen decided to go to college to get a better job and to make more money, our habit of encouraging all students to go on to college has been a disservice to many of these students. Research shows that most high-wage jobs in the future will be in technical fields that do not require a 4-year general college degree. Although higher education is highly correlated with future earnings, education per se does not guarantee higher income. The key to economic security is obtaining an occupational skill. Therefore, our ideas about the quality and worth of technical education and careers must be reevaluated. Teaching styles and techniques must correspond to the learning styles of all students, not just some of the students. Integrating academic and vocational curricula will benefit all students. Integrated curriculum will help students make connections between related theories and practical applications while showing students a wide range of career options.

Integrating academic and vocational curricula sounds like a great idea. However, because teachers have been prepared to be experts in their own disciplines and schools are set up to deliver separate disciplines in courses, we must consider what changes are needed so that curricular integration will occur. The next information sheet describes the characteristics and features of high quality, integrated academic and vocational programs.

Read the information sheet below. Identify and list as many positive outcomes of the case study as possible. Then, if possible, discuss these with one or more peers who are also studying this module.

Moving to an Integrated Curriculum: A Case Study of Central High School

Central High School is a comprehensive high school serving 1500 students, grades 9-12. The curriculum offers college-prep courses, twelve vocational cluster areas, and assorted electives. The school and community has always been proud of its college placement rate but has the problem common to many schools today of the stigma placed on the non-college bound students. These students and their teachers seem to remain on the fringes of the high school experience.

Recently, a new superintendent was hired who began the change process by gently and persistently challenging the status quo. Preliminary information was collected to establish baseline data. Previous graduates were interviewed to determine their current status (e.g., attending postsecondary education, employed, unemployed). Transcript analysis was conducted to determine if all students were being adequately prepared for their post-graduation choices. Job market trends were studied, locally and globally, to evaluate the future employment opportunities for graduates. Employers were interviewed to learn which skills would be most necessary on the job. The results showed many graduates who had gone on to college were unable to find jobs in their fields of study. Some who did not take college-prep courses or study a vocational cluster were unable to find a job at all. Employers wanted employees who could learn on the job and get along with co-workers. Want ads in local and state listings frequently wanted graduates with some post-high school technical training.

The superintendent invited school personnel, parents, students, community members, and representatives of business and industry to join in the process of strategic planning for the school. This process allowed individuals to share their feelings about how the schools could be improved for the benefit of all students.

It was determined through this process that all students could benefit from early career exploration, opportunities for applied learning, and a more tolerant climate for individual differences in the school. Integrating the academic and vocational curricula was seen as a way to address all three of these issues.

Moving to this integrated curriculum did not happen overnight. The superintendent shared, "This process had to progress at a comfortable pace—slow enough to make sure we had the support of all parties but fast enough so we did not lose momentum."

Because the integration process can be viewed as a continuum, all teachers were asked first to explore their own disciplines: What were the applications for various academic concepts? What were the trends in the workplace for the use of the academic concepts? How is the workplace changing in various occupational clusters? Various opportunities were provided for teachers to get to know each other and the trends for their disciplines. These included joint staff meetings, summer internships

in local businesses, observations of worksites, and guest speakers. Because of the challenge of the information explosion, teachers were asked to study their own curriculum, selecting the core competencies. Teachers were also asked to think about how they could be resources to teachers in other disciplines.

Small groups of 2-4 teachers were encouraged to explore the possibilities of doing some projects together. For example, one group, comprising English, biology, child care, and carpentry teachers, planned a unit on birds for the preschool students, culminating in a day of presentations/activities with the preschoolers and the construction of blue bird houses. The results were fantastic! Students who knew nothing about the child care program were impressed with the skills needed to work with preschoolers; the carpentry students had a chance to demonstrate their skills and help others in building the bird houses. All the students had an opportunity to plan, write and present activities to the preschool class. Local day care centers were given copies of the stories and activities and the bird house plans. Parents volunteered to help with materials, while the local newspaper sponsored the culminating event. The unit project satisfied the goals for the school: students from different backgrounds developed more tolerant attitudes toward each other; they were very involved in applied learning activities; and they were able to explore new career options.

While several of these integrated projects were taking place throughout the school, it soon became obvious that common planning time and flexible scheduling was a critical need. The administration responded with willingness to modify schedules to make these early integration efforts possible. Parents, students and community members were kept informed of these changes through newsletters and the public media.

It became evident to all that minor changes to the schedule caused dramatic disruption to some courses, teachers, and students. Now that the whole school would be involved, individual teachers who felt threatened by the changes began complaining that any changes would make it impossible for them to complete their own curriculum requirements. As long as volunteers were doing things it was OK, but now that everyone had to participate to make schedule changes work, the picture was different.

The resisters were gently but firmly included in the planning process. As a group, the majority of teachers and administrators agreed that some form of flexible scheduling would be implemented. A small group of volunteers was asked to research alternatives and visit schools with various kinds of scheduling models. The results would be discussed at the next meeting.

While just in the beginning stages, Central High School is on a path to an integrated curriculum.

The following items check your comprehension of the material in the previous information sheets, The Rationale for Integrating Academic and Vocational Curriculum and Moving to an Integrated Curriculum: A Case Study of Central High School. Please respond to each item. If possible, discuss your responses with one to three peers who are also studying this module.

Self Check

1. In your own words, define integrated academic and vocational curriculum.

2. List three ways students can benefit from an integrated curriculum.

3. Would you consider integrated curriculum appropriate only for vocational students? Explain.

4. How could you begin making your own curriculum more integrated? Give an example.

5. Identify and list as many positive outcomes as possible from the case study of Central High School.

Compare your written responses to the self-check items with the model answers given below. Your responses need not exactly duplicate the model responses; however, you should have covered some of the same major points.

Model Answers

1. Integrating curriculum is often seen as a means to improve the teaching of academic subjects by offering a practical context and improving instruction in vocational subjects by emphasizing and upgrading their academic content. Academic and vocational teachers might plan projects together and share resources, encouraging all students to benefit from this interaction.

2. Students can benefit from early career exploration, opportunities for applied learning, and a more tolerant climate for differences among students.

3. No, an integrated curriculum can be appropriate for all students, no matter what their post-high school plans.

4. First, I could begin exploring my own discipline. Do I know how the academic concepts are applied in the real world? Do I know the trends in the workplace for my occupational field? Am I ready to begin getting to know my professional colleagues? Do I know how my discipline could be a resource to them? Next, I can move on to hands-on and applied activities in my classroom, exploring some collaborative activities with my colleagues. I should also be willing to work at the school and district levels in planning the future of education in our community.

5. There were many positive outcomes at Central High School. They include the following:

   - Parents, business and in and others provided input into the integration process.
   - Teachers were empowered to modify the curriculum.
   - There seemed to be cohesion of teaching team members.
   - The resistance of some teachers was addressed in a positive manner.

Level of Performance: Your written responses to the self-check items should have covered the same major points as the model answers. If you missed some points or have questions about any additional points you made, review the material in the information sheets, The Rationale for Integrating Academic and Vocational Curriculum, and Moving to an Integrated Curriculum: A Case Study of Central High School, or check with your resource person if necessary.

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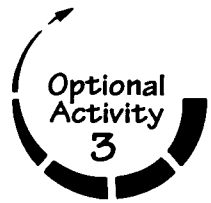
Learning Experience II

OVERVIEW

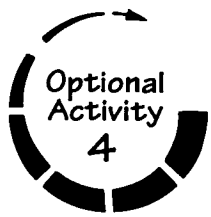
Describe the characteristics and features of high quality, integrated academic and vocational education programs.

You will read the information sheet, A Description of a Model Integrated Academic and Vocational Curriculum, pp. 15-19.

You will read the information sheet, Components of an Integrated Program, p. 20.



You may wish to visit one or more integrated academic and vocational programs to see firsthand how they operate. Use the observation checklist, What to Look For, to guide your visit and record your findings, pp. 21-24.



After reading Components of an Integrated Program and visiting one or more integrated programs, you may wish to discuss your observations, opinions, and conclusions with one to three classmates who are also studying this module.

You will complete a Readiness Inventory to assess your attitudes and knowledge concerning the integration of academic and vocational curriculum, pp. 26-27.

OVERVIEW

Based on your responses to the Readiness Inventory in Activity 5, you will complete a Planning Worksheet to identify the knowledge, skills, or experiences you feel you need to help you prepare to integrate curriculum, p. 28.

After you have developed your plan to gain the additional knowledge, skills, and experience you need, use the Planning Worksheet Checklist, p. 29, to evaluate your plan.

16

Enabling Objective

Describe the characteristics and features of high quality, integrated academic and vocational education programs.

Activity 1

Read the information sheet, A Description of a Model Integrated Academic and Vocational Curriculum.

A Description of a Model Integrated Academic and Vocational Curriculum*

Developing an integrated academic and vocational program must be seen as a process – moving from small initiatives at the classroom level to large, school-wide initiatives. What a program will look like will vary from district to district, depending upon the characteristics of the community surrounding the school and the individual attitudes of educators, parents, and students. Because of these variables, an integrated program may be described by the actual curriculum being taught, the fields of interest of the students being taught, and/or the teachers working together.

Based on the definitions in the previous section, an integrated program will, at the very least, be broader than a specific discipline. Academic skills will be highlighted in the vocational classroom; in the academic classroom, activities will demonstrate the real world application of theory. An integrated program could combine groups of students in differing fields of interest (e.g., chemistry and vocational agriculture) and engage them in joint activities to build interpersonal skills while demonstrating the application of theoretical principles. An integrated program could also focus on several teachers, their disciplines, and their students to develop a larger joint project.

The *goal* is for schools to move from the simplest to more complex activities, involving students from all interest areas, with support from the entire educational community. There really is no *one* way to create an integrated program, which is why it seems difficult to look for the perfect, model program to emulate. Instead, consider the advice from Heidi Hayes Jacobs, (1989) who suggestes that "school districts that use a combination of design options manifest the greatest success and the least fragmentation in their programs" (pp. 18-19).

Moving to an integrated curriculum can be seen as a five-step process. In **step one**, all teachers must consider and be responsible for their own discipline content and teaching methods (see Figure 1).

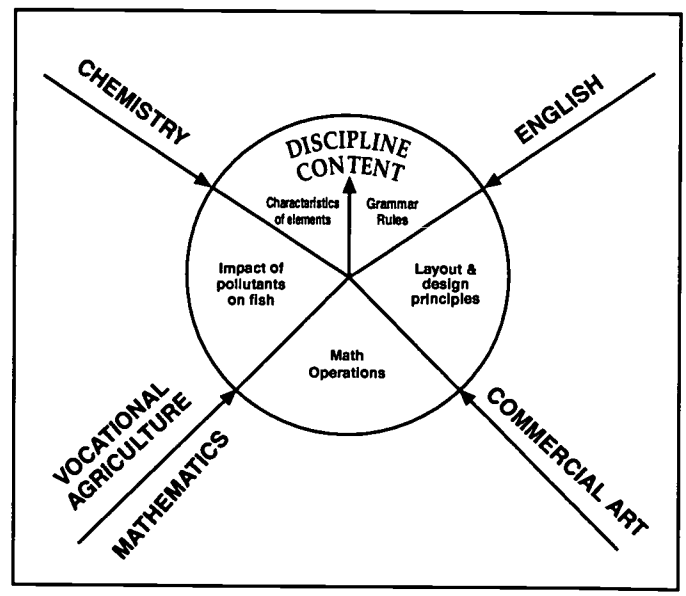


FIGURE 1: Moving to an Integrated Curriculum: Step 1-Know Your Discipline

*This model was developed by Mary J. Kisner, Penn State University, 102 C Rackley Building, University Park, PA 16802.

Teachers must know their discipline well and how it may have changed over the years. They must be willing to adjust and adapt their comfortable curriculum as needed. Teachers must know the real world application of the concepts they teach. They must be prepared to deliver that content in a variety of ways to multifaceted learners, knowing that *all* students will eventually enter the world of work. They must also be aware of the changes in the work place, which might require different kinds of skills to be taught (e.g., just knowing content might not be enough...students also need to know how to find new information, solve problems, get along with co-workers, etc.).

The **second step** toward integration is for teachers to begin teaching content in new, hands-on ways (see Figure 2). Learning in real life seldom happens in isolation. Discussing ideas, manipulating materials, and making mistakes all assist in the learning process. Whether learning about an algebra equation with manipulatives or testing a chemical reaction, the learning process combines actual content (i.e., this is what happens when these two chemicals combine) with observation and reflection. Vocational teachers must know the trends in their own occupational fields and be prepared to focus on the transferable skills that will be useful to students—even as their occupations undergo changes in technology and research and changes in the marketplace. They must know how their occupational knowledge and skills could be used by many students as a starting place for expanded learning opportunities (e.g., ways in which beginning vocational agriculture might be a trigger for a future environmental engineer). Vocational teachers must also know the underlying academic skills used in their occupational fields.

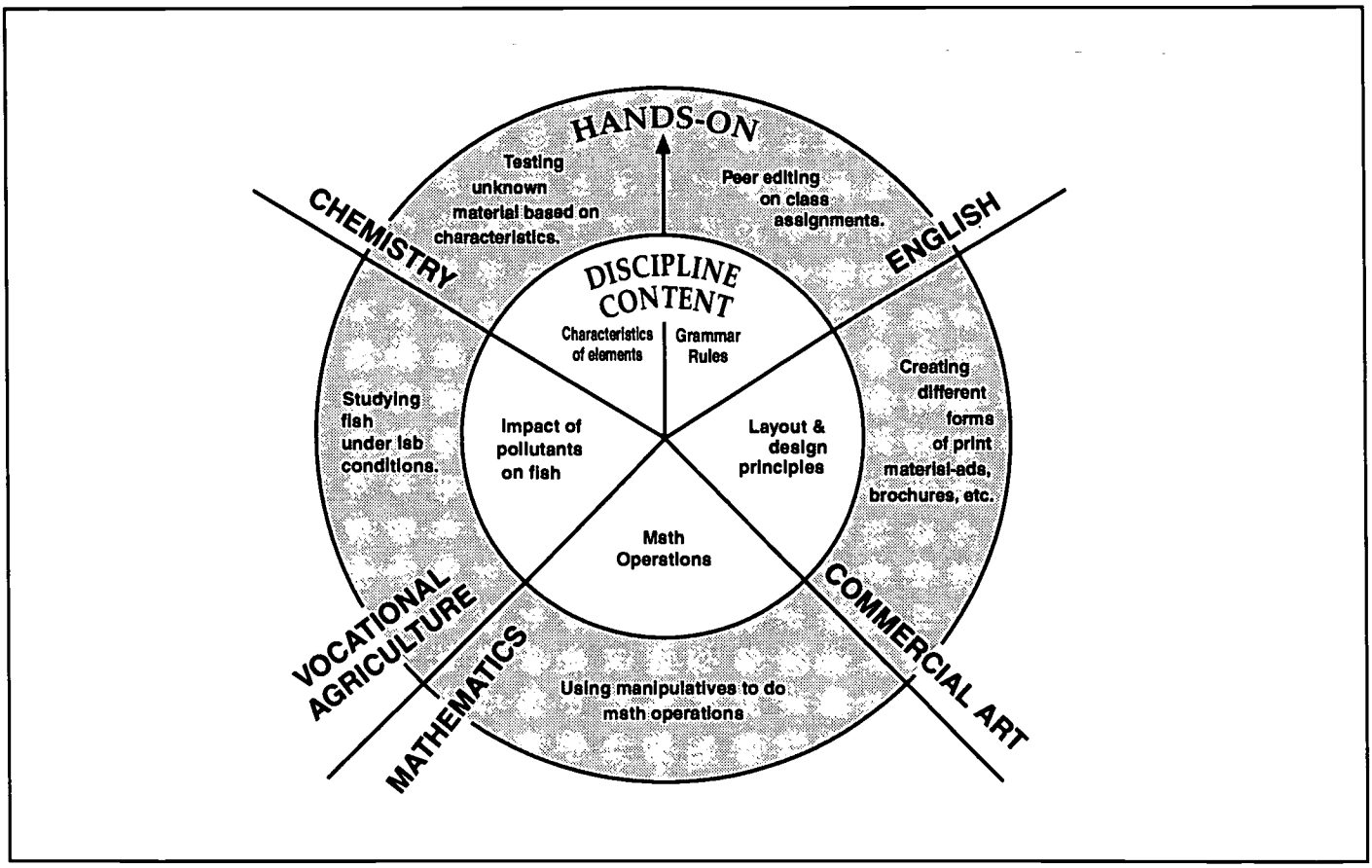


FIGURE 2: Moving to an Integrated Curriculum: Step 2-Involve Students in Hands-on Activities

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A **third step** toward integration is to add the element of the real world. For example, when they learn that if two given chemicals combine, a poisonous solution is created and that when this poisonous solution ends up in the stream, fish die, students understand why these chemicals should be properly disposed of and labeled (see Figure 3). Students will be applying the academic theory they have learned to a real life situation and studying the implications. Students of two or more disciplines could work together to contribute to this project.

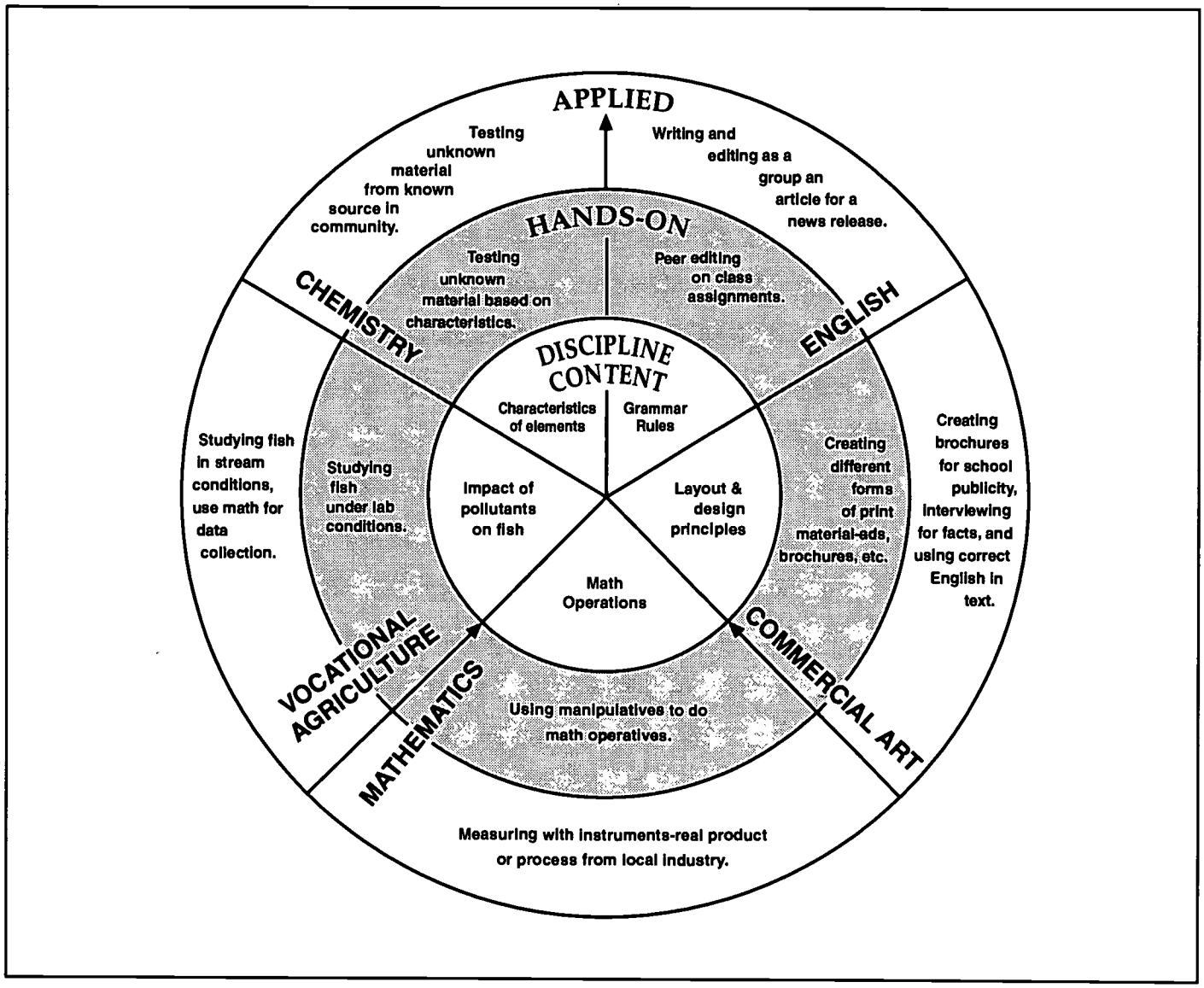


FIGURE 3 : Moving to an Integrated Curriculum: Step 3 -Apply Activities to the Real World

A **fourth step** toward integration involves many more teachers, students, and disciplines (see Figure 4). The project would have school- or community-wide implications. Students are involved in solving a problem that matters to them, with a final culminating activity of interest to the whole community.

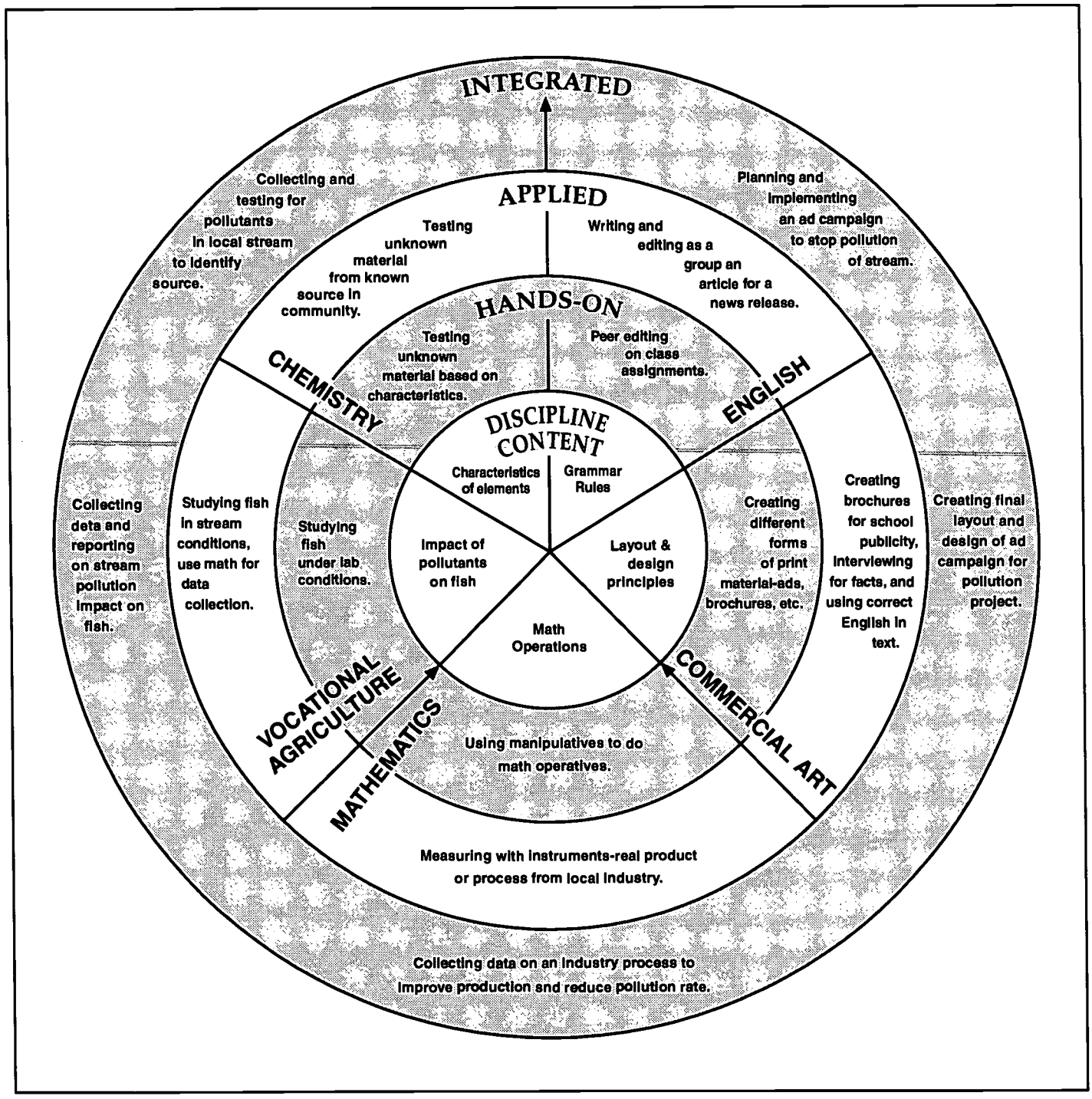


FIGURE 4 : Moving to an Integrated Curriculum:
Step 4-Plan Projects with Other Disciplines to Help Students See Connections

A fifth and **final step** (see Figure 5) begins by planning with the whole community to determine the project of interest. This project would then allow discipline-specific information to emerge from the study. This level of integration is the most complex, requiring the most cooperation from the whole community—including parents, students, teachers, administrators, and local business and industry. Sometimes a school chooses a vocational cluster of occupations to be its focus. For example, the curriculum of Health Academies is built around the health occupations. We might see a group of schools, each one choosing a different focus, creating magnet schools.

A truly integrated curriculum must move beyond one teacher incorporating new teaching methods or emphasizing academic concepts in an occupational field. However, the range of models have shown us that a simple, integrated curriculum could be as small as two teachers cooperating on a joint project. It could be as large as a whole school and surrounding community cooperating on a school-wide project.

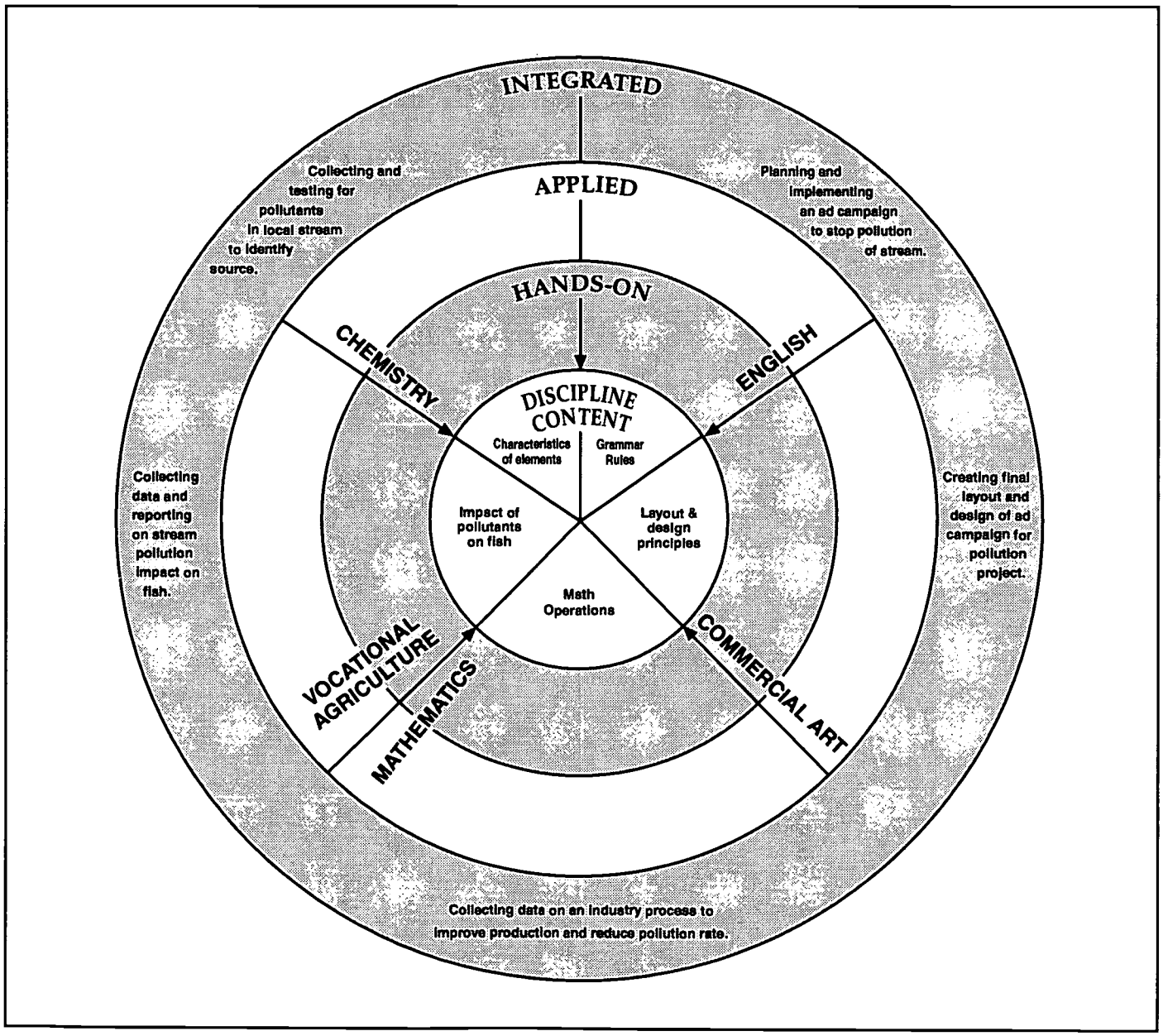


FIGURE 5 : Moving to an Integrated Curriculum:
Step 5 - Start with a Project, Letting Discipline-Specific Information Emerge from the Study

Activity 2

Read the information sheet, Components of an Integrated Program.

Components of an Integrated Program

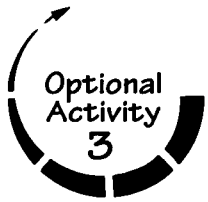
One of the most difficult things for educators to do is to determine if a school or program is truly on the path of integration. Frequently, seeing students engaged in many activities can make a visitor think integration is actually taking place. Being told by an administrator that "things are happening" is sometimes accepted as an affirmative response to the question, "Does this school have an integrated curriculum?"

There are a variety of standards against which to analyze a program of curricular integration. The eight components of an integrated program listed below were developed at Temple University. These components are the core of an instrument used to determine the Status of the Integration of Academic and Vocational Education (SIAVE). The components can be used as a guide by educators when evaluating the extent of integration taking place in their schools. The instrument was designed to consider career-bound youth and students who plan to enroll in a two-year community college or technical college rather than enter a four-year college or university after graduating from high school. However, because of the research showing the lack of success many college bound students experience, an integrated curriculum could be considered essential for all students. The components identified by SIAVE follow:

1. A challenging and coherent program of studies.
2. Individualized advising for students.
3. Activities that raise expectations for students.
4. High performance standards for students.
5. Opportunities for extra help and extra time so students can complete a rigorous program of studies.
6. Professional development for academic and vocational staff.
7. Various indexes used to evaluate student progress.
8. Administrative support.

A detailed list of the indicators that might be observed at schools with integrated curriculum is provided in the following activity.

> "...seeing students engaged in many activities can make a visitor think integration is actually taking place."



You may wish to visit one or more fully operational academic and vocational integrated programs to see firsthand how they operate and to talk with teachers, administrators, support staff, students, and business, industry, and community members who are involved in integration efforts. Use the observation checklist, What to Look For, to help you identify observable indicators of each component and to record your findings.

What to Look For

The following checklist was adapted from the Status of the Integration of Academic and Vocational Education (SIAVE)* Instrument. Below each component of an integrated curriculum/program are the observable indicators of that component. When visiting schools, use the checklist as a general guide to observing the overall integration program. In addition, Item 4 will be most helpful when examining the specific integration efforts of individual teachers or teaching teams.

___1. **There is a challenging and coherent program of studies that prepares career-bound students for continued learning in employment and an educational setting.**

Observable indicators include the following:

- Career-bound students are enrolled in rigorous coursework.
- Context-based academic courses have replaced general courses.
- Vocational courses emphasize mastery of related academic content.
- Articulation strategies are employed (e.g., Tech Prep).
- School-based learning is linked to work-based learning (e.g., shadowing, internships, cooperative education).
- There are active vocational student organizations.
- There are active advisory committees.
- The integration program is embedded in and driven by a written plan.

___2. **There is individualized advisement for career-bound students that uses information and experiences as the basis for decisions about self, educational programs, and employment.**

Observable indicators include the following:

- Career-bound students and their parents are oriented (through seminars, individual and group meetings, etc.) to workplace requirements and the connection between those requirements and challenging academic and vocational curriculum.
- Aptitude and interest assessments are conducted by a "community of educators" including teachers, counselors, and business and industry personnel.
- Teachers conduct classroom-based advising related to career exploration.

For more information about the SIAVE Instrument, contact Temple University, Professional Personnel Development Center, Ritter Hall, Philadelphia, Pennsylvania, 19122. (215) 204-8929.

___3. **The school- and work-based activities foster higher expectations for career-bound students.**

Observable indicators include the following:

- Collaboration between vocational and sending schools, parents, and students to develop rigorous, coherent academic programs for career-bound students. In-school performance standards are benchmarked against industry standards.
- Aptitude and interest assessments are conducted by a "community of educators" (e.g., teachers, counselors, and industry personnel).
- Vocational teachers stress math, science, and reading.
- The school culture (climate) includes:
  1) students completing challenging tasks and solving complex, multi-step, high-level problems;
  2) staff development devoted to raising student expectations;
  3) vocational and academic teachers communicating to career-bound students that they can meet higher academic and vocational expectations.
- General-track and slowed-down courses have been eliminated.
- There is multi-faceted, active and aggressive community and home support for higher expectations efforts.

___4. **There is cooperation between academic and vocational educators to assist career-bound students to meet high performance standards.**

Observable indicators include the following:

- Teams, composed of at least one academic and at least one vocational teacher, are engaged in joint instructional planning to integrate vocational and academic curricula.
- Academic skills are highlighted in vocational classrooms and laboratories.
- Real-world applications of the subject are demonstrated in academic classrooms.
- Teachers deliver the content using a variety of methods—including providing students with opportunities for hands-on learning.
- Students are provided with time to observe, analyze, and reflect upon the interrelatedness of vocational and academic skills.
- The learning environment fosters democratic values and encourages students to take risks.
- Vocational and academic teacher team members model a love of lifelong learning.
- Program evaluations, including personnel surveys and follow-up studies, are used by administrators and team members to improve the academic and vocational competency of career-bound students.
- Student learning experiences involve the community, including business and industry.

___5. **Extra help and extra time is provided to assist career-bound students to complete a rigorous and coherent program of academic and vocational studies.**

Observable indicators include the following:

- Minimum reading and math achievement levels are established to identify students needing extra help and extra time.
- Individualized plans, benchmarked against industry standards, are on file for each student needing extra help and extra time.
- Catch-up instruction is available from tutors, teachers, mentors, and community people for students needing extra help or time.
- Academic progress is monitored for each student needing extra help or time.
- Parents are aware of the need for extra help or time.
- Voluntary or mandatory catch-up time is available before school, after school, or during vacations.

___6. **Professional development activities are planned for academic and vocational staff.**

Observable indicators include the following:

- Academic and vocational teachers are engaged in focused, ongoing, sequential, and productive staff development related to the acquisition and application of academic content (e.g., math, science, and communication skills) in the workplace.
- Administrative personnel are engaged in staff development activities related to improving the academic abilities of career-bound students.
- Instructional plans and observations of academic and vocational teachers reflect applied teaching strategies.
- Vocational and academic teachers are given extended time (for planning and observation) to learn from one another.
- Teacher teams regularly visit local business and industry.
- Professional development is embedded in and driven by a written plan.

___7. **Various indexes are used to evaluate progress toward academic and vocational goals.**

Observable indicators include the following:

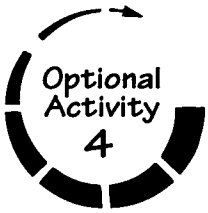
- Academic scores, vocational scores, and noncognitive factors (e.g., program/course completion rates, etc.) are used to improve the academic and vocational competency of career-bound students.
- Program evaluations, including personnel surveys and follow-up studies, are used to improve the academic and vocational competency of career-bound students.
- A total quality approach, including measures of school climate, are used to improve the academic and vocational competency of career-bound students.
- Exit interviews with career-bound students are conducted to identify coherence between expected and actual program practices.

___8. **There is administrative support for the integration program.**

Observable indicators include the following:

- The support system is structured so that vocational teachers have materials and staff development opportunities to increase the emphasis on curricular integration.
- The support system framework makes provision for a reorganized instructional day that is designed to promote integration (e.g., block scheduling, longer periods, common planning time).
- The support system is structured so that staff development focuses on teams.
- The support system is designed to empower building-level personnel.

___9. **Record additional observations and conclusions below:**



After your visit, you may wish to discuss observations and findings with one or more of your peers who is also studying this module. Focus on identifying the differences between programs and curricula that are integrated and those that are not. In the space below or on a separate sheet, list as many differences as you can.

To help you assess your attitudes and knowledge concerning the integration of academic and vocational curricula, complete the following Readiness Inventory.

Planning Worksheet Checklist

Instructions: Read each of the items listed. Check box 1-5 to indicate your feelings concerning that item, using the following scale:

1 = Feel extremely uncomfortable
2 = Feel uncomfortable
3 = Undecided
4 = Feel comfortable
5 = Feel extremely comfortable

How comfortable do you feel about your *knowledge* of:	1	2	3	4	5
1. The core competencies in your discipline?	❑	❑	❑	❑	❑
2. How your discipline fits into the world of work?	❑	❑	❑	❑	❑
3. How to manage a class of students doing hands-on activities?	❑	❑	❑	❑	❑
4. How to relate your subject content to real-world tasks?	❑	❑	❑	❑	❑
5. How to team teach with a colleague?	❑	❑	❑	❑	❑
6. How to develop and/or use non-traditional assignments?	❑	❑	❑	❑	❑
7. What is happening in your school district regarding curriculum reform?	❑	❑	❑	❑	❑
How comfortable is your *attitude* concerning:					
1. Being asked to give up some course content to make time for collaborative teaching?	❑	❑	❑	❑	❑
2. Being asked to give up free periods or personal time to plan with colleagues?	❑	❑	❑	❑	❑

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	1	2	3	4	5
3. Working with colleagues who teach differently than you do?	❑	❑	❑	❑	❑
4. Being asked to teach in a new way?	❑	❑	❑	❑	❑
5. Teaching students with different learning styles?	❑	❑	❑	❑	❑
6. Teaching students who are unmotivated?	❑	❑	❑	❑	❑
7. Assigning various forms of non-traditional homework?	❑	❑	❑	❑	❑
8. Making changes in the current educational system?	❑	❑	❑	❑	❑

Scoring: Ideally, you should have rated each item *4* or *5*. However, you probably rated some lower. Make a note of items that you rated *1*, *2*, or *3*—these are the areas in which you need greater knowledge, skills, or experience before you can successfully integrate curriculum. In Activity 6, you will get a chance to develop a plan to gain the knowledge, skills, or experience you need.

Based on your responses to the Readiness Inventory, complete the Planning Worksheet below to identify the additional knowledge, skills, or experiences you feel you need. Also, indicate *how* you plan to gain what you need to be prepared for integration. If you will need specific *resources* to meet your needs, list them in the third column. You may wish to discuss your ideas with your resource person or with one or more peers who are also studying this module.

Planning Worksheet

What I Need (knowledge, skills, or experiences)	How I Can Get My Needs Met	Resources I Will Need

After you have completed your plan to gain the additional knowledge, skills, and experience you need, use the Planning Worksheet Checklist below to evaluate your work.

Planning Worksheet Checklist

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable or was impossible to execute, place an X in the N/A box.

The plan:

	LEVEL OF PERFORMANCE			
	N/A	NO	Partial	Full
1. included the specific knowledge, skills, and experiences needed, as indicated by the results of the inventory.	❑	❑	❑	❑
2. provided for gaining the needed knowledge, skills, and experiences by doing the following:				
a. reading reliable, up-to-date references	❑	❑	❑	❑
b. participating in courses, workshops, or conferences	❑	❑	❑	❑
c. identifying local or state guidelines concerning integration	❑	❑	❑	❑
d. consulting teachers who are involved in implementing integrated programs	❑	❑	❑	❑
e. visiting and observing integrated programs	❑	❑	❑	❑
f. arranging to keep up-to-date concerning integration	❑	❑	❑	❑
3. identified specific, appropriate activities for gaining all needed knowledge, skills, and experiences	❑	❑	❑	❑
4. was realistic and feasible in application	❑	❑	❑	❑

Level of Performance: All items must receive FULL or N/A responses. If any item receives a NO or PARTIAL response, review the material in the information sheets, revise your plan accordingly, and check with your resource person if necessary.

Notes

Learning Experience III

OVERVIEW

Identify the important roles of teachers, administrators, and others in implementing integrated academic and vocational curriculum.

You will read the information sheet, Roles of Key Personnel in Integrating Academic and Vocational Curriculum, pp. 33-34.

You will read the information sheet, Hints for Conducting an Effective Interview, p. 35.

You may wish to interview: 1) an academic and a vocational teacher, 2) a program supervisor and an administrator, 3) some students, and 4) some business, industry, or labor representatives who have had experience in implementing an integrated curriculum to learn about their experiences, p. 36.

You will read three case studies and answer questions about how the teachers described in these cases performed, pp. 37-39.

You will critique the performance of the teachers described in the case studies you read in Activity 4, p. 41.

OVERVIEW

You will compare your own responses to the Model Critiques, p. 42.

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Identify the important roles of teachers, administrators, and others in implementing integrated academic and vocational curriculum.

Read the information sheet below on Roles of Key Personnel in Integrating Academic and Vocational Curriculum.

Roles of Key Personnel in Integrating Academic and Vocational Curriculum

Integrating academic and vocational curriculum involves many players in addition to the specific teachers involved in the integration effort. Because of its complexity, integration requires the assistance of many other personnel from the school and the community.

WHO ARE THE KEY PERSONNEL?

The key personnel who play an important role in integrating curriculum include administrators, teachers, support staff, students, parents, business and industry representatives, and members of the surrounding community.

WHAT ARE THE RESPONSIBILITIES OF KEY PERSONNEL?

All contributors to the integration effort have three responsibilities to fulfill. Each contributor needs to be–

- a willing learner,
- an active listener, and
- an involved participant in the change process

It is impossible to list all the activities that might be confronted in the development of an integrated curriculum for your school. Just know that each contributor's responsibilities will probably not involve "business as usual." Each contributor will need to consider the changing world around the school, the changing needs of students, and the possibilities of reforming educational practices. In the past, most of the contributors needed to successfully integrate curriculum were not involved in any of the planning to determine what would be taught or how it would be taught in the schools. This must change. Effective planning for change must consider the insights and needs of all the key personnel involved.

HOW MIGHT THE ROLE OF KEY PERSONNEL SHIFT?

Administrators may be required to shift to new management styles. They may need to act in a more flexible, facilitative role, helping teachers move into integrated curriculum activities. Change can be upsetting to individuals, so their jobs will include reminding staff of the agreed upon vision for the future. Helping staff focus together on the common goal will assist the change process. They may also be asked to serve as advocates or champions for teachers. It may fall on their shoulders to show the school board or the community that they support the efforts of their staff.

Teachers' roles shift—requiring more teamwork and serving as resources for other teachers and students. Moving to a more hands-on environment in class requires that teachers act as facilitators of the learning process instead of simply content experts. Teachers must know what new skills will be required of their students in the future and then be prepared to help them learn those skills.

Support staff members' role changes may vary with the position.

The roles of ***guidance counselors*** will expect them to provide all students with realistic career counseling. For those students who will not be attending a traditional four-year college program, they will need to be aware of the many other options. They may inform students about the career opportunities available through two-year vocational and technical programs. They also may be asked to administer new kinds of interest and aptitude assessments for younger students, as career exploration moves down into the middle school curriculum.

Classroom aides' roles may shift from helping specific students keep pace with assigned homework to helping small groups of students complete activities and conduct research. They may be working with a wider range of student abilities and interests and may be considered more a part of the teaching team.

Office staff members will discover that integrated curriculum means students are more actively involved in their learning and, therefore, may be in locations other than their assigned classrooms (e.g., the library, in another classroom, in a computer lab). They may also be asked to monitor student transcript information more closely to ensure that students are pursuing rigorous programs of study. Follow-up with recent graduates may be another responsibility that they may not have had in the past.

In the library and computer labs, ***librarians and lab assistants*** should expect students to be exploring a variety of information, often at unconventional times, in order to work on interdisciplinary projects.

Students will now be expected to meet higher standards and become active participants in their learning. They should expect to share their progress with parents and ask for assistance from their parents and teachers if it is needed.

Parents should plan to be more involved in the planning process for school reform initiatives. They may be asked to share their expertise in the classroom, serve on an advisory committee, or participate in strategic planning.

Members of the community should also plan to be involved in the planning process, whether they have children in school or not. The community will provide important support to young people as they move into the adult world.

Business and industry have critical new roles in education today. They are no longer just the recipients of the product of the schools; they now must be actively involved in the educational process. To ensure that students are learning the right skills, employers must be visible in the schools. They may come into classrooms as advisors or speakers. They may provide sites for field trips or work-based experiences for students. They may also serve as mentors for teachers and provide opportunities for worksite internships.

How Can You Prepare for *Your* Role?

Confronting the need to change often requires an attitude adjustment. Change is uncomfortable for everyone. However, by participating in the process, you can have some control over the pace and direction of change. Through your participation, you may find that change becomes more manageable and more comfortable. Also, being able to see changes coming helps you deal with them more effectively.

Look around. Listen. Learn about the changing world around your school and community. By reading the daily newspaper and watching or listening to local news, you can stay in touch with the community. News magazines and books on current events can keep you in touch with the world.

Talking with others in the community—colleagues, local business leaders, parents, students, teachers, administrators—will give you valuable information about the world students face. Attending meetings, workshops and special presentations can keep you up-to-date on state, community, and local school issues. And finally, participating actively in planning will ensure that your voice is hear and your views are considered in the coming changes.

Read the information sheet, Hints for Conducting an Effective Interview.

Hints for Conducting an Effective Interview

Interviewing someone actually working with an integrated program can give you a realistic picture of how the implementation of integrated curriculum really is accomplished. Interviews allow you to ask clarifying questions as you go along. In addition, you can benefit from the personal insights shared with you by the interviewee.

It is recommended that you take the following steps when conducting an interview.

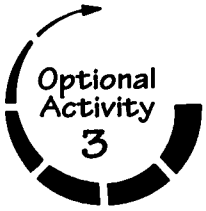
1. Find the *right candidate* for your interview. This may involve asking several individuals for recommendations about who would be most appropriate.

2. Set up an *appointment*. Set a time and place that are convenient for the interviewee.

3. Do your homework. Compose *key questions* ahead of time to help you guide the discussion. This is important because it will help you keep the interview brief and on track.

4. During the interview, take *notes* or use a tape recorder, if the interviewee agrees.

5. Write down your *observations* and *conclusions* immediately after the interview. If you have taken notes, transcribe them while the interview is still fresh in your mind. If you wish to quote the person, make sure the quotation is accurate.



Interview one or more of the following to learn about their experiences with implementing an integrated curriculum:

- an academic and a vocational teacher
- a program supervisor and an administrator
- some students
- one or more business, industry, or labor representatives.

Ask them about their experiences, their views, and their recommendations concerning the integrated programs in which they have been involved.

Notes

Read the following case studies carefully. Be prepared to critique the performance of the teachers described by answering questions about each case in the next activity.

The case studies are from NCRVE's *Preparing Teachers to Successfully Integrate Vocational and Academic Education: A Case Study Approach*, Berkeley: NCRVE, 1995.

CASE STUDY 1:

The Turning Point

Joan Burton teaches engineering and architectural drafting at Andrew Jackson Vocational/Technical School. She also teaches a course in computer-aided drafting at the local community college. Her junior and senior level students are selected on the basis of teacher/principal recommendation. Joan has a reputation for being very demanding and for motivating students to produce superior work.

Joan requires her drafting students to prepare a portfolio with a complete set of drawings and daily journal entries. She works with an English teacher, Marie Sanchez, to evaluate the journals. When she first started assigning journal writing as a part of the portfolio, many students displayed a lot of resistance. They wanted to practice drafting, not writing.

Joan decided to help her students change their attitudes about writing. One day she invited a representative from the Federal Aviation Commission to speak to her class. During the speech, a student asked the representative if she thought journals were important. The representative held up her journal, which was about an inch thick and said, "I write in my journal every day." The speaker explained that she writes up all the details of what she does every day. This was a turning point for the students. "Now," said Joan, "they don't even question their journal writing assignments."

Marie was also pleased with the results. She commented, "You could see an immediate improvement in the students' journal entries after the speaker visited the drafting class. They now ask a lot of questions about how they could improve their journals. I have even noticed an increase in motivation toward their other English assignments."

Joan and Marie realize the importance of both applied writing and of involving community people as part of the curriculum. They have been discussing new ways in which to coordinate speakers with curriculum activities. The primary problem is that, since the most qualified people in the community have busy schedules, it is difficult to get them to commit to making a visit to the school.

QUESTIONS TO CONSIDER

1. Why did this particular speaker have such an impact on the students?
2. Why did the students have an increase in motivation for their English assignments?
3. If you were Joan or Marie, how would you go about arranging for qualified individuals from the community to visit your classes?
4. How should teachers help prepare individuals from the community to make presentations to students?
5. What are the benefits for students, the school, and the community, of involving business and industry in educational programs? How does business and industry benefit?

CASE STUDY 2:

The Student Does the Teaching

Jennifer King is a young, eager second-year math teacher at Doe Run High School, which is located in a small rural area that feeds students into Pace Vocational School. Jennifer is one of three math teachers at Doe Run. The math teachers use a lot of equipment in the applied math classrooms to demonstrate math concepts. Jennifer has used compasses, protractors, rulers, and other math tools used in her education courses. However, this past year she tried working with vernier calipers and micrometers in an applied math class. Jennifer had never used these math tools before.

During math class, Jennifer noticed that Greg Morgan, a student involved in auto mechanics, was familiar with the vernier calipers and micrometers that she was trying to explain as a unit of instruction. Jennifer was extremely uncomfortable teaching the use of these tools. She explained, "I was doing a poor job of teaching. I was trying to teach how to use these tools from the book and it was not working." Only one student seemed to understand what Jennifer was teaching. Jennifer knew that this student, Greg, recognized these tools. Greg explained to Jennifer that he had used vernier calipers and micrometers in his auto mechanics class at Pace Vocational School. Then, Greg explained the use of vernier calipers and micrometers by actually demonstrating their use to other students in the class.

Greg enjoyed helping his math teacher and the other students learn the practical use of vernier calipers and micrometers. He was proud of himself and what he had learned about the use of this equipment in the auto mechanics laboratory.

After school, Jennifer went to the auto mechanics teacher, George Jones, and told him about Greg teaching students in her math class how to use vernier calipers and micrometers. George proceeded to assist Jennifer to better understand the use of these tools. She appreciated his help.

Jennifer has continued to talk with George about the equipment and tools that he uses to teach math concepts. When she reads something in the math book that is technology oriented, she visits with George and asks him to explain the procedure. Jennifer explains, "I feel very comfortable asking for help from George. However, George says he is intimidated because he feels I know so much more math than he does. But I feel that he knows more math because he uses the hands-on approach to teach math every day. I teach math using the theory approach."

After having taught applied math for almost two years, Jennifer feels the students view math teachers differently. The students are pleased that their math teachers have taken an interest in learning more about their vocational preparation. Jennifer also feels that the students have more respect for academic skills that are necessary to be successful in vocational classes.

QUESTIONS TO CONSIDER

1. Why do you think Jennifer thought it was a good idea to let Greg teach the other students about vernier calipers and micrometers?
2. Did Jennifer and George, the auto mechanics teacher, work together to create a positive climate for the integration process? What more could they do?
3. Why does Jennifer feel that George has knowledge about math that she does not? Why does George feel that Jennifer has knowledge about math that he does not have?
4. Some vocational teachers are intimidated with the theoretical knowledge that academic teachers have while some academic teachers are intimidated with practical know-how that vocational teachers have. What are some strategies that can help vocational teachers and academic teachers work together without feeling intimidated?
5. What might be happening throughout the school system to upgrade deficient teachers' skills?

CASE STUDY 3:

Parasites in the Fish Tanks

The Princeville High School received funds last school year to build a greenhouse and purchase tanks to stock fish. John Alvarez, the agriculture teacher at Princeville, stocked the fish tanks with catfish and trout. By October, four agriculture students had chosen the operation of the fish tanks as their class project.

Due to ammonia buildup created by overstocking the tanks and improper water temperature, the fish became stressed. That stress led to an outbreak of a fish parasite known as ick. Once John and the four agriculture students realized that the fish were stressed, they transferred the fish into new water.

At that point, John asked two science teachers, Beth Hays and Cathy Muth, if they would like their students to be involved with identifying the parasite involved and applying treatment. Beth and Cathy agreed that the activity would be beneficial to their students so the agriculture students and the science students began to work together on the activity. They spent two laboratory days identifying and treating the parasite. Beth and Cathy were excited about working with John on this project. Beth was very cautious and reserved because her science students were a little nervous about experiencing a new technology. John commented, "I think Beth is a little nervous because of the unknown."

A technician from the local fish hatchery, Roy Dobbins, was contacted and agreed to assist the students with this project. Roy spent two days at the school assisting with analyzing the problem and instructing students on microscope use. During his first day at the school, Roy helped the students review the potential problems. Roy also showed students what parasites looked like using some of the fish he brought with him that had known parasite populations.

The second day was devoted to actual hands-on laboratory work consisting of catching the fish and determining which fish were infected and which fish were not infected. The students felt good about their roles in the decision-making process. Actually, the four agriculture students, who had ownership in the fish project, made the final decision for the group based upon the scientific data that was gathered. Cathy commented, "We need to do more of these joint activities that allow the students to apply their knowledge in a practical setting."

It was easy for the students to see the application of scientific principles instead of just looking at slides under the microscope. In this activity, students were able to identify a real problem and then solve it. John overheard the students comment that they were fascinated with the movement of the parasites under the microscope and liked being able to handle the fish.

The solution to the parasite problem was treating one of the tanks with copper sulfate. The second tank did not have enough parasites, so did not require treatment. And even more important, John is planning to expand on this program next year and to involve even more students and people from the community.

QUESTIONS TO CONSIDER

1. Give reasons why a science teacher might feel uneasy participating in this exercise to identify and treat a fish parasite.
2. What other community people might be of assistance in teaching students relevant agriculture skills? List resources in your community to assist with agriculture and science projects.
3. How might John expand this program next year?
4. How might Beth and Cathy actively involve John in their science instruction?

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Write a brief critique of the teachers' performance as described in each case study you read in Activity 4. Use the questions at the end of each case to guide your critiques.

Compare your written critiques of the teachers' performance with the Model Critiques given below. Your responses need not exactly duplicate the model responses; however, you should have covered the same **major** points.

Model Critiques

CASE STUDY 1:
THE TURNING POINT

This particular speaker had such an impact on the students because she was speaking from real experiences on the job. Even though she was saying the same thing as the teacher, she was a new voice, lending credibility to a school activity that students did not see as valuable training for the future. This credibility carried over to other writing activities. To help visiting speakers be most effective, it helps to prepare them ahead of time. Speakers should have an understanding of what you are trying to accomplish with their presentation. Then they can tailor their remarks, keeping your goals in mind. Students benefit from the new input from the real world of the community. The school benefits by enhancing their curriculum with this input. The community benefits from the good will that is created by this activity. Business and industry benefit because they have a chance to share their experiences with the future work force, hopefully to have an impact on their success.

CASE STUDY 2:
THE STUDENT DOES THE TEACHING

Jennifer felt that Greg had information about the use of the tools that she did not. It appeared to benefit both her and the class to have him participate in the lesson. The process of having Jennifer and George work together created a positive climate for the integration process. Students benefited greatly from their interaction in this process. While the teachers felt somewhat inferior about their knowledge of math, each had a different perspective. While these feelings should be acknowledged as understandable, in light of their educational backgrounds, this should also be a starting point for collaboration. The school system could offer professional development workshops to encourage teachers to plan and work together. This would help alleviate these feelings.

CASE STUDY 3:
PARASITES IN THE FISH TANKS

If academic teachers are uneasy about participating in hands-on, applied exercises, it might be because their educational backgrounds focused on theory alone. All of the ramifications of not succeeding at identifying the parasite might discourage their participation. They might also be uncomfortable with the team teaching experience and don't know how to participate effectively. Other resources in the community might include the cooperative extension service, local fish breeders and stores, or university researchers. Next year, John's program could include more writing activities, presentations to middle school students, and entries into science exhibitions. With this experience as a starting point, the academic science teachers should be encouraged to explore other areas of John's discipline that could enhance their science instruction.

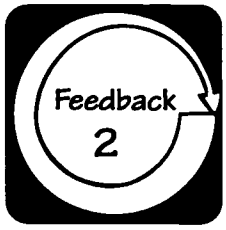
Learning Experience IV

FINAL EXPERIENCE

Demonstrate your readiness to begin integrating academic and vocational curiculum.

While preparing to teach or while teaching, prepare yourself to integrate academic and vocational curriculum by completing the activities listed on the Planning Worksheet you developed in Learning Experience II, p. 28. This will involve acquiring the additional knowledge, skills, and experiences you identified.

As you perform each activity, document your actions (e.g., in writing, on tape, through a log) for assessment purposes.



Arrange to have your resource person review your Planning Worksheet, documentation, and any reference materials you studied.

Your total competency will be assessed by your resource person using the criteria in the Teacher Performance Assessment Form, p. 45.

Based on the criteria specified in this assessment instrument, your resource person will determine whether you are competent to begin academic and vocational integration.

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Teacher Performance Assessment Form

Prepare to Integrate Academic and Vocational Curriculum

Directions: Indicate the level of the teacher's accomplishment by placing an X in the appropriate box under the Level of Performance heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

In assessing readiness to implement curriculum integration, the teacher:	LEVEL OF PERFORMANCE					
	N/A	NONE	POOR	FAIR	GOOD	EXCELLENT
1. reviewed knowledge of the essential components of curriculum integration	☐	☐	☐	☐	☐	☐
2. reviewed attitudes about implementing integrated curriculum .	☐	☐	☐	☐	☐	☐
3. determined knowledge, skills, and experiences needed to integrate curriculum	☐	☐	☐	☐	☐	☐
4. identified specific means for gaining the needed knowledge, skills, and experiences	☐	☐	☐	☐	☐	☐
5. began to carry out the plan to gain the needed knowledge, skills and experiences	☐	☐	☐	☐	☐	☐
In acquiring the additional knowledge, skills, and experiences, the teacher:						
6. read reliable, up-to-date references	☐	☐	☐	☐	☐	☐
7. participated in courses, workshops, or conferences	☐	☐	☐	☐	☐	☐
8. identified local or state guidelines concerning integration	☐	☐	☐	☐	☐	☐
9. consulted teachers who are involved in implementing integrated curriculum	☐	☐	☐	☐	☐	☐
10. visited and observed integrated programs	☐	☐	☐	☐	☐	☐

Continued on next page...

	LEVEL OF PERFORMANCE					
	N/A	NONE	POOR	FAIR	GOOD	EXCELLENT
11. arranged to keep up-to-date concerning integration	❑	❑	❑	❑	❑	❑
12. use the space below to write additional comments, if appropriate						

Level of Performance: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

Notes

Notes

About Using the Center's PBTT Modules

Organization

Each module is designed to help you gain competency in a particular skill area considered important to teaching success. A module is made up of a series of learning experiences, some providing background information, some providing practice experiences, and other combining these two functions. Completing these experiences should **enable** you to achieve the **performance** objective in the final learning experience. The final experience in each module always requires you to demonstrate the skill in an actual teaching situation when you are an intern, a student teacher, an inservice teacher, or occupational trainer.

Procedures

Modules are designed to allow you to individualize your teacher education program. You need to take only those modules covering skills that you do not already possess. Similarly, you need not complete any learning experience within a module if you already have the skill needed to complete it. Therefore, before taking any module, you should carefully review (1) the introduction, (2) the objectives listed on p. 4, (3) the overviews preceding each learning experience and (4) the final experience. After comparing your present needs and competencies with the information you have read in these sections, you should be ready to make one of the following decisions:

- That you do not have the competencies indicated and should complete the entire module
- That you are competent in one or more of the enabling objectives leading to the final learning experience and, thus, can omit those learning experiences
- That you are already competent in this area and are ready to complete the final learning experience in order to "test out"
- That the module is inappropriate to your needs at this time

When you are ready to complete the final learning experience and have access to an actual teaching situation, make the necessary arrangements with your resource person. If you do not complete the final experience successfully, meet with your resource person and arrange to (1) repeat the experience or (2) complete (or review) previous sections of the module or other related activities suggested by your resource person before attempting to repeat the final experience.

Options for recycling are also available in each of the learning experiences preceding the final experience. Any time you do not meet the minimum level of performance required to meet an objective, you and your resource person may meet to select activities to help you reach competency. This could involve (1) completing parts of the module previously skipped, (2) repeating activities, (3) reading supplementary resources or completing additional activities suggested by the resource person, (4) designing your own learning experience, or (5) completing some other activity suggested by you or your resource person.

Terminology

Actual Teaching Situation:
A situation in which you are actually working with and responsible for teaching secondary or postsecondary vocational students or other occupational trainees. An intern, a student teacher, an inservice teacher, or other occupational trainer would be functioning in an actual teaching situation. If you do not have access to an actual teaching situation when you are taking the module, you can complete the module up to the final learning experience. You would then complete the final learning experience later (i.e., when you have access to an actual teaching situation).

Alternate Activity or Feedback: An item that may **substitute** for required items that, due to special circumstances, you are unable to complete.

Occupational Specialty: A specific area of preparation occupational specialties include training programs such as automobile mechanics, welding, and electricity, nursing, computer technology, environmental and technology.

Optional Activity or Feedback: An item that is not required but is designed to supplement and enrich the required items in a learning experience.

Resource Person: The person in charge of your educational program (e.g., the professor, instructor, administrator, instructional supervisor, cooperating/supervising/classroom teacher, or training supervisor who is guiding you in completing this module).

Student: The person who is receiving occupational instruction in secondary, postsecondary, or other training program.

Occupational Cluster: A major employment such as agriculture and natural resources, mechanical/transportation, business technology, engineering technology, health and human services, construction and design, and communication technologies.

You or the Teacher/Instructor: The person who is completing this module.

Levels of Performance for Final Assessment

N/A: The criterion was not met because it was not applicable to the situation.
None: No attempt was made to meet the criterion, although it was relevant.
Poor: The teacher is unable to perform this skill or has only very limited ability to perform it.
Fair: The teacher is unable to perform this skill in an acceptable manner but has some ability to perform it.
Good: The teacher is able to perform this skill in an effective manner.
Excellent: The teacher is able to perform this skill in a **very effective** manner.

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