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ABSTRACT

This document consists of a final report and practitioner's guide. The final report describes a project that studied successful integration efforts between academic and vocational education. Four secondary school and three community college programs were studied. Teachers and administrators were interviewed, classes were observed, and curriculum materials were collected. The results of the site visits and materials collected were synthesized into the handbook, which can be used for resource planning or reference. The final report contains the following sections: background; rationale; major accomplishments and significant findings; final product abstract; evaluation and impact; human resources; and nine appendices. The appendices are as follows: program nomination form and cover letter; secondary administrator interview guide; college administrator interview guide; secondary teacher interview guide; college instructor interview guide; classroom observation guide; site descriptions; 32 resource bibliographies; and an article on research and leadership. The practitioner's guide contains the following sections: What is integration? Why integrate? How is integration structured? How is integrated instruction planned? How is integrated instruction delivered? How is integrated instruction evaluated? What outcomes have been realized from integrated instruction? and What is the next step? Twenty-four references, site descriptions, and 33 additional resources are included. (NLA)

STRATEGIES FOR INTEGRATING VOCATIONAL AND ACADEMIC EDUCATION: FINAL REPORT

Illinois State Board of Education

Adult Vocational and Technical Education

STRATEGIES FOR INTEGRATING VOCATIONAL AND ACADEMIC EDUCATION: FINAL REPORT

Project Director

Chris A. Roegge

Project Staff

James R. Galloway
Julie A. Weige

Department of
Vocational and
Technical Education
College of Education
University of Illinois
at Urbana-Champaign

Illinois State Board of Education

Louis Mervis
Chairman

Robert Leininger
State Superintendent
of Education

Department of Adult, Vocational and Technical Education

Vocational Education
Program Improvement
Section

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ABSTRACT

Strategies for Integrating Vocational and Academic Education
Funding Agreement Number QLAC53D
Chris A. Roegge, Project Director
Department of Vocational and Technical Education, University of Illinois at Urbana-Champaign
July 1, 1990 - July 30, 1991

Integration of academic and vocational education has become one of the most important topics in vocational education today. Vocational educators are seeking ways to improve the image of vocational education, increase enrollment in vocational education courses and programs, and improve instruction. Academic educators are attempting to make instruction and learning of concepts and principles more relevant to the "real world." Vocational/academic integration has gained such prominence in vocational education that it is a major mandate of the newly reauthorized Carl Perkins Vocational and Applied Technology Act.

A variety of integration strategies have been developed and implemented over the past several years. Many educators, however, are still looking for ways to "operationalize" the integration concept. The goal of this project was to identify and study successful integration efforts, in order to provide direction for others seeking to implement integrated programs and/or activities.

Four secondary and three community college programs were studied. Teachers/instructors and administrators were interviewed, classes were observed, and curriculum materials were collected. The integration strategies ranged from individual informal activities occurring within a class to new classes formed specifically to integrate vocational and academic instruction. For the most part, vocational and academic teachers collaborated in the planning of the coursework. In one case, vocational and academic teachers team taught an integrated class. All reported positive outcomes such as increased student attendance and attentiveness, increased teacher enthusiasm, and a more positive attitude toward their vocational or academic counterparts.

The results of the site visits and material collection were synthesized into a handbook entitled *Setting the Stage: A Practitioner's Guide to Integrating Vocational and Academic Education*. This guide is intended for use as a resource in planning pre- or inservice teacher education classes or workshops, or as a reference for use by individuals who wish to pursue integrated activities. Three-hundred forty copies of the guide were delivered to the Vocational Program Improvement Section, Illinois State Board of Education, on July 23, 1991.

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BACKGROUND

Integration of academic and vocational education is defined in many ways using many terms. Interdisciplinary education, applied basics, applied academics--all have been used to describe the idea. Basically, integration is a rather broad concept which entails 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 (i.e., industrial technology, agriculture, home economics, business education, health occupations). Indeed, many view the vocational education subject areas as applications of one or more of the academic disciplines in an occupational setting. Agriculture, for example, may be viewed as applied biology (agriculture programs were even given the name "Applied Biological and Agricultural Occupations" at one time), though applications of chemistry and mathematics are also prevalent in agriculture.

Due to the separation between "vocational" and "academic" education which has existed and grown over the years, there is confusion over exactly what integration is and represents. It has been viewed in essentially two ways: as a curriculum issue and as a teaching issue. To this point, the field has treated it primarily as a curriculum issue and has responded by developing or modifying curricula. Both issues must be addressed to accomplish the goals of integration. In its simplest form, however, integration is nothing more than good, sound teaching practice--making abstract concepts more understandable by applying them to real-life situations. It exhibits potential to reinforce students' acquisition of basic and higher-order academic skills, to enhance the rigor and completeness of occupational skill training, and to renew the way in which both academic and vocational education are delivered.

RATIONALE

The reasons for supporting the integration of academic and vocational education are many and varied. Certainly, the results of current educational programs, or more realistically the lack of results, support the idea that things must change to turn around the trend of poorly educated graduates. Economically, as a country, the struggles have been to maintain the current status at a time when the emphasis should be on increasing the competitive edge. Business and industry leaders have already voiced their need and concern for better-educated personnel.

Education and economics are interdependent. The relationship between how we educate the youth now and what jobs will be available to them in the future must be recognized (McClure & Cotton, 1986).

Research has indicated that the jobs of the future will require not only more skill but also more education (Bailey, 1990). A study by the Hudson Institute reported that to see a 3% growth rate by the year 2000, the skills of 25 million workers would have to be upgraded and improved by 40% (Owens, 1989). Naturally, workers must have a solid footing when it comes to basic skills. Critical thinking and decision making must be second nature to them (Carnevale, Gainer, & Meltzer, 1988).

Certainly, to remain competitive there are several improvements that need to be initiated. Furthermore, these improvements should begin at the school level so that all students receive the needed instruction. If academic and vocational education were integrated, an improved workforce could result with less time and money being expended for costly remedial training. The integration of vocational and academic education would also give students a whole picture rather than just pieces of the pie. The results of integration would see students and workers making a connection between their integrated courses and the actual workplace. Integration would treat subjects and content in an interactive manner as things truly occur in "real life."

Schools are teaching too few of the most essential work skills to students. A large portion of students are not receiving the basic skills (the fundamental academic and employability skills which form the foundation for advanced learning) that will aid them in securing a position that could lead to a career or at least, sound employment. Simply, everyone needs to read, write, speak, compute, and reason. These are all essential requirements that are needed as foundations to build upon for background knowledge. It is also much easier for a person with good basic skills to learn a new skill. In fact, it would be almost impossible to receive and understand new information without a good grasp on basic skills. Therefore, it is necessary to emphasize basic skill instruction in all educational programs.

Academic education has always been viewed as the main core of schooling. Substantially less consideration has been given to those students who do not plan on continuing their education (Parnell, 1985). Students may find that vocational education classes are difficult

to accommodate in their schedules. Thus these non-college bound students are trapped in an academic, or worse, a "general" track that may not lead to employment. Yet actually when time has allowed, research has shown that all students, not just vocational students, take vocational classes. In the National Assessment of Vocational Education (NAVE), it was found that 97% of students take at least one vocational education course during their high school years (Wirt, 1991). Clearly, it can be seen that students will take vocational education courses when time permits.

Integration is a way for students who are taking a vocational direction, which may or may not include college, to still get a solid background in academic skills. It is also a means by which academic students may enhance their employability. "It should be evident that a primary goal of integration is to make the experience of applied vocational education more accessible to academic students at the same time that advanced academic courses are made more accessible to students concentrating in vocational education. Consequently, we would promote greater intermingling of students in both curricular streams." (Gray, 1991). This should result in an improved outlook for all students.

According to popular belief, the current educational system is not adequately teaching or training its citizens. Integration of academic and vocational education will put an emphasis on reading, writing, and mathematic skills while also addressing the "thinking" skills or knowing "how" to learn. In essence, a whole learning experience would be created. The importance of work related skills and "lifetime" learning skills which all students need to be productive in the workforce must not be underestimated.

The integration of vocational and academic education includes students learning necessary workplace skills and the ability to learn these workplace skills requires solid academic foundations (Pritz, 1990). Through integration, the development of skills that are necessary for a productive, literate, and employable workforce will result. Academic and vocational education need to concentrate their efforts so that recipients will get the most from the program (Recommendations, 1988).

Integration efforts in the Southern Regional Education Board states have produced positive outcomes such as gains in academic achievement and student motivation. This leads to some other assumptions about integration: increased student retention, more teacher enthusiasm, a better overall school climate, and a better-prepared, more well-rounded graduate who is more prepared to take on the challenges of the "new" workplace. Projects such as this one seek to prove or disprove these assumptions.

MAJOR ACCOMPLISHMENTS AND SIGNIFICANT FINDINGS

Project Activities by Objective

Objective 1: To identify, from the population of Illinois comprehensive high schools, area vocational centers, and community colleges, a sample of institutions where successful integration of vocational and academic skills has been locally conceptualized, planned and implemented.

Activity 1.1: Develop operational definition of an "integrated" instructional program.

Recent literature on vocational/academic integration was reviewed, with particular attention to "The Cunning Hand, The Cultured Mind" by Grubb & Plihal (1990). After reviewing the models identified in the Grubb & Plihal study, it was decided to use the "curricular alignment" model as the basis for operationally defining an "integrated" program. The key ingredient in this model, and in the definition, is the cooperation of teachers from an academic discipline and vocational subject area in the planning, delivery, and/or evaluation of instruction. Another feature of many of this type of program was that they were developed and implemented locally, that is, the programs were not a result of any statewide or national initiatives or pilot projects. With this in mind, an integrated program was then operationally defined as a locally conceptualized and developed program in which collaboration between academic and vocational teachers is taking place for the purpose of integrating vocational and academic content to improve instruction.

Activity 1.2: Develop instrument and method to identify integrated programs.
The operational definition developed in Activity 1.1 was included in a cover letter which was sent to all community college occupational deans and secondary regional vocational system directors, along with a postcard program nomination form (included in the Appendix). The cover letter asked the respondents to nominate programs which, in their judgement, fit the operational definition of an integrated program. Mailing labels for the regional system directors were acquired from DAVTE, and the Illinois Community College Board supplied a mailing list of community college occupational deans. The letters and nomination forms were mailed out on October 21, 1990.

Informal contacts were also made with DAVTE staff members, directors of other DAVTE projects university and community faculty, and secondary teachers and administrators. The project consultant attended the Illinois Council of Vocational Administrators fall conference in Bloomington on October 28-30 and made several recommendations for potential sites based on contacts made there. Also, statewide newsletters and other publications were reviewed for descriptions of integrated programs.

In addition, suggestions for potential sites were gleaned from reports and data of the Sophisticated Technologies project.

Activity 1.3: Select sites for further study.

The next step was to follow up with selected programs to provide further basis for selecting the final sample. Given the somewhat narrow definition, response was limited, as was planned and anticipated. A total of 22 programs were nominated via the survey, and many sites responded that they had no programs which fit the operational definition. Of these, 14 were contacted by the project consultant, along with three programs selected from the Sophisticated Technologies project data and two from the ICVA conference contacts. The phone follow ups were used to further assess the programs' (1) fit with the operational definition, (2) teacher and student opinion of the program, and (3) administrative support for the program. (See the Appendix for directions and protocols for the phone follow ups).

The project consultant and project director met in Champaign on November 13 to select programs for further on-site study. Five secondary and four community college programs were tentatively selected for on-site interviews and class observations. The project consultant began arranging for the on-site visits at that time.

Objective 2: To describe the structure, function, planning, operation and outcomes of these successful vocational/academic skills integration strategies.

Activity 2.1 Develop instruments and procedures for on-site data collection.

Data were collected via interviews with vocational and academic teachers involved with the integrated programs, interviews with department, school or college administrators, and observations of the integrated class(es) in operation. Data collection instruments for the interviews and observations were adapted from several sources: the Sophisticated Technologies project, the Grubb & Plihal study, other NCRVE activities, and various studies and/or evaluations of "tech prep" type programs (See the Appendix for copies of the instruments used).

Procedures for the data collection were developed between the project director and project consultant at the November 13 meeting in Champaign and refined in subsequent telephone contacts both before and after the first visit had been conducted.

Activity 2.2 Conduct site visits.

All site visits conducted to date were scheduled and conducted by the project consultant between November 29 and December 14, 1990. All visits were one day in duration. Integrated classes were observed, vocational and (where feasible) academic teachers were interviewed, and (where appropriate) administrators were interviewed at each site. Any materials that had been developed locally to accompany the integrated program were collected as well. All site visit materials (completed observation and interview instruments, instructional materials, and summary reports written by the project consultant) were returned to the project director before the end of December. The project director and

project consultant met in Champaign on December 21 to discuss and summarize the site visits.

Activity 2.3 Analyze and summarize site visit data.

Data from the site visits were organized by project director and research assistant according to five categories: context; origin and purpose; student makeup; planning, delivery, and evaluation; and outcomes. Narrative site reports were written based on the data from these categories (see Appendix for site visit reports).

Activity 2.4 Conduct follow-ups as necessary

After preliminary data summary and review, the project director followed-up two sites via telephone to address questions and issues arising from the initial data reports. Information from these follow-ups was incorporated into the site summary reports.

Objective 3: To synthesize, from the descriptions, guidelines and resources for integrating vocational and academic instruction.

Activity 3.1 Review resource materials

A review of the literature on integration was conducted by project staff. The review served several purposes: (1) to provide background and rationale for the project, (2) to provide a framework for organizing the data summary, analysis, and reports, and (3) to provide a list of resource materials available on the subject. Several resource materials were purchased (see Section d).

Activity 3.2 Review and analyze narrative site reports

Project staff reviewed the narrative reports from each site. Within each data reporting category (context; origin and purpose; student makeup; planning, delivery, and evaluation; outcomes) elements which were common across sites were identified. These comprised the major recommendations or guidelines for integration. In addition, the decision was made to include as guidelines site-specific strategies along with the site descriptions. In this way, audiences could identify similarities with specific sites and adapt integration strategies from these sites.

Objective 4: To develop the guidelines and resources into a handbook for use as an aid in teaching practitioners to plan and implement integrated programs.

Activity 4.1 Determine appropriate handbook format

Project staff reviewed integration literature reports, previous ISBE-funded project products, curriculum materials, and materials previously produced for inservice/workshop activities. It was decided, given the nature of the data, to make the handbook a general guide for planning and implementing integrated programs and/or activities. The primary audiences for the handbook were identified as regional system directors, community college occupational deans, academic and vocational department heads, ISBE staff, and vocational teacher educators. In other words, those who would likely have responsibility for planning pre- or inservice teacher education activities.

Activity 4.2 Incorporate elements of literature review, materials collection, and site data into handbook format

Information for the handbook was organized into a question-and-answer format as follows:

What is integration?
Why integrate?
How is integration structured?
How is integrated instruction planned?
How is integrated instruction delivered?
How is integrated learning evaluated?
What outcomes have been realized from integrated instruction?
What is the next step?

(See the following section for a handbook abstract)

FINAL PRODUCT ABSTRACT

Setting the Stage: A Practitioner's Guide to Integrating Vocational and Academic Education

Integration was operationally defined to include activities involving the collaboration of vocational and academic teachers to improve instruction in either the academic or vocational discipline, or both. A review of the literature revealed that there are many reasons for integrating vocational and academic education (related to learning, achievement, and economic development), and many assumptions about what the outcomes of integrated instruction should be. Also, integrated activities which have been implemented to this point have shown positive results for both students and teachers.

Integration is many things, from simple informal activities conducted by a single teacher in a class to very complex, formal programs and/or courses. Integration commonly takes the form of activities delivered within a course or of newly developed courses designed to be integrated. Most meaningful integration requires some form of collaboration between vocational and academic teachers. Time for planning, development, and maintenance of integrated instruction is essential for success.

While specific evaluation methods have yet to be developed and tested, integration appears to produce positive results by traditional evaluation methods and through anecdotal evidence. Teachers report improved student attitude and achievement, and improved teacher enthusiasm as well. Perhaps the most important outcome to date has been the breaking down of artificial barriers which separate academic and vocational professionals in educational institutions.

EVALUATION AND IMPACT

The effects of this project on practice have yet to be determined, as the handbook has yet to be disseminated. The findings of the project reinforce those reported in earlier studies on the subject, although the evidence remains largely anecdotal in nature. All instruments and methods used in the project were developed and/or adapted from previous research literature. The handbook was reviewed by ISBE staff and community college personnel.

Though its impact cannot be judged at this time, the handbook is viewed as an interm step between where the field is now in terms of integration and where it will eventually be when fully integrated programs are developed state and nationwide. It will assist in the process of developing awareness of integration in general, implementation issues, and future directions.

HUMAN RESOURCES

Paid:

Chris A. Roegge
Visiting Assistant Professor
Department of Vocational and Technical Education
University of Illinois at Urbana-Champaign
Project Director

James R. Galloway
Independent Consultant
Loda, Illinois
Project Research Associate

Julie A. Welge
Graduate Student
Department of Vocational and Technical Education
University of Illinois at Urbana-Champaign
Graduate Research Assistant

Unpaid:

Donald A. Johnson
Dean of Vocational/Technical Education
Rock Valley College
Rockford, Illinois
Handbook reviewer

George Kreider
Dean of Career Education
Kankakee Community College
Kankakee, Illinois
Handbook reviewer

APPENDIX

1. Program Nomination Form and Cover Letter
2. Secondary Administrator Interview Instrument
3. College Administrator Interview Instrument
4. Secondary Teacher Interview Instrument
5. College Instructor Interview Instrument
6. Classroom Observation Instrument
7. Narrative Description of Sites
8. Resource Bibliography
9. Article from Update on Research and Leadership

Appendix 1: Program Nomination Form and Cover Letter

System Directors,
RVAs,
Community College Deans

Dear Colleague:

The Illinois State Board of Education, Department of Adult, Vocational and Technical Education has funded a project entitled "Strategies for Integrating Academic and Vocational Education." The project is housed at the University of Illinois and was commissioned to identify and develop strategies to assist teacher education programs offer quality preservice and inservice training in this important emerging area.

In order to accomplish this, the project seeks to study locally-conceptualized and developed programs which successfully integrate academic and vocational instruction in Illinois community colleges and high schools. As an educator in close contact with programs and teachers, you can provide an invaluable service by helping to identify integrated programs.

For the purpose of this activity, an integrated program is defined as a program in which collaboration between academic and vocational teachers is taking place for the purpose of integrating vocational and academic content to improve instruction.

If you know of one or more programs in your college or region which fit this definition, please fill in the information on the enclosed post card and return it to me (two programs may be nominated on the card). A closer examination of all nominated programs will be conducted, and a final sample will be selected from this pool for in-depth study.

Thank you in advance for your valuable assistance in this activity and for your interest in improving education.

Best Regards,

Chris A. Roegge
Project Director

Appendix 2: Secondary Administrator Interview Guide

SITE: _____

PROGRAM NAME: _____

DATE: _____

INTERVIEWEE NAME: _____

INTERVIEWEE POSITION: _____

DIRECTIONS: Explain to the interviewee that the purpose of this project is to study programs which successfully integrate vocational and academic subject matter, that the methods which contributed to their success might be identified and shared. Results of the study will be developed into a handbook for use in preservice and inservice teacher education activities. This interview focuses on the origin, planning, implementation, delivery, and outcomes of the integrated program being studied at this site.

Where present, the sub-questions deal more specifically with the issues raised in each question. Examples for clarifying questions and/or specifying types of responses are provided parenthetically where appropriate.

PART 1: INTERVIEWEE INVOLVEMENT

1. What is the nature and scope of your involvement in this program?

1.1 What specific link do you have with the program?

1.2 Why did you become involved?

PART II: PROGRAM ORIGIN AND PURPOSE

2. Why was the program started?

2.1 How much of the impetus for starting the program came from administration?

_____ all
_____ most
_____ some
_____ none

2.2 What types of support were provided by administration for the formation of the program? (providing resources, release time for meetings, facilitating meetings, speaking on behalf of the program, providing staff development activities, etc.)

3. What is the intended audience for the program?

_____ high achievers
_____ average achievers
_____ low achievers

_____ general track
_____ vocational track
_____ college preparatory track

4. How are students selected for participation in the program? (self-selected or recruited, what criteria are used?)

PART III: PROGRAM PLANNING AND IMPLEMENTATION

5. How were faculty and staff selected to participate in the planning of the integrated program? Were any incentives offered? If so, what were they?

6. What barriers were encountered in the planning and implementation of this program? How were they overcome?

PART IV: PROGRAM OPERATION AND MAINTENANCE

7. What types of special resources, if any, have been provided for the integrated program?

7.1 How crucial are they to the continuance of the program?

7.2 How stable are they?

8. To what degree does the program depend on a specific person or persons to "hold it together?"

PART V: PROGRAM OUTCOMES AND EVALUATION

9. What are the benefits of the integrated program?

9.1 For students?

9.2 For teachers?

9.3 For the school as a whole?

9.4 What unexpected results were observed?

10. What are the drawbacks (costs)?

11. Do the benefits outweigh the costs? Explain:

12. How is the integrated program evaluated?

12.1 Are there any special provisions for evaluation of the integrated program? If so, what are they?

12.2 Are there any plans to establish or modify a special evaluation procedure for the integrated program?

Appendix 3: College Administrator Interview Guide

SITE: _____

PROGRAM NAME: _____

DATE: _____

INTERVIEWEE NAME: _____

INTERVIEWEE POSITION: _____

DIRECTIONS: Explain to the interviewee that the purpose of this project is to study programs which successfully integrate vocational and academic subject matter, that the methods which contributed to their success might be identified and shared. Results of the study will be developed into a handbook for use in preservice and inservice teacher education activities. This interview focuses on the origin, planning, implementation, delivery, and outcomes of the integrated program being studied at this site.

Where present, the sub-questions deal more specifically with the issues raised in each question. Examples for clarifying questions and/or specifying types of responses are provided parenthetically where appropriate.

PART 1: INTERVIEWEE INVOLVEMENT

1. What is the nature and scope of your involvement in this program?

1.1 What specific link do you have with the program?

1.2 Why did you become involved?

PART II: PROGRAM ORIGIN AND PURPOSE

2. Why was the program started?

2.1 How much of the impetus for starting the program came from administration?

_____ all
_____ most
_____ some
_____ none

2.2 What types of support were provided by administration for the formation of the program? (providing resources, release time for meetings, facilitating meetings, speaking on behalf of the program, staff development, etc.)

3. What is the intended audience for the program?

_____ high achievers
_____ average achievers
_____ low achievers

_____ degree students
_____ certification students
_____ transfer students
_____ other (specify)

4. How are students selected for participation in the program? (self-selected or recruited, what criteria are used?)

PART III: PROGRAM PLANNING AND IMPLEMENTATION

5. How were faculty and staff selected to participate in the planning of the integrated program? Were any incentives offered? If so, what were they?

6. What barriers were encountered in the planning and implementation of this program? How were they overcome?

PART IV: PROGRAM OPERATION AND MAINTENANCE

7. What types of special resources, if any, have been provided for the integrated program?

7.1 How crucial are they to the continuance of the program?

7.2 How stable are they?

8. To what degree does the program depend on a specific person or people to "hold it together?"

PART V: PROGRAM OUTCOMES AND EVALUATION

9. What are the benefits of the integrated program?

9.1 For students?

9.2 For teachers?

9.3 For the school as a whole?

9.4 What unexpected results were observed?

10. What are the drawbacks (costs)?

11. Do the benefits outweigh the costs? Explain:

12. How is the integrated program evaluated?

12.1 Are there any special provisions for evaluation of the integrated program? If so, what are they?

12.2 Are there any plans to establish or modify a special evaluation procedure for the integrated program?

Appendix 4: Secondary Teacher Interview Guide

SITE: _____

PROGRAM NAME: _____

DATE: _____

INTERVIEWEE NAME: _____

INTERVIEWEE POSITION: _____

DIRECTIONS: Explain to the interviewee that the purpose of this project is to study programs which successfully integrate vocational and academic subject matter, that the methods which contributed to their success might be identified and shared. Results of the study will be developed into a handbook for use in preservice and inservice teacher education activities. This interview focuses on the origin, planning, implementation, delivery, and outcomes of the integrated program being studied at this site.

Where present, the sub-questions deal more specifically with the issues raised in each question. Examples for clarifying questions and/or specifying types of responses are provided parenthetically where appropriate.

PART 1: INTERVIEWEE INVOLVEMENT

1. What is the nature and scope of your involvement in this program?

1.1 What specifically do you do in the program?

1.2 Why did you become involved?

PART II: PROGRAM ORIGIN AND PURPOSE

2. Why was the program started?

2.1 Who started it?

2.2 What were the reasons for starting it?

2.3 What external forces, if any, (e.g., state or federal initiatives) helped initiate this program?

3. What steps were taken to gain support for the idea? In other words, how was the idea "sold" to administration, board, students, parents? (try to get very specific procedures here)

4. Who does the program serve?

4.1 Approximately what percentage of students in the program are:

_____ 9th graders
_____ 10th graders
_____ 11th graders
_____ 12th graders

4.2 Approximately what percentage of students in the program are:

_____ high achievers (top 25 percent)
_____ average achievers (middle 50 percent)
_____ low achievers (bottom 25 percent)

4.3 Approximately what percentage of students in the program are:

_____ general track
_____ vocational track
_____ college preparatory track

4.4 Approximately what percentage of students in the program are:

_____ male
_____ female

4.5 Approximately what percentage of the students in the program are:

_____ LEP
_____ handicapped
_____ academically disadvantaged
_____ economically disadvantaged

5. How are the students selected for participation in the program? (self-selected or recruited, what criteria are used?)

PART III: PROGRAM PLANNING AND IMPLEMENTATION

6. Once the idea had been accepted, what steps were followed in the actual, "nuts and bolts" planning of the program?

6.1 Who was involved? In what ways?

6.2 Were any incentives offered to participate? If so, what were they?

6.3 What resource materials were used?

6.4 Were any new materials developed? (e.g., lesson plans, modules, courses of study, curricula, lab plans, program descriptions)

6.5 In what ways did academic and vocational teachers work together in planning this program?

_____ cooperative materials development
_____ cooperative planning of courses
_____ cooperative modification of existing lesson plans
_____ cooperative materials review
_____ other (specify)

6.6 Other planning activities undertaken:

7. What major obstacles were encountered in planning and implementing the program? How were they overcome? (in other words, what would you do differently if you had to plan this program all over again? Why?)

PART IV: PROGRAM OPERATION (STRUCTURE AND DELIVERY)

8. How is the program structured?

8.1 Where is it housed?

_____ in the vocational program area
_____ in the academic program area
_____ other (specify)

8.2 Who administers or directs it?

_____ vocational director or dept. head
_____ academic dept. head
_____ vocational teacher
_____ academic teacher
_____ building administrator
_____ other (specify)

8.3 Who teaches the courses?

_____ vocational teacher
_____ academic teacher
_____ both
_____ other (specify)

8.4 What courses are included (this may be available in the documentation)?

8.5 Which, if any, courses are newly developed just for this program?

9. How is instruction delivered?

9.1 What resource materials are being used? (Applied Academics curricula from CORD or AIT, other commercial materials, locally developed materials)

9.2 Approximately what percentage of instruction in the program is given by:

_____ academic teachers
_____ vocational teachers
_____ teams of both
_____ other (specify)

9.3 What instructional activities are conducted jointly by vocational and academic teachers?

_____ lesson planning
_____ lab planning
_____ course scheduling
_____ teaching specific lessons within courses
_____ teaching or supervising laboratory activities
_____ supervising student projects
_____ teaching entire courses
_____ other (specify)

10. How is learning evaluated?

10.1 Is there a written policy (grading scale) for the integrated program or is it up to individual teachers?

10.2 What type of credit is awarded (academic vs. elective)?

10.3 Which of the following is done cooperatively by both vocational and academic teachers in the program?

_____ evaluating tests, quizzes
_____ evaluating homework assignments
_____ evaluating lab activities
_____ evaluating projects
_____ assigning final student course grades
_____ other (specify)

PART V: PROGRAM OUTCOMES AND EVALUATION

11. What are the benefits of the integrated program?

11.1 For students?

11.2 For teachers?

11.3 For the school as a whole?

11.4 What unexpected results were observed?

12. What are the drawbacks (costs)?

13. Do the benefits outweigh the costs? Explain:

14. How is the integrated program evaluated?

Appendix 5: College Instructor Interview Guide

SITE: _____

PROGRAM NAME: _____

DATE: _____

INTERVIEWEE NAME: _____

INTERVIEWEE POSITION: _____

DIRECTIONS: Explain to the interviewee that the purpose of this project is to study programs which successfully integrate vocational and academic subject matter, that the methods which contributed to their success might be identified and shared. Results of the study will be developed into a handbook for use in preservice and inservice instructor education activities. This interview focuses on the origin, planning, implementation, delivery, and outcomes of the integrated program being studied at this site.

Where present, the sub-questions deal more specifically with the issues raised in each question. Examples for clarifying questions and/or specifying types of responses are provided parenthetically where appropriate.

PART 1: INTERVIEWEE INVOLVEMENT

1. What is the nature and scope of your involvement in this program?

1.1 What specifically do you do in the program?

1.2 Is your role in the program a part of your regular load?

1.3 Why did you become involved?

PART II: PROGRAM ORIGIN AND PURPOSE

2. Why was the program started?

2.1 Who started it?

2.2 What were the reasons for starting it?

2.3 What external forces (e.g., state or federal initiatives) helped initiate this program?

3. What steps were taken to gain support for the idea? In other words, how was the idea "sold" to administration, board of control, and the public? (try to get very specific procedures here)

4. Who does the program serve?

4.1 Approximately what percentage of students in the program are:

_____ degree students
_____ certification students
_____ transfer students
_____ other (specify)

4.2 Approximately what percentage of students in the program are of:

_____ high academic ability
_____ average academic ability
_____ low academic ability

4.3 Approximately what percentage of students in the program are:

_____ male
_____ female

4.4 Approximately what percentage of the students in the program are:

_____ LEP
_____ handicapped
_____ academically disadvantaged
_____ economically disadvantaged
_____ single parents

5. How are the students selected for participation in the program? (self-selected or recruited, what criteria are used?)

PART III: PROGRAM PLANNING AND IMPLEMENTATION

6. Once the idea had been accepted, what steps were followed in the actual, "nuts and bolts" planning of the program?

6.1 Who was involved? In what ways?

6.2 Were any incentives offered to participate? If so, what were they?

6.3 What resource materials were used?

6.4 Were any new materials developed? (e.g., lesson plans, modules, courses of study, curricula, lab plans, program descriptions)

6.5 In what ways did academic and occupational/technical instructors work together in planning this program?

_____ cooperative materials development
_____ cooperative planning of courses
_____ cooperative modification of existing lesson plans
_____ cooperative materials review
_____ other (specify)

6.6 Other planning activities undertaken:

7. What major obstacles were encountered in planning and implementing the program? How were they overcome? (in other words, what would you do differently if you had to plan this program all over again? Why?)

PART IV: PROGRAM OPERATION (STRUCTURE AND DELIVERY)

8. How is the program structured?

8.1 Where is it housed?

_____ in the occupational/technical program area
_____ in the academic program area
_____ other (specify)

8.2 Who administers or directs it?

_____ occupational/technical dept. head or equivalent
_____ academic dept. head or equivalent
_____ occupational/technical instructor
_____ academic instructor
_____ dean
_____ other (specify)

8.3 Who teaches the courses?

_____ occupational/technical instructor
_____ academic instructor
_____ both
_____ other (specify)

8.4 What courses are included (this may be available in the documentation)?

8.5 Which, if any, courses are newly developed just for this program?

9. How is instruction delivered?

9.1 What resource materials are being used? (Applied Academics curricula from CORD or AIT, other commercial materials, locally developed materials)

9.2 Approximately what percentage of instruction in the program is given by:

_____ academic instructors
_____ occupational/technical instructors
_____ teams of both
_____ other (specify)

9.3 What instructional activities are conducted jointly by occupational/technical and academic instructors?

_____ lesson planning
_____ lab planning
_____ course scheduling
_____ teaching specific lessons within courses
_____ teaching or supervising laboratory activities
_____ supervising student projects
_____ teaching entire courses
_____ other (specify)

10. How is learning evaluated?

10.1 Is there a written grading policy for the integrated program or is it up to individual instructors?

10.2 Which of the following is done cooperatively by both occupational/technical and academic instructors in the program?

_____ evaluating tests, quizzes
_____ evaluating homework assignments
_____ evaluating lab activities
_____ evaluating projects
_____ assigning final student course grades
_____ other (specify)

PART V: PROGRAM OUTCOMES AND EVALUATION

11. What are the benefits of the integrated program?

11.1 For students?

11.2 For instructors?

11.3 For the department or college as a whole?

11.4 What unexpected results were observed?

12. What are the drawbacks (costs)?

13. Do the benefits outweigh the costs? Explain:

14. How is the integrated program evaluated?

Appendix 6: Classroom Observation Guide

DIRECTIONS: This instrument is not designed to collect much specific data, but rather to provide guidelines for describing the class. Fill in the blanks where appropriate, but do not be restricted to the blanks only. Comment on these and other aspects of the class which are noteworthy.

Site: _____

Name of the Class: _____

1. What is the setting?

_____ academic classroom; department _____
_____ academic laboratory; department _____
_____ vocational classroom; department _____
_____ vocational laboratory; department _____
_____ other (specify)

2. How well-equipped is the setting? Describe:

3. Who is teaching?

_____ academic teacher; subject: _____
_____ vocational teacher; subject: _____
_____ team teaching

4. Who are the students?

_____ number male
_____ number female
_____ number white
_____ number black
_____ number hispanic
_____ number asian
_____ other (specify)

5. What is the topic or lesson being covered?

6. What instructional materials are being used?

7. What teaching method is being used?

_____ teacher-centered (lecture)
_____ student-centered (inquiry, activity)

Describe in detail.

8. What is the mix of vocational and academic content being covered?

_____ % vocational
_____ % academic

comments:

9. What is the level of material being covered?

_____ basic
_____ comparable to other courses
_____ advanced

comments:

9a. Are any specific references made to other academic or vocational courses, content, or applications?

10. What is the level of student activity?

_____ highly engaged
_____ moderately engaged
_____ slightly engaged

comments:

SITE DESCRIPTIONS

CASE 1

Context: Case 1 is located in a rural community with a population of approximately 1100 that is supported primarily by agriculture. The high school is housed in an older, yet well maintained building with an estimated 125 students. The business education program has been integrated with English (communications) and mathematics. The primary teacher, who is the business education teacher, has been with the school for 20 years. Due in part to the small size of the school, close, informal relationships exist between the teachers with no artificial barriers existing between vocational and academic teachers. Keyboarding, computer applications, and general business are taught in the senior-level business class. The program is well-equipped with twelve computers and six printers which are housed within the business classroom.

Origin and Purpose: The business education teacher decided some years ago to focus the business education program on "life preparatory" skills which would be more universal and transferable. Due to the size of the school and job availability, she thought it was necessary to build the program in this manner, rather than to attempt to prepare students for specific occupations. Through a VIP experience, she identified communication skills as a major need and in turn met with the English teacher informally to seek help in integrating those communication skills into the program.

Student Makeup: An even distribution of grade levels existed within the class with an average to high-average ability level. Students are evenly distributed by gender as well. Students are self-selected with predominantly college preparatory goals. There are some economically disadvantaged students in this area, approximately 30%, possibly due to the recent state of the farm economy.

Planning, Delivery, and Evaluation Activities: The program has a business base with an emphasis on English and mathematics. In the English area, the business teacher advised English students on computer hardware and software use so that they may use them to do papers for English. There is essentially joint supervision and use of the computer labs. Term papers are cooperatively planned and evaluated between the teachers. For example, they may combine research and writing skills with information on the economy and business structure of Japan. Furthermore, the English and business teachers use common methods, styles, materials, and evaluation techniques. Additionally, the business teacher adopted a method of evaluating written work of the students from the English teacher. The English teacher in turn assigns business-oriented topics for activities in her classes. business students also assist and train English students on specific computer skills and programs. In the mathematics area, the math and business teachers cooperatively design individual projects for students. Additionally, the math teacher is also a something of a computer expert and serves as a computer resource for the business teacher.

Outcomes: The outcomes of the integrated business education program as perceived by the teachers and administrators are primarily positive. There is an increased transfer of learning for the students while it has also reinforced skills that they have learned in other classes. Teachers have grown individually while also building closer and mutually respectful relationships. The biggest drawback noted was that of the time commitment. However, there was an overall sense of enthusiasm and accomplishment from both students and teachers.

CASE 2

Context: Case 2 is located in a rural community in southern Illinois with a population of approximately 3200. High school enrollment holds steady at around 450. This community has a strong economy based primarily on the manufacturing industry. The school offers an industrial technology program integrated with mathematics and science. Additionally, advanced math classes use handbooks that were developed with applications from industrial technology. The school district has a new Superintendent who is the driving force behind the improvements in the school. The industrial technology teacher is experienced and well-respected throughout the area. In fact, he is often sought out as a resource for other programs.

Origin and Purpose: The originator of this integrated program was the Superintendent. Also, the school received a science literacy grant from ISBE for the development of the advanced math applications handbooks. The purpose of the integration was to enhance student interest and motivation.

Student Makeup: Students were primarily comprised of juniors and seniors who were evenly divided by gender. Nearly 75% were high achievers with almost all being college preparatory. A very small portion of the student body was economically disadvantaged.

Planning, Delivery, and Evaluation Activities: All the integration was done in the planning stage. They reviewed commercial materials and in turn the math, science, and vocational teachers collaborated to write the advanced math curriculum. The delivery and student evaluation were done within a traditional math class structure.

Outcomes: Students were more enthusiastic and motivated and subsequently teaching was easier. Preparation time was noted as a major barrier. However, there were unexpected outcomes of recognition and notoriety for the development of the integrated activity.

CASE 3

Context: Case 3 is located within a large suburban school district that actually encompasses three high schools. It is a relatively wealthy district in an area which is experiencing tremendous growth. (One of the high schools opened in 1977 and currently has 2100 students enrolled.) This has been the first year for the Food Science course that integrates Home Economics and Science content.

Origin and Purpose: The program was initiated by the administration to revitalize the Home Economics program. The Principal strongly believes in the interdisciplinary concept and therefore was instrumental in the founding of the programs. The school board supported the idea from its inception. Participants volunteered to be involved in the program, which is intended for all interested students. The idea was sold to the students and the community through brochures, newsletters, student newspapers, and actual recruitment in the science classes. The program linked cooperative learning principles as well. Other interdisciplinary programs are also being refined and established.

Student Makeup: Students are fairly evenly divided between 10th, 11th, and 12th grades. However, the class is predominantly female. The students are mostly "general" track. Fifty percent are academically disadvantaged and student ability level follows a bell curve. Students are self-selected after certain information has been provided and reviewed.

Planning, Delivery, and Evaluation Activities: The program is administered cooperatively by the Home Economics and Science department heads. Home economics and science facilities and equipment are both used. All course- related activities are done cooperatively with team teaching by the home economics and science teachers. Summer curriculum development work was done by the home economics and science staff for which they received a stipend. A written curriculum guide was developed for the course by reviewing textbooks, extension service materials, and other assorted periodicals. During the school year, team teachers had a common prep period during which they met at least once every week to discuss their plans. Students receive .5 home economic credit and .5 science credit. Since there was a negative student attitude toward science in general, there was an obstacle in attracting students to the course. The program does not require any major expense items that could jeopardize its continuation.

Outcomes: Administrative support has been very strong with teacher enthusiasm also running high. Teacher compatibility was an unexpected benefit that resulted from the program. The major drawback was the time required by the teachers to create the curriculum. However, there is a broadening of teacher expertise and awareness of other disciplines. There has been a positive change in the attitude toward home economics. Students are more attentive and interested in the applications. Awareness of career opportunities for students also resulted. All in all, it was perceived that a better educated student was produced.

CASE 4

Context: Case 4 is a district with three cooperating high schools involved in the Physical Science program. The Physical Science course is a combination of chemistry, earth science, and industrial technology that is taught in three sections for twelve weeks at a time. Students rotate to a different section at the end of each twelve week session. The program is administered on a district-wide basis and has operated in the black with a good surplus since its beginning. Students must fulfill a general science requirement at the 9th grade level to gain entrance.

Origin and Purpose: The program was initiated by the science department head, a new person from outside the district, to improve upon the required 9th grade general science survey course. A secondary purpose was to improve enrollment in the industrial technology program. An underlying factor was the strong influence of the "technology explosion." The course was intended for average to low ability level students.

Student Makeup: The class is racially mixed and evenly divided by gender. Students are also evenly divided between vocational and general track concentrations. Students were of average to low ability levels, as the course had intended. Nearly 30% of the students are academically and/or economically disadvantaged. Students are self-selected for participation in the course.

Planning, Delivery, and Evaluation Activities: The program is administered by the science department head and teachers were recruited by the department head as well. Science and industrial technology teachers worked and were paid for summer curriculum development efforts. Each teacher worked independently to develop curriculum for his or her own section. Commercial materials were the major reference for the curriculum development activity. The teachers were responsible for writing their own class materials which were all applications-based. Instruction is student-centered with an emphasis on theory. Students are highly engaged while the content level is generally basic. Students receive one science credit toward graduation for this course. Classrooms and laboratories are well-equipped and no other special resources are required. Final grades are determined cooperatively between the teachers. It seems that scheduling the class has been a large concern for teachers, counselors, and students. Additionally, turfism was a concern when developing the course.

Outcomes: Teachers enjoy changing students every twelve weeks and thus are more enthusiastic. Better teaching methods have also resulted. Student attendance and behavior have improved and therefore, student achievement is high in comparison to the science survey course results. Students are learning to learn cooperatively. Surprisingly, students are coming in to work on their own time. Preliminary data from the district indicates that students in the physical science are achieving at higher levels than those in the general science survey course.

CASE 5

Context: Case 5 is a two-year college with an integrated Agriculture Business Management course. It is taught by occupational/ technical instructors. The program was started 20 years ago in response to student need. Students are required to take an internship during their sophomore year. The course is taught in an academic classroom with student desks, blackboards, and audio/visual equipment in both the occupational/technical areas and academic program area.

Origin and Purpose: The Career Dean believes in the career preparation program so that students receive the instruction necessary to be successful in the workplace. He feels that the Agriculture and Health Occupations programs integrate more than others. Instructors integrate because they realize students need it to succeed. Faculty and staff went through the same routine selection process to be hired as they would with other programs. In other words, integration is viewed as occurring naturally in the program, making special selection of instructors unnecessary.

Student Makeup: The program supervisor, who is also an instructor, said the class is 90% male and 10% female. Approximately 50% were average achievers and 25% were within the low and high achieving categories. Students average age is in their 20s. All students are following the degree program. Transfer students must follow a different path to meet certain requirements.

Planning, Delivery, and Evaluation Activities: The coursework consists of both vocational and academic content, although it seems to consist of more academics using vocational examples. The program is intended for average achievers and degree students. Students are recruited from high school agriculture classes as well as self-selected. Teaching is student-centered with inquiries and activities. Students are also required to participate in an internship their sophomore year. Of course, evaluation of the interns performance is standard policy. There is also a unique meat judging scholarship program available to four students per year. Additionally, monetary donations were given to the college for test plots.

Outcomes: Instructors have adjusted their teaching methods by relating academics to different applications for the students benefit. Consequently, students have learned various applications rather than just strict theory, which will result in longer retention. The school has improved its reputation by gaining credibility and by producing an improved student product. Case 5 is also conducting a study to examine the possible introduction of agriculture computer classes. Once again, instructors have voiced their desire to have more time to teach.

CASE 6

Context: Case 6 is a two-year community college that has a Medical Lab Technician (MLT) program which integrates quantitative chemistry and clinical chemistry. Two instructors

teach the integrated clinical chemistry and academic quantitative analysis course. One of the instructors is the program coordinator and the other is the head of the Allied Health Department.

Origin and Purpose: A few years ago when the program was established, the academic and vocational instructors were involved in the planning stage. The Medical Lab Technician and chemistry instructors started this program because of student need. The academic chemistry class was not related closely enough to actual on-the-job information and procedures. The program initiators were required to present information to the college curriculum committee to gain approval for the class. Students in the program take a clinical chemistry class for the first eight weeks and the combined vocational/technical class is conducted the second eight weeks. To gain interest and inform students about the program, instructors often speak at area high schools. The program is intended for above average to high achievers and degree students.

Student Makeup: Program was primarily 70% female and 30% male, with approximately 30% being economically disadvantaged. Seventy to seventy-five percent are of average academic ability and 25-30% of high academic ability. This program serves those wishing to obtain a degree and has both self-selected and recruited individuals. The course is intended to be taken in the first year of the program.

Planning, Delivery, and Evaluation Activities: The program operates within the occupational/technical area. Academic and vocational instructors cooperate in planning courses and modifying lesson plans. The material is taught with approximately 70% vocational content and 30% academic content. The staff is supportive, including the science department, who lost credit hours due to the changed program. Teaching is student-centered with laboratory exercises following guided practice. Student activity is considered highly engaged with open, articulate communication.

Outcomes: Case 6 found students that learned the chemistry as related to the MLT occupation and instructors had greater control over the specifics to be taught. Chemistry instructors must be knowledgeable on various new techniques and/or technological advances to know what to teach.

CASE 7

Context: Case 7 is a community college located in a suburban area with a Respiratory Therapy Program that has integrated science and chemistry within the Allied Health Department. Classes are taught within a well-equipped vocational classroom and laboratory which has been denoted as "state of the art" in terms of equipment and facilities. Classes are instructed by an occupational respiratory therapy instructor.

Origin and Purpose: The program was started when the college realized the community need for health care providers. The private sector strongly supported the program. The

focus is on scientific content as it relates to the health field. Course content is approximately 75% vocational and 25% academic. Course work was intended for the high achievers. Curriculum materials were mainly obtained from commercial sources, although some materials were self-developed by the instructors.

Student Makeup: Students are self-selected and recruited for this program. Many gained information through Health Career days at area high schools. Most interested students had a solid science background. The program requires a minimum 2.0 GPA. The class is comprised of 75% female and 25% male who have degree goals. Students are generally older and more mature. It is estimated that 60% are of high academic ability while 40% are of average ability. Nearly 10% of the students are economically disadvantaged.

Planning, Delivery, and Evaluation Activities: The program is well supported by the administration and the community. Instructors collaborated and cooperated in planning the course and reviewing the material. Teaching is student-centered and instructors use questioning techniques to evaluate student understanding. Furthermore, advanced level materials are used with highly engaged students. Occupational and academic instructors jointly evaluate laboratory activities and projects, and assign grades.

Outcomes: The results of the program represent science instruction as it relates to the health field in an accurate way. Community involvement and interest was a boost in the early stages of program establishment.

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Appendix 9: Article from Update on Research and Leadership

Vocational/Academic Integration Project

A project is in progress at the University of Illinois to describe methods of establishing and implementing programs which integrate academic and vocational instruction. Integrating vocational and academic content/skills/instruction is a topic which has received considerable national attention recently. This Illinois State Board of Education-funded project differs from many other research and development efforts in this area in that it focuses on locally conceptualized and developed programs.

Strategies for Integrating Vocational and Academic Education seeks to identify and study integrated programs and/or courses which are not the direct result of any state or national initiative, but have been locally conceived, planned, and implemented. The rationale behind this idea was twofold: (1)it was felt that externally initiated programs or activities may be unduly constraining; (2)many local innovations, though worthy of emulation, often go unshared and unnoticed beyond the boundaries of the school where they are developed. By studying how these integrated efforts were conceptualized, developed, and implemented; and by searching for common threads among different locations, the project aspires to develop guidelines for training of instructors who would seek to provide integrated instruction to their students.

The first major task in completing this project was to find local integration activities which fit the parameters of the study. Some innovative integrated programs had been described in state and/or national publications, but these were few and far between. In order to find the needles, first the haystacks had to be located. The first task was to come up with an operational definition of the integration concept. For the purpose of this project, integrated programs were defined as any programs in which "collaboration between academic and vocational teachers is taking place for the purpose of integrating vocational and academic content to improve instruction."

Community college occupational deans and regional system directors in the state were asked to nominate two programs which fit the above definition, if they existed in their region or college. Administrators were also contacted informally at the Illinois Council of Vocational Administrators Fall Conference in Bloomington, and reports from the Sophisticated Technologies project were reviewed. These activities yielded a long list of programs with "potential." All of the "potential" programs were followed-up by phone to further assess their desirability for the project. Finally, nine sites (four community colleges and five secondary) were selected for more in-depth study.

Each site was visited by a project staff member. Interviews were conducted with vocational and academic teachers who were involved in the integrated activities and with administrators. Classroom observations were conducted in the integrated classes to get a

feel for the actual integrated instruction and to fill in any gaps left by the interviews. Data is being summarized and analyzed at this time.

The product of this activity will be a guidebook of strategies and recommendations for planning and implementing integrated programs. The guidebook will be useful for planning and conducting preservice or inservice teacher education courses, or as a reference for individual program planning activities. The project is scheduled for completion by June 30, 1991.

For more information, please contact Chris A. Roegge at the University of Illinois, College of Education, Department of Vocational and Technical Education at (217) 333-0807.

IL91PD13

SETTING THE STAGE:
A Practitioner's Guide
To Integrating Vocational
And Academic Education

Illinois
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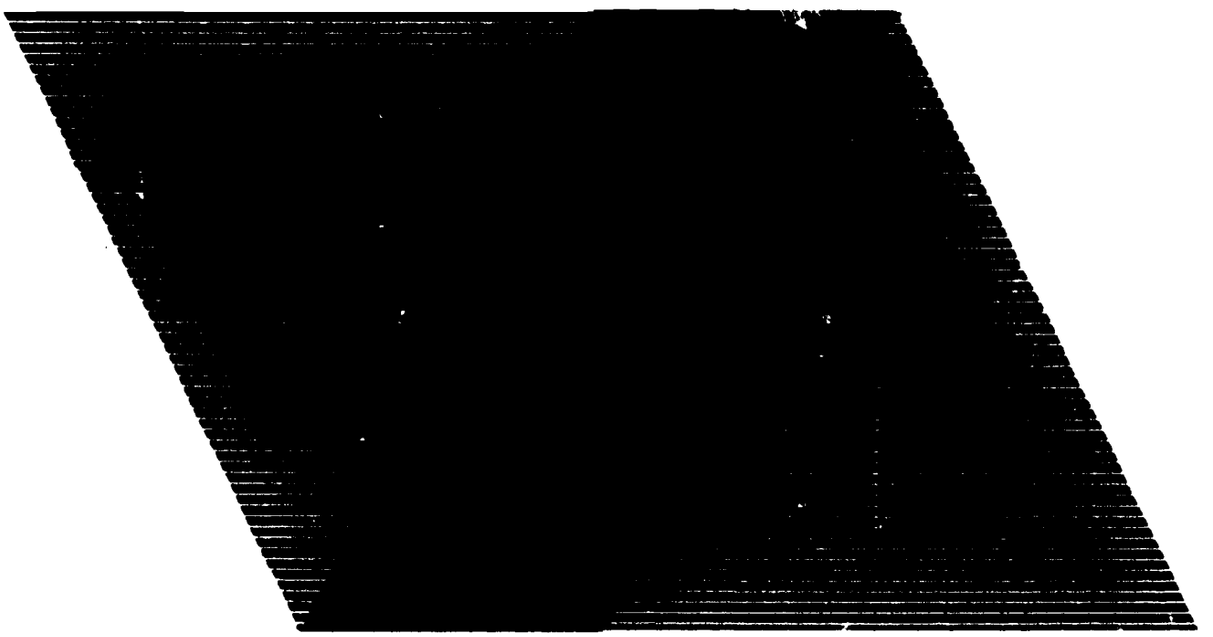
of Education

Adult
Vocational and
Technical Education



SETTING THE STAGE:
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And Academic Education

Project Director

Chris A. Roegge

Project Staff

James R. Galloway
Julie A. Welge

Department of
Vocational and
Technical Education
College of Education
University of Illinois
at Urbana-Champaign

Illinois
State Board
of Education

Louis Mervis
Chairman

Robert Leininger
State Superintendent
of Education

Department of
Adult, Vocational
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TABLE OF CONTENTS

Much has been written, studied, and said during the last several years about integrating academic and vocational education. Numerous pilot projects have been initiated, curricula developed, workshops conducted and conferences held on the subject. The *Phi Delta Kappan*, in its February 1991 issue with the theme "The Rebirth of Vocational Education" dedicated much page space to the topic. Indeed, since integration is a high priority of the newly reauthorized Carl Perkins Vocational and Applied Technology Education Act, it will undoubtedly come more and more to the forefront of educational policy and reform, not only of vocational education, but of education in general.

As vocational/academic integration moves forward, priority is shifting from questions of rationale to those of planning and implementation of integrated programs. Teachers want and need to know how to deliver integrated instruction. Administrators want and need to know the costs and benefits of integrated programs. In summary, practitioners need to know how to make integration operational.

In Illinois, educators have already moved ahead with the Technical Preparation, or "Tech Prep" programs funded by the Illinois State Board of Education (ISBE). Integration of vocational and academic content is a key, if not **the** key component of a Tech Prep program. This need and the overall need for information on integration led ISBE to also fund a project, entitled **Strategies for Integrating Vocational and Academic Education** during 1990-1991, to identify and describe such strategies.

Regional system directors, regional vocational administrators, and community college occupational deans were surveyed to locate innovative integrated programs which had been locally planned and carried out. A sample of successful integrated programs was selected, teachers and administrators at the sites were interviewed, instructional materials were reviewed, and integrated classes were observed to see what made these innovative strategies work in real settings.

This guide represents the culmination of that effort. It is a brief general guide to initiating vocational/academic integration in a school program. It is intended for use by administrators, instructors, and teacher educators to aid in planning and implementing inservice and preservice programs, or as a reference to guide individual efforts of school administrators and/or classroom teachers.

The guide uses a question-and-answer format to address the following:

- **What is integration?**
- **Why integrate?**
- **How is integration structured?**
- **How is integrated instruction planned?**
- **How is integrated instruction delivered?**
- **How is integrated learning evaluated?**
- **What outcomes have been realized from integrated instruction?**
- **What is the next step?**

This guide is not meant to be an exhaustive source of information. The field is still learning about integration; new developments are constantly being tried, adopted, modified, or rejected. This guide is designed to create awareness of integration and to convey in general terms how it may be carried out. Much information is available in print, videotape, via conferences, and especially from other educators. With this guide as a starting point, readers may seek and make use of that wealth of information.

What is integration?

Integration of academic and vocational education is defined in many ways using many terms. Interdisciplinary education, applied basics, applied academics--all have been used to describe the idea. Basically, integration is a rather broad concept which entails 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 (i.e., industrial technology; agriculture; home economics; business, marketing and management; health occupations). Indeed, many view th. vocational education subject areas as applications of one or more of the academic disciplines in an occupational setting. Agriculture, for example, may be viewed as applied biology (agriculture programs were even given the name "Applied Biological and Agricultural Occupations" at one time), though applications of chemistry and mathematics are also prevalent in agriculture.

Due to the separation between "vocational" and "academic" education which has existed and grown over the years, there is confusion over exactly what integration is and represents. It has been viewed in essentially two ways: as a curriculum issue and as a teaching issue. To this point, the field has treated it primarily as a curriculum issue and has responded by developing or modifying curricula. Both issues must be addressed to accomplish the goals of integration. In its simplest form, however, integration is nothing more than good, sound teaching practice--making abstract concepts more understandable by applying them to real-life situations. It exhibits potential to reinforce students' acquisition of basic and higher-order academic skills, to enhance the rigor and completeness of occupational skill training, and to renew the way in which both academic and vocational education are delivered.

In the cases (See Appendix for descriptions) studied in this project, integration occurred through collaborative course planning, instructional materials development, teaching, and student evaluation. The content areas which were being integrated included:

- **business education/communications/problem solving/personal development**
- **home economics/science**
- **technology/earth science/chemistry**
- **health (medical lab technician)/chemistry**

Why integrate?

The reasons for supporting the integration of academic and vocational education are many and varied. Certainly, the results of current educational programs, or more realistically the lack of results, support the idea that things must change to turn around the trend of poorly educated graduates. Economically, as a country, the struggles have been to maintain the current status at a time when the emphasis should be on increasing the competitive edge. Business and industry leaders have already voiced their need and concern for better-educated personnel.

Education and economics are interdependent. The relationship between how we educate the youth now and what jobs will be available to them in the future must be recognized (McClure & Cotton, 1986).

Research has indicated that the jobs of the future will require not only more skill but also more education (Bailey, 1990). A study by the Hudson Institute reported that to see a 3% growth rate by the year 2000, the skills of 25 million workers would have to be upgraded and improved by 40% (Owens, 1989). Naturally, workers must have a solid footing when it comes to basic skills. Critical thinking and decision making must be second nature to them (Carnevale, Gainer, & Meltzer, 1988).

Certainly, to remain competitive there are several improvements that need to be initiated. Furthermore, these improvements should begin at the school level so that all students receive the needed instruction. If academic and vocational education were integrated, an improved workforce could result with less time and money being expended for costly remedial training. The integration of vocational and academic education would also give students a whole picture rather than just pieces of the pie. The results of integration would see students and workers making a connection between their integrated courses and the

actual workplace. Integration would treat subjects and content in an interactive manner as things truly occur in the workplace.

Schools are teaching too few of the most essential work skills to students. A large portion of students are not receiving the basic skills (the fundamental academic and employability skills which form the foundation for advanced learning) that will aid them in securing a position that could lead to a career or at least, meaningful employment. Simply, everyone needs to be able to read, write, speak, compute, and reason. These are all essential requirements that are needed as foundations to build upon for background knowledge. It is also much easier for a person with good basic skills to learn a new skill. In fact, it would be almost impossible to receive and understand new information without a good grasp on basic skills. Therefore, it is necessary to emphasize basic skill instruction in all educational programs.

Academic education has always been viewed as the main core of schooling. Substantially less consideration has been given to those students who do not plan on continuing their education in a four-year college or university (Parnell, 1985). Students may find that vocational education classes are difficult to accommodate in their high school schedules. Thus these non-college bound (not intending to pursue a baccalaureate degree) students are trapped in an academic, or worse, a "general" track that may not lead to employment. Yet research has shown that when time allows, all students, not just vocational students, take vocational classes. In the National Assessment of Vocational Education (NAVE), it was found that 97% of students take at least one vocational education course during their high school years (Wirt, 1991). Clearly, it can be seen that students will take vocational education courses when time permits.

Integration is a way for students who are preparing for a career, which may or may not include future four-year college, to get a solid background in academic skills. It is also a means by which academic students may enhance their employability. "It should be evident that a primary goal of integration is to make the experience of applied vocational education more accessible to academic students at the same time that advanced academic courses are made more accessible to students concentrating in vocational education. Consequently, we would promote greater intermingling of students in both curricular streams." (Gray, 1991). This should result in an improved outlook for all students.

According to popular belief, the current educational system is not adequately teaching or training its citizens. Integration of academic and vocational education will put an emphasis on reading, writing, and mathematic skills while also addressing the "thinking" skills or knowing "how" to learn. In essence, a whole learning experience would be created. The importance of work related skills and "lifetime" learning skills which all students need to be productive in the workforce must not be underestimated.

The integration of vocational and academic education includes students learning necessary workplace skills and the ability to learn these workplace skills requires solid academic

foundations (Pritz, 1990). Through integration, the development of skills that are necessary for a productive, literate, and employable workforce will result. Academic and vocational educators need to concentrate their efforts so that students will get the most from the program (Recommendations, 1988).

Integration efforts in the Southern Regional Education Board states have produced positive outcomes such as gains in academic achievement and student motivation (Bottoms, 1989). This leads to some other assumptions about integration: increased student retention, more teacher enthusiasm, a better overall school climate, and a better-prepared, more well-rounded graduate who is more prepared to take on the challenges of the "new" workplace. Projects such as this one seek to prove or disprove these assumptions.

How is integration structured?

As illustrated previously, integration is a broad concept which may be operationalized in a variety of ways. The most complete classification of integration efforts to date may be found in the work of Grubb, Davis, Lum, Plihal, and Morgaine (1991) sponsored by the National Center for Research in Vocational Education (NCRVE) at the University of California at Berkeley. Grubb et al. identified several "models" into which observed integration activities were classified. These models include:

- **The infusion of academic content into existing vocational courses by vocational teachers**
- **The infusion of academic content into vocational courses by combinations of vocational and academic teachers**
- **The use of "vocational" applications to illustrate concepts and principles within academic courses**
- **The alignment and modification of the content of both the academic and vocational curricula**
- **Independent senior-year projects which incorporate skills learned in academic and vocational coursework**
- **Occupationally-centered academies, or schools-within-schools**
- **Occupationally-centered high schools**
- **An occupational cluster school structure replacing the traditional academic department structure**
- **A combination of academic departments and occupational clusters in a matrix structure**

These models range in complexity from the relatively simple (infusion of academic content into existing vocational courses, which requires no collaboration and may be accomplished within an existing structure), to the exceedingly complex, in which the entire school

structure is redesigned. It is generally felt that models or approaches which are based upon collaboration between academic and vocational teachers are most likely to be effective in the long term. The major criterion, therefore, which was used to select programs for study in this project was that "collaboration between academic and vocational teachers or instructors was taking place for the purpose of improving instruction."

Other approaches exist which may also provide viable alternatives for providing integrated instruction. These include:

- **Vocational Student Organization activities**
- **Student competitions**
- **Work-based learning or internship experiences**
- **Simulations or thematic programs**

To date, no single approach has proven superior. Indeed, it is difficult to even compare several of the models, as they differ widely in their scope and complexity. The application of the appropriate model is highly dependent on situational factors.

Brief descriptions of four cases observed in Illinois illustrate the diversity of types of integration structures which exist within the models described above.

> **Case 1:** A series of "life preparatory" skills activities, taught within the context of an existing business course, integrates communication skills, personal development, interpersonal relations, and problem solving. In this case, academic content is infused within a vocational business course. In addition, however, course content is aligned with complementary content in an English course. Also, projects and student competitions which require the application of both academic and vocational content are assigned and evaluated cooperatively by vocational and academic teachers. This case has elements of several models.

> **Case 2:** A year-long food science course integrates home economics and general science and is team taught by home economics and science teachers. Students are awarded .5 credit in home economics and .5 credit for science. This is an example of a multi-disciplinary course which aligns and presents both academic and vocational content together to maximize application and reinforcement. The team teaching aspect of the course separates it from simpler infusion or applications models.

Case 3: A ninth-grade science/technology course consists of three twelve-week sessions of chemistry, earth science, and industrial technology. Instruction is timed to introduce related content and applications concurrently, and students rotate between sections every 12 weeks. Though this might be called a multi-disciplinary course, it is really more a case of curricular alignment and modification. The three sections are really distinct courses, though they are cooperatively planned and delivered to align complementary content.

Case 4: A clinical chemistry course in a medical laboratory technician program at a community college integrated theoretical chemistry with the occupational lab technician skills. The course was designed to focus on the chemistry content most directly applicable to lab technician occupations, and to teach it in an applied setting. It was collaboratively planned by faculty from the chemistry and med tech programs.

Though unique, each of these cases illustrate the importance of interdisciplinary collaboration in some facet of their structure, whether it be planning, delivery, evaluation, or a combination of the above. Obviously, the two main structures observed were (1) completely integrated courses, and (2) integrated activities conducted within existing courses.

How is integrated instruction planned?

The Importance of Purpose

The form that integrated programs take and how they are planned and delivered is ultimately determined by the context in which they operate and the purpose for which they are initiated. The degree of formality of an integrated activity depends partly on the context in which it exists. Informal integration is facilitated in a small, closely-knit faculty group wherein teachers share ideas and information. Informal activities occurring within existing courses have been observed in this type of situation. In larger schools with more complex and layered administrative framework, integration tends to follow a more structured pattern and take the form of formal course(s) or curriculum guides.

Almost universally, improvement of programs is given as the reason for undertaking an interdisciplinary effort. A common reason given is to "turn out a better-prepared student." Typically, a specific problem, such as low enrollment or student dissatisfaction serves as the impetus for an innovation. Therefore, an integrated course, program, or activity may be established to:

- **improve student academic achievement**
- **improve student motivation**
- **improve student attendance and attentiveness**
- **increase course or program enrollment**
- **increase student retention in a program**

These or other goals may drive the establishment of an integrated course. Student and program needs are likely to change with time, and therefore the goals of the integrated activity will change also. The long-term goal of "turning out a better-prepared student" may then be achieved as a result of accomplishing the intermediate goals.

The Need for a Champion

Effecting change in a school is no easy task. Volumes have been written about what it takes to effect change in an organization. In order to succeed, any innovation must have strong backing. In the case of integrated activities (courses or programs) ones that are successful share one important characteristic--a committed person (or persons) to champion the cause. If integration is to be truly effective, to be more than a short-term response to a state or federal initiative, people must believe in it and be eager to convert the non-believers. Someone must serve as the spark. Typically, in order for the change to be permanent, the more influence the champion has over policy, the better.

Planning the Activity

Planning for integration requires three basic resources: people, time, and materials.

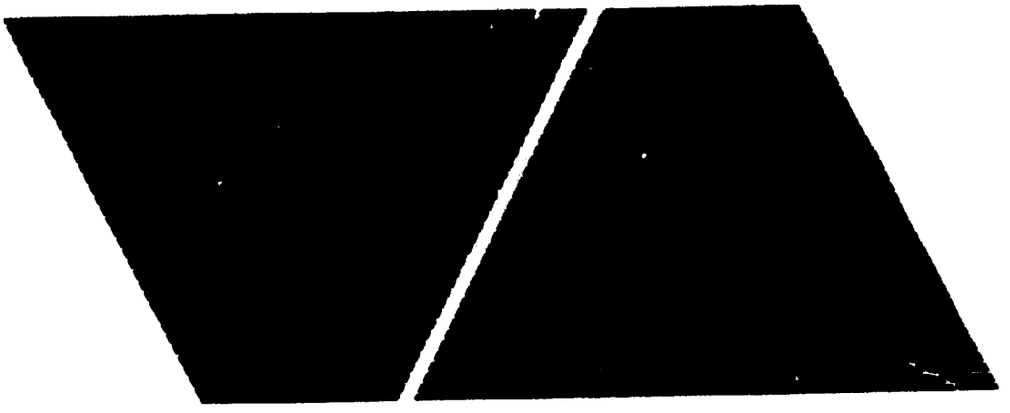
People: Staff representing the disciplines to be integrated will probably be responsible for planning the activity. Deciding who should be involved in planning an innovation such as this is a difficult proposition, at best. Obviously, persons planning an integrated activity should buy into the concept. Therefore, voluntary participation has proved workable. If feasible, some schools offer small stipends or extra preparation time as incentives.

Time: Initial planning must occur well before the activity (a new course, for example) is to begin. Typically, staff are paid to develop courses and curricula in the summer (one to two weeks is common). This initial time investment must be followed, however, with added preparation time once the course is initiated. Collaborative relationships between vocational and academic teachers must be initiated and maintained in order for meaningful integration to occur. **In order for these collaborative relationships to be maintained, teachers from the different disciplines involved in the integration must be given common preparation time on a regular (daily or weekly) basis.** This is particularly important if team teaching or other collaborative delivery approaches are being used. The middle school concepts of teaming and block-of-time scheduling contain many elements which are useful in planning for integration (see the Resource Bibliography).

Materials: In order for different disciplines to be integrated, common content, or theory and application, must be properly combined. One teacher could sit down with a pile of textbooks and curriculum guides and painstakingly match up the appropriate content. A preferred strategy, however, is to utilize human resources to their full potential; thus the collaborative approach. By pulling together teachers with expertise in different areas, the appropriate combinations may be more fully exploited. Working together, teachers from the different disciplines may then select the most appropriate instructional and resource materials for the course. A variety of resource materials have already been generated on this subject. A bibliography of resource materials is presented in the appendix to this handbook.

Flexibility should be built into the plan insofar as is possible to ensure the integrated program, course, or activity's ability to meet changing student or program needs over time.

How is integrated instruction delivered?



Integrated instruction may be delivered in a wide variety of ways, as illustrated in the preceding section. Two common delivery methods which were observed in Illinois programs are:

- **Integrated activities delivered within an existing course**
- **Forming a new course to deliver integrated instruction**

Integrated Activities Delivered Within an Existing Course

This type of integration is facilitated by one-on-one communication and cooperation between an academic and a vocational-technical teacher. It may be formalized, though it is typically informal and undocumented. Many different types of specific integrated activities may be delivered in this manner. Most simply, the academic and vocational-technical teacher may occasionally discuss related content in their two disciplines and share ways (ideas or physical materials) to reinforce concepts or improve instruction. When they have a common preparation period, this simple sharing may evolve into more complex and thoughtfully planned activities.

Cross-teaching: For units of instruction or topics which are particularly complementary, teachers may trade classes for one or more class sessions. An example of this strategy is an exchange between an English teacher and a business teacher in a high school. The business teacher teaches a unit on using word processing software in the computer laboratory to a senior-level English class. The English students then use the computers to complete independent writing projects. Other possibile topics for cross-teaching include students learning to write letters of application for employment, communicating effectively in

interviews, and conducting group meetings. At the community college level, instructors may exchange the teaching of a section of their respective courses.

Independent Consulting: A teacher from one discipline could serve as a consultant on particular topics from another discipline (class, etc.). This strategy is again exemplified by the business teacher in a school, who provides both formal and informal consulting to any students on computer applications. The business teacher has made arrangements with other teachers to provide this service, and regularly reviews relevant content with them prior to making the consultations. In another example, an industrial/technology teacher could provide consulting on physics applications.

Peer Consulting: This is essentially the same as above, the difference being that the students serve in the consultant's role rather than, or in addition to, the teacher(s). As in the teacher consulting example, students with particular expertise in specific computer applications provide consulting for other students who need to use the particular application. Students use extra non-class time to provide the consultations.

Creative Scheduling: Two teachers may seek to schedule certain complementary topics so that they are taught at approximately the same time. This is particularly useful if: (1) the teachers share the same students (though this is rare at the community college level), and (2) the content is such that the vocational-technical class can provide a ready application of one or more academic concepts. For example, units on plant processes (respiration, transpiration, photosynthesis) being taught in a biology class could be reinforced in an agriculture or horticulture class studying crop, vegetable, or ornamental plant production. This is accomplished by scheduling complementary units on plant production practices (planting, fertilizing, etc.) to be taught concurrently with the plant process units.

Cooperative Evaluation: Students are often assigned projects in which they must apply knowledge and/or skills from more than one discipline. A cooperative grading arrangement could be established which would evaluate the student's understanding of the concept(s) and ability to apply them simultaneously. In one example, a vocational-technical instructor uses the same method of evaluating student writing as the English instructor.

These are but a few common examples of activities that may be carried out without undue stress, change, or complexity. The only key ingredient required is communication and sharing among teachers from different disciplines. It may be strictly informal in nature. It may start very small and remain so, or may evolve into even more intricate and mutually beneficial arrangements.

The main drawback to these more informal approaches is that they are highly dependent on one or two people to make them work. If a teacher moves, retires, or simply loses interest, the innovation and all of its benefits may be lost forever.

A Note About Community College Integration: This project found that, by and large, community colleges define integration somewhat differently than secondary schools, particularly in this area of integrating within existing courses. Colleges view integration as the broad learning activity occurring when students are directed to take related occupational and academic courses to complete a program of study. Thus, while the types of informal integration identified above can and do occur in community college courses, they are viewed with the overall focus or culmination of the program in mind.

Forming a new course to deliver integrated instruction

This seems to be the most common "formal" integration strategy. The key is in identifying appropriate content to be combined and teachers to plan and deliver the content. Again, within the framework of a course, many delivery strategies may be followed.

Team Teaching: Instructionally, this seems to be the "ideal." A food science class was observed which integrated home economics and general science. The science and home economics teachers are both in the classroom at the same time. One takes major responsibility for the day's lesson, while the other "floats" around the room to provide individual assistance as needed. The teachers exchange roles, depending on the focus of the day's lesson. The "floater" may also interject appropriate supporting comments when necessary. The class may also be split into groups for project work with one teacher assigned to each group, or both may float to supervise independent study or individual project work. The key is a common planning period for the team. In this example, it took two to three hours per week of planning time to effectively team teach the class, particularly when it is an innovation such as an integrated class. This particular class met one hour per day and students were awarded .5 credit for science and .5 for home economics.

Course Sectioning: Responsibility for teaching an integrated class may be divided among two or more teachers (a combination of academic and vocational) who do not share responsibility for individual class sessions. The project observed a ninth grade physical science class divided into three sections lasting twelve weeks each, one section of chemistry, one of earth science, and one of industrial technology. Students rotate between sections every twelve weeks. The teachers essentially taught the same section three times. The key is again collaborative planning of the class, with common preparation time provided for the teachers to discuss content and delivery, and to plan specific activities. If each teacher were to teach his or her section "in a vacuum," any integration of teaching or learning would occur strictly by accident. The work is in establishing the relationships between related content and developing those relationships in each section. This is why regular contact for review and planning is so essential for this approach.

Content Alignment: A variation on the course sectioning approach is the content alignment approach. An example of this is an integrated physics/technology course designed to support and provide application for an existing physics course. The integrated course is scheduled around the existing course, and the course of study is carefully aligned with the

course of study of the existing course. Each unit of the integrated course provides an application of a concept or principle being concurrently taught in the academic course. Again, time for teachers from both courses to review and plan together is essential.

The above descriptions are intended to briefly illustrate the overall intent and "look" of a course specifically designed to be integrated. Implementing a new course is no simple task, and many questions will need to be answered along the way. For example, after determining which disciplines will be combined in an integrated course, one must ask:

- **Who will teach the course?**
- **For whom is the course intended?**
- **Will the course be required or elective?**
- **Which department(s) will administer the course?**
- **Where will the course be housed?**
- **What type of credit (and how much) will be awarded?**
- **What procedures must be followed to establish the course?**
- **From whom must approval be gained to establish the course?**

These and many other "detail" questions must be addressed. Thus, it may be easy to lose momentum and let the initiative disappear on its own. This is the major drawback (reinforcing the importance of the "champion" described earlier in this handbook). The advantage is that, once formed, a new course becomes a formal part of the overall curriculum or degree program, thereby assuring some degree of permanence (unlike more informal arrangements). Once a part of the curriculum, the course is no longer dependent on the energy and initiative of one or more individuals to make it work.

How is integrated learning evaluated?

As the "integration movement" continues to progress, answers to questions about integration are revealed. Currently, the field seeks answers primarily to questions of implementation and delivery. To a large extent, the question of evaluating integrated learning has still not been confronted directly. In the sites studied in this project, standard testing and evaluation procedures were still the norm (pencil-and-paper tests). However, some notions about how integrated learning should be assessed are worth discussing.

The Perkins Act requires that states establish performance measures and standards in the area of academic skill achievement, and in one or more of the areas of competency attainment, work skill attainment, retention and placement. The "outcomes" section of this guide (page 18) describes several assumptions about the benefits of integrated instruction, many of which parallel the areas of emphasis in the Perkins Act. The Illinois State Board of Education is currently working on establishing standards and measures of performance for the State Goals for Vocational-Technical Education: academic achievement, occupational competence, educational attainment (retention), employment, access and equity, and economic competitiveness. Any meaningful method of evaluating integrated learning will need to be built around these measures. If the assumptions about integration are true, integrated learning should facilitate the acquisition of skills in both the academic and occupational areas concurrently, while yielding positive outcomes in the other areas as well.

If it addresses the concerns of the workplace as it should, integrated instruction will enable a student to process knowledge and skill from different disciplines and apply it to problems in the "real world." This is what must be kept in mind when thinking about and designing ways to evaluate student learning. Much has been written about how American students can regurgitate discrete facts and figures but are unable to apply those facts and figures to solve problems. Therefore, it behooves educational integrators to change the way in which they

test for achievement. If integrated instruction is evaluated through traditional assessment methods, its promise may never be realized.

A ready example of an attempt to evaluate learning in an integrated or applied format are exemplified by the tests provided with the "Applied Academics" curricula from the Center for Occupational Research and Development in Waco, Texas. The Applied Mathematics course, for example, uses an updated version of what used to be called "story problems" to test students ability to apply mathematical skills. Teachers could write similar types of problems, making them relevant to local business and industry applications.

Another example of integrated evaluation of learning is to present students with "problem situations" which might occur in the workplace. One teacher observed in the project presented students with a hypothetical problem situation. Each student had to formulate an idea for solving the problem, then present and defend the idea before the class at a "staff meeting." Students thus learned to formulate and develop ideas in a logical manner, to solve problems, and to communicate their ideas effectively.

Still another way of assessing student learning is through direct experience in the workplace. Work-based learning, cooperative education, or internship experiences, if well-designed, planned, and carried out, could possibly offer the most accurate method of evaluating a student's ability to truly apply what they have learned. The key lies in the phrase "well-designed, planned, and carried out." The planning should include specific academic and vocational skills to be demonstrated. Instructor and employer (internship supervisor) should then cooperatively determine which skills will be evaluated on the job and which will be evaluated in class. Appropriate methods of evaluation (written testing, observation of performance) are selected. For on-the-job evaluation, appropriate instruments should be developed which address the specific skills to be evaluated. Instructor and employer should collaboratively interpret the on-the-job evaluations and arrive at the final grade for the experience.

What outcomes have been realized from integrated instruction?

There are many assumptions about what benefits will accrue from integrating vocational and academic instruction. The idea makes so much sense that it is easy to assume:

- **that academic achievement will be improved**
- **that students will be more motivated and attentive**
- **that students will stay in school and in integrated programs**
- **that teaching will become fun as a result**
- **that the entire school climate will be improved**
- **that a better product (student) will be produced**
- **that our educational system will return to its place of prominence.**

At this time, little empirical evidence exists to prove these assumptions. In order for educators (both academic and vocational) to buy into the idea, these assumed benefits must be proven.

While it is still early and evidence concerning outcomes is incomplete, what is available gives cause for optimism. Significant gains in student academic achievement have been reported by SREB schools (Bottoms, 1989). Teachers have reported a "better student attitude," increased attendance and attentiveness, and an improvement in student enthusiasm. Teachers also report being surprised at the benefits of working together with teachers from other disciplines. Teachers became aware, some for the first time, of exactly what other teachers did in their classes. They reported learning new strategies or teaching tips, being more conscientious about their preparation and teaching (particularly in team teaching situations) since someone else was depending on them. They reported having renewed enthusiasm for teaching.

No benefits of any innovation are realized without costs. The major drawback identified by educators involved in integration efforts is the time required for planning, implementing, and maintaining the initiatives. More preparation time, particularly common preparation time, will need to be provided for academic and vocational teachers to plan, review, and modify programs and activities. This includes time in the summer for advance preparation as well as planning periods during the school year. Release time or other incentives will also be needed for participation in staff development and inservice activities.

It is well to remember that it is still too early to provide definitive answers to this question. It should also be remembered that integrated programs designed with a specific purpose or goal in mind will most likely be successful in achieving that purpose or goal. For example, if the goal is to increase student reading or math achievement scores, a program can be designed which will do just that. If, however, integration is to achieve the far-reaching goals to which it aspires, programs need to be planned and implemented more carefully, and learning needs to be evaluated with utmost care and precision.

What is the next step?

The initial step in any process is to develop an awareness of the process. More and more information about integration is being produced. The resource bibliography in the appendix of this handbook is a starting point. Many articles have been written which provide arguments and rationale for integration. These provide an appropriate background, particularly if the reader is not completely sold on the idea.

In addition to print material, and as a next step in the awareness process, more and more conferences and workshops are being held on the subject. For example, integration was the focus of the 1990 Illinois Vocational Association Convention. As the Tech Prep programs move further up the planning ladder, it is likely that more inservice on the subject of integration will need to be provided. As integration is a Perkins initiative, more statewide initiatives will probably be forthcoming to facilitate integration activities. Regional System Directors and ISBE staff can provide information on these and other types of activities as well. Persons seeking information may write or call:

Vocational Education Program Improvement Section
Illinois State Board of Education
100 North First Street
Springfield, Illinois 62777-0001
(217) 782-4620

Perhaps most importantly, one can begin by sharing information within one's own department, discipline, or school building. "Turfism" has been identified as one of the most significant barriers to integration. Isolation begets more isolation. Opening the lines of communication, through formal avenues within the school or informally, is the first step in overcoming isolation and turfism.

Integration holds much promise for education. It may help to eliminate the narrow focus of both vocational and academic programs. It may eventually minimize or even eliminate the distinction between "academic" and "vocational" and the stigma which has been attached to the "vocational" designation. What it is already doing in some areas is eliminating the barriers between vocational and academic teachers. Teachers are talking to one another, some for the first time, and becoming aware of what others do in their classrooms. They are seeing the connections between their subject areas and are exploiting those connections. Teachers involved in integrated programs express great enthusiasm for their teaching.

Exciting stories are being told about the effects of integrated instruction on student achievement and attitudes. Again, it is too early to provide definite proof, but results are encouraging. The key to any educational enterprise is the teacher or instructor. In the final analysis, integration may be simply "good teaching."

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APPENDIX

Site Descriptions

Resource Bibliography

SITE DESCRIPTIONS

CASE 1

Context: Case 1 is located in a rural community with a population of approximately 1100 that is supported primarily by agriculture. The high school is housed in an older, yet well maintained building with an estimated 125 students. The business education program has been integrated with English (communications) and mathematics. The primary teacher, who is the business education teacher, has been with the school for 20 years. Due in part to the small size of the school, close, informal relationships exist between the teachers with no artificial barriers existing between vocational and academic teachers. Keyboarding, computer applications, and general business are taught in the senior-level business class. The program is well-equipped with twelve computers and six printers which are housed within the business classroom.

Origin and Purpose: The business education teacher decided some years ago to focus the business education program on "life preparatory" skills which would be more universal and transferable. Due to the size of the school and job availability, she thought it was necessary to build the program in this manner, rather than to attempt to prepare students for specific occupations. Through a VIP experience, she identified communication skills as a major need and in turn met with the English teacher informally to seek help in integrating those communication skills into the program.

Student Makeup: An even distribution of grade levels existed within the class with an average to high-average ability level. Students are evenly distributed by gender as well. Students are self-selected with predominantly college preparatory goals. There are some economically disadvantaged students in this area, approximately 30%, possibly due to the recent state of the farm economy.

Planning, Delivery, and Evaluation Activities: The program has a business base with an emphasis on English and mathematics. In the English area, the business teacher advised English students on computer hardware and software use so that they may use them to do papers for English. There is essentially joint supervision and use of the computer labs. Term papers are cooperatively planned and evaluated between the teachers. For example, they may combine research and writing skills with information on the economy and business structure of Japan. Furthermore, the English and business teachers use common methods, styles, materials, and evaluation techniques. Additionally, the business teacher adopted a method of evaluating written work of the students from the English teacher. The English teacher in turn assigns business-oriented topics for activities in her classes. business students also assist and train English students on specific computer skills and programs. In the mathematics area, the math and business teachers cooperatively design individual projects for students. Additionally, the math teacher is also a something of a computer expert and serves as a computer resource for the business teacher.

Outcomes: The outcomes of the integrated business education program as perceived by the teachers and administrators are primarily positive. There is an increased transfer of learning for the students while it has also reinforced skills that they have learned in other classes. Teachers have grown individually while also building closer and mutually respectful relationships. The biggest drawback noted was that of the time commitment. However, there was an overall sense of enthusiasm and accomplishment from both students and teachers.

CASE 2

Context: Case 2 is located within a large suburban school district that actually encompasses three high schools. It is a relatively wealthy district in an area which is experiencing tremendous growth. (One of the high schools opened in 1977 and currently has 2100 students enrolled.) This has been the first year for the Food Science course that integrates home economics and science content.

Origin and Purpose: The program was initiated by the administration to revitalize the home economics program. The principal strongly believes in the interdisciplinary concept and therefore was instrumental in the founding of the programs. The school board supported the idea from its inception. Participants volunteered to be involved in the program, which is intended for all interested students. The idea was sold to the students and the community through brochures, newsletters, student newspapers, and actual recruitment in the science classes. The program linked cooperative learning principles as well. Other interdisciplinary programs are also being refined and established.

Student Makeup: Students are fairly evenly divided between 10th, 11th, and 12th grades. However, the class is predominantly female. The students are mostly "general" track. Fifty percent are academically disadvantaged, and student ability level follows a bell curve. Students are self-selected after certain information has been provided and reviewed.

Planning, Delivery, and Evaluation Activities: The program is administered cooperatively by the home economics and science department heads. Home economics and science facilities and equipment are both used. All course- related activities are done cooperatively with team teaching by the home economics and science teachers. Summer curriculum development work was done by the home economics and science staff for which they received a stipend. A written curriculum guide was developed for the course by reviewing textbooks, extension service materials, and other assorted periodicals. During the school year, team teachers had a common prep period during which they met at least once every week to discuss their plans. Students receive .5 home economic credit and .5 science credit. A negative student attitude toward science in general was an obstacle in attracting students to the course. The program does not require any major expense items that could jeopardize its continuation.

Outcomes: Administrative support has been very strong with teacher enthusiasm also running high. Teacher compatibility was an unexpected benefit that resulted from the program. The major drawback was the time required by the teachers to create the curriculum. However, there is a broadening of teacher expertise and awareness of other disciplines. There has been a positive change in the attitude toward home economics. Students are more attentive and interested in the applications. Awareness of career opportunities for students also resulted. All in all, it was perceived that a better educated student was produced.

CASE 3

Context: Case 3 is a district with three cooperating high schools involved in the physical science program. The physical science course is a combination of chemistry, earth science, and industrial technology that is taught in three sections for twelve weeks at a time. Students rotate to a different section at the end of each twelve week session. The program is administered on a district-wide basis and has operated in the black with a good surplus since its beginning. Students must fulfill a general science requirement at the 9th grade level.

Origin and Purpose: The program was initiated by the science department head, a new person from outside the district, to improve upon the required 9th grade general science survey course. A secondary purpose was to improve enrollment in the industrial technology program. An underlying factor was the strong influence of the "technology explosion." The course was intended for average to low ability level students.

Student Makeup: The class is racially mixed and evenly divided by gender. Students are also evenly divided between vocational and general track concentrations. Students were of average to low ability levels, as the course had intended. Nearly 30% of the students are academically and/or economically disadvantaged. Students are self-selected for participation in the course.

Planning, Delivery, and Evaluation Activities: The program is administered by the science department head and teachers were recruited by the department head as well. Science and industrial technology teachers worked and were paid for summer curriculum development efforts. Each teacher worked independently to develop curriculum for his or her own section. Commercial materials were the major reference for the curriculum development activity. The teachers were responsible for writing their own class materials which were all applications-based. Instruction is student-centered with an emphasis on theory. Students are highly engaged while the content level is generally basic. Students receive one science credit toward graduation for this course. Classrooms and laboratories are well-equipped, and no other special resources are required. Final grades are determined cooperatively between the teachers. It seems that scheduling the class has been a large concern for teachers, counselors, and students. Additionally, turfism was a concern when developing the course.

Outcomes: Teachers enjoy changing students every twelve weeks and thus are more enthusiastic. Better teaching methods have also resulted. Student attendance and behavior have improved, and students are learning to learn cooperatively. Surprisingly, students are coming in to work on their own time. Preliminary data from the district indicates that students in the physical science are achieving at higher levels than those in the general science survey course.

CASE 4

Context: Case 4 is a two-year community college that has a Medical Lab Technician (MLT) program which integrates quantitative chemistry and clinical chemistry. Two instructors teach the integrated clinical chemistry and academic quantitative analysis course. One of the instructors is the program coordinator and the other is the head of the Allied Health Department.

Origin and Purpose: A few years ago when the program was established, the academic and vocational instructors were involved in the planning stage. The medical lab technician and chemistry instructors started this program because of student need. The academic chemistry class was not related closely enough to actual on-the-job information and procedures. The program initiators were required to present information to the college curriculum committee to gain approval for the class. Students in the program take a clinical chemistry class for the first eight weeks and the combined vocational/technical class is conducted the second eight weeks. To gain interest and inform students about the program, instructors often speak at area high schools. The program is intended for above average to high achievers and degree students.

Student Makeup: Program was primarily 70% female and 30% male, with approximately 30% being economically disadvantaged. Seventy to seventy-five percent are of average academic ability and 25-30% of high academic ability. This program serves those wishing to obtain a degree and has both self-selected and recruited individuals. The course is intended to be taken in the first year of the program.

Planning, Delivery, and Evaluation Activities: The program operates within the occupational/technical area. Academic and vocational instructors cooperate in planning courses and modifying lesson plans. The material is taught with approximately 70% vocational content and 30% academic content. The staff is supportive, including the science department, who lost credit hours due to the changed program. Teaching is student-centered with laboratory exercises following guided practice. Student activity is considered highly engaged with open, articulate communication.

Outcomes: Case 4 found that students learned the chemistry as related to the MLT occupation and instructors had greater control over the specifics to be taught. Chemistry instructors must be knowledgeable on various new techniques and/or technological advances to know what to teach.

CASE 5

Context: Case 5 is located in a rural community in southern Illinois with a population of approximately 3200. High school enrollment holds steady at around 450. This community has a strong economy based primarily on the manufacturing industry. The school offers an industrial technology program integrated with mathematics and science. Additionally, advanced math classes use handbooks that were developed with applications from industrial technology. The school district has a new superintendent who is the driving force behind the improvements in the school. The industrial technology teacher is experienced and well-respected throughout the area. In fact, he is often sought out as a resource for other programs.

Origin and Purpose: The originator of this integrated program was the superintendent. Also, the school received a scientific literacy grant from ISBE for the development of the advanced math applications handbooks. The purpose of the integration was to enhance student interest and motivation.

Student Makeup: Students were primarily comprised of juniors and seniors who were evenly divided by gender. Nearly 75% were high achievers with almost all being college preparatory. A very small portion of the student body was economically disadvantaged.

Planning, Delivery, and Evaluation Activities: All the integration was done in the planning stage. They reviewed commercial materials and in turn the math, science, and vocational teachers collaborated to write the advanced math curriculum. The delivery and student evaluation were done within a traditional math class structure.

Outcomes: Students were more enthusiastic and motivated and subsequently teaching was easier. Preparation time was noted as a major barrier. However, there were unexpected outcomes of recognition and notoriety for the development of the integrated activity.

CASE 6

Context: Case 6 is a two-year college with an integrated agriculture business management course. It is taught by occupational/ technical instructors. The program was started 20 years ago in response to student need. Students are required to take an internship during their sophomore year. The course is taught in an academic classroom with student desks, blackboards, and audio/visual equipment in both the occupational/technical areas and academic program area.

Origin and Purpose: The career dean believes in the career preparation program so that students receive the instruction necessary to be successful in the workplace. He feels that the agriculture and health occupations programs integrate more than others. Instructors integrate because they realize students need it to succeed. Faculty and staff went through the same routine selection process to be hired as they would with other programs. In other

words, integration is viewed as occurring naturally in the program, making special selection of instructors unnecessary.

Student Makeup: The program supervisor, who is also an instructor, said the class is 90% male and 10% female. Approximately 50% were average achievers and 25% were within the low and high achieving categories. Students average age is in their 20s. All students are following the degree program. Transfer students must follow a different path to meet certain requirements.

Planning, Delivery, and Evaluation Activities: The coursework consists of both vocational and academic content, although it seems to consist of more academics using vocational examples. The program is intended for average achievers and degree students. Students are recruited from high school agriculture classes as well as self-selected. Teaching is student-centered with inquiries and activities. Students are also required to participate in an internship their sophomore year. Of course, evaluation of the interns performance is standard policy. There is also a unique meat judging scholarship program available to four students per year. Additionally, monetary donations were given to the college for test plots.

Outcomes: Instructors have adjusted their teaching methods by relating academics to different applications for the students benefit. Consequently, students have learned various applications rather than just strict theory, which should result in longer retention. The school has improved its reputation by gaining credibility and by producing an improved student product. Case 6 is also conducting a study to examine the possible introduction of agriculture computer classes. Once again, instructors have voiced their desire to have more time to teach.

CASE 7

Context: Case 7 is a community college located in a suburban area with a Respiratory Therapy Program that has integrated science and chemistry within the Allied Health Department. Classes are taught within a well-equipped vocational classroom and laboratory which has been denoted as "state of the art" in terms of equipment and facilities. Classes are instructed by an occupational respiratory therapy instructor.

Origin and Purpose: The program was started when the college realized the community need for health care providers. The private sector strongly supported the program. The focus is on scientific content as it relates to the health field. Course content is approximately 75% vocational and 25% academic. Course work was intended for the high achievers. Curriculum materials were mainly obtained from commercial sources, although some materials were self-developed by the instructors.

Student Makeup: Students are self-selected and recruited for this program. Many gained information through Health Career days at area high schools. Most interested students had a solid science background. The program requires a minimum 2.0 GPA. The class is

comprised of 75% female and 25% male who have degree goals. Students are generally older and more mature. It is estimated that 60% are of high academic ability while 40% are of average ability. Nearly 10% of the students are economically disadvantaged.

Planning, Delivery, and Evaluation Activities: The program is well supported by the administration and the community. Instructors collaborated and cooperated in planning the course and reviewing the material. Teaching is student-centered and instructors use questioning techniques to evaluate student understanding. Furthermore, advanced level materials are used with highly engaged students Occupational and academic instructors jointly evaluate laboratory activities and projects, and assign grades.

Outcomes: The results of the program represent science instruction as it relates to the health field in an accurate way. Community involvement and interest was a boost in the early stages of program establishment.

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