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The cognitive connection: Contextual learning through the integration of community college vocational and academic curricula

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THE COGNITIVE CONNECTION: CONTEXTUAL LEARNING THROUGH THE INTEGRATION OF COMMUNITY COLLEGE VOCATIONAL AND ACADEMIC CURRICULA

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

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in

Education

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ABSTRACT

The concept of integrating vocational and academic education into one unified curriculum was studied through applied, qualitative research based on historical information and a review of the literature.

The results indicated that the traditional curriculum paradigm and management practices in use in public education systems are archaic and are of little use in preparing high school and community college graduates for meaningful employment.

This study supported the conclusion that vocational and academic teachers must assume a shared responsibility for educating all students.

In addition, the study found that educators concentrate on cognitive learning aspects, rather than the effective coordination of academics and real-world (vocational) development of the student. The study found learning in context through the integration of vocational and academic curricula, and using organized clusters as a new paradigm, high school and community college graduates will be better equipped to succeed in the work place.

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Chapter I

THE SETTING

Faced with the demands of an increasingly technical work force, public education must properly prepare students by providing the advanced job skills needed for today's employers.

Unfortunately business leaders throughout this nation have stated that public education is failing to produce a work force pool with academic skills and work competencies strong enough to handle the communication and problem solving needs of today's work place (Harrison, 1992).

Due to the dynamics of a diverse, complex society and high technology work force needs, the postsecondary system found itself trying to meet a variety of demands. Consequently, the system is no longer meeting the needs of the work place, perhaps a reevaluation should take place. The title "Community College" infers that the institution and its goals should meet the needs of its community. The basic need of a community is jobs (Seybert, 1993). Therefore, the writer suggests that the community college must focus its curriculum on meeting the needs of the work force.

The question may now be asked, what curriculum models would best prepare students for the real work world as well

as setting foundation for continuing higher education? Congress passed the Carl D. Perkins Vocational and Applied Technology Education Act of 1990. The law's statement of purpose was designed to improve America's high-technology competitiveness. One of the law's three themes was to integrate vocational and academic learning. Integration was seen as providing equitable participation for special populations (American Vocational Association, 1991).

Cognitive scientists have supported the integrated curriculum as a way to implement learning in context. They have reaffirmed the importance of learning in context and suggested that humans who gain both academic and vocational competencies are better prepared to meet the demands of today's world of work (Berryman and Bailey, 1992).

Background

The role of vocational education in preparing the work force has been perceived by the congress of the United States as improving America's high-technology competitiveness (American Vocational Education, 1991). It is this perception influenced by business leaders that has made vocational education an important force in public education (Mc Farland, 1992).

Employers have repeatedly stressed that U.S. firms cannot be competitive in a global economy unless public

education produces graduates who have solid basic educational skills, work ethics, and work competencies needed for today's workforce (Berryman and Bailey, 1992). Corporations have continually pointed out the high cost of re-educating a workforce that should have been properly prepared by the secondary and post-secondary education system. In addition to the re-educating costs, productivity is lost in man-hours while re-education takes place, therefore raising production cost.

In the past, corporations have perceived the community college system as leaders in preparing a quality workforce. Therefore, firms are now investing additional capital by teaming up with local community colleges forming a variety of programs including apprenticeship programs designed to help prepare students for the work place (Hudelson, 1993).

The business community supports a curriculum that employs learning in context. This is a way of gaining both academic skills and vocational competencies (Grubb and Kraskouskas, 1993). Several states have been experimenting with different curriculums, using, for example, the integration model. This model perpetuates learning in context by integrating academic and vocational content into one unified curricula. There have been many approaches to integrating academic and vocational education resulting in a variety of positive results. Unfortunately, to this date no one curriculum model has been identified as the ideal for

most schools (Grubb, Davis and Lum, 1991). Learning in context has been supported by cognitive scientist and it has been proposed that the integration curriculum is a way to implement learning in context (Berryman and Bailey, 1992).

Learning in context by integrating vocational and academic education is not the total answer to public education. However, it can be a start toward a system that has relevance to todays workforce and societal needs.

Nature of the Problem

The basic education skills and work competencies of the average high school and community college graduate are far below the workforce needs (Berryman and Bailey, 1992). Lopez (1989) stated that "American companies needs workers who can operate computers, analyze data, read and understand complicated instructions" (p. 30). Bottoms (1992) statistically stated that "only 30 percent of the employers in the recent Assessment of American Education thought that new workers were prepared . . ." (p. 26). Therefore, the final product presently produced by the public education system does not meet the expectations and the needs of the nation's employers. Education plays an important role in preparing the future workers which are the backbone of American business and industry.

Significance of the Problem

The consequence of the lack in basic education skills, work competencies, and work ethics is that employers are dissatisfied with current public education systems (Brock, 1992 and Coomer, 1992). Employers are burdened with unbelievably high costs of re-educating a workforce that should have been properly prepared before graduating (Berryman and Bailey, 1992). New technological and management models have become the new priority demanding a workforce with higher critical thinking skills (Hoyt, 1991).

In order for American corporations to compete successfully in a global market place, the public education system must change; instructional experience must be made relevant with context to careers (Gray, Hudelson, and Mc Walters, 1992). Upon considering the impact public education has upon societal demands and work force needs, it has become unfortunately clear that traditional public education systems' ideological view and legal mandate of "free and equal education for all" is no longer constant. It is skewed by the complex societal needs of today.

Statement of the Problem

It is apparent that public education is no longer meeting its own ideological and legal responsibilities

within the present paradigm. Therefore, today's education system is failing to adequately educate students in the all-important reading, writing and math skills. Specifically, the current community college educational curriculum is not properly preparing it students to meet the dynamic needs of today's diverse complex society and a highly technical workforce (Feldman and Keen, 1992). Berryman and Bailey (1992) stated that "in other words, although our educational system provides opportunity to some extent, it does less than our democratic mythologies would have us believe" (p. 108). Therefore, the problem is to determine what model curriculum should be used by the community college to best prepare students for both today's workforce needs and to function as responsible citizens in our society.

Purpose of the Study

The purpose of the study was to identify a single curriculum model which best integrates academic and vocational education for the community college setting.

Questions Guiding the Study

Do integration models exist, will these models meet future needs, and does any one model hold the best promise for academic/vocational integration? This study focuses on

recent research on the collaborative integration of academic and vocational education.

Limitations

Numerous studies have been conducted focusing on the historical prospective of public education, the relationship between public education and the workforce needs, the research on learning and reform and reconstruction of public education, and the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, with its emphasis on integrating academic and vocational education. Limited studies have been conducted focusing on integration of academic and vocational education.

While experimentation continues to implement many different approaches to the problem at many institutions across the nation, an in depth study conducted by Grubb, Davis and Lum (1991) identified eight attempts as the most promising in integrating academic and vocational education. This study targets the conclusions yielded by Grubb, Davis and Lum (1991) by the use of an assessment. The assessment has been developed from the data base synthesized from the literature review in order to prove the finding of Grubb, Davis and Lum.

Grubb and Kraskouskas (1993) surveyed data involving "200 postsecondary institutions across the United States..."

(p. 24) concerning the integration of academic and vocational education. Their findings conquer with the previous study findings and conclusions. Therefore, their conclusions remain unchanged.

Definition of Terms

Academic Education: Theoretical education (The National Commission on Secondary Vocational Education, 1984).

Basic Skills: Low abilities in reading, writing, or math (Kearns, 1991, p. 56). Teaching the three R's (The American Society for Training and Development, 1990, p. 56). About 80 percent of all applicants screened nationally by Motorola fail entry-level examinations that require seventh grade English and fifth grade mathematics (Lopez, 1989, p. 12).

Bi-Polar Approach: Adapting the environment to existing skills of the learner (assimilation), or from helping the individual adapt successfully to the demands of the environment (accommodation) (Keefe, 1987, p. 34).

Brain-Based Learning: The ability to detect patterns and to make approximation, phenomenal capacity for various types of memory, the ability to self-correct and learn from experience by way of analysis of external data and self-

reflection, and an inexhaustible capacity to create (Caine and Caine, 1991, p. 3).

The Carl D. Perkins Vocational and Applied Technology Education Act of 1990, which was re-authorized on July 1, 1991: The law provides greater vocational education opportunities to disadvantaged people. States are obligated to spend this money on schools and centers that offer vocational/technical education, and or postsecondary institutions that serve large numbers of disadvantaged students. The law's statement of purpose and the additions of applied technology to its name suggest that lawmakers designed the Perkins Act to improve high-tech competitiveness (Wilcox, 1991, p. 16). Each funded program must integrate vocational and academic competencies and must provide equitable participation for special populations (AVA Guide to the Carl D. Perkins Vocational and Applies Technology Educations Act 1990, 1991).

Cognitive Style: Each learner has preferred ways of perception, organization, and retention that are distinctive and consistent (Keefe, 1987, p. 7). A framework for a more complex form of learning that makes it possible for us to organize and make sense of what we already know (Caine and Caine, 1991, p. viii). Teaching for thinking simply is teachers and administrators examining and striving to create

school and classroom conditions that are conductive to children/s thinking (Costa, p. 31).

Downsizing: Fewer people to do more work. Time and resource constraints mean efficiency and teamwork are required to get work done (Schnorr, 1991, p. 3).

Functional Illiteracy: Lacking in basic literate skills. Sixty percent of job applicants cannot pass a basic examination keyed to a seventh grade level (Weintraub, 1991, p. A28). It is the label for people who cannot read well enough to decipher safety signs and instruction manuals (Foegen, 1990, p. 56).

Integration of Academic and Vocational Education: Joint effort of vocational and academic educators to bridge the gap between theoretical and practical education (The National Commission of Secondary Vocational Education, 1984, p. 2). Integrate behavior and perception, emotions and physiology. Designing and orchestrating life like, enriching, and appropriate experiences for the learner (Caine and Caine, 1991, p. viii, p. 8). A total academic and vocational program is seamless (Harrington, 1987, p. 3). An abstract approach and through a more concrete, applied approach (Pritz and Davis, 1991, p. 39). Teachers together could come up with generative theme around which to organize

units and courses (Rosenstock, 1991, p. 435). A shared responsibility for educating all students, for selling the virtues of academic and vocational elements alike (Douglas, 1992, p. 42). The State Secretary is authorized to provide funding to a wide range of educational institutions forming consortia to develop, implement and operate programs using different models of curricula which integrate vocational and academic learning (AVA Guide to the Carl D. Perkins Vocational and Applied Technology Education Act, 1990, 1991, p. 14). The primary goal integrating academic education and vocational education is to make education more accessible to academic students at the same time that advance academic courses are made more accessible to student concentrating in vocational education (Gray, 1991, p. 443).

Learning in context: All instructional experience must be made relevant to all students with a context of careers and future work (Mc Walters, 1992). The primary focus for educators, therefore, should be on expanding the quantity and quality of ways in which a learner is exposed to content and context (Caine and Caine, 1991).

Tech-Prep: A four year secondary and postsecondary program leading to an associate degree or two-year certificate. The requirement in technical preparation in at least one field of the following: agriculture, business, health, applied

science, engineering technology, mechanics, industrial, practical art or trade. The goals are: dropout prevention, employment placement, explicit articulation agreements, transfer to four-year degree programs, and/or involvement of business in program development (AVA Guide to the Carl D. Perkins Vocation and Applied Technology Education Act of 1990, 1991, p. 29).

Chapter II

REVIEW OF LITERATURE

Introduction

This chapter is a review of the literature concerning the relationship between public education and its effects upon the work force needs of this nation. Several interrelated aspects concerning this relationship are reviewed. Consideration is given to the following areas: Basic skills of the labor work force, training and retraining needs and cost, and basic education.

A historical perspective review on public education focused on educational reform initiated by commissioned reports by the U.S. Government Commission on Education.

Cognitive learning concerning scientific studies on learning and their relationship to integration of vocational and academic education in contrast to traditional standards and practice.

The interrelated aspects of reform and reconstruction were reviewed and consideration is given to the Carl D. Perkins Vocational and Applied Technology Education Act, misconceptions of integration, ideal integration of vocational and academic education, implementing applied academics, desegregation of vocational and academic.

education, and integration implementation.

Relationship between Public Education and Workforce Needs

Employers in business and industry around the nation are all looking for new workers that possess good communication skills and leadership abilities (Martinez, 1992).

Basic Skills of the Labor Workforce

The previous statement leads one to ask: is secondary and post-secondary public education properly preparing students with the necessary communication skills and leadership abilities demanded by employers? Weintraub (1991) reported that business leaders are dissatisfied with the current quality of education. Ginn stated that "60 percent of the company's applicants cannot pass a basic examination that is keyed to a seventh grade education" (p. A28). He expressed concern over the future of companies in their ability to compete in the open market without a literate workforce. "We need workers with skills that will allow us to be competitive into the next century" (p. A28).

Training and Retraining Needs and Cost

The population lacking in basic education skills has resulted in employers having to invest additional time and dollars to educate a workforce that should have been properly prepared by the high school and community college system. Brooks (1990) pointed out that employees who thought of themselves as long past matriculation find themselves once again in the classroom seeking new skills in order to remain valued assets to their firm. Employees find themselves often having to settle for lower positions rather than being laid off (Flynn, 1990). Knowdell (1990), expressed the need for retraining. "Some of the change will be by choice; some will not. Either way there's going to be a huge need for training and retraining" (p. 60).

Retraining costs are high, and rising, for those companies conducting training and retraining programs. The Commission on Skills of the American Work Force (1990), formed by the National Center on Education and the Economy, found that the "skills of U. S. workers are lagging their counter-parts overseas, causing a crisis in productivity" (p. 6). The commission "called on the U. S. government to immediately pour billions of dollars into public schools and on-the-job training and recommended that U. S. businesses be required to invest an amount equal to 1 percent of their payrolls on worker training" (p. 6).

Functional Illiteracy

In addition to training cost, safety is also costly and cost can be kept at a minimum by employees that have abilities to read safety singes and rules and regulations governing safety practices. Foegen (1990) stated that "functional illiteracy is the label for people who cannot read well enough to decipher safety signs and instruction manuals, thus risking personal well-being as well as company, competitiveness" (p. 56).

Employers perceive the public education system as failing to fulfill the expectations and needs of industry. Iacocca (1990) dismayed with public education stated, "if you don't have people who are smarter than the robots they work with, the game is over in trade competition" (p. 56). Kearns (1990) Chairman of Xerox Corporation, commented on the cost of training employees in basic communication skills plus the cost of man-hour down-time. "American business will have to hire a million new workers a year who can't read, write or count. Teaching them how, and absorbing the lost productivity while learning, will cost industry $25 billion a year . . ." (p. 56). The American Society for Training and Development (1990), and The National Alliance of Business (1990) supported Kearns and added that "Employers are already spending $210 billion annually on job training and retraining" (p. 56).

Skills Needed In The 1990's

As the cost of training continues to escalate, hiring standards have steadily become higher because of the dynamic technology needs of today. Schnorr (1991), pointed out that in clerical work personal computers have become common place, and warehouse workers use them to "keep track of inventories, work assignments, and job accounting" (p. 3). Construction equipment is becoming more sophisticated, and employees have to learn a variety of procedures to "install, maintain and repair many different types of equipment" (p. 3).

Downsizing results in fewer people doing more work. It became the trend in the 1980's as a means of achieving efficiency and becoming more competitive. "Time and resource constraints mean efficiency and teamwork are required to get work done. This increases the need to hire people with good judgment, reasoning, and decision-making skills" (p. 3).

National trends in workforce skills require upscaling of the workforce pool for the nation to compete successfully in a global economy. Schnorr (1991), also pointed out that "75 percent of all jobs created between 1985 and 2000 will require higher skill levels" (p. 4).

In summary, employers no longer perceive the American work force as a cost effective resource. They are

dissatisfied with the lack of reading, writing and math skills of high school and particularly community college graduates entering the work force. Employers are angry and concerned over the high cost on the necessary training and retraining of employees that do not possess such basic communication skills.

A Historical Perspective

Researchers in the field of education have observed that public education has not been successful in keeping up with the dynamic highly technical industry needs of corporations that employ the end product that the education system produces. This research supports industry's demand for educational reform and reconstruction within the last decade. The National Commission on Excellence in Education published a report entitled A Nation at Risk (1984). It recommended that "knowledge, learning, information, and skilled intelligence are the new materials of international commerce" (p. 7). The authors also stated that many high school graduates are not prepared to enter the work force or further their education at a post-secondary institution.

A Practical View

Other reports supported the aforementioned conclusions including mentioning the lack in preparing high school and community college graduates for the real work world. The National Commission on Secondary Vocational Education report (1984), called "The Unfinished Agenda", made a series of recommendation for reform of vocational education. Additional and rigorous academics requirements ignore the "differences in student interests and abilities, and the needs of those high school students who do not plan to go to college and who purposefully choose a vocational program" (p. 1). The report further stated that this "narrow focus ignores the fact that approximately 80 percent of the jobs in America do not require a college degree, and most students will not obtain one" (p.1). The report could not ignore the fact that one of the tasks of education should be preparation of graduates for adult life in the real world and suggested that this could be accomplished through the "joint effort of vocational and academic educators to 'bridge the gap' between theoretical and practical education" (p. 2).

Tomorrow's Work Skills

Corporate America agrees and supports the finding of A Nation at Risk (1984), and "The Unfinished Agenda" by adding that the public education system has failed to properly prepare its graduates as a valuable resource to major corporate employers of this nation. Martin (1991) supported this view of corporate America by stating "indeed, we estimate that fewer than half of all 21 to 25 year olds are adequately prepared in reading, writing, and mathematics" (p. R3). He stressed his point by asking . . . "Should our students have an education experience that is relevant to the world of work?" (p. A3).

The Secretary's Commission on Achieving Necessary Skills (SCANS) produced a report for the United States Department of Labor (1991). The SCANS report called for a transformation of "the nation's school into high-performance organizations. . ." (p. VI). The report stressed that our nation cannot be competitive in the global market place unless public education produces high school and community college graduates who have both academic skill and are workforce prepared. Therefore, a need exists for educational reform.

Transition from School to Work

Reform and reconstruction, the cry of the 1980's and amplified in the 1990's. Lewis (1990) stated that "several upcoming reports will turn the spotlight on the problem of the transition from school to work" (p. 748). Dole (1991) agreed with Lewis and added, "A high school diploma simply doesn't say much about a young person's basic skills in such areas as computer literacy, problem solving, and communication, let alone the more traditional reading and math skills" (p. 748). Packer (1992) also commented on the inadequate public education system that the SCANS report uncovered: "The most disturbing finding of the initial SCANS report is that more than half of our young people leave school without the knowledge or foundation required to find and hold a good job" (p. 27).

It is apparent, in view of the aforementioned observations, that our nation cannot be competitive in a global economy unless schools produce graduates who have both academic skills and workforce competencies. Therefore, the need exists for educational reform. Public education must reevaluate its goals and target its curriculum toward the needs of today and the future.

Scientific Study of Research on Learning

Educators must reevaluate their role and become facilitators of learning engaging more of the application of theoretical knowledge to critical thinking and problem solving skills in relationship to the real work world (Berryman and Bailey, 1992).

Learning Style

In order for theoretical knowledge to be integrated and applied in critical thinking, cognitive scientists have studied the process of how people acquire academic and vocational/occupational skills. Keefe (1987) cited the findings of cognitive scientists to support the integration of academic and vocational education. Cognitive style is "each learner having preferred ways of perception, organization, and retention that are distinctive and consistent" (p. 7).

Realizing the Brain's Potential

Does the methodology of today's instruction utilize cognitive learning? Caine and Caine (1991) recognized the need for change in the methodology of instruction used today. "What is needed is a framework for a more complex

form of learning that makes it possible for us to organize and make sense of what we already know" (p. VIII).

Brain-Based Learning is the concept of total involvement of the student by integrating behavior and perception, "emotions and physiology" (p. VIII). Caine and Caine (1991) suggested that the teacher should be a facilitator that engages more of the abilities and capabilities of the human brain. This can be accomplished by "designing and orchestrating life-like, enriching, and appropriate experiences for the learners and ensuring that students process experiences in such a way as to increase the extraction of meaning" (p. 8). The model for Brain-Based Learning was the integration curriculum (p. 119). Experience is the essential component for meaningful learning and teaching. "The primary focus for educators, therefore, should be on expanding the quantity and quality of ways in which a learner is exposed to content and context" (p. 5).

A Program for Thinking

Can cognitive learning be effective in helping to meet the needs of todays workfoce? Costa (1991) focused on the thinking process in learning by creating school conditions "conductive" to children's "thinking" (p. 31). Children must learn cooperative skills which can teach them "empathy" to build a better "global community" (p. X).

In order to meet the needs of employers today and in the future, the communication skills and problem solving skills also need to be part of the objectives of education. "The problem-solving skills they learn today will provide them the stamina to tackle the immense problems facing our ecological future" (p. x).

Employment and "societal demands for higher-order thinking are increasing. Employability studies document the need for a future work force capable of more sophisticated thinking than was generally required in the past" (p. 2). Higher technology demands higher order thinking skills. "Such skills as independent analysis, flexible thinking, and collaboration problem solving are now considered basic requirements for many jobs" (p. 2).

In summary, cognitive scientists, educators, and researchers have found that integration of academic and vocational content improves the brain's abilities to learn by allowing the learner a chance to experience learning through directly applying theoretical content to a practical task and producing results. Cognitive scientists have concluded that humans who gain academic and technical skills are better able to transfer problem solving skills to the real work world.

Reform and Reconstruction of Public Education

Experts on education and the economy are worried by the growing gap they see between the capabilities of graduates and the work force needs (United States Department of Labor, 1991). Compared to some economic competitors, the United States lacks a real structure for preparing students to enter the work force (Commission on the Skills of the American Workforce, 1990).

The Perkins Act

The nations law makers have recognized that the gap between the capabilities of graduates and the work force needs must be closed. High school and community college graduates must be better prepared to enter the work force (Hoachlander and Mikala, 1994, p. 20). The passing of The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 and re-authorized in July 1991, congress gave vocational education the opportunity to become a powerful force in the public education system. Wilcox (1991) reviewed The Perkins Act and pointed out that the law will "provide greater vocational education opportunities to disadvantaged people" (p. 16). This will come about by obligating states to spend money on schools and centers that offer vocational/technical education.

The law makers are clearly listening to business and industry's complaints of a work force lacking in basic literacy skills. "The law's statement of purpose and the addition of 'Applied Technology' to its name suggest that lawmakers designed the new Perkins Act to improve America's high-technology competitiveness" (p. 16).

The Tech-Prep portion of the Perkins Act has received much attention from educators throughout the nation. Scott (1991) expressed his perception of Tech-Prep by stating "The time is right for Tech-Prep because of important business and industry trends and changing work force skills requirements" (p. 22). The American Vocational Association (AVA) guide to the Perkins Act (1991) describes Tech-Prep as a "four-year secondary and postsecondary program leading to an associate degree or two-year certificate" (p. 29).

The goals of Tech-Prep are: "dropout prevention, employment placement, explicit articulation agreements, transfer to four-year degree programs, and/or involvement of business in program development" (p. 29). The programs or curriculums will be "performance based and monitored regularly" (p. 29).

The AVA guide to the Perkins Act also pointed out that academic content will be integrated with vocational content. The theme was expressed in the following:

> The Secretary is authorized to provide funding to a wide range of educational institutions

> forming consortia to develop, implement and operate programs using different models of curricula which integrate vocational and academic learning. (p. 14)

Perkins also targeted those people who have special needs to be helped by vocational programs. Each funded program "must integrate vocational and academic competencies and must provide equitable participation for special populations" (p. 26).

Misconception of Integration

Integration of vocational and academic learning has been perceived and interpreted in a wide range, consequently creating many different views and misconceptions. Many in education interpret integration as adding academic content to vocational programs. For example, in Write's (1991) interpretation of integration of academic and vocational education, we find:

> The first major change of the new federal legislation is that it begins to shift away from the traditional job-skills orientation of vocational education and toward the broader purpose of using vocational education as a vehicle for learning academic and other kinds of

> thinking skills and for linking thought with action. (p. 426)

Gray (1991), on the other hand, states:

> Unfortunately, when the concept is put into practice, it typically gets degraded to mean only that vocational education students should take more academic courses. This is not the only goal; it is not even the primary goal. The primary goal of integrating academic education and vocational education 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. (p. 443)

Grubb (1991) stressed the point by stating that true integration is not simply a factor of adding more academic material to a vocational program. He has stated "simply exhorting vocational instructors to incorporate more reading, math, or writing exercises into their courses or to rely on packaged curriculum materials that present basic skills for vocational courses doesn't offer much chance of success" (p. 54).

English (1991), a long time advocate of integration of academic and vocational education, stated, "It is truly

unfortunate that too many academic and vocational educators are interpreting integration to mean vocational teachers should be teaching more academic content" (p. 54).

English asked the following:

- Have the academic and vocational knowledge bases required for occupational entry been identified?
- Have the general education objectives of vocational education programs been identified?
- Are vocational teachers required to obtain course content information from academic instructors?
- Are academic teachers required to obtain course content and other information from vocational instructors?
- Is the school management system designed to remove barriers affecting cooperation between academic and vocational instructors?
- Does the school management system provide opportunities for both formal and informal exchanges of information between academic and vocational instructors?
- Do vocational and academic instructors schedule the introduction of new concepts to allow for coordinated reinforcement of

instruction?

- Do in-service programs provide opportunities for vocational and academic teachers to jointly plan and develop curricula? (p. 54)

The True Integration of Vocational and Academic Curricula

In considering the arguments presented concerning integration, Harringtion (1987), expressed that academic educators have their role and vocational educators have theirs. "In theory, it is up to academic instructors to teach academic subjects. The role of vocational instructors, then, is to show how the academic skills apply to occupational tasks and to reinforce the academics within the vocational instruction" (p. 2). True integration was defined as: "Full integration of the total academic/vocational program is seamless. Academic and vocational teachers work as equal partners to meet students' educational needs" (p. 3).

The Impact of Integrating Academic and Vocational Curricula

Does integration work, and can it truly produce a positive impact on the learner? Pritz and Davis (1991) stated that vocational education is extremely important if academic content is going to be made applicable to a career.

Education should not continue to be separated. "Teachers need to make students aware of the connection between academic skills and vocational tasks" (p. 38). Mc Walters (1992) added that "all instructional experience must be made relevant to all students with a context of careers and future work" (p. 24).

Pepple (1991) headed a research project to determine the extent to which vocational education courses would impact academic disciplines. Math was used as the applied academic curriculum, and one of the conclusions was "the data indicated that the applied mathematics curriculum materials enable students to perform at higher levels across a broad range of skill areas in mathematics than the traditional materials being used in comparison" (p. 8). The concept of integration breaks traditionally run curriculums and posses a threat to present managerial structure.

Breaking Down the Traditionally Run Curriculum

In view of the information just presented, it is difficult to understand why local government and the general public allow the tradition paradigm to prevail over a new paradigm that would promote full integration of the total academic/vocational program. Gray (1992) admitted, "any real change will require that individuals like myself throughout the entire education system and job training community quit

community quit worrying about protecting our turf and start focusing on our common goals" (p. 24). Rosenstock (1991) pointed out the traditional separation between vocational and academic education. "One barrier to envisioning such an integration is the nearly total separation between academic and vocational education in today's high schools" (p. 435). Traditionally those students who are labeled non-college-bound are tracked in vocational programs. "Vocational programs are often, literally and figuratively, in the basement of the school. They have become a dumping ground, and both students and the teachers in these programs have the lowest status in the school" (p. 435). As long as this continues true integration will not take place. "Pursuing integration with academic education requires us to adopt a different view: that vocational education is a different way to learn the same academic concepts and skills that non-vocational students learn" (p. 435).

To implement desegregation of vocational and academic education the system must be restructured. "The first step is for teachers to work together, to see their mission as joined -- not divided between those who prepare students for college and those who prepare them for work" (p. 435). Without cooperation and team work integration simply becomes a buzz word. The main beneficiary of integration is the student, but eventually employers and society profit from the process.

Douglas (1992) recognized the need for integration by stating "both academic and vocational teachers play an important part in the education of today's youth" (p. 42). He also recognized the separation between vocational and academic education including the physical locations of sites within campus grounds that segregate the disciplines.

Integration: Implementation

The traditional paradigm must be dismantled and along with it the wall separating academic and vocational education. Financially it may not be possible to change the physical facilities, but what must be changed is that vocational and academic educators work together. Schmide (1991) reported on a research project focused on "identifying strategies that have been implemented collaboratively between vocational and academic teachers at selected consortium pilot sites to determine teachers' perceptions of the strategies" (p. 1). Results of the study give significant support to the integration of academic and vocational education movement. Schmide concluded that "the teachers commented that they no longer perceived of themselves as 'us and them,' academic versus vocational teachers or vice versa. Their focus became the students and how they could best help the students learn what they needed" (p. 4). Segregation became a wall of the past.

"The teachers, both academic and vocational, commented that they gained respect for what the others were teaching and the problems they had in teaching" (p. 4).

In summary, public education is failing when it comes to meeting the challenge of employers' needs. Reform in education must happen by restructuring in order to prepare graduates to be better citizens for a complex society and to be assets to the employers of this nation. By integrating academic and vocational education we will find a means of better preparing our work force pool.

Summary

The relationship between public education and work force needs is one of impact. Public education directly impacts the work force by supplying it with the most valuable resource, educated humans. It is unfortunate that the quality of education used in preparing students to become good citizens and valued employees has become over time archaic and obsolete. Postgraduate education such as community colleges no longer know what purpose they serve. The community college system is trying to meet too many needs. The writer suggests that the focus should be to service its communities most urgent need by educating its citizens to be valuable to the needs of the workforce. Therefore, the community college focus will be on track by

offering relevant "real world" education that will help its community to prosper.

Congress has assessed the needs of the work force and concluded that reform in public education is in order. The passing of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 has given new status to vocational education by the law's statement of purpose, to improve America's high-technology global competitiveness. The law has three themes: articulation between secondary and post-secondary programs, accountability through development of performance measures and standards, and integration of academic and vocational education curriculum. Integration is viewed by the writer as the conductor that orchestrates the remaining two themes.

Cognitive scientists support integration by proposing that the integration curriculum is a way to implement learning in context.

The integration of academic and vocational curriculum offers public education a base that can better prepare students for meaningful, productive employment.

Chapter III

RESEARCH DESIGN and PROCEDURES

The study followed an applied qualitative research design utilizing the Critical Science approach as a paradigm for the research design.

Research Questions

The evaluation efforts have also gathered information with regard to (1) the relationship between public education and workworce needs, (2) a historical perspective on public education, (3) the scientific study of research on learning, and (4) reform and reconstruction of public education.

The following research questions were identified:

1. Will the existing models for community college vocational education programs be adequate in meeting the projected required course development needed for the twenty-first century,
2. What specific models of integration currently exist, and
3. Does any single model hold promise as an approach to the contextual restructing necessary to

implement the integration of vocational and academic curricula?

Procedure

The research process was an applied, qualitative design based on a review of literature concerning the traditionally run public education system.

Data Analysis

In order to address the first research question a review of literature was conducted to define the relationship between public education and its relationship to the work place. The literature review lead to further study with an historical perspective focused on public educational reform initiated by reports on public education commissioned by the United States government.

A synthesis from the literature reviewed posed the second research question targeted towards all secondary and post-secondary public institutions experimenting with integrated models focused on integrating vocational and academic education. Further research was conducted focused on reform and reconstruction of public education, and the scientific study of research on learning.

A third research question focused on a single model

appeared to hold promise as an approach to the contextual restructuring necessary to implement the integration of vocational and academic curricula. Extensive research was conducted in the area resulting in eight models identified as the most promising in integrating academic and vocational education (Grubb, Davis and Lum, 1991). These models were numbered one through eight and described in Table 1.

Treatment of the Data

In addressing each research question a synthesis and reorganization of the literature resulted in formulating a new matrix. The Critical Science approach, as the new paradigm was implemented to assess the effectiveness of the identified eight different approaches to the integrated models. The assessment was constructed in the form of a list of statements and numbered one through 13 from the data base of the new matrix. Each model was measured against the list and an "X" was placed only if the model met the criteria of the specific statement. Each model was assessed in the same manner. A sample of the Criteria Assessment Measurement is available in Table 2.

Table 1

Models of Integrating Vocational and Academic Education

	Curriculum Changes	*Teacher Changes*	*Students Targeted*	*Institutional Changes*
1. Incorporating more academic content in vocational courses	Vocational courses include more academic content	Vocational teachers modify courses	Vocational students	None
2. Combining vocational and academic teachers to enhance academic content in vocational programs	Vocational programs include more academic content, in either vocational courses or related applied courses	Academic teachers cooperate with vocational teachers	Vocational students	None
3. Making academic courses more vocationally relevant	Academic courses include more vocational content; sometimes new courses (e.g., applied academics) adopted	Academic teachers (usually) modify courses or adopt new ones	Potentially all students; in practice, vocational and general-track students	None
4. Curricular alignment: horizontal and vertical	Both vocational and academic courses modified and coordinated across courses and/or over time	Vocational and academic teachers cooperate; numbers range from two to all	Potentially all students; actual targets vary	None necessary; curriculum teams may foster cooperation
5. Senior projects	Seniors replace electives with a project; earlier courses may change in preparation	None necessary; teachers may develop new courses or modify content to better prepare students	All students	None necessary
6. The Academy Model	Alignment among academy courses (English, math, science, vocational) *may* take place	Vocational and academic teachers may collaborate on both curriculum and students	Usually potential dropouts; sometimes students interested in specific occupational areas	School-within-a-school; block rostering; smaller classes; links to employers
7. Occupational high schools and magnet schools	Alignment among all courses may take place, emphasizing the occupational focus	All vocational and academic teachers assigned to an occupational school or magnet within a school; collaboration facilitated	Students interested in specific occupational areas	Creation of a self-contained occupational school or magnet school
8. Occupational clusters, "career paths," and majors	Coherent sequences of courses created; alignment may take place among courses within clusters	Teachers belong to occupational clusters rather than (or in addition to) conventional departments; collaboration facilitated	All students	Creation of occupational clusters; enhancement of career counseling; possible cluster activities

Table 2

Criteria Assessment Measurement

Instructions: Place an "X" in the proper column as a positive response identifying the appropriate model(s) integrating the Integration of Vocational and Academic Education criteria statement.

Criteria Statement Identifying Integration of Vocational and Academic Education	Identified Models 1	2	3	4	5	6	7	8
1. Determine the knowledge and skills related to general education required for occupational entry.								
2. Specify the general education objectives of the vocational program.								
3. Require vocational instructors to obtain course and other information from academic instructors.								
4. Require academic teachers to obtain course and other information from vocational instructors.								
5. Ensure that the school management system is designed to remove barriers affecting cooperation between academic and vocational instructors.								

	Model >	1	2	3	4	5	6	7	8
6.	Provide a school management system that provides opportunities for both formal and informal exchange of information between academic and vocational instructors.								
7.	Design an in-service program that provides opportunities for vocational and academic instructors jointly to plan and develop curricula.								
8.	Include academic instructors in occupational advisory committee meeting.								
9.	Use a participating management model to promote cooperation and interaction between academic and vocational instructors.								
10.	Have an example of articulation between academic and vocational instructors in the school.								
11.	Have curriculum, instruction, media, or other materials designed for articulation.								
12.	See the need for a new delivery system to integrate and articulate vocational education.								
13.	Encourage vocational and academic instructors to schedule introduction of new concepts to allow for coordinated reinforcement of instruction.								

Chapter IV

FINDING and DISCUSSION

Barriers to Integrating Academic and Vocational Education

There are many possible barriers to integrating academic and vocational education. Traditional separate academic and vocational structures may be hard to overcome. Teachers and instructors my perceive integration as just another quick fix to many of the same old problems and choose not to support the integration effort. Support from administrators may not be evident by not providing time, or incentives for academic and vocational teachers to collaborate. School districts may perceive integration as a costly project and vote not to fund teacher release time, staff development, and equipment and materials needed.

Findings

Research Question 1: Are existent community college vocational education program models meeting Twenty-First Century needs?

The review of literature revealed that researchers in the field of business and public education have observed

that both high school and community college graduates do not possess the academic skill and work competencies strong enough to handle the technical, communication, and problem solving skills needed for today's workforce. Therefore, the existing models for community college vocational education programs are not adequate in meeting the projected required course development needed for the twenty first century.

Due to barriers constructed barriers by the established traditional paradigm the writer feels that any attempts to restructure public education would only be futile without first dismantling the system -- reconstruction simply becomes a buzz word. New models introduced into the present paradigm would be diluted and skewed by attempts made to fit it into existing paradigms. One can only suggest that an entirely new structure be formed, utilizing the integrated occupational cluster model and focused on preparing the students to meet the demands of both the work force and the responsibilities of good citizenship.

Research Question 2: Do integration models currently exist, and can they be qualitatively studied?

This study revealed a previous study, conducted by Grubb, Davis, and Lum (1991) found that many school districts throughout the country have been experimenting with a

variety of integration curriculums. Research on these curriculums resulted in eight models being identified as most promising in integrating academic and vocational education. Consequently, there are eight specific models of integration that can be qualitatively compared and studied.

Research Question 3: Is there an existing model that holds promise as a guide to effective restructuireing and integration of the vocational-educational process?

Model Eight, The Integrated Occupational Cluster model, was identified as the model currently meeting the majority of the identified requirements of an effective integration process.

This model promotes collaboration, integration and real-time alliance with offering an individualized program study.

Contradictory Results

The results of the study do not concur with those of Grubb, Davis, and Lum (1991). The authors summarized by stating that "many approaches to integrating vocational and academic education exist, rather than a single model that could apply to all schools. It would, therefore, be

misguided for federal or state policymakers to impose a single model or decide on one 'best' approach" (p. IV).

Summary of Findings

The findings in this study identified eight models earlier reported by in the research report by Grubb, Davis, and Lum (1991). These models were subjected to assessment using a synthesized criteria based on qualitative research by the use of a criteria and historical information developed through a literature review. Model Eight, was found to be the most successful in satisfying all the criteria on the assessment instrument. Therefore, the Integrated Cluster model was the single most effective model in approaching the ideal integrated curriculum for most schools. Additionally, this model can be modified for the community college career-based curriculum. A summary of the findings are presented in Table 3.

Table 3

Summary of Findings

Criteria related to Integration Models for Vocational and Academic Curricula. An "X" indicates the model meets the listed criteria.	Identified Models 1	2	3	4	5	6	7	8
1. Determine the knowledge and skills related to general education required for occupational entry.		x	x				x	x
2. Specify the general education objectives of the vocational program.				x		x		x
3. Require vocational instructors to obtain course and other information from academic instructors.	x	x		x			x	x
4. Require academic teachers to obtain course and other information from vocational instructors.		x		x		x	x	x
5. Ensure that the school management system is designed to remove barriers affecting cooperation between academic and vocational instructors.						x	x	x

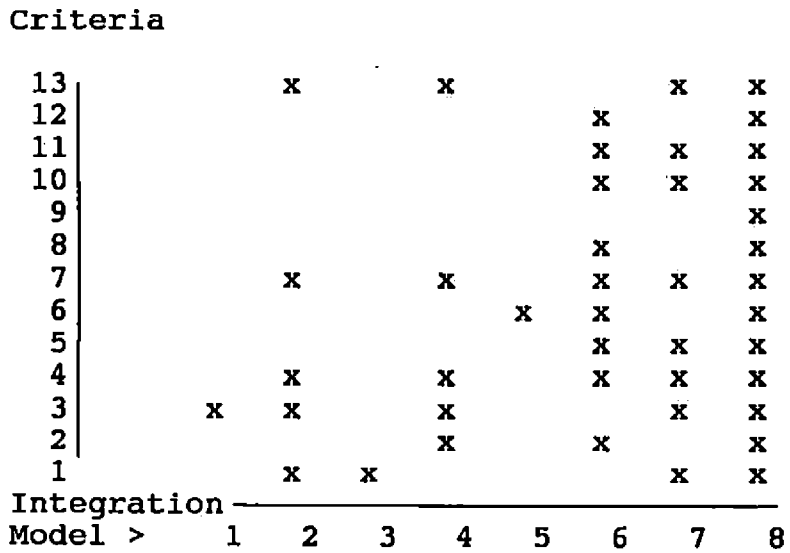
	Model Number >	1	2	3	4	5	6	7	8
6.	Provide a school management system that provides opportunities for both formal and informal exchange of information between academic and vocational instructors.					x	x		x
7.	Design an in-service program that provides opportunities for vocational and academic instructors jointly to plan and develop curricula.		x		x		x	x	x
8.	Include academic instructors in occupational advisory committee meeting.						x		x
9.	Use a participating management model to promote cooperation and interaction between academic and vocational instructors.								x
10.	Have an example of articulation between academic and vocational instructors in the school.						x	x	x
11.	Have curriculum, instruction, media, or other materials designed for articulation.						x	x	x
12.	See the need for a new delivery system to integrate and articulate vocational education.						x		x
13.	Encourage vocational and academic instructors to schedule introduction of new concepts to allow for coordinated reinforcement of instruction.		x		x			x	x

The histogram presented below graphically displays the results of findings from criteria assessment. The vertical axis is numbered 1 through 13, each number representing a particular criteria statement. The horizontal axis is numbered 1 through 8, each number representing one of the identified models of integration. Each integrated model was measured against the criteria statements and an "X" was placed only if the model shown on the horizontal axis met the criteria of the specific statement as shown on the vertical axis.

The distribution graphically illustrates that model number 8, the "Integration Occupational Cluster Model" met all criteria represented on the vertical axis.

Figure 1

Histogram Graph displaying a Multimodal distribution.



Discussion

The data indicated that the adequate preparation of students for future work force and societal needs, will require the restructuring and firmly committed integration of academic and vocational education, and the collaborative and cooperative efforts of all those involved in the educational process.

As the models are briefly presented below, it will become apparent that many are "band-aid" approaches and not meeting the intent or necessities of full integration. It will also become readily evident that Model 8, the Cluster Model, presents the best opportunity for effective integration.

Model 1: Increased Academics

The First integrated model incorporated more academic content in vocational courses. This approach does not eliminate tracking, as well as adding more reading and math to a course where the vocational instructor has no expertise.

Model 2: Combinations

Model Two combines vocational and academic instructors

and incorporates academic content into vocational programs. There was no preparation of the students for any sequence of occupations.

Integrated Model 3: Vocationally Relevant

This Model attempts to make the academic curriculum more vocationally relevant by incorporating vocational applications and restructuring academic courses. There is no cooperation between vocational and academic instructors. Vocational instructors make use of applied academic packaged material.

Integrated Model 4: Curricula Alignment

In Model Four vocational and academic courses are modified. The modifications predominantly affect the vocational courses leaving the academic courses unaffected. This does not promote integration.

Integrated Model 5: The "Senior Project"

This is the "Senior Project" approach where some schools often require a research paper, a physical project and/or oral presentation. This project forces students to integrate their learning from different courses, including

the skills learned in vocational courses. The model hardly promotes integration.

Integrated Model 6: Academy

The "Academy" or "Schools-Within-Schools" model. No cooperation or collaboration was found between vocational and academic instructors.

Integrated Model 7: Occupational Schools

Model Seven, "Occupational High Schools and Magnet Schools" is limited to vocational students and focus on integration is a problem with only limited collaboration.

Integrated Model 8: Clusters

Model Eight incorporates occupational clusters, career paths, and occupational majors. It was found that this model was highly successful in integrating vocational and academic curricula and eliminated tracking. It provided for a synergistic team approach to teaching through cooperation and collaboration and promoted accountability by incorporating performance based outcomes of contextual learning. Analysis also identified many reports concerning integrating vocational and academic education contained

general conclusions and passive recommendations; at times suggesting that further studies should be conducted before any firm decision was made. These politically correct conclusions and recommendations were rather in not risking recommending a single integrated model. As shown in Table 3, and Figure 1, the "Integrated Occupational Cluster" model, was found to be the most successful in satisfying all the assessment criteria.

Implications

As long as the barriers of traditionally separate academic and vocational structures continue, there can be no success in attempting to restructure public education. Cooperative efforts from both academic and vocational teachers must be established. Support from teachers, local administrators and district boards must be evident. School management barriers must give way to new models designed to accommodate the integration of vocational and academic curricula.

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The public education system has been focused on educational reform experimenting with several alternative models to learning. Educational reform was initiated by the authors of reports commissioned by the United States Government Commission on Education.

It is the conclusion of this study that the existing models for community college educational programs are not adequate to meet the needs of todays work place. American business and industry leaders have called upon the schools to upgrade the quality of education provided at all levels. Public education must prepare individuals for real life situations that will help them become educated and productive citizens.

It has been noted that many school districts throughout the nation have experimented with different approaches to the integration of academic and vocational education curriculum resulting in a wide and varied range of curriculum models. Eight specific models have been identified that hold promise for the effective integration of academic and vocational education (Grubb, Davis and Lum,

1992).

Because vocational and academic teachers are included in each occupational cluster with no academic or vocational departments, the "Integration Occupational Cluster" model stands out as holding the greatest promise for effectively meeting the challenge of integrating academic and vocational education for most schools.

Recommendations

The Integrated Occupational Cluster model is the single most effective model in approaching the ideal integrated curriculum. This model developed by English (1982) was implemented by Dauphin County Technical High School in Pennsylvania. Lee (1993) stated "The 22-year-old school has been cited as a national model by the United States Department of Education and Labor and the National Association of State Directors of Vocational Education, among others" (p. 30).

It has been proposed that implementation of an occupational cluster model in a career based community setting would provide all students with a program of instruction through a coherent sequence of courses. This would enable students to achieve higher order skills in both academic and vocational competencies.

It has been suggested that integration of academic and

vocational education is not the total answer to public education. However, it can be a start towards a system that has relevance to todays societal and work force needs by desegregating vocational and academic subjects and non-college bound from college bound students.

Therefore, the occupational cluster model provided for a synergistic team approach to teaching through cooperation and collaboration efforts from both academic and vocational instructors. Increased articulation, rigorous and comprehensive courses, accountability by performance based outcomes, instructor empowerment, and cognitive learning processes will eliminate many of the deficiencies of the traditional school managerial structure.

It is recommended that the following changes be made in the restructuring process for integrating academic and vocational education into one unified curriculum:

- Replace vocational and academic departments with clusters to serve as the organizational unit of the school.
- Provide open, unstructured time for academic and vocational teachers to share in a relaxed atmosphere.
- Design an in-service program that provides opportunities for vocational and academic instructors to jointly plan and develop curricula.

- Specify the general education objectives of the vocational and academic programs.
- Ensure that the school management system is designed to remove barriers affecting cooperation between academic and vocational instructors.
- Work with the business community to determine competencies needed by local employees.
- Encourage vocational and academic instructors to schedule the introduction of new concepts to allow for coordinated reinforcement of instruction.

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