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ABSTRACT

This proceedings contains five papers. "Learning in the Workplace: A Qualitative Study of Skill and Knowledge Acquisition in Youth Apprenticeship Programs" (Cheryl E. P. Evanciew) discusses research on youth apprenticeship programs as opportunities for contextual, meaningful, and relevant use of knowledge gained in school. "Effects of Integrating Cognitive Apprenticeship Instructional Methods into the Community College Writing Classroom" (Sarah L. S. Duncan) reviews the literature on cognitive apprenticeship and documents its effectiveness. "Stakeholder Perceptions of a Technology and Applied Science Academy" (Paula Puckett and Catherine Kirby) uses data gathered from classroom observations and student, parent, faculty, and board member interviews to evaluate the first year of operation of the Champaign Central High School Academy of Technology and Applied Science. "New Directions in Agricultural Education: The Impact in Public Schools" (Thomas H. Bruening et al.) reports a study in which 263 of the 933 agriculture teachers in five states were surveyed regarding goal and resolution statements in agricultural education programs/plans. "Ohio Vocational Teachers' Attitudes toward and Knowledge of Skill Standards: A Preliminary Analysis" (Greg Belcher and N. L. McCaslin) discusses a survey of 346 Ohio vocational teachers. (MN)

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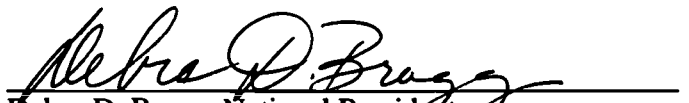
Debra D. Bragg
National President, Omicron Tau Theta
University of Illinois, Urbana-Champaign

NOTE FROM THE NATIONAL PRESIDENT

The 1995 Professional Studies and Research Seminar sponsored by the Omicron Tau Theta National Honorary Society was held in Denver, Colorado, November 30-December 3. The seminar was held in conjunction with the annual American Vocational Association Conference. The Seminar consisted of five paper presentations given by young scholars in the field of vocational-technical education. The presenters were selected through a blind, peer-refereed process. The papers cover the following topics: skill acquisition in youth apprenticeship programs, improving writing in the community college, stakeholder perceptions of an applied science academy, agricultural education in public schools, and the attitudes of vocational teachers toward skill standards.



Debra D. Bragg, National President
1995 AVA Annual Meeting

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Learning in the Workplace: A Qualitative Study of Skill and Knowledge Acquisition in Youth Apprenticeship Programs

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Abstract

A major concern of our current educational system is instructional practices that emphasize abstract rather than contextual learning methods. Youth apprenticeship programs are designed to situate learning in the workplace, thereby providing students with contextual, meaningful, and relevant use of knowledge taught in school. In contrast to traditional educational practices that rely on the transfer of knowledge from one situation to another, the situated cognition theory places learning in a community of experienced practitioners in an effort to situate learning in the context it will be used. This research sought to determine the effectiveness of youth apprenticeship programs by gathering data related to the situated cognition theory of learning and instruction. Data was collected and analyzed qualitatively through observations and interviews of management, adult mentors, and youth apprentices and through analysis of program documents.

Learning in the Workplace: A Qualitative Study of Skill and Knowledge Acquisition in Youth Apprenticeship Programs

Our current educational system has been criticized for doing an inadequate job of preparing students for work and adult life. Part of this inadequacy may result from programs and curricula used in schools that focus on preparing students for college rather than work (Kazis, 1993). Recent reports indicate that approximately 60% of high school graduates do not go to college (Filipczak, 1992). In fact, many jobs currently available to high school graduates either require little education or training beyond high school or require specialized technical training rather than a four-year college degree (Carson, Huelskamp, & Woodall, 1993; Hodgkinson, 1985).

Inadequate preparation for work and life after high school may partially result from a historic lack of formal school-to-work transition programs for youth (Aring, 1993). Students often exit high school with little or no formal training to prepare them for life in an adult world. In addition to work-related skills and concerns, appropriate social skills needed for life as independent adults are often lacking in high school graduates. Exposure to typical adult social skills, such as being a worker, a member of a community, and a spouse and/or parent, may assist young adults in becoming effective and productive citizens of a workplace as well as a community. According to Pallas (1993), students need socialization skills "so that they can carry out the adult roles embedded in the structure of the society" (p. 411).

To assist students in becoming independent workers and adults, schools are beginning to explore and implement school-to-work transition programs that may better prepare students for life after high school. School-to-work transition is defined "as a condition where the student can demonstrate the skills necessary for entry into a primary labor market occupation or career path consistent with his or her aspirations" (Stone, 1992, p. 7). Effective school-to-work transition programs may not only provide students with relevant educational experiences that resemble work experiences they may encounter after graduation, these programs may also provide students with critical social skills needed for adult life by allowing students to participate in the adult world of work before exiting high school (Cremin, 1989; Pallas, 1993).

There are a variety of transition programs available. For this research, youth apprenticeships were selected because they can provide a holistic and practical school-to-work transition program that integrates relevant learning with social activities needed for cognitive development (Bailey, 1993). Youth apprenticeships give students the opportunity to utilize school knowledge with real work activities to provide a bridge between intellectual and cognitive skills by utilizing contextual problem-solving in real world, authentic settings (Raizen, 1989).

Youth apprenticeship programs also provide students an opportunity to acquire skills and knowledge under the guidance of a mentor or master craft's person (Smith & Rojewski, 1993). This arrangement allows for guided work experiences and learning opportunities not always found in other programs (Stern, 1992). According to Hamilton (1989), a mentor's responsibilities include instructing, demonstrating tasks, coaching as tasks are performed, explaining why tasks are done in a particular way, challenging learners to do well, initiating learners into the culture of the workplace, and affirming learners' value as people. Haensly and Parsons (1993) add that mentors assist learners in gaining important social skills and increasing their independence and autonomy.

A major influence on an apprentice's skill and knowledge acquisition is the mentor. Research suggests that having a mentor increases an apprentice's ability to become an independent thinker and worker by sequencing learning opportunities, connecting work-based learning and school-based learning, and allowing the apprentice to make connections between previous and new learning experiences on the job (i.e., reflection; Haensly & Parsons, 1993; Hamilton, 1989). How a mentor accomplishes these tasks is unclear because many youth apprenticeship programs offer no training in pedagogy for mentors (Hamilton).

Purpose of the Study

With increased interest in the workplace as a learning environment for adolescents, appropriate pedagogy is needed to guide the implementation and effectiveness of work-based programs. The purpose of this qualitative study was to explore, discover, and describe experiences between mentors and youth apprentices in a youth apprenticeship program as those experiences related to situated cognition theory. Observations, interviews, and document analysis were used to support a constructivist description of themes or patterns derived from the data. Situated cognition was defined as an integration of the social situation and an individual's ability to learn. Results of this study may enhance the effectiveness of learning in the workplace and youth apprenticeship programs by providing information on how participants view their experiences with workplace learning.

Research Questions

1. What learning and teaching experiences occurred between mentors and youth apprentices in workplaces participating in youth apprenticeship programs?
2. What teaching methods and behaviors did mentors (or other experienced workers) exhibit when working with youth apprentices?
3. How did apprentices experience these teaching and training methods and behaviors?
4. Did participants believe a more relevant and useful education was acquired by participating in the workplace component of youth apprenticeships?

Conceptual Framework

Current research suggests that incorporating alternative methods of learning may be more conducive to reducing differences between school and work activities. One of these methods, based on the situated cognition theory of learning, states that learning should occur within the context of a given situation and should attempt to replicate as closely as possible procedures used by practitioners of a given culture. Situated cognition theory focuses on "the relationship between learning and the social situations in which it [i.e., learning] occurs" (Lave & Wenger, 1991, p. 14). The foundation of situated learning is the placement of learning in a real-life, socially-shared setting rather than as an individual, abstract mental activity (Schell & Babich, 1993).

Situated cognition theory provides a suitable framework for observing how individuals learn in a workplace. Situated cognition views learning that occurs in a real world environment as more effective and relevant because it places learning in a community of expert practitioners. Furthermore, several strategies for providing effective learning associated with situated cognition have their basis in traditional apprenticeship approaches to learning (Lave, 1988).

Situated cognition theory was selected as the basis for this study because of the emphasis on learning in a real-world environment. In the context to this study, situated cognition was used because of its emphasis on socially constructed knowledge. Since a youth apprenticeship program occurs within a given community, situated cognition holds promise for seeking answers to the questions posed in this study.

Procedures

A qualitative design was used to discover and explore interactions between mentors and youth apprentices in the workplace. A constructivist approach was used because of its similarities and compatibility with the situated cognition theory of learning. Constructivism, as defined by Glasersfeld (1989), focuses on a particular relationship between an individual's mind and the world. Glasersfeld maintained that an individual cannot achieve a complete understanding of new information without some past experience with which to connect. Knowledge and truth are individually created or constructed based on an individual's past social experiences or culture. In

other words, an individual's interpretation and understanding are a reflection of one's past social situations and are based on a combination of what an individual hears, reads, writes, gestures, and experiences. Furthermore, past and present social experiences can shape how an individual constructs knowledge.

Site and Sample Selection

A purposive search was conducted for youth apprenticeship programs located within driving distance of my home. The program selected was in a rural community approximately 35 miles from my home in South Carolina. After learning about the program, I contacted the youth apprenticeship coordinator to describe the research project and ask about the possibilities of involving this program. The coordinator consented to involvement in the study. Permission was also obtained from the vocational director of the school district sponsoring this particular program.

Having obtained permission, the coordinator and I worked out the logistics of the research such as time and number of sites needed. Six sites were selected based on the coordinator's suggestions and her belief that these businesses would be willing to be involved. I then contacted each site to assess the feasibility of the site's inclusion in the study. The six initial sites included three manufacturing companies (capacitor, power hand tools, and yarn), one computer electronics company, one school district computer repair office, and one automotive dealership. Students involved in this study were enrolled in the following occupational areas at the career center: two in business management, four in computer electronics, and one in automotive mechanics. Each site had one mentor for each apprentice, except the school district repair office, which had two mentors assigned. In addition, there was one apprentice who had graduated from high school. Participants included eight apprentices, six mentors, two manufacturing executives, and one youth apprenticeship coordinator for a total of 17 participants. However, by the end of the study, only two sites remained--the district computer repair office and the automotive dealership. The other four ceased participation either because of economic difficulties, lack of time, or lack of interest.

Data Collection Procedures

Qualitative data collection procedures require varying amounts of interaction with participants (LeCompte & Preissle, 1993). For this study, two interactive methods, participant observation and interview, and one noninteractive method, document analysis, were used for data collection.

Participant observation allows researchers to gather impressions of a situation firsthand and record behavior as it occurs (Adler & Adler, 1994; Merriam, 1988). Participant observation allows researchers to observe who and what was involved, where and when events occurred, and to feel or sense a situation by viewing the program from an insider's point of view. This allows researchers to see behaviors and actions as they occurred rather than relying on secondhand accounts of what had taken place.

Interviews allow researchers to discover what is in and on a participant's mind (Patton, 1990). Interviews may also be used to discover if data from observations agree with what participants say. In this study, semi-structured interviews were used to ensure that the same basic questions were asked of all participants, but not necessarily in the same order or with the same wording. Interviews were recorded using an audio tape recorder to ensure accuracy. In addition, written notes were taken during the interviews in case of equipment malfunction or failure. Interviews and notes were then transcribed using a word processor.

Documents are usually written materials and can provide a rich source of information. Merriam (1988) describes three major types of documents: (a) public or archival records that may include birth and death certificates, marriage licenses, or mass media information; (b) personal documents that may include diaries, scrapbooks, or letters; and (c) physical traces that may or may

not be a written document, but include items that can be measured for frequency such as number of parts assembled or degree of wear on buildings or equipment.

For this study, I relied on public documents about the program from the career center. Program documents such as workplace competencies guidelines, a student handbook, a mentor guidebook, and an overview booklet were obtained from the program coordinator. The overview booklet provided information regarding procedures and qualifications needed for acceptance in the youth apprenticeship program. The mentor guidebook was used to compare what was discovered through observations and interviews with guidelines and suggestions made to mentors.

Analysis involved searching the data for emerging themes and then separating the data into categories associated with those themes. I began data analysis by reviewing the purpose of this study, which was to explore, discover, and describe learning and teaching experiences that occurred between a mentor and an apprentice. Two broad categories, learning and instruction, and the apprenticeship program were established. Under the heading of learning and instruction, the following detailed categories emerged: tasks performed at work, interactions and teaching methods used by mentors, work-based learning, school-based learning, and work ethics and social behaviors. Under the heading of the apprenticeship program, the following detailed categories emerged: participants' views of the program, benefits of the program, and written documents compared to the data.

Findings

Findings from this study were interesting and enlightening. The following sections provide findings that describe how and what types of learning and instruction occurred and participants' views of the program.

Tasks Performed at Work

Workplace tasks vary greatly depending on the type of business and the nature of the work to be performed (Pauly, Kopp, & Haimson, 1994). Some workplaces emphasize working on a single yet diverse job whereas others focus on developing limited technical skills. In this study, youth apprentices performed a variety of tasks on the job. Tasks were usually assigned by the mentor and were determined by job demands and requirements. Although some tasks seemed menial, they appeared to be job-related, relevant to the setting, and provided students with meaningful and responsible work experiences.

The job tasks of two business management apprentices were similar. The first site was a major yarn manufacturing company. The apprentice there worked in the business office. The second site was a capacitor manufacturer and the apprentice worked in the personnel office. Each apprentice performed work tasks similar to those of a secretary. These tasks included filing, typing, data entry, sorting, updating computer files, answering phones, taking messages, and preparing mail.

The four apprentices enrolled in computer electronics at the career center were placed in the following businesses: a school district computer repair office, a power tool manufacturing company, and a small computer manufacturing business. At the onset of this study, the school district repair office had one apprentice. However, that apprentice's employment was terminated because of excessive absences. Shortly afterward, this office hired a second apprentice. Both apprentices performed tasks and duties similar to a computer technician. They repaired computer equipment (e.g., computers, printers, monitors), made phone calls to other businesses to obtain parts, compare prices, determine availability of parts, shipped components for outside repair, and completed and maintained all paperwork.

A computer electronics apprentice at a power hand tool manufacturer was training to work in the maintenance department. The training there required him to work throughout the plant to

become familiar with the total operation. During this study, this apprentice worked on an automated production line that manufactured internal coils for motors in power hand tools. His job was to check and record measurements of parts to compare them against allowed tolerances and to adjust machine settings when needed.

A fourth computer electronics apprentice was hired at a small, highly specialized computer manufacturing business. His job requirements were to visually inspected bare printed circuit boards for clean holes, cut or broken traces, and discoloration of laminate. He also used test programs to check parts for malfunctions, performed diagnostic testing of computer boards for bad components or bad solder connections, and installed individual components onto computer boards.

An automotive mechanics apprentice at an automotive dealership was hired as a diesel mechanic. He performed all duties associated with a mechanic such as replacing brakes and clutches, changing oil and filters, and completing necessary paperwork. In addition, he replaced transmissions, installed rebuilt engines, and performed periodic service maintenance on vehicles (i.e., oil change, greasing fittings, and checking for leaks).

In this study, youth apprentices were assigned tasks appropriate for their job. However, apprentices at the school district computer repair office and the automotive dealership were provided an opportunity to perform tasks with greater variety and diversity. This discrepancy could have been the result of the nature of the work (e.g., tasks related to the job), the mentor (e.g., more interested or involved with apprentice), or because those businesses participated longer and therefore more observations were conducted at those sites.

Interactions and Teaching Methods Used by Mentors

Collins, Hawkins, & Carver (1991) advocate six methodological approaches to engage a learner: modeling, coaching, scaffolding, articulation, reflection, and exploration (see figure 1). In cognitive apprenticeship learning environments, learners are actively engaged in opportunities to perform interesting and challenging work while being afforded an opportunity to view how information may be used in a real world setting (Schell & Babich, 1993; Schell & Rojewski, 1993).

Findings indicated that mentors used modeling, coaching, and scaffolding to assist youth apprentices in learning the processes and tasks associated with their work and workplace. Apprentices told of how their mentors would show and tell them how to complete specific tasks or procedures. For example, John[1] (the mentor at the automotive dealership) instructed, demonstrated, and explained to Michael (the apprentice at the automotive dealership) the procedures and dangers associated with installing a new transmission in a truck. Dale (the apprentice at the school district computer repair office) explained how his mentor, Don, taught him correct diagnostic procedures and tricks of the trade (heuristics). In addition, on several occasions mentors were observed showing apprentices how to complete a repair or providing hints (coaching or scaffolding) on how to determine what was causing the problem. Apprentices also told of how their mentors encouraged them to explore their abilities to solve problems in other situations. According to Dale:

> A lot of times [Don] wants me to kind of figure something out that he hasn't shown me before. After I work with it and try to figure it out, he'll show me what I didn't do or whatever. The big thing is, he likes for me, instead of coming straight to him about stuff, is to look it up in the manuals and all the information we have in [the office] and try to figure it out on my own instead of always relying on him. (Interview, 1/7/95).

[1] All names are pseudonyms

However, there was little evidence of mentors encouraging apprentices to reflect, articulate, or explore their learning.

Work-Based Learning

According to Hamilton and Hamilton (1992) work-based learning has relevance and importance, has immediate application, and occurs among adults which contributes to a student's educational and social development. Pauly et al. (1994) added that youth apprenticeship programs are designed to provide students with a variety of work-related experiences integrated with guided workplace learning. In addition, youth apprenticeship programs may provide students an opportunity to receive advanced technical skill training, career exposure and exploration, and academic support. Stern, Finkelstein, Stone, Latting, and Dornsife (1994) suggest that the most important characteristic of any effective school-to-work program is a combination and integration of school-based and work-based learning.

Participants in this study indicated that they received meaningful work-based learning that allowed them to apply skills and knowledge learned at school in a relevant and real world setting. For example, an automotive mechanics apprentice commented on how he was able to apply his school-based knowledge on brakes, clutches, and automotive electrical systems performing repairs on the job. In addition, participants believed they received important technical skill training. An apprentice working at the district computer repair office indicated that he was able to learn how software operations can affect and alter hardware operations. Several apprentices also indicated that their work experience had provided them with an opportunity to determine if they truly enjoyed their occupational area or if they would rather try another area.

Additional findings emerged concerning unexpected work responsibilities and duties. Two apprentices indicated their job required them to perform tasks they did not expect. For example, Dale, an apprentice working as a computer technician, was required to make phone calls to obtain information from other companies. According to Dale:

> Call[ing] the businesses and making transactions and the paperwork part, you know, it all helps. It's all part of the job. It gives me good speaking skills . . . with the phone and calling up [people]. It helps me to be able to work with, be able to talk with other business people you know? Transactions and stuff like that helps me compare prices and different things and figure out which one would be the best to go with. (Interview, 1/17/95)

Another apprentice working as a diesel mechanic was unaware of the importance of checking and verifying that repairs were performed correctly and accurately before returning vehicles to customers. He explained that textbooks do not explain how to make a repair if the vehicle has an unexpected problem (e.g., rusted bolts, damage to a part). According to Michael:

> In a classroom, you learn out of a book. In the book, it shows you . . . how to do a brake job . . . step-by-step. . . . But what it don't do is . . . show you what to do if the bolt's rung off or it the bolt's rusted up or if someone beat on it with a hammer. . . . Sometimes you run into stuff that someone's done [messed] up [and] it makes the repair a whole lot more difficult. And you [have to] learn through somebody else's experience. (Interview, 1/17/95)

A question that arises from this data is that if youth apprenticeship programs are designed to have businesses collaborate with schools to determine what skills need to be addressed in the school, why were apprentices surprised by these tasks (Bailey & Merritt, 1993; Hamilton & Hamilton, 1992; Pauly et al., 1994)?

School-Based Learning

School-based learning has importance and relevance in learning to work. According to Hamilton and Hamilton (1992), classrooms are the most appropriate places for learning such concepts as basic math, reading, and basic skills related to occupational areas. However, because schools have a tendency to detach meaning from contexts, school-based learning often focuses on learning rules rather than applying knowledge (Berryman & Bailey, 1992; Resnick, 1987).

Participants in this study indicated that although their school-based learning was useful, it did not fully prepare them for the workplace. For example, apprentices in computer electronics used their trouble shooting skills from school at work. However, school taught them nothing about how software had possible effects on hardware. According to Dale, ". . . like trouble shooting and stuff like that. That's basically what I learned at school that helps. The class I take is not much software. But I am learning a lot about the software [at work]" (Interview, 1/17/95).

The apprentice in automotive mechanics was able to use his school-based learning about brakes, clutches, transmissions, and electrical components on vehicles in his workplace. However, he was working as a diesel mechanic and school taught him very little about diesel engines. According to Michael, ". . . our class was just the basic automotive class. It was good. It didn't teach me nothin' about diesels but it taught me like other things like brakes, clutches" (Interview, 1/17/95).

Furthermore, there were several significant differences in school-based and work-based learning. The apprentice in automotive mechanics indicated that in a classroom it was difficult to remain interested in a topic if a teacher is required to repeat it several days in a row because other students in the class either did not pay attention, did not study, or did not complete their homework. According to Michael, ". . . the class can't move on until everybody knows how to do it. So you doing the same thing over and over and you lose interest in it" (Interview, 1/17/95). In schools, because teachers often are required to repeat lessons until all students in the class understand the concept or procedure, students often become bored and uninterested (Berryman, 1992). In addition, teachers often do not have enough time to devote to each individual student, whereas a mentor provides apprentices with one-on-one instructional time (Haensly & Parsons, 1993; Hamilton, 1989). Michael gave the following account of working with a mentor: "I like it 'cause, um, you get to work alone with somebody you know, more like work and train at the same time kinda deal. Um, have somebody to guide you" (Interview, 1/17/95).

Work Ethics and Social Behaviors

Our experiences and culture define appropriate work ethics and social behaviors (Lave, 1988). Petty and Hill (1994) used the following terms to described an individual with appropriate work ethics: dependable, ambitious, considerate, and cooperative.

Apprentices who participated throughout the study had culturally acceptable work ethics and social behaviors. Apprentices displayed characteristics of getting along with others in the workplace, being at work when scheduled, and being able to communicate effectively with customers and coworkers.

However, maturity level of apprentices was a concern for some mentors and executives. Several adults indicated that they were concerned about 17- and 18-year- olds entering a professional workplace environment and having the maturity level needed to be a productive and effective employee. According to Robert, the personnel supervisor at a power tool manufacturing plant, "The biggest problem [was] maturity. . . . You look at 18 year-old kids coming in here that are still in high school working in [a manufacturing] environment. . . . They come in, they didn't realize what it was like out there" (Interview, 5/10/94).

During this study, three apprentices were terminated because their mentor felt their work ethics were inadequate. The first apprentice at the district computer repair office was terminated

due to excessive absences. Two other apprentices were dismissed from two manufacturing plants because they were deemed undependable. According to Robert, the personnel supervisor, the apprentice at the power tool manufacturer was fired because he would leave his work area to visit with others. Roger, the senior vice president at the yarn manufacturer, fired the apprentice after he began keeping company with another worker who operated on the principle of the slower the better.

Two senior level personnel participants did not feel as though they should be responsible for teaching work ethics. They indicated that apprentices should enter the workplace with the work ethics needed to function effectively in a workplace. According to Roger, "You can't keep people from gravitating towards other people and other employees and picking up work ethics that in most cases they probably should have had developed to a degree by the time they get here from their parents or whoever . . . but kids influence easily" (Interview, 4/21/94).

A question that arises from this data is that if apprentices do not have acceptable work ethics or social behaviors, where and how are they to develop them? Interestingly, Hamilton (1989) included this dimension of learning as a responsibility of apprenticeship mentors. If apprentices are terminated because they lack culturally acceptable social skills, who will take the responsibility for teaching young adult workers the necessary social skills?

Participants' Views of the Program

Participants in this study exhibited positive views and made positive comments about the program. Senior executives felt that the program allowed students to obtain hands-on experience that may assist them in gaining experience in their occupational area. According to Roger, youth apprentices "learned a lot by getting that hands-on experience . . . just doing all kinds of different jobs" (Interview, 4/21/94). Robert commented that the program "helps [students] see the relevance of school . . . and understand what's expected of them" (Interview, 5/10/94).

Mentors felt that the program offered apprentices an opportunity to gain confidence in their abilities and to teach apprentices about being an adult worker. Don, the mentor at the school district computer repair office, said of the program: "One of the things I hope we give [our apprentice] is confidence in her abilities and what she can do because that's something you don't always have when you get out of school" (Interview, 5/28/94). John, the mentor at the automotive dealership expressed the following thoughts: "There's a lot of things that schools don't teach, so I try to [instill in Michael] what's right or wrong. See, it's not always mechanic work--it's everything. [There are] life situations" (Interview, 1/17/95).

Apprentices believed that the program allowed them an opportunity to receive on-the-job training, to gain experience, and to decide if they were truly interested in their occupational area. Dale felt that the program was:

> a good opportunity for students . . . to go ahead and get into jobs and work there and do as a career at an earlier age. It's good encouragement to keep on studying and continue with wherever you want to go and not just go straight to work or something. (Interview, 1/17/95)

Furthermore, apprentices enjoyed the opportunity to work one-on-one with a mentor. According to Michael, "I like [working with a mentor] because you get to work alone with somebody . . . more like work and train at the same time. . . . [You] have somebody to guide you" (Interview, 1/17/95). Apprentices also felt that their mentor assisted them in learning the skills and knowledge needed in the workplace. When asked how having a mentor affects learning, Dale said, "it's like having an extra teacher. . . . [He] helps me on the job and in what I do here, and just helps me learn everything about this job 'cause I didn't know much about it" (Interview, 1/17/95).

Discussion

This study was conducted to explore, discover, and describe a rural youth apprenticeship program, not to evaluate the program. The intent was to describe the teaching and learning methods and behaviors of mentors and youth apprentices. Although data collection was limited to a few select sites and participants, several implications emerged that may have relevance for learning in the workplace component of youth apprenticeship programs.

Youth apprenticeship programs may reduce discrepancies between school-based and work-based learning. Resnick (1987) suggested that there are four significant differences between school-based learning and work-based learning: (a) schools tend to focus on individual performance rather than on socially shared performance; (b) schools tend to emphasize abstract thinking rather than application of skills and knowledge; (c) schools rely on mental symbol manipulation rather than hands-on activities; and (d) schools attempt to generalize knowledge rather than concentrate on situation specific knowledge and skills. In this study, youth apprentices discussed how being in a workplace allowed them to apply what they had learned at school to real world situations. Some apprentices were provided with an opportunity to participate in socially shared hands-on activities such as working with other adults in the workplace to complete a task, process, or procedure.

According to Hamilton (1989), mentors may instruct a learner, demonstrate how a task is performed, coach a learner as a task is being performed, explain how or why a task is done, initiate a learner into the culture of the workplace, and affirm a learner's value as a person. Several of these behaviors were displayed in this study. There was evidence to support mentors instructing, demonstrating, coaching, and explaining to apprentices how and why tasks or procedures are done in particular ways. In addition, mentors in this study appeared to assist apprentices gain self-esteem by allowing independent work and then praising a job well done. What makes this finding especially interesting is that the mentors who performed these behaviors received no formal training from this program. Being an educator with nine years of formal training, I expected to find that untrained workers would do a less than adequate job of teaching.

Rosenbaum (1992) believed that youth apprenticeship programs can benefit educators, students, and employers. Participants from this study tended to agree with this assertion. The youth apprenticeship coordinator felt that the program provided businesses with better prepared employees. Students believed that the program allowed them to gain experience in their occupational area. Apprentices were afforded an opportunity to apply school-based knowledge in a workplace thereby allowing them to see a connection between school and work. Students were also able to observe the requirements and skills needed for employment.

Employers stated that they were able to contribute to an adolescent's education and train students in procedures and practices relevant to their company. Employers felt that youth apprentices would become productive and effective employees due to this experience.

Schools may benefit from an increase in resources (e.g., current equipment, input for curriculum) available through business and industry (Filipczak, 1992). According to documents obtained from the youth apprenticeship coordinator, businesses were involved in establishing and updating curriculum requirements for the program. In addition, youth apprenticeship programs may have positive effects on a school's public relations by providing local businesses an opportunity to see what occurs in the school and suggest alterations when needed.

Although youth apprenticeship programs are beneficial, there are limitations. A major limitation of youth apprenticeship programs is the cost (Bailey & Merritt, 1993). Businesses usually pay apprentices a salary and this can be costly, especially in economically difficult times. In fact, one business in this study had to lay off two apprentices because of economic hardships.

Implications

Hamilton and Hamilton (1992) reported that some workplaces are more conducive to learning than others. In this study. students in business management had very little interaction with their mentor. However. apprentices in small computer repair and automotive mechanics worked closely with their mentor and were provided with a variety of work tasks to perform. These two apprentices were also given opportunities for independent work. Vygotsky's (1978) zone of proximal development suggests that learning is enhanced and encouraged when students are allowed to begin learning new tasks with assistance, but assistance is reduced until the student is capable of performing the tasks independently. Mentors who worked closely with apprentices allowed them to gain independence by gradually reducing the amount of support and assistance.

One approach to providing apprentices with challenging and useful tasks is to pair the apprentice with a mentor. Mentors can then guide and assist apprentices in correct procedures to complete a task while teaching apprentices new and relevant information. However, there is limited research about how mentors gain the skills needed to teach apprentices. In this study. none of the mentors had any formal training. A mentor has many responsibilities, not the least of which is to teach an apprentice. Research is needed to: (a) discover how mentors provide effective instruction on the job: and (b) determine if mentors need formal training to be effective. Findings from this study indicate that mentors instructed apprentices in ways that felt natural to them. But what would happen if the apprentice fails because of the mentor's lack of ability to teach? Who's fault is it then--the mentor's or the apprentice's? Therefore, research needs to be conducted concerning the amount and type of training mentors may need to be effective teachers and role models. Although public school teachers are required to have a college education. mentors are not. Does this make a difference or do experienced, expert adult workers innately use methods they believe are more beneficial?

Another major issue of youth apprenticeship programs is work ethics and social behaviors. Being in the company of adult workers also allows apprentices to observe adult behaviors and actions that can assist apprentices in overall development toward adulthood and in the transition from adolescence to adulthood (Hamilton & Hamilton. 1992: Lave & Wenger, 1991). Furthermore, being in the presence of adults can assist adolescents in learning acceptable (and unacceptable) cultural and community work ethics. However, several questions emerge from this area, such as who in a business or community defines work ethics, are they different from one business to another, and if apprentices do not have a sense of work ethics before being employed, how are these instilled and by whom? Are appropriate work ethics a prerequisite for inclusion in the youth apprenticeship program? In addition, if students enter the workplace with appropriate work ethics and social behaviors, are they still considered an apprentice? Is the priority of youth apprenticeship programs work ethics awareness or skills acquisition?

This study was not conducted to generalize results. Instead, this study was done because of an interest in learning in the workplace and to obtain a starting point for seeking additional information regarding learning and teaching in a workplace. Although significant findings emerged, this study had limitations. First, follow-up interviews of apprentices that were fired were extremely difficult to obtain. Of the three apprentices that were fired, only one was located for a follow-up interview. Second, this study would have been strengthened by reviewing student's school transcripts to look for any differences in their school performance before and after entering the program. Third, more interviews at varying times would have added greater insight and understanding to the study. This would have allowed me to detect possible changes in thoughts toward the program over a period of time. Specific issues that could have been addressed focus on the possible perpetuation of sexual inequities. This was a rural area and many people still hold on to traditional ideas about where males and females should work. In this study, females were placed in traditional female employment settings and males were placed in traditional male

employment setting. Was this because the students selected these careers based on their own interests or because someone else encouraged them to select traditional careers? If they were influenced by another, who was it? Was it a parent or the school? These are important questions that need to be addressed.

In future studies, I would like to explore the social aspects associated with learning in a workplace. Although I did obtain some data on this topic, more is needed to get a more complete picture of how students are introduced to and accepted (assuming they are accepted) into a workplace environment. This may be especially significant considering several people in this study suggested that youth apprentices are just that, youth apprentices and not *regular* employees. Considering that these students work alongside experienced employees for the purpose of gaining knowledge and skills associated with their chosen career, what is the difference between being a high school student enrolled in a youth apprenticeship program and a high school student hired to work part time at a business? Maybe a more appropriate question would be, what are the defining elements of a youth apprenticeship program and what makes it unique? In this program, the defining element and uniqueness was that students worked four days a week instead of attending the career center.

An issue related to the uniqueness of youth apprenticeship programs is that of nomenclature. In this study, the career center offered business management. However, findings from observations of apprentices on the job revealed that these apprentices were performing tasks more closely associated to that of secretaries. Were their classes at the career center focused on business management or secretarial skills? Based on knowledge and understanding of the area, it is possible that the career center was being politically correct by changing the names of courses while still teaching the same skills that were taught before.

Furthermore, I would like to conduct further research into the training of mentors. Would more training result in a better mentor or is it more a matter of selecting a competent, dependable, and willing employee? According to findings from this study, mentors exhibited effective teaching behaviors even though they had no formal training. If untrained mentors are able and willing to work with students who are truly interested in learning, what makes a youth apprenticeship program so different from paid part-time work experience? Although this study has answered some questions regarding learning in the workplace, it has left many more questions unanswered. By using these unanswered questions as a guide, additional research can be conducted.

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Figure 1

Dimensions for Cognitive Apprenticeship Environments

CONTENT	METHOD	SEQUENCING	SOCIOLOGY
Domain Knowledge Facts & Procedures	***Modeling*** Students learn by observing	***Increasing Complexity*** Increase difficulty gradually	***Situated Learning*** Reflects real world situations
Heuristic Strategies Tricks of the Trade	***Coaching*** Providing hints to students	***Increasing Diversity*** Increase variety	***Community of Expert Practice*** Communication of expert procedures
Control Strategies Metacognitive Skills	***Scaffolding & Fading*** Teacher support lessens	***Global to Local Skills*** Focus on whole before parts	***Intrinsic Motivation*** Learning for personal reasons
Learning Strategies How to Learn	***Articulation*** Students verbalize learning process		***Cooperation*** Students working together
	Reflection Students compare performances		
	Exploration Student's own problem solving strategy		

Note: Adapted from Collins, A., Hawkins, J., & Carver, S.M. (1991). A cognitive apprenticeship for disadvantaged students. In B. Means, C. Chelemer, & M.S. Knapp (Eds.), Teaching advanced skills to at-risk students (pp. 216-243). San Francisco: Jossey-Bass.

Effects of Integrating Cognitive Apprenticeship Instructional Methods into the Community College Writing Classroom

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Effects of Integrating Cognitive Apprenticeship Instructional Methods into the Community College Writing Classroom

The 21st century American workplace will be increasingly high-tech and sophisticated, and employers will demand that their employees to possess appropriate levels of problem solving, mathematics, and communication skills (Berryman, 1993; Carnevale, Gainer, & Meltzer, 1988; Johnston & Packer, 1987; Kane, Berryman, Goslin, & Meltzer, 1990; Secretary's Commission on Achieving Necessary Skills, 1991). Researchers (e.g., Johnson, Evans, Galloway, & Foster, 1990) have identified these basic skills, which include (a) affective skills, (b) basic academic skills (including reading, writing, computation, and oral communication skills), (c) cognitive skills (including problem solving, decision making, and critical thinking skills), (d) social skills, (e) technical knowledge and skills, and (f) transferable skills, the ability to learn, flexibility, and adaptability (p. 5).

As Johnston and Packer (1987) explain, "When skill requirements [for jobs in the 21st century] in language, reasoning, and mathematics are averaged, only four percent of the new jobs can be filled by individuals with the lowest level of skills, compared to 9 percent of jobs requiring such low skills today" (p. 99). They report that "the fastest-growing jobs require much higher math, language, and reasoning capabilities than current jobs" (p. 99). Adelman (1989), in his argument for integrating academic and vocational education, reports a consensus among business, analysts, and government that the jobs of the future will require mastery of these basic skills, which many students today do not possess.

The Problem and its Significance

National assessments of basic skills have found that many Americans begin their post-secondary education with a deficiency in math, language, and problem-solving skills (i.e., Applebee, Langer, Jenkins, Mullis, & Foertsch, 1990; National Center for Education Statistics, 1994a, 1995). Recent research in teaching has demonstrated that problem solving, mathematics, and communication skills can be learned best when the principles of cognitive science, metacognition, and cognitive apprenticeship are applied (Bereiter & Bird, 1985; Collins, Brown, & Holum, 1991; Collins, Brown, & Newman, 1987; Collins & Gentner, 1980; El-Komi, 1991; Englert, Raphael, Anderson, Anthony, & Stevens, 1991; Fischbach, 1993; Johnson, Flesher, Ferej, & Jehng, 1992; Schoenfeld, 1985). Many of these studies have focused on well-structured domains like mathematics (Fischbach, 1993; Schoenfeld, 1985) and technical training (Johnson et al., 1992). Recently, research in the less-structured domain of communication—one of the key skill areas identified by Workforce 2000—has focused on writing instruction (i.e., El-Komi, 1991; Englert et al., 1991; Flower, 1993; Flower & Hayes, 1980; Kish, 1993; Nash, 1991). We know that currently many students complete 12 years of elementary and secondary education without developing these necessary skills; therefore, educators must seek to develop, test, and implement effective instructional methods to remedy this appalling state of affairs.

This study examined the effects of incorporating the theory, principles, and instructional methods of cognitive apprenticeship into the community college writing classroom. Virtually all post-secondary vocational and technical programs require students to take at least one writing course, which will usually be taught by instructors in the college's English department. Building on the work of researchers in writing instruction (Flower, 1993; Flower & Hayes, 1980) and mathematics (Fischbach, 1993; Schoenfeld, 1985), this study used cognitive apprenticeship instructional methods—with a specific focus on modeling—to present a problem solving approach to writing (Flower, 1993) by having instructors use the technique of think aloud modeling (Collins, Brown, & Holum, 1991; Collins, Brown, & Newman, 1987) when presenting new writing tasks (i.e., summarizing, critiquing, synthesizing material from other sources) to their students. This integration of academic and vocational perspectives is essential if our students are to be prepared to function productively in the workplace of the next century (Ascher & Flaxman, 1993; Berryman, 1993; Bodilly, Ramsey, Stasz, & Eden, 1993; Duncan, 1993).

Cognitive Apprenticeship

Research in cognitive science has made a significant impact on the way we think about learning and teaching (Gick & Holyoak, 1987; Phye, 1986; Royer, 1986). Because knowledge and skills are situated and bound in a particular context (Brown, Collins, & Duguid, 1989; Perkins & Salomon, 1989), the most appropriate instructional method is one that incorporates both (a) the realistic portrayal of the knowledge, procedures, and skills and (b) opportunities to apply the knowledge and develop and perfect the procedures and skills in a realistic context—a description of a system known for centuries as Apprenticeship. Research in education supports the efficacy and logic of apprenticeship. Many researchers (including Bransford, 1979; Johnson et al., 1992; Perkins, 1988; Rosenshine & Meister, 1992) have worked to discover effective methods for developing expertise in learners. As these educators (i.e., Collins et al., 1986; Collins et al., 1991; Johnson et al., 1992; Johnson & Fischbach, 1992; Rosenshine, 1986; Rosenshine & Meister, 1992; Schoenfeld, 1985) describe the cognitive version of apprenticeship, instructors first present a problem and then model the strategies and activities necessary to solve it.

1. The instructors perform as masters, thinking aloud to share their strategies and thoughts with students. Modelers deliver the most complete description of their cognitive activities, their strategies, and provide scaffolding, which they hope will assist students in their own efforts. They describe what they are thinking, why they are doing what they are doing, and correct or re-direct themselves appropriately.
2. Following the modeling, instructors guide students through similar problems, providing necessary support and assistance. Instructors provide necessary supports (scaffolding) and explain the principles and rules that apply. Each successive problem is increasingly complex, and the instructor provides less and less assistance as the students gain experience.
3. Ultimately, students develop competency and solve problems without the assistance of the expert. It is not coincidental that these steps remind us of the methods employed by masters and apprentices for hundreds of years.

In cognitive apprenticeship, as in traditional apprenticeship programs, the master first demonstrates the process for the novice, then closely supervises and coaches as the student begins to perform the simpler components, moving to more and more complex tasks as his/her basic skills become automated. The master coaches, corrects, and teaches the student to evaluate his/her own performance, while gradually reducing the master's involvement as the student nears mastery. The focus on self-evaluation is extremely important because it reinforces cognitive awareness of the principles that support the activities. Cognitive apprenticeship methods have been studied in mathematics (Fischbach, 1993; Schoenfeld, 1985, 1988) and technical curricula (Johnson et al., 1992) and in reading (Palincsar & Brown, 1984). Cognitive apprenticeship has also been proposed as a method in writing instruction (Collins et al., 1986; Flower, 1993; Hayes & Flower, 1980).

Problem Solving

Apprentices learn to solve the problems inherent in their craft by taking on increasingly more challenging tasks with decreasing amounts of assistance from the master. Although much of the research on taking a problem solving approach in education has been conducted in well-structured domains like mathematics (Schoenfeld, 1985), Hayes (1989) sees writing as problem solving. Studies on teaching problem solving in mathematics (Schoenfeld, 1985) have found that unless care is taken to ensure that students grasp the theories and principles underlying mathematics, they may only learn to perform by rote the procedures involved. Rote learning of procedures does not guarantee that students will be able to apply appropriate theories and principles when confronted with new problems that do not closely resemble the examples they have learned to solve. In other words, students may not transfer the skills into new situations. Schoenfeld (1985) says that effective mathematics instruction must require students to understand both mathematical concepts and methods, recognize relationships and think logically, and apply the appropriate mathematical

concepts, methods, and relations to solve problems. Effective writing instruction has similar requirements.

Hayes (1989) and Flower (1993) are among those who have studied the application of the problem solving paradigm to writing. The parallels between the cognitive and problem solving activities required in mathematics and writing are considerable. Rules and "formulas" exist in writing and the same potential exists for students to gain only superficial understanding—they may learn to write grammatically complete sentences that say nothing or may be unable to transfer their writing skills out of the classroom and into the world.

Scaffolding

Scaffolding (Rosenshine & Meister, 1992; West, 1991) includes any device or strategy that supports students in their learning. One example of the use of scaffolding in writing instruction is reflected in the work of Englert and colleagues (1991), who developed an acronym to represent their scaffold, their approach to solving the problem of writing well—POWER. In their approach to writing, P refers to planning; O to organizing, W represents writing the preliminary draft, E is for editing, and R stands for revision (p. 345). Although these methods of representing the composing activities vary slightly, they concur about what is necessary and encompass the same tasks. This is but one example of scaffolding for writing instruction. Although different labels are used and different divisions are made in the composing activities, the common tasks include planning, organizing, drafting, revising, editing, and proofreading—however they are named.

Protocol Analysis

Instructors cannot model their composing activities and strategies unless they know what they are. Studies focusing on the processes involved in writing (Hayes & Flower, 1980) have employed protocol analysis (Newell & Simon, 1972) in their attempts to describe what goes on in the minds of writers as they compose. When instructors attempt to model their cognitive strategies and processes, they must first possess a clear understanding of all their own strategies and activities, which requires that they thoroughly analyze their own composing protocols. According to Hayes and Flower (1980), the

> task in analyzing a protocol is to take the incomplete record that the protocol provides together with . . . knowledge of the nature of the task and of human capabilities and to infer from these a model of the underlying psychological processes by which the subject performs the task. (p. 9)

Think Aloud Modeling

When thinking aloud to model composing activities for students, instructors must first be aware of and then be able to articulate all these components. At best every verbal protocol will be incomplete. As they attempt to verbalize every thought and step and strategy that they employ while thinking-aloud about the task, modelers cannot hope to mention everything (Hayes & Flower, 1980). People think much faster than they can speak, at least much faster than they can speak coherently, but incomplete or not, these verbal protocols provide the only available window into the mind of the writer. Studies in the use of think aloud modeling(Bereiter & Bird, Collins et al., 1991; Collins et al., 1987; 1985; Palincsar & Brown, 1984) have produced positive results. Students have been able to develop the skills that were modeled and employ the strategies they were coached to use.

Cognitive Apprenticeship in Vocational and Technical Education

Cognitive apprenticeship instructional methods, which evolved from vocational apprenticeship traditions, are valuable for vocational and technical education programs (e.g., Bodilly, Ramsey Stasz, & Eden, 1993; Johnson & Thomas, 1994; Rosenshine, 1986). For example, the coaching, scaffolding, and fading activities of cognitive apprenticeship were performed by an "intelligent tutoring system . . . a computer-coached practice environment" (p. vi) in a study conducted by Johnson, Flesher, Ferej, and Jehng (1992). They applied the

theories of cognitive science to the dilemma of teaching aviation mechanics students to troubleshoot like experts. Their study included 34 sophomore and junior students, with 18 students in the experimental group and 16 in the control group. Students in the experimental group practiced for an average of five hours each; the simulated problems presented by the tutor "allowed students to gain considerable experience in proper use of the cognitive strategies needed for competent troubleshooting because it emphasized cognitive skills and de-emphasized physical skills" p. vii). No significant difference was found between the experimental and control groups' hypothesis-generating skills, but the experimental group "was significantly better able to correctly evaluate their hypotheses than the control group). Students in the experimental group were also more able to "recover from their errors" more often than the control group students (85% and 35% respectively). Johnson et al. (1992) concluded that extra, realistic problem solving practice may enhance the application of troubleshooting skills in the workplace and that explicit teaching of troubleshooting processes and skills is advisable.

Cognitive Apprenticeship in Mathematics Instruction

Johnson and Fischbach (1992) and Fischbach (1993) studied the use of cognitive apprenticeship as a method of instruction for technical mathematics and problem solving in a community college. Building on the work of Schoenfeld (1985) (who advocated that mathematics instructors model their problem solving skills for their students during instruction), this study involved technical mathematics classes in a midwestern community college. The goals of the technical mathematics course were to provide the students with skills they could apply in their technology programs. Working with intact classes in a control group design, this study combined Schoenfeld's problem solving method with a collaborative learning focus. The study was conducted during ten weeks of a semester; instructors modeled problem solving (think aloud modeling) and employed group problem solving methods. Students also participated in collaborative efforts to solve complicated and applied problems. Although the post-treatment scores (problem solving examination, final course examination, and standardized mathematics examination) revealed no significant differences between the cognitive apprenticeship and control groups, the researchers concluded that their data supported the use of cognitive apprenticeship as an effective alternative to the traditional method. They also concluded that instructors must increase their own knowledge of mathematics so that they can provide appropriate coaching and scaffolding for students and their knowledge of the applications students will face in the workplace. Johnson and Fischbach also concluded that instructors must be thoroughly trained in the techniques of modeling, coaching, and scaffolding if they are to be effective in these roles.

Cognitive Apprenticeship in Writing Instruction

Scardamalia and Bereiter (1986), in their review of research in writing instruction, noted the potential power of cognitive apprenticeship to support students' writing skills development. Bereiter and Bird (1985), Collins, Brown, and Newman (1987), Flower (1993) and her colleagues (Flower et al., 1994) and Hayes (1990) are just some of the individuals who have examined cognitive apprenticeship in writing instruction. In Classrooms That Work: Teaching Generic Skills in Academic and Vocational Settings, (Stasz et al., 1993), the authors describe "An English Classroom That Works: Writing as Thinking" (p. 60), a college-preparatory English course in which the instructor includes workplace situations, situated learning, modeling, scaffolding, and coaching. Although the students are college bound, the instructor recognized the necessity of making students aware of the realities of the world outside school and of preparing them to become lifelong learners. The instructor made students responsible for their own work, just as they will be expected to in the workplace. Writing assignments about literature were "situated" in the students' own cultural experiences by requiring them to consider how the literature reflected existing problems in their own lives. By grounding the work in realistic and meaningful contexts and purposes,

the instructor made the writing tasks relevant to students as individuals. The instructor included think aloud modeling in his repertoire of teaching techniques. Scaffolding took the form of optional organizational structures for the assigned research paper written on the board. Coaching consisted of providing hints to students, who knew that the hints were directive and not answers in themselves. By presenting both the literature and composition grounded in their relevance and practical application, the instructor enriched his subject.

Summary

The importance of writing as a basic skill in the high tech workplace of the next century has been well documented (Berryman, 1993; Carnevale et al., 1988; Johnston & Packer, 1987; Kane, et al., 1990; Secretary's Commission on Achieving Necessary Skills, 1991). The levels of competency have been measured and have found that the students of today—the workers of the future—typically do not achieve competency in written communication skills (Applebee et al., 1990; NCES, 1994a, 1995). To remedy this situation, researchers in many areas of education (i.e., Bereiter & Bird, 1985; El-Komi, 1991; Englert, et al., 1991; Fischbach, 1993; Flower, 1993; Flower, Wallace, Norris, & Burnett, 1994; Johnson et al., 1992; Palincsar & Brown, 1984; Schoenfeld, 1985) have sought to develop methods to enhance the development of these basic skills. The instructional methods inherent in cognitive apprenticeship, including modeling and scaffolding, are effective tools for building a strong foundation of necessary skills in our students.

Methods and Procedures

The Nonequivalent Control Group Design (Borg & Gall, 1989; Campbell & Stanley, 1963; Cook & Campbell, 1979). Students in intact sections of writing courses at a public, 2-year community college participated. Nine instructors volunteered; each had a single writing course involved in the study. The nine classes were randomly assigned to the treatments: modeling with scaffolds, scaffolds without modeling, and control groups—with a single instructor, who had prior knowledge of think aloud modeling and had expressed her intention to begin modeling in class, purposefully assigned to modeling. Proper training of instructors in the modeling with scaffolds treatment sections was critical (Fischbach, 1993; Johnson, J. L., 1992). Modeling instructors participated in six hours of modeling instruction before the spring semester began in January, 1995. Pre- and post-test scores on American College Testing's Collegiate Assessment of Academic Proficiency (CAAP) Writing Skills Test (1993), pre- and post-test essay scores, instructor journals, classroom observations (researcher observations and audio tapes), and instructor interviews comprised the data. The Multivariate Analysis of Covariance (MANCOVA) statistical method was conducted on SPSS® (Norusis, 1993) to analyze the data (Kirk, 1982, p. 715). Two covariates were used: adjusted group means on both pre-tests (essays and CAAP); group means of both post-tests were the dependent variables.

Data Collection and Analysis

American College Testing's (1993) Collegiate Assessment of Academic Proficiency (CAAP)--Writing Skills Test was used as the quantitative pre-test and post-test. Combined scores and subscores for Usage/Mechanics (punctuation, grammar, sentence structure) and Rhetorical Skills (strategy, organization, style) were analyzed separately.

> This 72-item, 40-minute tests measures the student's understanding of standard written English in Usage/Mechanics (punctuation, grammar, sentence structure) and Rhetorical Skills (strategy, organization, style). Spelling, vocabulary, and rote recall of rules of grammar are not tested. The test consists of six prose passages, each of which is accompanied by a set of 12 multiple choice test items. A range of passage types is used to provide a variety of rhetorical situations. A total score and two subscores are provided. (American College Testing, 1993, p. 2)

Assumptions of the Collegiate Assessment of Academic Proficiency (CAAP) (ACT, 1993) include that (a) CAAP should not be regarded as a measure of minimum competency and (b)

"CAAP should assess academic achievement in selected skills [i.e., writing] that are considered critical for upper division work or for functioning well in the working world [emphasis added]. CAAP tests are designed with a scale of 40-80, a mean of 60, and a standard deviation of 5. Subtests are scaled for a mean of approximately 15 with a standard deviation of 2.5 (ACT, CAAP User's Guide, p. 20). The User's Guide also recommends analysis of covariance (of the CAAP Combined scores) as an appropriate statistical method to control potential bias.

The CAAP Writing Skills Tests were sent to ACT for evaluation. ACT returned the score sheets and the combined scores and subscores for both mechanical and rhetorical skills were entered into a data base for statistical analysis. Statistical analysis was conducted using the SPSS® for Windows™ statistical software package (Norusis, 1993). MANCOVA was the technique chosen because it can statistically "remove the effect of a confounding variable's influence" (Best & Kahn, 1986, p. 280), which could not be controlled by experimental design. As Best and Kahn explain, analysis of covariance (ANCOVA) "uses the principles of partial correlation with analysis of variance" and is the method of choice "when the subjects in two or more groups are found to differ on a pretest or other initial variable" (p. 281). MANCOVA, which is necessary because this study has four dependent variables, thus "enables the researcher to equate the preexperimental [sic] status of the groups in terms of relevant variables" (p. 281).

A second pre-test, an in-class persuasive essay, was also administered during the first week of classes. Prompts for the essays were those used by the Educational Testing Service for twelfth graders in the National Assessment of Educational Progress (NAEP):

> Prompt A: "Take a stand on whether or not funding for the space program should be cut and write a persuasive letter that would convince a legislator of this stand" (Applebee et al., 1990, p. 71).
>
> Prompt B: "Take a stand on whether a bike lane should be installed and refute the opposing view" (Applebee et al., 1990, p. 75).

For the pre-test, equal numbers of the two essay prompts were randomly distributed to students in each class by their instructors. Students who wrote essays in response to prompt A as a pre-test were assigned prompt B for their post-test; students who wrote in response to prompt B as a pre-test were assigned prompt A as a post-test. This procedure was followed to ensure that no student would write a pre- and post-test on the same topic, thereby reducing the possibility of testing effect.

All pre-tests were given during the first week of classes. Post-tests were administered during final examination week of the 15 week semester; thus, pre- and post-tests occurred approximately 14 weeks apart. The CAAP post-test was administered only to students in the participating classes who had taken the CAAP pre-test. Post-test essays were written by all students in participating classes, and in one of the classes, these essays also functioned as final examinations. Pre-test essays were held by the researcher until post-test essays were written, so that both groups of essays would be evaluated by the same cadre of experienced readers during a single grading session. White's (1992) grading criteria, which parallels the numerical system employed by the NAEP but is simpler, was used during the holistic essay evaluation.

Student Attrition From Data Analysis

Because statistical adjustment was necessary to "equalize" the means of the non-equivalent groups in this study, only those students with complete sets of data could be included in the statistical analysis (Glass & Hopkins, 1984; Kirk, 1982). One hundred fifty-nine students took the CAAP and essay pre-tests, and their names, demographic information, and CAAP scores were entered into a database as soon as ACT returned the score sheets. At the end of the semester, 91 students remained in these nine classes, and those who had taken the pre-tests were administered post-tests. Students at DACC are sometimes admitted into classes after the first week; therefore, not all the students writing

the final essay had taken the pre-tests. Absences and students' withdrawal from classes meant that not all who had taken the pre-test took the post-test. After entering the CAAP post-test scores and the pre- and post-test essay scores into the database, students with incomplete data were removed; leaving 82 sets of complete data for statistical analysis. These data were used in the multivariate analysis of covariance. Comparisons among treatment and control groups reveal a slightly smaller percentage of attrition (48%) for the modeling with scaffolding treatment, followed by 50% attrition for the control group, and 51% attrition for the scaffolding only treatment.

Statistical Findings

The statistical analysis of the covariates found that cognitive apprenticeship instructional methods were effective in teaching writing skills. Analysis of the ACT instrument data found that the students' mean post test scores were higher at a statistically significant level ($p = .05$) than those of the controls. These findings indicate that using think aloud modeling to teach writing tasks is a viable instructional alternative; moreover, it can result in increased student writing skill development.

The follow up univariate analysis of covariance indicated significant differences in the CAAP Combined post-test mean scores ($p < .05$), CAAP Mechanics post-test mean scores ($p < .05$), CAAP Rhetoric post-test mean scores ($p < .05$). No significance was found among the treatment groups for the dependent variable: essay post-test mean scores (see Table 1).

Table 1. Univariate Analysis of Effects of Treatment

Post-tests	MS	MSE	F	p
Essay	.77	.49	1.56	.22
CAAP Combined	89.81	7.85	11.44	.00*
CAAP Mechanics	11.86	2.18	5.43	.01*
CAAP Rhetoric	29.41	2.88	10.23	.00*

Note. N = 82; * $\alpha = .05$

Univariate analysis of covariance revealed that statistically significant differences in mean post-test scores did exist among the treatment groups. Three one-way analyses of variance (ANOVA) were conducted to determine where significance between the groups occurred:

1. A one-way analysis of variance was conducted on the CAAP Combined post-tests means and resulted in an F value of 6.32 ($p < .05$). A Tukey-HSD test revealed that the means of both the modeling and scaffolding groups were significantly higher than those of the control group (see Table 2).

Table 2. One-way Analysis of Variance: CAAP Combined Post-Test Mean Scores

Source	df	MS	F
Between Groups	2	140.01	6.32*
Within Groups	79	22.15	

* $p < .05$

2. A one-way analysis of variance was conducted on the CAAP Mechanics post-tests means and resulted in an F value of 3.69 ($p < .05$). A Tukey-HSD test revealed that the modeling group scored significantly higher than the control group (see Table 3).

Table 3. One-way Analysis of Variance: CAAP Mechanics Post-Test Mean Scores

Source	df	MS	F
Between Groups	2	18.96	3.69*
Within Groups	79	5.14	

* $p < .05$

3. A one-way analysis of variance was conducted on the CAAP Rhetoric post-tests means and resulted in an F value of 7.20 ($p < .05$). A Tukey-HSD test revealed that the means of both modeling and scaffolding were significantly higher than those of the control group (see Table 4).

Table 4. One-way Analysis of Variance: CAAP Rhetoric Post-Test Mean Scores

Source	df	MS	F
Between Groups	2	45.07	7.20*
Within Groups	79	6.26	

* $p < .05$

Qualitative Findings

Instructors who performed the modeling reported increased student attention and enthusiasm during modeling. They also reported that students quickly learned the errors they made during modeling and concluded that this occurrence supported the effectiveness of the instructional technique. Modeling instructors reported that more training and supervision during the semester would increase both their competency and comfort in modeling.

Classroom Observations

To validate that the cognitive apprenticeship modeling and scaffolding actually occurred in the treatment classrooms, three observations were made for each participating instructor ($n = 27$). Rosenshine's (1983) list of teaching functions was adapted for use as an observation guide for these visits. The researcher recorded each of the teaching functions observed during each class period while making notes about the instructional activities, scaffolding used, and students' activities.

The teaching function noted most frequently was Lecture; lecture was used in all three treatment groups and by all participating instructors. Discussion, as a teaching function or method, was also employed by all instructors in all treatments; however, in most cases, this discussion took the form of teacher questions and student responses rather than free-flowing, voluntary conversation. Scaffolds were presented in all treatment groups as well: Five scaffolding presentations were observed in modeling class observations, five were observed in scaffolding classes, and four scaffold presentations were observed in the control classes. Guided student practice was observed in all treatment groups, both group work and individual student work. Individual guided practice was observed more often than was

group guided practice. Feedback and correctives (correction and coaching) were observed in all treatment groups.

Modeling was observed five times during nine observations of modeling treatment instructors and once in a control classroom. The researcher observed modeling treatment instructors model the use of scaffolds on three occasions; although scaffolds were given to students in scaffolding and control classes, instructor modeling of the use of the scaffolds was observed only in the modeling treatment classes. Although modeling was observed on five occasions in the modeling classrooms, think aloud modeling was observed only four times and only in modeling treatment classes. Think aloud modeling requires that the instructor verbalize virtually all her/his cognitive procedures, strategies, and thought processes; on one occasion a modeling instructor recited the steps of the writing task but failed to describe the strategies and thought processes being used.

To summarize, lectures were observed frequently, and discussion, as observed in this study, usually took the form of teachers' questioning and students' responding rather than spontaneous dialogue among individuals. Scaffolding and guided student practice provided support for students as they attempted to complete the writing tasks at hand and allowed instructors to give students feedback and coaching.

Summary of Interviews

Debriefing interviews with 8 participating instructors revealed a wide range of course requirements for different sections of English 101 and 102 at DACC. English 101 instructors required an average of six papers during the semester; however, despite the variety of particular papers assigned, each section's work included descriptive, expository, and persuasive writing. M3 also required a summary. The focus on English 102 courses is the development of argumentative writing skills—an argumentative research paper using and citing sources. The three instructors interviewed each required a controlled research paper and an independent research paper. One also required a definition, comparison/contrast or cause and effect paper, and a written final examination. English 130 covers basic sentence writing, paragraph development, and eventually an out of class paper based on information gathered from sources.

Most of the participating instructors met individually with students during the semester. These conferences provided an opportunity for coaching, feedback, and correction for students as they worked on their writing.

The self-reports of instructional methods revealed that instructors believe that they do not use lecture often in the classroom, a perception that was contradicted by classroom observation data. Instructors also acknowledged that classroom discussion most often takes the form of teacher questions and student answers, rather than free, voluntary dialogue. The instructors' perceptions that they use scaffolding concurred with classroom observations.

Modeling instructors shared their perceptions about modeling as an instructional tool and reported that they believed the technique to be effective, noting that student attention seemed higher during modeling activities and that students' responses— "I sensed good and average students responded to modeling" —seemed to indicate that the method was beneficial. The modeling instructors stated that they would have benefited from more extensive training, to prevent their slipping back into old methods and to increase their competency and comfort.

Summary of Instructors' Journals

Although as a group the journals were brief and presented primarily superficial information, some interesting issues arose. One modeling instructor revealed a concern that modeling should be well rehearsed to avoid errors. This concern seems reasonable at first; however, the spirit of think aloud modeling (see Schoenfeld, 1985), if not its utility, requires that the instructor actually compose the writing task at hand, and there is a danger that over-rehearsal could result in memorized presentations rather than actual examples of the struggle involved in composing written work.

One modeling instructor's journal expressed her enthusiastic acceptance of the benefit of modeling; she reported that she now models in all her classes. Interestingly, she is the only modeling instructor who referred to feeling nervous throughout the semester. Perhaps she is less extroverted than the others. Personality traits, comfort levels about public speaking, and willingness to appear fallible to one's class are all issues that must be considered by individuals who are interested in modeling as an instructional method.

Several examples of scaffolding were presented in the journals and have been presented in previous sections. Descriptions of in-class group work were also present. Collaborative writing activities were used by two instructors.

Scaffolding

Modeling and scaffolding instructors were given identical sets of three writing scaffolds during the pre-semester training. Modeling instructors were shown how to model the use of the scaffolds and asked to use them in instruction. Scaffolding instructors were also asked to use the scaffolds, but when handouts were reviewed, none of these scaffolds was included by any of the instructors. During the initial meeting with scaffolding instructors, one had indicated that she would prefer to use her own materials.

The classroom handouts included with one modeling instructor's journal consisted of two papers developed by a faculty member and students, "How can you make an 'A' on your research paper?" and "The Journey to the Final Copy," respectively. Most of the handouts given to the researcher were photocopies of text that the instructors used as supplemental textbook materials or, for most of the instructors in the study, articles upon which writing assignments were based.

Conclusions and Recommendations

What does it all mean? Cognitive apprenticeship works. Whether in well- or ill-structured domains (see Rosenshine, 1986), the holistic, problem-solving approach used in apprenticeship is, at least, an effective alternative instructional method (i.e., Fischbach, 1993), and in this study has been shown to be more effective than current practices in writing instruction. Cognitive apprenticeship has been a successful approach in technical skills instruction, mathematics instruction, reading and writing instruction. It is an ideal vehicle for integrating vocational and academic education because it integrates theory and application in its conduct. Writing instructors, who received only six hours of training in modeling, experienced increases in student attention, enthusiasm, and writing skills' development (as measured by the CAAP and essays). Modeling, as an instructional method, can be taught; however, the modeling instructors in this study were absolute in their belief that they had needed more training, more opportunities to practice, and much more coaching and feedback during the semester.

The scaffolding focus of the study was less successful. Perhaps because the focus was on think aloud modeling, insufficient attention was given to the issues of scaffolding. This study did not design, anticipate, or manage the scaffolding issues well (identifying the criteria for useful scaffolds, developing effective scaffolds, training instructors in the use of the scaffolds, enforcing the consistent use of the scaffolds during the semester, gathering scaffolds used by instructors). Although the researcher distributed and discussed the use of three scaffolds to all treatment instructors, none were used in the study. The instructors did use scaffolding in their instruction, but they used individualized and adapted scaffolding. Perhaps the idiosyncratic nature of composing is accompanied by idiosyncratic usefulness of scaffolds. The researcher, in her own teaching, has observed that some students find a particular organizational scaffold extremely useful while others in the class find it impossible to comprehend—and refuse to use it.

Modeling instructors were unanimous in their judgment that modeling both increased student attention and improved student writing. One modeling instructor reported that when she made an error during modeling, the error appeared immediately in the students' own work. She felt that the rapid learning of this error indicated the powerful nature of

modeling as an instructional tool. Another modeling instructor reported increased student attention from "good and average students" during modeling and informed the researcher that she had incorporated the technique into her other classes. Her enthusiasm for modeling the writing task may have been communicated to her students and, one would hope, might be contagious.

All three modeling instructors reported feeling the need for more training and coaching to prevent them from slipping back into old teaching patterns. One potential problem, and one that might be prevented through increased training, is that instead of actually solving the writing problem via think aloud modeling, instructors may memorize and re-deliver rehearsed presentations—they will act the part of modeling rather than do it. Schoenfeld (1985) avoided this trap by inviting students to bring new mathematics problems for him to solve during class. Writing instructors may avoid the temptation to recite rather than model by asking students to bring short pieces of writing (e.g., newspaper articles) and modeling the writing task (i.e., summary, criticism, synthesizing sources) using these fresh materials. This spontaneous modeling will, however, require that instructors free themselves from the need to appear infallible to their students. Writing is hard work, and watching their instructor model the writing task may reduce students' concerns about their own imperfect and sometimes arduous efforts. Students need to observe the struggle of the master writer to put their own struggle into perspective.

Finally, modeling instructors reported that integrating modeling into the classroom will require major readjustments in the timing of the semester activities. For example, an experienced modeler can perform a think aloud for summarizing a brief piece of writing in 15-30 minutes, but that modeling is just the first step—it should be followed by instructor-coached group efforts at summarizing another passage (guided group practice), after which the class might be asked to reach a consensus on a satisfactory summary. Only then should students be expected to write summaries on their own. With class periods lasting for as few as 50 minutes, at least two class meetings will be required before the final summary assignment is made. If the goal is to achieve competence in writing summaries, this will be time well spent. Without summarizing skills, students cannot be expected to write research papers and reports based on outside sources, whether in school or on the job.

Recommendations for Further Study

1. Serious inquiry into the issues of scaffolding (see Rosenshine & Meister, 1992; West, Farmer, & Wolff, 1991) (identifying the criteria for useful scaffolds, developing effective scaffolds, training instructors in the use of the scaffolds, enforcing the consistent use of the scaffolds during the semester, gathering scaffolds used by instructors) should be conducted so that (a) useful scaffolding can be developed and used in the writing classroom, and (b) subsequent studies into the value of cognitive apprenticeship in the writing classroom will avoid the problems with scaffolding encountered in this study.

2. The success of this study, in terms of significant increases in the students' writing skills as measured by the ACT instrument, supports the use of cognitive apprenticeship instructional methods in the academic classroom and teachability of modeling. Further studies of this kind should be conducted with larger numbers of instructors and students, and in secondary as well as post-secondary institutions of education. Such studies will provide an opportunity to reaffirm or challenge this study's findings and to refine the training necessary for instructors to become effective modelers.

3. Subsequent studies should include observations and/or videotaping of all class meetings; this significant investment in time and resources (well beyond the resources available for this study) will permit comprehensive data collection. Instructor journal keeping should be emphasized and other data-gathering methods, like focus group meetings, should be employed.

4. Comprehensive modeling and scaffolding training programs must be developed so that instructors can develop expertise in these instructional methods and thereby maximize its effect on students' skills development. These training programs should be taught via cognitive apprenticeship. Master modelers should support and guide these apprentices to their own levels of expertise. Modeling and scaffolding training must include opportunities for master-, peer-, and self-evaluation by reviewing videotaped modeling episodes. Both formative and summative evaluations should be included in the development, conduct, and revision of these training programs.

5. Research that compares external evaluations of students' writing skills to instructor-assigned grades for writing courses should be conducted. Course grades should reflect consistent levels of writing competency. In this study, the holistically evaluated essay means were just less than competent—which, if consistent with grades given in classes, would mean that the mean grade of the 82 students would be a C- or D; which is unlikely. While the observed level of competency was consistent with the NAEP results and no course-grade comparisons were made in this study, this raises a serious question.

Recommendations for Practice

1. Classroom implementation of cognitive apprenticeship must be approached with care. The success of this study and others might tempt instructors to jump onto the bandwagon and begin using modeling and scaffolding immediately. However, those responsible for implementing cognitive apprenticeship should first provide appropriate training for their instructors and then evaluate the results of their efforts. These evaluations will provide vital information to all who wish to adopt this instructional system. While these instructional tools are powerful, like all tools they are most useful to those who have been thoroughly taught to use them; the skills and the underlying principles must be fully absorbed, and the skills must be practiced until expertise is gained—or we violate the basic premise of the master-apprentice design.
2. The success of this instructional approach in mathematics, reading, writing, and technical education—and its foundation in vocational education—makes it an ideal method for delivering integrated vocational and academic curriculum. The revelation of cognitive activities and strategies could enhance the interdisciplinary understanding that is critical to collaborative efforts. As writing instructors' modeling de-mystifies composition for their colleagues in technical areas, the technical instructors can, in turn, de-mystify their own disciplines. The barriers can be removed.
3. The value of think aloud modeling and scaffolding for reading, writing, mathematics, and technical curriculum has been established (see, for example, Englert et al., 1991; Flower, 1993; Flower, et al., 1994; Flower & Hayes, 1980; Scardamalia & Bereiter, 1986; Schoenfeld, 1985); therefore, teacher education programs should incorporate these innovative instructional methods into the teacher education curriculum. Professors should not only present these methods to their students, they should incorporate them into their own instructional activities.

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The following document is an evaluation report of the Central High School Academy stakeholder perceptions. For the purpose of this evaluation, stakeholders are defined as the:

- Academy students,
- Academy teachers,
- Academy students' parents and
- Academy Board members.

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Champaign, IL 61820

EVALUATION REPORT:
STAKEHOLDER PERCEPTIONS
OF THE
CHAMPAIGN CENTRAL HIGH SCHOOL
ACADEMY OF
TECHNOLOGY AND
APPLIED SCIENCE

AUGUST, 1995

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Executive Summary

This evaluation concerns stakeholder perceptions of the Central High School Academy of Technology and Applied Science after the first year of program implementation. Academy students, teachers, parents and Board members were surveyed and interviewed. In addition, evaluators conducted observations of the Academy classes.

The results of the surveys and interviews are presented in the findings and evidence section, using descriptive and graphic analysis. In general, the issues revolve around curriculum, career exploration, the Academy experience, influence on students and communication.

Through surveying and observing students, evaluators determined students' perceptions of the Academy were generally positive. The key issues for this stakeholder group focused around the curriculum, the Academy's influence on the students' development and the Academy experience in general. The findings conclude that the Academy has made inroads toward its stated goal of "helping students understand what it means to be successful students." Students found the curriculum and activities were relevant to future job and education needs, thus the Academy is also progressing toward another goal of "relating classroom learning to life experiences." In addition, Academy activities help students develop career awareness. The facility, special programs, curriculum and teachers combined to create a unique learning environment, different from the regular school.

Teachers' perceptions were gathered through interviews and observations. Issues for this group centered around the curriculum, specifically integration efforts, and impressions of their first experience teaching in the Academy setting. Although the teachers reported progress with developing and delivering an integrated curriculum, they also expressed disappointment that they had not been able to fully accomplish their goal. The physical proximity of the teachers' classrooms and offices within the Academy and the ongoing collaboration and extra efforts that were characteristic of this group of teachers resulted in a nurturing environment that both students and faculty enjoyed.

Parents' perceptions of two general issues were determined through a survey. Findings indicated that parents and guardians of Academy students were generally pleased with the Academy's influence on their students' development and interest in school work. Once again, the smaller, nurturing environment was cited as a possible reason for the students' progress. Communication between the Academy and parents indicated opportunities for improvement. Several parents indicated the need for consistent, advanced notice of failing grades.

The members of the Academy's Board of Directors were surveyed to determine the perceptions of their role in influencing the Academy and the communication between them and the Academy. The Board appears to be interested in the Academy's progress and willing to become more involved in its activities. Findings indicated that current levels of Board involvement might be a result of lack of communication and unclear roles and responsibilities. Willingness to create a successful Career Academy is apparent from both the Boards' and teachers' perspectives. The Academy can approach its second year with opportunities for continued growth and the commitment of key stakeholder groups. Evaluators' suggestions for improvement are included in the Findings section of this document.

Academy Overview

The Academy of Technology and Applied Science at Central High School completed its first year of existence in June, 1995. This school-within-a-school is one of over 150 secondary school academies in the United States. No two are alike but several models have developed that are differentiated by certain characteristics. Central's Academy is patterned after the California model which emphasizes both academics and technical training and requires local business involvement and input into curriculum design and delivery. The overall purpose is to preserve students' options and interests in attending further training and/or education beyond graduation from high school. The model is characterized by several components: an occupational theme; block scheduling of the four Academy classes during the morning periods; classes restricted to Academy students; team teaching, and; an integrated curriculum.

Funding for Central's Academy is derived from several sources including the Unit 4 Board of Education, the federal Job Training Partnership Act (JTPA), a grant from the Illinois State Board of Education and seven local business partners. The proposed budget for the first year of the program totals $367,564.

The Academy is staffed by four teachers, including one who also serves in an administrative capacity as its coordinator. The Academy accepted 50 students in its first year and are planning to enroll 50 more freshmen students during each of the next three school terms. There were 49 students enrolled at the time of the evaluation.

Students were recruited from among those entering freshmen who fell between the 25th and 75th percentile on standardized tests and who, in many cases, fit the at-risk student profile. All student participation is voluntary. There are plans to add another Academy with a different technical focus in the future.

Evaluation Purpose

The purpose of this evaluation is to determine key stakeholder perceptions of the Academy. Such perceptions help define the program as it currently exists, identifying its strengths, opportunities for improvement and issues to consider as the program expands into its second year. The four major groups of stakeholders are identified as the Academy students, their parents/guardians, Academy teachers and members of the Academy's Board of Directors.

Evaluation Questions

1. What are the perceptions of Academy students regarding the curriculum, the Academy experience and its influence on career exploration?

2. What are the perceptions of Academy teachers regarding the Academy experience, its effect on them and the students?

3. What are the perceptions of Academy parents regarding curriculum, program/parent communication, and the Academy's influence on their student's development?

4. What are the perceptions of Academy Board members regarding their role in influencing the Academy, and communication between the Board and Academy staff?

Methodology

Stakeholder perceptions were gained from results of three surveys: one to parents, another to students and a third to members of the Board of Directors. Academy teachers provided input as to the focus of key questions to be addressed in the evaluation as well as specific questions to include on the survey documents (see Appendices). The issues that the teachers brought forward were combined with issues the evaluators derived from expertise and early observations at the Academy. The following paragraphs further explain data collection activities for each stakeholder group.

Student survey:
The student survey was administered at one time to 59% (n=29) of the total academy population (49). This group was fairly representative of the total population: 45% male and 55% female; 86% Caucasian and 14% African American; average age, 15.

Teacher interviews:
Teacher perceptions were gathered through interviews with all four teachers. The teacher interview guide was jointly designed by the evaluation team based on prior expertise, Academy document review and initial site visit observations. Two evaluators conducted the interviews on the same day at the same time. Each teacher was interviewed by one evaluator.

Parent survey:
A letter was sent to all parents requesting their permission to interview and/or survey their children. This letter was attached to the parent survey and included a return envelope addressed to the evaluators. The Academy teachers reminded the students to return the permission slips. Evaluators made follow up phone calls to parents as well. Some

responses were mailed and others were returned to school with the students. The response rate to the parent survey was 57%.

Board survey:
The Board survey was given to all attending members at the April 18th Board meeting at Sam's Club (a business partner). The survey was later delivered to two non-attending board members. The surveys were accompanied by stamped envelopes self addressed to the evaluators at their university address. A response rate of 69% was obtained. (Note: Due to their multiple roles teachers and academy administrators who also serve as board members were not given the survey.)

Questions on the Board survey were derived from teacher input and recommendations gathered from a text on business communications.

Document review:
The documents reviewed for the evaluation included the grant proposal to the funding agency, monthly newsletters, the Academy brochure, written Academy goals, public relations documents, and newspaper articles.

Site visits:
The evaluation team conducted approximately 12 separate site visits which included observations of all four core classes, guest speaker lectures, and monthly award ceremonies. On several occasions visits extended beyond school hours, providing the opportunity for informal conversations with students and teachers.

Stakeholder Group	Methods	Population Total	Number of Respondents	Response %
Academy Teachers	Interview Document Review, Observations	4	4	100%
Academy Student Parents	Surveys	49	28	57%
Academy Students	Survey, Informal interviews, Observations	49	29	59%
Academy Board Members	Survey, Board Meeting Observation	12	9	69%

Evaluators' Professional Backgrounds, Values, Biases and Framework for the Evaluation

The evaluation team consisted of three members. Two members have experience in conducting research in a closely related educational reform. Tech Prep and have previous evaluation experience. The third member has extensive experience in assessing classroom teaching techniques and has previous evaluation experience. Our combined expertise and experiences in addition to the newness of the program influenced our approach. A comparison of the two related educational reforms and a brief explanation of the focus of our previous research helps explain the perspective we brought to this evaluation.

Career Academies were initiated in secondary schools to address the needs of the population of students whose post graduation plans include work or technical school, instead of entering a university. Career Academy and Tech Prep initiatives have infused seed monies into vocational education at the secondary level in hopes that schools will challenge students with a more rigorous academic preparation grounded in work related learning activities. Upon graduation those students will be better prepared to meet the challenges of rapidly changing technology in the workplace and further academic study or technical training depending on their career choices.

Typically Tech Prep and Academy students' standardized test scores range between the 25th and the 75th percentile, however neither reform limits student selection to that group. Within this range of students is a group who are considered "at risk" for completing high school. Both programs attempt to decrease that risk by promoting high levels of parent-school communication, teacher-student involvement, practical application of academic concepts and by establishing a school-within-a-school atmosphere. The two initiatives share characteristics that differentiate them from traditional vocational education. Examples include:

- more rigorous academic courses
- a required sequence of core courses in math, science, communication/English and a technical area
- the determination of the technical area derived from community and student needs
- an integrated vocational and academic curriculum taught by teams of teachers
- a focus on career exploration
- the inclusion of "workplace" or "employability" skills infused in the required curricula
- encouragement of program participants to seek education and/or training beyond high school in occupations that provide opportunities for advancement
- an emphasis on partnerships between the schools and local employers including mentoring, job shadowing and guest speaker activities
- multiple funding sources including local support from business and industry

Implementing either one of these complicated educational reforms requires major changes in the ways schools are organized, the ways decisions are made, the skills involved in coordinating diverse stakeholder groups and the development of new curricula. Tech Prep and Career Academies do not come with step-by-step "how to" manuals. They were purposely designed to allow local sites to develop programs tailored to meet the needs of the students, schools and community. This lack of a prescription in Tech Prep has led to many innovations in schools across the nation. It has also resulted in many initiatives that

have failed, are floundering or are conducting business (vocational education) as usual, only under the new name, Tech Prep.

A critical portion of the Tech Prep research the evaluators were involved with revealed six essential processes that must be present to build a new system of education. Three of these processes also appear in related form in the literature regarding successful career academies. They are: 1) an integrated core curriculum; 2) collaborative implementation of the program based upon a network of people and organizations that form the local initiative; and 3) a highly relevant approach to teaching and learning that links learning in the school setting to the genuine laboratory of the workplace and community. (Bragg, Kirby, Puckett, Trinkle and Watkins, 1994; Stern, Raby and Dayton, 1993). We looked for evidence of these processes in the evaluation.

A literature review indicated previous evaluations of Career Academies have concentrated on student outcomes, employment patterns, and participation in postsecondary schooling (Stern, et al., 1992). Our approach looked at the program as the evaluation subject instead of the students in the program. We designed our perspective to be broad enough to determine some of the relationships between the four major stakeholder groups, recognizing that the list was not inclusive of all groups who influence or are influenced by the Academy.

The concepts of Career Academies and Tech Prep make sound educational sense to nearly everyone who becomes familiar with them. That, however, does not insure their permanent places in the educational system when planning and implementation grant monies are no longer available. Strong networks of local support in the form of partnerships and committed stakeholder groups must be present to help the effort become institutionalized and distribute the burden of providing resources of expertise and money. Perceptions of the Academy's first year of operation will play an important role in determining the direction and future existence of the initiative.

The next section summarizes the evaluation findings. Since the Academy recently completed the first year, the data may be helpful in planning for the future. Suggestions are included with each finding. Questions can be directed to the authors.

References:

Bragg, D., Kirby, C., Puckett, P., Trinkle, K., & Watkins, L. (1994, October). Building a preferred future with tech prep systems. (MDS 713). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Stern, D., Raby, M., & Dayton, C. (1992). Career academies: Partnerships for reconstructing American high schools. San Francisco, CA: Jossey-Bass.

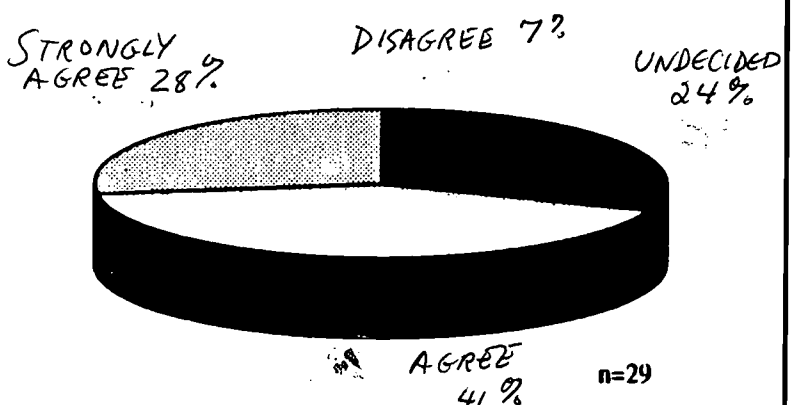
FINDINGS, EVIDENCE AND SUGGESTIONS

Student Perceptions: Curriculum

Finding: The Academy has made inroads toward its stated goal of "helping students understand what it means to be successful students."

Student Survey:

"I feel confident about my performance in school."



Observation:

Evaluators observed students communicating with adults and other students in a mature manner. In addition to having career goals, students shared their understanding of what it would take to accomplish the goals--studying, college and lots of hard work.

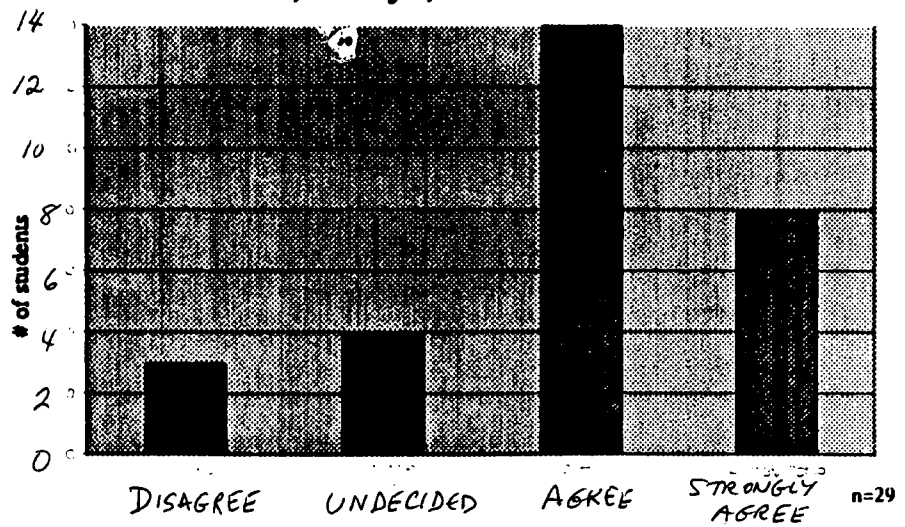
Suggestion: Further define "successful student." This will make the goal easier to measure in the future. The Academy concept offers a rich opportunity for accomplishing this goal as well as developing well-rounded individuals.

Student Perceptions: Curriculum

Finding: Academy students find the curriculum and activities are relevant to future job and education needs, thus the Academy is progressing toward its goal of relating classroom learning to life experiences.

Student Survey:

"The Academy helps me understand how my high school courses will be useful to me later, on the job, and/or in further education."



Observation:

Guest speakers are scheduled every Friday morning. Topics they cover include how school subjects are used at work and the employment opportunities in their occupations.

Evaluators observed 3 guest speakers. Students appeared to generally enjoy the presentations. They remained attentive and asked relevant questions.

Students appear to enjoy their classes in the Academy. This was confirmed on the student survey when 20 of 29 (70%) respondents chose an Academy class as their favorite school subject.

Student Survey: "What do you like about the Academy?"

"The teachers have high standards--they push you to make everything in your portfolio look good and it looks good on your resume."

"The guest speakers are really cool but there should be more women and minorities."

"The classes are integrated, like life is, so we can see the results of...one class and analyze it in another."

"We get a 'jump start' on our futures."

Suggestion: Recruit a diverse pool (gender and ethnicity) of speakers who represent a variety of occupations. Develop a presentation guide that will be mailed to each speaker to enable more consistent presentations.

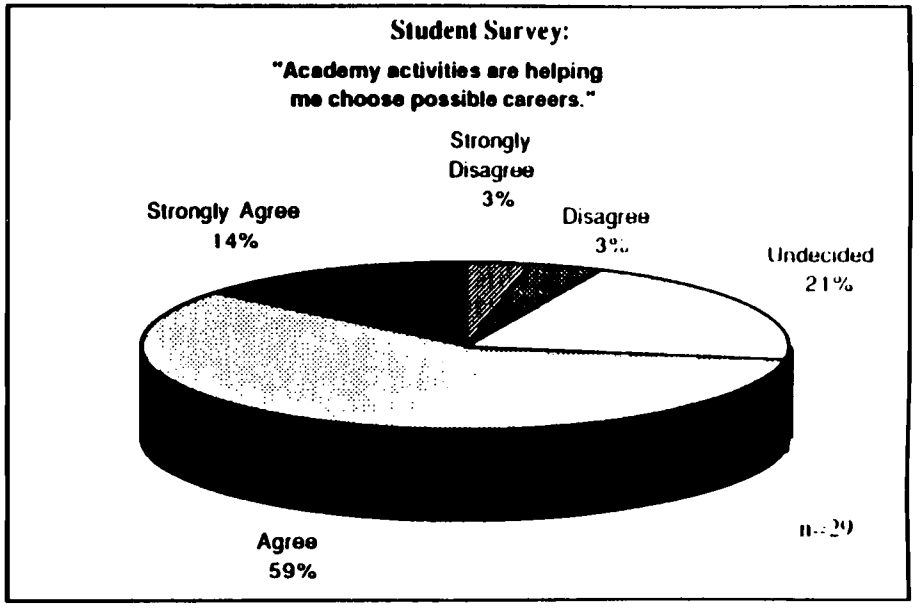
Student Perceptions: Academy Influence on Career Exploration

Finding: The Academy helps students develop career awareness.

Student Survey:
"What is your future career goal?"

Airplane pilot (2)	Law enforcement
Agronomist	Medical (6) including Pediatrician, EMT, & Psychologist
Architect (2)	
Biologist	Singer
Carpenter	Sports store owner
Dancer	Sports medicine
Disc Jockey	Video game counselor
Teacher	Zoologist (2)
Investment Banker	

n=29, 5 students did not answer



Student Survey:
"List 3 things you like about the Academy"

"We get a lot more information about jobs, careers and our future."

"The guest speakers." (7 responses)

"The projects we do are fun and [will be] useful in the future."

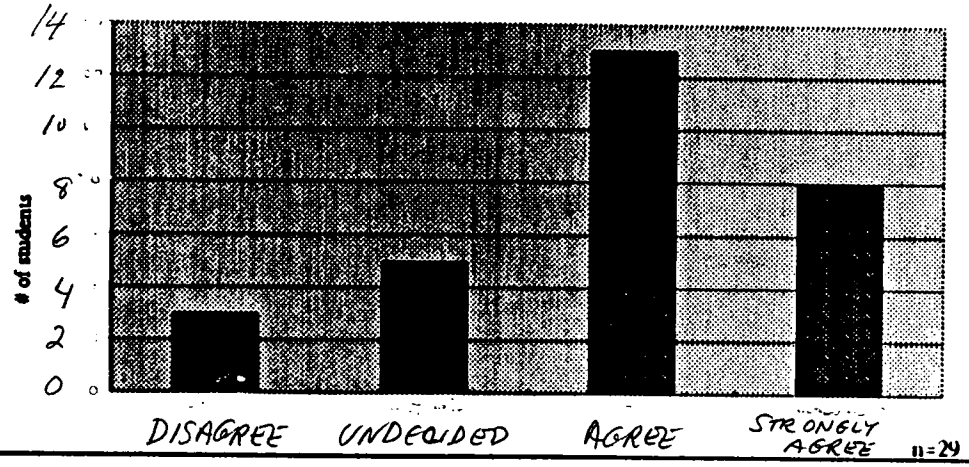
Suggestion: Further define the Academy focus--Academy of Technology and Applied Science may be unclear to students and parents. State it in terms students and parents can understand.

Student Perceptions: The Academy Experience

Finding: Most students enjoy the facility, special programs, curriculum, and teachers that create a unique learning environment different from the regular school.

Student Survey:

"There is a good learning atmosphere in the Academy.



Observation:

Students are recognized once a month with a party. A cake and one $100 savings bond are donated by corporate partners.

Students frequently return to the Academy at the end of the day to "hang out".

Students routinely conduct tours of the Academy for visitors.

Students gravitate to the computers during every free moment. They are allowed to check out laptops overnight to complete assignments.

Student Survey:

"List some ways Academy classes are different from the courses your friends (not in the Academy) take."

"I get more one-on-one help because if one teacher isn't available one of the others is."

"We get to do a lot with the computers. This is not necessarily so outside of the Academy."

"The environment is set off from other distractions. You really want to do your work."

"I like [it] that we can go on field trips for one class and not have to worry about make up work from our other classes in the Academy."

"The teachers really work on having all of our work done and [they expect] the best."

"We are treated with respect and are expected to return it."

Suggestion: Continue the extra efforts toward creating a sense of community within the larger high school.

Teacher Perceptions: Curriculum

Finding: Teachers have made progress toward developing an integrated curriculum.

Teacher Interviews:

Responses to question regarding curriculum integration:
"[We were successful with]...our unit on stress, where we taught metabolic rates, biorhythms and genetic traits in biology; created spreadsheets of daily blood pressure readings in technology; computed mean, median and mode for heart rates in math; and read stories about stress then paraphrased on the computers for English."

Teacher Interviews:

All teachers expressed disappointment at curriculum integration efforts. Teachers planned to develop 3 major integrated units. One full unit was developed and taught. During the 2 periods set aside for planning time, teachers found themselves conducting other necessary activities (they brainstormed a list of 23 activities) including

- handling administrative duties
- preparing grant reports

Teacher Interviews:

"How is teaching in the Academy different from your regular classroom teaching?"

"I like it. Especially those civilized moments when we can plan."

"[Because of the proximity to one another] the way we taught was different, even when we weren't officially integrating."

Observation:

Evaluators observed a timeline hanging on the wall. Upon questioning, both the math and science teacher said that due to the physical proximity the math teacher knew the science teacher was teaching a unit on evolution. She, in turn, was able to prepare the students by teaching them large numbers. As a result, the science teacher reported that Academy students understood the timeline concept better than non-Academy students. She attributed the difference to the students' math preparation.

Suggestion: Refocus on the Academy purpose and commit time and energy to meeting curriculum integration goals.

Teacher Perceptions: The Academy Experience

Finding: The Academy experience has a positive effect in creating a nurturing community for students and faculty.

Teacher Interview:

What is the best thing about the Academy?

"the camaraderie among staff and students"
"freedom to teach the way we want to, 4 of us with the kids for 4 hours produces a nice atmosphere"
"the way teachers work together and the educational benefits of the students"
"kids really enjoy being here--that was our goal. Some are not happy, but they do come."

Teacher Interview:

"We've helped some parents learn how to be parents of students: setting guidelines for study time, following up on homework assignments and taking the initiative to contact the school."

Observation:
During site visits evaluators observed teachers:

answering students' questions regardless of the subject area.

available for student help after school, often staying beyond 5:00 p.m.

collaborating about a particular student's change in behavior that indicated the student was headed for trouble.

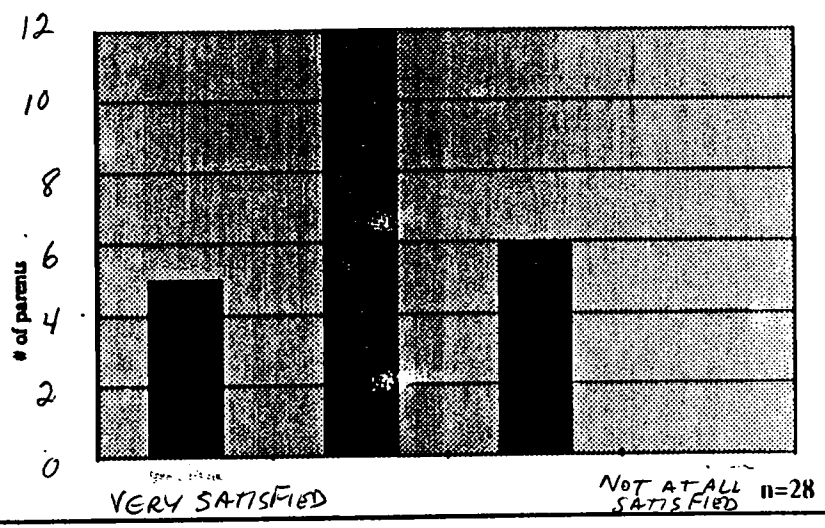
Suggestion: Identify the critical factors that made the Academy work from the teachers' view and share successes and failures with incoming and potential Academy teachers. Continue the collaborative approach to the Academy teaching experience.

Parent Perceptions: Communication

Finding: Most parents are satisfied with the communication from the Academy.

Parent Survey:

"How satisfied are you with the communication between you and Academy teachers?"



Parent Comments:

"Anything else you would like to tell us?"

- "When there has been a problem, teachers have gone out of their way to communicate and seek solutions." (3 similar responses)
- "The newsletter is great."
- " [The Academy is] . . . hard to reach by phone. "
- " [We] need more advanced warning about low grades to allow for make up before midterms come out. " (4 similar responses)

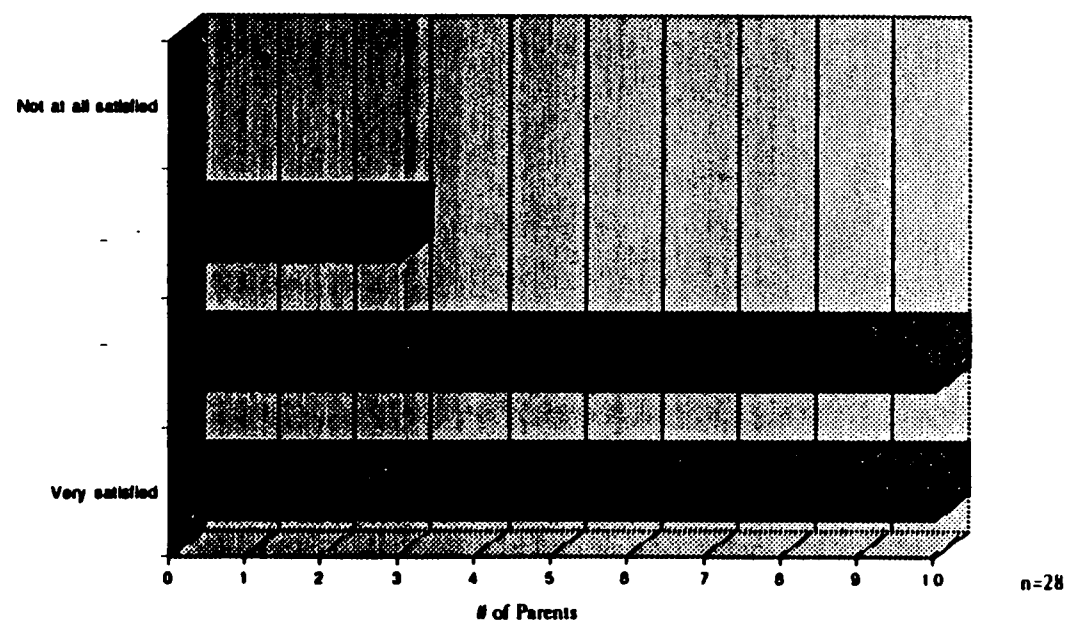
Suggestion: Add an answering machine to the Academy phone and publish the number in the newsletter to further encourage communication with parents. Implement pre-midterm progress reports for all students.

Parent Perceptions: The Academy Experience

Finding: Most parents are generally satisfied with their student's participation in the Academy.

Parent Survey:

"How satisfied are you with your student's participation in the Academy?"



Parent Survey:

"Would you recommend the Academy to other parents? "

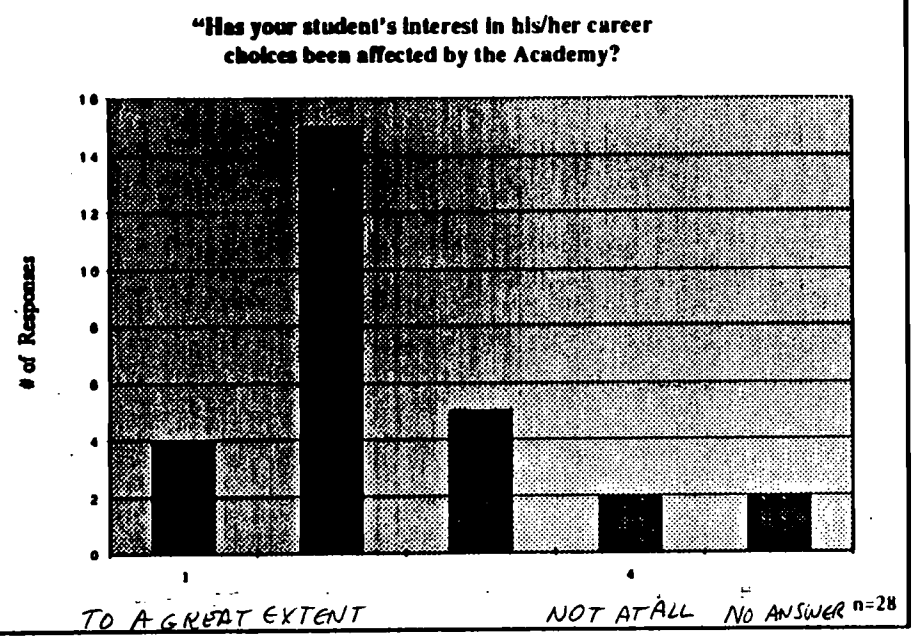
Yes	24
No	2
Don't know	2

Suggestion: Seek input from all parents to ascertain their expectations of the Academy and to continue the rapport the Academy currently enjoys with parents. Consider establishing a pre-enrollment "contract" with parents that defines both parties' roles and responsibilities.

Parent Perceptions: Academy's Influence on Student's Development

Finding: Parents perceive the Academy is assisting their student in making career decisions.

Parent Survey:



Parent Survey:

"My son is evaluating different career opportunities."

"In general, the Academy is promoting her competence and thereby her interest in whatever career is chosen."

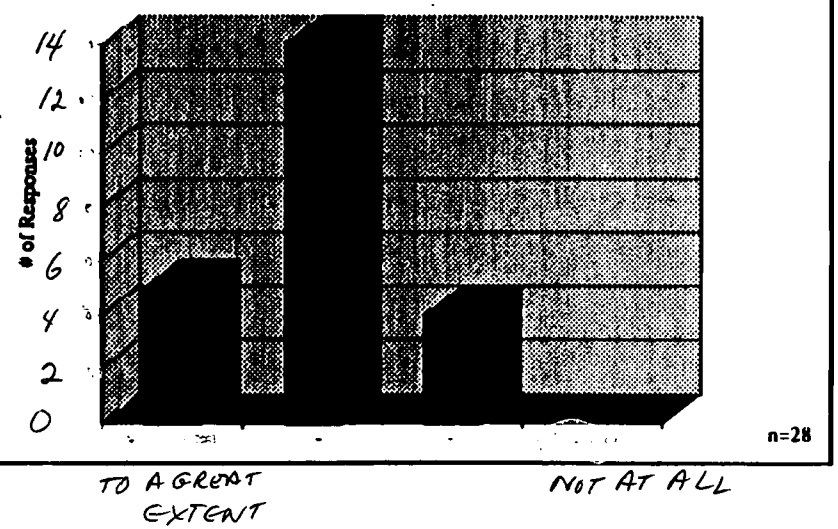
Suggestion: Continue efforts to educate parents regarding employment trends, the educational preparation necessary for those careers and the related career exploration activities conducted in the Academy.

Parent Perceptions: Academy's Influence on Student's Development

Finding: Most parents perceive the Academy has positively affected their students' interest in school work.

Parent Survey:

"To what extent has the Academy helped your student see the value of high school work?"



Parent Survey:

"[My daughter] is not a willing student. . . the small classes and excellent teachers have made all the difference."

"The Academy is a more nurturing environment for the tentative student."

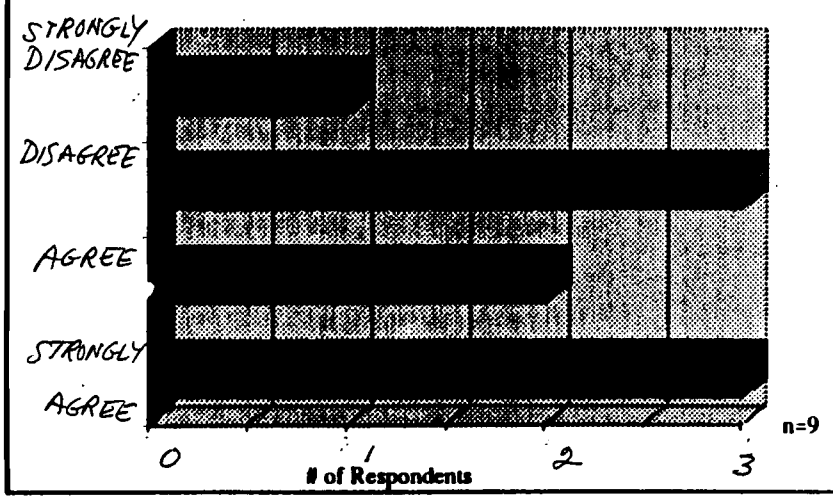
"My son has a serious history of disorganization. That has changed. . . . He has learned how to pace himself with school assignments... [and] value his education."

Suggestion: Continue efforts to maintain standards of academic excellence for the Academy student population. Celebrate the successes by asking parents to help with recruitment activities, e.g.. attend open houses, use parent quotes in promotional materials.

Board Perceptions: Communication

Finding: Academy partnerships require attention to administrative duties not typical of traditional teaching responsibilities.

Board Member Survey:



Teacher Interviews:

"What were your expectations about teaching in the Academy? "

"...It is 10 times more work than expected...coordination "other" activities such as writing grants, conference presentations and board meetings."

Observation:

Evaluators received different lists of board members that were outdated. There were name inconsistencies on both lists.

Board Member Comment:

"I was never officially notified that I am on the board....I have received notice for meetings up to 2 weeks after the meeting occurred."

Board Perceptions: Current Role in Influencing the Academy

Finding: The opportunity exists for increased Board involvement.

Board Survey:

"I would like to be more involved in what is happening with the Academy."

Choice	# of Responses	
Strongly Agree	2	
Agree	7	
Disagree	0	
Strongly Disagree	0	n=9

Observation of April 19th Board Meeting:

Academy Teachers and administrators spoke for a majority of the meeting time.

One Board member requested a list of phone numbers of other board members to facilitate communication for subcommittee activities.

Board Survey:

"Describe your vision for the Academy"

"Establish a practical education, more hands-on approach to learning and helping students to set goals"

"Expand the Academy into an advanced technology communication and visual arts center."

"To really get the average and above average [students] as much as average and below average students."

"Look at more aspects of Technology. Focus on careers and planning/preparing for careers."

"Help students realize they must show employers and other employees respect. They must have good attendance records. They must conform to the demands of the business to be successful."

"Each year continue to grow, not only in size but quality."

Suggestion: Seek further information regarding maximizing the relationship between the Academy and its Board. Consider a joint training session on visioning and role expectations with Board members and teachers.

APPENDICES

Student Survey
Central High School Academy
Spring, 1995

Gender: *(please check one)*
- ☐ Male 45%
- ☐ Female 55%

Age *(please check one)*
- ☐ 14 34%
- ☐ 15 58%
- ☐ 16 8%

Ethnic Group: *(please check one)*
- ☐ African American 13.8%
- ☐ White/Caucasian 86.2%
- ☐ Other *(please specify)*

_____

Do you plan on attending the Academy next year ?
(please check one)
- ☐ Yes 83%
- ☐ No 4%
- ☐ Undecided 13%

After high school my plans include: *(please check one)*
- ☐ No further education 0%
- ☐ Technical school 3%
- ☐ 2-year college 10%
- ☐ 4-year college 84%
- No Answer 3%

What is your future career goal?

_____

_____

_____

What is your favorite school subject

_____

Directions: For each statement below, circle the number that represents your views. **All answers are confidential.**

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Academy activities are helping me choose possible careers.	3%	3%	20%	58%	14%
2. The Academy helps me understand how my high school courses will be useful to me later, on the job and/or in further education	0%	12%	12%	48%	28%
3. There is a good learning atmosphere in the Academy	0%	10%	17%	45%	28%
4. I feel confident about my performance in school	0%	7%	24%	41%	28%
5. My parents/guardians are glad that I am participating in the Academy	0%	3%	17%	28%	52%
6. My Academy teachers give me helpful feedback on my progress	3%	7%	17%	45%	28%
7. I am aware of the subjects offered in all four years of the Academy.	7%	10%	14%	34%	35%
8. I would recommend the Academy to my friends	3%	3%	34%	27%	33%
9. My experience in the Academy has been positive	0%	10%	21%	41%	28%

Please complete the following questions.

10 List some ways Academy classes are different from the courses your friends (not in the Academy) take.

11 List 3 different things you LIKE about the Academy (besides the cake from Sam's).
1.

2.

3.

12 List 3 different things you would like CHANGED about the Academy (besides getting air conditioning). Include any SUGGESTIONS.
1.

2.

3.

Thanks for all your help!

*Interviewee Name*_____ *Date*_____
*Start time*_____ *Stop time* _____

CHS Academy Teacher Interview Guide

Thanks for taking time to talk with me today. I have about ten questions to ask you to help us with the Academy project. They will range from how you got involved with the program to where you see it going. Obviously, there are no right or wrong answers. Your comments will be anonymous and if you tell me to ignore certain remarks, I will.

1. How did you get involved with the Academy?

   I am assuming you are planning on continuing here next year, correct?

2. What were your expectations? In what ways have they been met?

3. What surprised you the most about what's happened in the Academy this past year?

4. Tell me about your experience teaching in the Academy.

5. What issues would you like to see addressed in the Academy report?

6. Tell me about the students that you have this year..

7. I understand one of the cores of the Academy concept is curriculum integration. What are examples of ways this has occurred?

If you could give yourself and team members a grade on integration, what would it be?

How did you select that grade? What needs to happen for the grade to change?

8. Another core concept for the Academy was building career awareness. How was this conducted?

What was your involvement?

9. I know you said that _____was the thing that attracted you to the Academy. What do you think will work to bring teachers into the Academy in the next two years?

If you could give them advice to help them succeed in teaching in the Academy, what would it be?

10. If you could change anything about the Academy, what would it be?

11. What do you feel is the best thing about the Academy?

Thank you.

Champaign Central Academy
Board of Director Survey
Spring, 1995

This survey is part of an Academy evaluation, conducted by three University of Illinois graduate students. The evaluation is examining stakeholder group (students, parents, teachers, board members) perceptions of the Academy.

Please take a few minutes to reflect on the questions below. There are no right or wrong answers. Your responses will be strictly anonymous and confidential.

Return the survey by April 25, 1995, in the postage-paid envelope provided. All responses will be analyzed and major findings presented in a final report.

Directions:
For the statements below, please circle the extent to which you agree or disagree with each statement.

		Strongly Agree	Agree	Disagree	Strongly Disagree	No Answer
1.	Communication from the Academy to the Board is sufficient and timely.....	33%	22%	34%	11%	
2.	The information I receive prior to Board meetings is helpful.....	22%	44%	22%	0%	11%
3.	The number of meetings we held this year was sufficient.....	44%	56%	0%	0%	
4.	I am familiar with the curriculum of the Academy.....	44%	33%	22%	0%	
5.	I would like to be more involved with what is happening at the Academy.....	22%	78%	0%	0%	
6.	I feel confident that I know what is happening at the Academy.	33%	44%	22%	0%	
7.	I am please with the amount of community and business support for the Academy.....	11%	22%	56%	0%	11%

- over-

Please reflect on the questions below and write your answers in the space provided. If you need more space, please attach additional pages.

1. Describe your involvement (subcommittee, Academy visits, contact with business community on behalf of the Academy, etc.) with the Central High School Academy Board of Directors.

2. What do you see as your primary role as a member of the Academy Board?

3. What is the best aspect of the Academy?

4. What aspect of the Academy would you like to see improved?

5. Describe your vision for the Academy.

Thank you for your time and valuable insights. Please return this survey in the postage-paid envelope provided by April 25, 1995.

Surveys should be returned to:
Paula Puckett
College of Education, Room 345
University of Illinois at Urbana-Champaign
1310 S. Sixth Street
Champaign, IL 61820

THANK YOU!

Parent/Guardian Questionnaire: The results of this questionnaire will be used to improve the Academy. Your responses will remain anonymous. Thank you for your help.

Directions: Please circle the number that best indicates your views.

1. How satisfied are you with your student's participation in the academy?

   Please explain.

Very satisfied 1	2	satisfied 3	Not at all 4	No Answer
47%	40%	13%	0%	

2. How satisfied are you with the communication between you and the Academy teachers?

   Please explain:

Very satisfied 1	2	satisfied 3	Not at all 4
21%	54%	24%	0%

3. How often has your Academy student talked about his or her day at the Academy with you?

Very often 1	2	3	Not at all 4
32%	46%	22%	0%

4. Has your student's interest in his/her career choices been affected by the Academy?

To a great extent 1	2	3	Not at all 4	
14%	54%	18%	7%	7%

5. To what extent has the Academy helped your student see the value of high school work?

To a great extent 1	2	3	Not at all 4
32%	50%	14%	4%

6. Would you recommend the Academy to other parents?

   Please explain.

Yes	No	Don't know
85%	7%	8%

7. Is there anything else you would like to tell us about your or your student's experience with the Academy? Use the back of this questionnaire for additional space.

Please return in the enclosed, stamped envelope to:

Paula Puckett
Room 344 Education Building
1310 South Sixth Street
Champaign, IL 61820

NEW DIRECTIONS IN AGRICULTURAL EDUCATION: THE IMPACT IN PUBLIC SCHOOLS

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INTRODUCTION

In recent years, strategic planning has gained popularity because it helps decision makers to plan effective programs. Strategic planning involves a holistic approach to planning that reflects education's growing concern beyond subject matter. *The Strategic Plan for Agricultural Education* (1990) recommended changes that would strengthen agricultural education in the public schools. The Strategic Plan document states, "the challenge to the agricultural education profession... is to develop a vision of agricultural education for the next decade that addresses technology, innovation, entrepreneurship, creativity, flexibility and individual needs in agriculture" (1990, p. 3).

Assessment of program initiatives and directions proposed in 1989 by the National Council for Agricultural Education was somewhat limited. Zurbick (1993) conducted an assessment of the status of agricultural education in several western states to identify innovative and creative programs in agricultural education. Nesbit (1992) conducted a study to determine changes that have occurred in Idaho's secondary agricultural education programs.

The Strategic Plan for Agricultural Education (1990) recommended changes necessary in order for agricultural education to remain in public schools. Representatives at the Agricultural Education Summit formed goals and resolutions they believed would structure programmatic changes for delivering agricultural education in the U.S. Leadership provided by the committee drafting the plan offered a challenge. Each state was strongly encouraged to develop a "strategic plan" following guidelines, goals and resolutions of the national plan.

"Without a commission to study the needs of individual states and make recommendations, the agricultural education reform movement will be piecemeal, at best" (Paxton, p. 7). After five years, concerns exist as to the effectiveness of and if the "new directions" have impacted agricultural education. Have teachers adopted *The Strategic Plan for Agricultural Education* (1990) or are they developing their own agenda? Have teachers already implemented local plans, programs and curricula that coincide with the national directives? Are there gaps in programming that need attention by planners?

PURPOSE AND OBJECTIVES

The major purpose of this study was to determine the extent of past use and need for goal and resolution statements included in the agricultural education program and the strategic plan in the five states. The objectives of the study were to:

1. Describe program characteristics of schools.
2. Identify past use and need for goal statements included in the agricultural education program and the *Strategic Plan.*

3. Identify past use and need for resolution statements included in the agricultural education program and the *Strategic Plan.*

METHODS AND PROCEDURES

Selection of States

The selection of five states for the study was based on two criteria: 1) determination if state leadership teams took a role in pushing forward the tenets of the *Strategic Plan*; and 2) if both the state department of education and the university were actively involved in promoting change as envisioned in the *Strategic Plan*. These criteria were based on comments made by Dr. Larry Case, Coordinator of Agricultural and Rural Education, who indicated that the five states met the two criteria stated above, therefore, justifying selection for the study.

Population and Sample

The target population for the study was all agriculture teachers in five states: Arkansas, Idaho, Indiana, Iowa and South Carolina (N=933). The frame was obtained from respective agricultural education departments in the five states. A sample of 263 was randomly selected using computer generated numbers. This sample size reflects a 5% margin of error with a 5% risk of drawing a bad sample (Krejcie & Morgan, 1970).

Instrumentation

The survey instrument developed by Eaton (1994) was modified and used for the study. The instrument contained three sections. Sections one and two consisted of 48 items relative to the "use" and "need" of goals in agricultural education programs for the strategic plan and perceptions related to the National Summit Resolutions for Agricultural Education. Responses to these items were scaled on a five-point Likert scale. The "use" scale ranged from never = 1 to consistently = 5. The "need" scale ranged from not needed = 1 to very much needed = 5. The following section contained 19 items which measured individual program characteristics (enrollment by grade levels and gender, number of periods, changes in enrollment, FFA chapter membership, programs that influence students to enroll in agricultural education, number of teachers in school, years of experience, educational level attained, gender, membership, etc.). The face and content validity of the instrument were established using a panel of experts which consisted of faculty and graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University.

Data Collection and Analysis

A cover letter explaining the purposes of the study, a copy of the instrument and a return addressed envelope were mailed to the participants on February 16, 1994. The instruments were printed in five different colors and contained an identification number on the back cover for non-response follow-up, ease of recording and data entry. After two follow-up mailings which took eight to ten weeks, a total of 146 teachers responded (56%). Teachers who responded within six weeks of the first mailing (early) and teachers who responded after six weeks (late) were compared for non-response bias. No significant differences were found between the two groups of teachers and as such the results were generalized to the population. Descriptive statistics were used to organize and summarize data. A post-hoc reliability analysis indicated that the instrument had acceptable reliability (Cronbach's alpha 0.86).

FINDINGS

Demographic Profile of Teachers

Ninety-five percent of the teachers were male (Table 1). A majority (57%) of teachers reported the master's degree as their highest education level, followed by the bachelors degree (37%). On an average, teachers had 19.6 years of teaching experience. Most teachers (79%) were members of the NVATA. Forty-five percent of teachers reported that they subscribe to the *Agricultural Education Magazine*.

Objective 1: Individual Program Characteristics

The individual program characteristics of schools are presented in Table 1. Agricultural education program enrollment for junior high and senior high for the school year 1992-93 indicated more students participated in the eighth grade. In junior high, on an average there were 23 students in grade 8 and 13 students in grade 7. In senior high, on an average there were 22 freshmen, 21 sophomores, 19 juniors and 16 seniors.

Program enrollment by gender indicated that 79% were males and 21% females. Percentage of students coming from rural farm or town background were more or less evenly distributed with 51% coming from urban backgrounds and 49% from rural backgrounds. Single class periods were utilized most frequently by agricultural education programs in the five states (85%), followed by both single and double periods (9%) and double periods (3%).

Data relative to changes in agricultural education program student enrollment in the five states during the last 3 years showed an increase in 77 programs (60%). On the other hand, only 11 programs (8%) indicated a decline in their enrollment by 5% or more. For 47 (32%) programs there was no change in enrollment.

The mean number of FFA members during the school year was 67. In regard to changes in FFA membership in the past three years, 66 programs (46%) increased their membership by more than 5% while 19 programs (14%) witnessed a decline in FFA membership. The remaining 57 (40%) programs did not experience any change in their FFA membership.

The mean number of participants in SAEP for the school year was 61. Forty (29%) programs experienced an increase in SAEP while 18 (13%) programs experienced a decrease. However, for 83 (57%) programs there was no change in SAEP.

Table 1

Individual Program and Teacher Characteristics

Characteristic	f	%	Mean/SD
TEACHER CHARACTERISTICS			
Years Teaching Secondary Agriculture			19.16/19.00
Highest Education Level			
Bachelors	53	37	
Masters	80	57	
Ph.D./D.Ed.	-	-	
Ed Specialist	6	4	
Other	3	2	
Gender			
Female	7	5	
Male	134	95	
Member of the NVATA			
Yes	111	79	
No	29	21	
Subscription to Agricultural Education Magazine			
Yes	63	45	
No	78	55	
PROGRAM CHARACTERISTICS			
Ag Ed Program Enrollment by Grade for 1992-93 School Year			
Junior High--7th grade			13/30.00
8th grade			23/34.06
High School--Freshman			22/17.80
Sophomore			21/14.31
Junior			19/13.74
Senior			16/10.85
Percentage of Program Enrollment by Gender			
Percent Females		21	
Percent Males		79	
Percentage of Students by Farm/Town Background			
Percent Students from Farm/Rural Homes		49	
Percent Students from Town/Urban Homes		51	

Table 1

Individual Program and Teacher Characteristics (contd.)

Characteristic	f	%	Mean/SD
Agricultural Education Program Periods			
Single	121	85	
Double	4	3	
Both Single and Double	13	9	
Others	5	3	
Changes in Ag Ed Program Student Enrollment in past 3 years			
Increased 25 percent or more	29	20	
Increased 5 to 24 percent	58	40	
No change	47	32	
Decreased 5 to 24 percent	8	6	
Decreased 25 percent or more	3	2	
Changes in FFA Membership in past 3 years			
Increased 25 percent or more	17	12	
Increased 5 to 24 percent	49	34	
No change	57	40	
Decreased 5 to 24 percent	14	10	
Decreased 25 percent or more	5	4	
Changes in SAEP in the past 3 years			
Increased 25 percent or more	15	11	
Increased 5 to 24 percent	25	18	
No change	82	57	
Decreased 5 to 24 percent	14	10	
Decreased 25 percent or more	4	3	
Total FFA Membership for the 1992-93 School Year			67/107.91
Total SAEP Participation for the 1992-93 School Year			61/52.50
Number of Teachers in Ag Ed Department			1.5/2.11

Objective 2: Past Use and Need for Goal Statements

Teachers were asked to review the goal statements in the strategic plan and indicate the degree to which they have used this in the past (on a scale of 1 = never to 5 = consistently) and the extent they perceived they needed the goal statements in the strategic plan. Data are shown in Table 2. Overall, teachers used "sometimes" to "consistently" the 23 goal statements included in the strategic plan. The top five goal statements "usually" or "consistently" used by teachers were: serve all individuals equally without discrimination (4.54), serve all groups equally without discrimination (4.47), teaching which includes leadership development (4.38), amplify the "whole person" concept of education including leadership skills (4.34), and teaching which include personal development. The "much needed" goal statements included: teaching which included leadership development (4.52), personal development (4.51), amplify the "whole person" concept of education including leadership skills (4.50), and cultivating partnerships with science (4.31) and math (3.96) departments.

Table 2

Means, Standard Deviations and Rankings for **Past Use** and **Need** for Goal Statements Included in Agricultural Education Programs and the Strategic Plan

Goal Statement	PAST USE			NEED		
	Mean	SD	R	Mean	SD	R
Serve all individuals equally without discrimination	4.54	0.71	1	4.24	0.89	8
Serve all groups equally without discrimination	4.47	0.71	2	4.31	0.96	5
Teaching which includes leadership development	4.38	0.75	3	4.52	0.73	1
Amplify the "whole person" concept of education including leadership skills	4.34	0.80	4	4.50	0.77	3
Teaching which includes personal development	4.27	0.75	5	4.51	0.71	2
Teaching which includes formal instruction	4.19	0.72	6	4.02	0.87	16
Enhance current curricula in agriculture	4.03	0.84	7	4.34	0.79	4
Amplify the "whole person" concept of education including interpersonal skills	4.01	0.84	8	4.25	0.87	7
Amplify the "whole person" concept of education including personal skills	3.98	0.83	9	4.19	0.86	12
Teaching which includes experiential learning	3.88	0.91	10	4.21	0.88	9
Close the gap between agricultural education and academic education	3.83	0.77	11	4.21	0.86	9
Respond to the demands of the market place	3.81	0.81	12	4.20	0.79	11
Enhance current curricula about agriculture	3.77	0.84	13	4.05	0.80	14
Cultivate partnerships with the science department	3.73	0.97	14	4.31	0.74	5
Create new curricula in agriculture	3.72	0.94	15	3.92	1.03	19
Respond to the trends of the market place	3.64	0.78	16	4.05	0.82	14
Advocate entrepreneurship education	3.62	1.00	17	3.89	0.86	20
Create new curricula about agriculture	3.57	0.95	18	3.94	0.90	18
Cultivate partnerships in the total educational system	3.56	0.93	19	4.08	0.86	13
Advocate free enterprise education	3.49	1.12	20	3.64	1.13	22
Cultivate partnerships with the math department	3.08	1.03	21	3.96	0.85	16
Cultivate partnerships with the English department	2.98	0.97	22	3.76	0.89	21
Cultivate partnerships with social studies department	2.63	0.97	23	3.31	0.94	23

Past use computed on a scale, 1 "Never" to 5 "Consistently"
Need computed on a scale, 1 "Not needed" to 5 "Very much needed"

Findings with the greatest implications in the past use and need goal statements were in the desired increase of "need" for specific goals. All five of the goals showing the greatest need increase were in cultivating partnerships. This increase is explained in Figure 1. The highest to lowest mean increase in needs were, "cultivate partnerships with the math department," +.88; "Cultivate partnerships with English department," (+.78); "Cultivate partnerships with Social Studies department," +.68; "Cultivate partnerships with the science department," +.58; and "Cultivate partnerships with the total educational system," +.52 (see Figure 1).

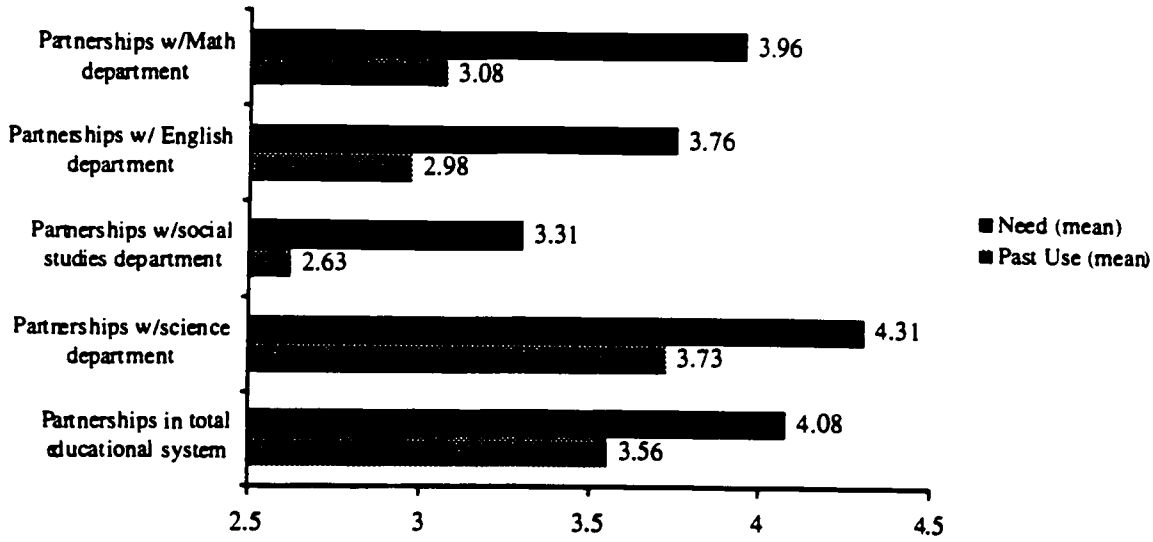

Figure 1. Top Five Mean Differences in "Past Use" and "Need" for Goal Statements

Objective 3: Past Use and Need for Resolution Statements

Teachers were asked to indicate the degree to which they had used the Resolution Statements in the past, and their perceptions as to the need to include each Resolution Statement in a strategic plan. Data are shown in Table 3. Overall, teachers identified eleven resolution statements that they use "sometimes" or "usually." The top five statements "usually" or "consistently" used by teachers were: promote life long learning (4.15), reaffirm dedicated stewardship of the environment (3.94), expand the network of relationships between agricultural education and the community (3.93), regularly review our mission making appropriate course corrections (3.79). Overall, teachers indicated that there was "much need" for the 20 of the 25 resolution statements. The top five "much needed" statements were the ones teachers consistently used in the past.

Table 3

Means, Standard Deviations and Rankings for Past Use and Need for Resolution Statements Made by the National Summit on Agricultural Education

Resolution Statement	PAST USE Mean	SD	R	NEED Mean	SD	R
Promote life-long learning	4.15	0.76	1	4.36	0.79	2
Reaffirm dedicated stewardship of the environment	3.94	0.79	2	4.44	0.82	1
Expand the network of relationships between agricultural education and the community	3.93	0.76	3	4.36	0.69	2
Tell our story in our school	3.82	0.84	4	4.34	0.84	4
Regularly review our mission making appropriate course corrections	3.79	0.93	5	4.24	0.80	7
Develop a state-wide plan for agricultural education	3.74	1.05	6	4.14	1.08	8
Expand the relationship between school agriculture and private business	3.71	0.79	7	4.34	0.72	4
Expand the network of relationships between agricultural education and industry	3.55	0.88	8	4.29	0.84	6
Limit leadership at the state level	3.55	1.05	8	3.46	1.18	19
Focus on desired long-term outcomes rather than temporary short-term problems	3.53	0.84	10	4.12	0.82	9
Pursue the national mission with high expectations for excellence	3.52	0.88	11	3.98	0.95	16
Develop a program accountability plan to assess excellence in agricultural education	3.48	0.98	12	4.12	0.93	9
Promote teamwork through an unyielding state-wide commitment to cooperation	3.46	0.96	13	4.12	0.92	9
Promote trust through a commitment to communication	3.47	0.84	14	4.04	0.90	13
Limit our scope of program delivery by teaching production agriculture	3.44	1.02	15	3.60	1.12	18
Move towards being united	3.43	0.88	16	4.01	1.00	15
Promote synergy (working together) through a state-wide commitment to coordinating efforts	3.42	0.80	17	4.04	0.78	13
Align program agendas beneath a single overarching mission	3.41	0.91	18	3.67	0.99	17
Limit the network of relationships between agricultural education and government	3.41	0.95	18	3.35	1.06	21
Seek expanded financial support through effective marketing	3.21	0.93	20	4.11	0.91	12
Have the state department of public instruction be responsible to coordinate state-wide programming for agricultural education	3.09	1.06	21	3.21	1.36	23
Have the state Ag. Teachers Association be responsible to coordinate national directives for ag. education	3.07	0.94	22	3.48	1.06	20
Charge state universities with the responsibility to implement a state-wide strategic plan for ag ed	3.04	1.14	23	3.28	1.33	22
Cut vestiges from the past	2.95	0.83	24	2.75	1.06	25
Expand the relationship between school agriculture and the arts	2.66	1.01	25	3.01	1.16	24

Past use computed on a scale, 1 "Never" to 5 "Consistently"
Need computed on a scale, 1 "Not needed" to 5 "Very much needed"

CONCLUSIONS AND IMPLICATIONS

The resolution statements indicated a commitment toward lifelong learning and teaching more about the environment, and suggest that the profession should continue to be involved in the community. Strategic planners can utilize these findings to guide curricula and program development, as well as inservice activities. The findings reaffirm the value of the strategic planning process and the benefits gained from viewing agricultural education from a broad perspective.

Teachers also believed that the strong historical relationship that agricultural education has in regards to youth development needs to be maintained, by teaching leadership and personal development to all individuals.

The greatest emphasis teachers placed on the goal statements were cultivating partnerships with academic courses. These findings were reflected through high differences in the means of "past use" and "need." This allows an interpretation as recognizing need for additional integration of academics in vocational courses. Gene Bottoms, Director of High Schools That Work, states that "Putting more academic content into vocational courses is vital in developing high school graduates who can apply abstract academic knowledge in new and challenging situations on the job and in life," (1992, p. 99). Bottoms also stressed that integration begins with keeping the vocational curriculum intact while seeking ways to emphasize reading, writing, math and science concepts. Recognizing the necessary direction for integration, teachers must continue to create and share ideas that foster this position. Additional studies of academic integration that exhibit success may further enhance those goals of the strategic plan for agricultural education.

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OHIO VOCATIONAL TEACHERS' ATTITUDES TOWARD AND KNOWLEDGE OF SKILL STANDARDS: A PRELIMINARY ANALYSIS

A Research Paper Presented at
Omicron Tau Theta
Third Annual Research Seminar
Denver, Colorado

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December 1, 1995

OHIO VOCATIONAL TEACHERS' ATTITUDES TOWARD AND KNOWLEDGE OF SKILL STANDARDS: A PRELIMINARY ANALYSIS

Introduction

Since the 1970's, the U.S. has steadily lost its share of the international market. Many of the semi-skilled jobs upon which Americans have relied since World War II are now going to countries that produce products at a much lower wage. Competing nations that have large shares of the global market also have well educated work forces, high-skilled manufacturing economies and rapid adaptation of new technology (Office Educational Research and Improvement, 1995).

In the last decade there has been an abundance of reports questioning the quality of education that is currently available in the U.S. (National Commission on Secondary Vocational Education, 1984; National Commission on Excellence in Education, 1983; and Commission on the Skills of the American Workforce, 1990). Many of these reports are calling for higher standards and an increased emphasis on academics. Not only is our nation competing poorly in the global economy, but our nation's students perform poorly on international achievement test (Office of Educational Research and Improvement, 1995). Yet, other reports (Bracey, 1995, 1994, 1993, 1992, 1991 and Carson, Huelskamp, & Woodall. 1992) contradict these reports and have stated that American schools are good and getting better. In these research based reports, the authors have provided indicators that show American schools are performing better than ever. These conflicting reports indicate there is disagreement regarding whether or not public education is performing well and this argument continues. Whatever the answer to this argument may be, there is agreement that there is room for improvement in education.

Skill standards identify what knowledge and abilities a worker should possess to successfully gain and maintain employment in the workplace. Workers that successfully demonstrate these skills are then certified that they have met these preset standards. Occupational skill standards currently being developed are to be nationally recognized and portable from state to state.

There are some occupations, such as doctors, lawyers and accountants who have had state standards for some time. These professionals must pass tests to demonstrate their knowledge and skills (Hudelson, 1993). Skill standards not only help guarantee the public that these individuals have the necessary requirements in the area, but they also help individuals determine the level of skill they possess regarding their profession.

Standards that are being and have been developed vary greatly between occupations. Definitions for these skill standards between occupations also vary. It is important to understand how a particular industry defines standards. Some definitions are very broad in nature while others are very specific. There are four basic areas in which standards are set: technical skills, employability skills, related occupational knowledge, and academic skills. For certification, some industries use a mixture of these skills while others may use only one type of skill.

Many standards currently used in vocational education programs were developed by educators. The development of these standards often had limited participation from business and industry. Therefore, the question of whether standards currently used in vocational education represent what is needed in the work force will continue to be asked. Although these standards may be accurate measures of a student's knowledge and ability, they may not match what is needed in industry. Hudson (1994) wrote, " . . . that if a nation is going to succeed in producing a more productive work force, schools must know definitively what industry expects of new workers" (p. 6). Business, industry and education need to work together in developing skill standards for the different occupations, and it is important that business and industry take the leading role in this development stage. The General Accounting Office (GAO) (1993) said that if this skill standard system is to be a success, it must be driven by industry.

Hudelson (1993) suggested that skill standards are becoming a major force of the national economic and education policy. Not only are skill standards needed to protect our interest in a global economy, but they are also needed to protect and uphold the reputations of American business and industry. There has been a move by industry to voluntarily start their own national skill standards, mainly as a way to protect the public from the unscrupulous members of their profession. For example, the National Institute for Automotive Service Excellence (ASE) was formed to help the auto repair industry gain back public trust. Sutphin (1994) wrote " . . . the dishonest mechanics brought about the need for certification of all auto repair technicians" (p. 26). Because the ASE standards were developed by industry it was able to maintain a reputation that is recognized nationwide.

There are many advocates for a national skill standard system, along with many statements of benefits for this system and the impact that it would have on the economy, educational systems, the work force, and society. Hoachlander and Rahn (1994) listed the following potential benefits of a skill standard system:

1. Greater work mobility and portability of credentials;
2. higher pay;
3. greater job certainty and more job opportunities for workers;
4. more efficient recruitment, screening and placement of employees by employers;
5. clearer goals and educational pathways for students;
6. more consistent, focused instruction and curriculum;
7. greater accountability for schools, programs, teachers and students;
8. increased quality of products and services;
9. higher consumer confidence and satisfaction (p. 20).

Glover (1992) listed another benefit of skill standards was to increasing the accountability in the spending of public money. There has been a growing demand for the accountability of outcomes for any public money that is being spent. Also, business and industry would play a major role in the accountability of these programs through the development of a skill standards system. Hudelson (1993) indicated that national skill standards offered accountability in the following areas:

1. For the workers, national skill standards recognize the worker as certified or an accomplished craftsperson.
2. For the employer, skill standards indicate a level of competence in their occupational area.
3. For the teachers, skill standards will define what knowledge and skills that industry expects of the graduates from the vocational education programs.
4. For the administrators, skill standards provide a fair means of evaluating vocational education programs.

One approach to enhance public education and gain back part of the American public's trust would be to establish national skill standards to use in evaluating individuals, schools and other educational programs. Once these systems are developed, they will need to be properly implemented if they are going to be effective in developing training programs and certifying workers' competence. To successfully implement any new system or program, it is vital to know the attitudes of the people that will be involved in the implementation process. After the attitudes of these key people are known, strategies for implementing such systems could be developed.

Conceptual Framework

The conceptual framework of this study was based upon the list of twenty-two occupations identified and funded by the Department of Education and Labor to identify and develop skill standards. The instrument was developed using the three types of attitudes--affective (evaluative), cognitive (belief), and behavioral (action)--identified by Pettyjohn, Banikart, Fitzgerald, Misovich, Spiegler and Triplet (1986). The following list of occupations and grantees indicate the ones that were selected and funded by the U.S. Departments of Education and Labor to identify and develop standards within their occupational areas (Hull, 1994):

1. Agriscience/Biotechnology (National FFA Foundation)
2. Air Conditioning, Refrigeration and Power (Southern Association of Colleges and Schools)
3. Automotive, Auto Body and Truck Technicians (National Automotive Technical Education Foundation)
4. Biotechnical Sciences (Education Development Center)
5. Chemical Process Industries (American Chemical Society/EDC)
6. Computer Aided Drafting (Foundation for Industrial Modernization)

7. Electronics (Electronics Industries Association)
8. Food Marketing Industry (National Grocers Association)
9. Forest/Wood Products (Production and Manufacturing (Foundation for Industrial Modernization)
10. Hazardous Materials Management Technician (CORD)
11. Health Science and Technology (Far West Laboratory)
12. Heavy Highway/Utility Construction (Laborers-AGC Education and Training Fund)
13. Human Services Occupations (Human Services Research Institute/EDC)
14. Phototonics Technician (CORD)
15. Printing (The Graphic Arts Technical Foundation)
16. Welding Occupations (American Welding Society)
17. Electronics (American Electronics Association)
18. Electrical Construction (National Electrical Association)
19. Industrial Launderers (Institute of Industrial Launders)
20. Metalworking (National Tool and Machining Association)
21. Retail Trade (National Retail Federation)
22. Tourism, Travel and Hospitality (Council on Hotel, Restaurant and Institutional Education)

Problem Statement

Performance measures and standards have the potential for impacting what is taught, how it is taught and how it is evaluated. Vocational educators need to be aware and supportive of these standards as they plan and modify their programs for the future. However, information about vocational educators attitudes toward, awareness and use of these standards is not available.

Purpose and Objectives

The purpose of this study is to determine Ohio vocational educators' attitudes toward skill standards that are being developed. The specific objectives are 1) measure attitudes of Ohio vocational educators about national skill standards, 2) measure the use of national skill standards by Ohio vocational educators, 3) determine the awareness of Ohio vocational educators of national skill standards, and 4) describe the respondents in terms of their demographic characteristics.

Research Design

The study was a descriptive research survey. It used a mail questionnaire to collect data from Ohio secondary vocational educators about their attitudes toward, awareness and use of national skill standards.

Population and Sample

The population for this study was all secondary vocational educators within the state of Ohio (N = 3499). A proportional stratified random sample of secondary vocational educators in Ohio was used. From the population, a sample of vocational teachers (n=346) was randomly drawn as recommended by Krejcie and Morgan (1970). Table 1 displays the stratification represented in the total sample.

Instrumentation

A mail questionnaire was used to collect data. This instrument was developed by the researchers and consisted of three sections. Section I included sixty-two items designed to determine the attitudes (affective, behavioral, and cognitive) of vocational educators using a five point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree). Section II consisted of a list of the twenty-two occupations funded by the Department of Education and Labor to determine the awareness and use of skill standards by vocational educators. Section III included background and situational information of these vocational educators.

Section one of the initial questionnaire consisted of 100 statements. A panel of nine graduate students examined the questionnaire for content and face validity. Item were changed according to the suggestions. The questionnaire was then sent to a sample of twenty-eight vocational educators who were randomly selected from the population to establish the questionnaires reliability. Section one of the instrument was reduced to 62 statements and resulting Cronbach's alpha coefficients for internal consistency were: affective items = .94, behavioral items = .84 and cognitive items = .84. A test-retest was also conducted to test for consistency over time. The percents of agreement for section one were: affective items = 85%, behavior items = 83% and cognitive items = 78%. For section two of the instrument only a test-retest was conducted. The percent of agreement was 87% for the awareness of skill standards and 97% for the use of skill standards.

Table 1
Stratification of the Sample (n = 346)

Service Area	Number of Teachers	Percentage of Total Population	Sample Size	Number of Respondents	Percent of Respondents
Health	187	5	17	10	58
Trades and Industrial	1442	41	142	88	62
Home Economics	260	8	28	17	61
Marketing Education	319	9	31	17	55
Business Education	806	23	80	43	54
Agricultural Education	485	14	48	27	56
Total	3499	100	346	202	58

Data Collection

Individuals selected to participate in this study were mailed a packet including a questionnaire, cover letter, and self addressed stamped envelope. After the initial mailing, individuals who had not returned the questionnaire by the end of the second week received a reminder postcard. A second packet was sent out the third week that contained a reminder letter, copy of the original cover letter, questionnaire, and self addressed stamped envelope. At the end of the fifth week 58% (202) questionnaires were returned from vocational educators in the sample. Ninety-six percent (194) of the 202 surveys that were returned were usable. Follow up of the non-respondents is in process. The non-response error will be controlled by taking a random sample of 10% of the non-respondents and compared them to respondents. If there is no significant differences found between the two groups of respondents, the results will be generalized to the population.

Data Analysis

Data were analyzed using SPSS/PC+ (1995) for windows computer program. Descriptive statistics (means and standard deviations for interval and ratio data and frequencies and percentages for categorical data) were used to report data. Negative stated items were reversed for the analysis.

For section one of the instrument the following values were used for determining whether respondents agreed, disagreed or were undecided: 1.00 - 2.49 (disagreement), 2.50 - 3.49 (undecided), and 3.50 - 5.00 (agreement). For section two of the instrument, the following values were used to determine awareness level of vocational educators of skill standards: 1.00 - 1.49 (not aware), 1.50 - 2.49 (limited awareness), 2.50 - 3.49 (somewhat aware), and 3.50 - 4.00 (very aware). The following values were used to determine the use of skill standards by this sample: greater than or equal to 7% (most used) and less than 6.99% (least used).

Findings

Table 2 summarizes the teachers attitudes toward skill standards in the affective category. Vocational educators from this sample tended to agree that; students that have met entry level skill standards will have a smoother transition from school to work (M = 4.52); students that complete high school vocational programs should be able to meet entry level job requirements (M = 4.38); multiple levels of mastery should be a characteristic of a national skill standard system (M = 3.91); a national skill standard system should be able to meet the changes in technology (M = 3.72); a national skill standard system would have an effect on how America will educate its children (M = 3.71); national skill standards should have a positive effect on vocational programs (M = 3.69); they believe that national skill standards enhance vocational programs (M = 3.68); skill standards will make vocational programs more accountable (M = 3.65); national skill standards should encourage students to take more ownership of their skill development (M = 3.60); national skill standards should have a positive effect on the

productivity of the American work force (M = 3.59); national skill standards should help to identify competent individuals for employment (M = 3.58); students who have met the skill standards for their occupation should receive higher wages than those who do not (M = 3.58); national skill standards would force closer alliances between education and business/industry (M = 3.56); national skill standards should increase the competitiveness of America in the global market place (M = 3.52); and, business and industry should play the most important part in the development of national skill standards (M = 3.52).

This sample of vocational educators were undecided whether; vocational programs that use national skill standards are more effective than those who do not use skill standards (M = 3.46); national skill standards should improve the quality of America's goods (M = 3.43); with a national skill standard system in place, industry would demand better qualified students from vocational programs (M = 3.40); vocational educator's technical competence will need to be upgraded in order to meet industry skill standards (M = 3.39); national skill standards would require vocational education to be market driven (M = 3.35); national skill standards will lower employer training cost (M = 3.30); a vocational education program that uses national skill standards will have a better reputation than those which do not use national skill standards (M = 3.28); national skill standards need to be very specific (M = 3.27); skill standards will help improve the vocational program that they teach (M = 3.27); a national skill standard system will be a worth while investment (M = 3.25); students from vocational programs with industry certification have higher level skills than students from vocational programs without such certification (M = 3.21); the federal government should support the development of a national skill standards system (M = 3.20); national skill standards should be portable across the nation (M = 3.19); national skill standards will establish an unfair method of assessing students' abilities (M = 3.13); national skill standards should be integral part of vocational education programs (M = 3.11); national skill standards will lower employer recruiting cost (M = 3.02); skill standards should be used by business and industry to determine who should be promoted (M = 2.99); development of a national skill standards system should be the responsibility of business and industry (M = 2.89); and, a national skill standards system would purge vocational education of its mediocre teachers (M = 2.70).

Table 2
Attitudes Toward Skill Standards (Affective) (n = 194)

Item Number		Mean	Std. Dev.
1.	Students that have met the entry level skill standards will have a smoother transition from school to work than those who do not.	4.52	.60
62.	Students that complete a high school vocational program should be able to meet entry level job requirements.	4.38	.67
39.	Multiple levels of mastery should be a characteristic of a national skill standard system.	3.91	.76
38.	A national skill standard system should be able to meet the changes in technology.	3.72	.89
*57.	A national skill standard system would not have any effect on how America will educate its children.	3.71	.81
28.	National skill standards should have a positive effect on vocational programs.	3.69	.77
2.	I believe that national skill standards enhance vocational education programs.	3.68	.96
16.	Skill standards will make vocational education programs more accountable.	3.65	.87
6.	National skill standards will demand more accountability of vocational education programs than what is presently required.	3.61	.88
13.	National skill standards should encourage students to take more ownership of their skill development.	3.60	.96
19.	National skill standards should have a positive effect on the productivity of the American work force.	3.59	.81
36.	National skill standards should help identify competent individuals for employment.	3.58	.83
46.	Students who have met the skill standards for their occupation should receive higher wages than those who do not.	3.58	.90
27.	National skill standards would force closer alliances between education and business/industry.	3.56	.85

Note. Rating scale was 1 = SD, 2 = D, 3 = U, 4 = A, 5 = SA
Note. Scores of negative items were reversed
* Denote negatively stated items

Table 2 (Cont.)

Item Number		Mean	Std. Dev.
42.	National skill standards should increase the competitiveness of America in the global market place.	3.52	.73
50.	Business and industry should play the most important part in the development of national skill standards.	3.52	1.01
7.	National skill standards will improve occupational training.	3.51	.88
4.	Vocational programs that use national skill standards are more effective than those who do not use skill standards.	3.46	1.00
44.	National skill standards should improve the quality of America's goods.	3.43	.80
*33.	A national skill standard system will be detrimental to vocational education.	3.41	.83
31.	With a national skill standard system in place, industry would demand better qualified students from vocational programs.	3.40	.80
26.	Vocational educator's technical competence will need to be upgraded in order to meet industry skill standards.	3.39	.97
11.	National skill standards would require vocational education to be market driven.	3.35	.92
9.	National skill standards should decrease the time required by employers to screen employees.	3.34	1.04
51.	National skill standards will lower employer training cost.	3.30	.90
30.	A vocational education program that uses national skill standards will have a better reputation than those which do not use national skill standards.	3.28	.98
45.	National skill standards need to be very specific.	3.27	1.01
14.	Skill standards will help improve the vocational program that I teach.	3.27	1.02
37.	A national skill standard system will be a worth while investment.	3.25	.89

Note. Rating scale was 1 = SD, 2 = D, 3 = U, 4 = A, 5 = SA
Note. Scores of negative items were reversed
* Denote negatively stated items

Table 2 (Cont.)

Item Number		Mean	Std. Dev.
49.	Students from vocational programs with industry certification have higher level skills than students from vocational programs without such certification.	3.21	.90
8.	The federal government should support the development of a national skill standard system.	3.20	1.19
*61.	National skill standards should not be portable across the nation.	3.19	1.00
*17.	National skill standards will establish an unfair method of assessing students' abilities.	3.13	.97
*18.	National skill standards should not be an integral part of vocational education programs.	3.11	1.03
25.	National skill standards will lower employer recruiting costs.	3.02	.83
29.	Skill standards should be used by business and industry to determine who should be promoted.	2.99	.98
56.	Development of a national skill standard system should be the responsibility of business and industry.	2.89	1.13
10.	A national skill standard system would purge vocational education of its mediocre teachers.	2.70	1.06
	Total Mean Score for Affective Statements	3.45	.91

Note. Rating scale was 1 = SD, 2 = D, 3 = U, 4 = A, 5 = SA
Note. Scores of negative items were reversed
* Denote negatively stated items

Table 3 summarizes the teachers' attitudes toward skill standards for the behavioral category. Vocational educators from this sample tended to agree that; they currently use the Ohio Competency Assessment Profiles (OCAPS) standards developed by the state in the vocational programs that they teach (M = 4.1); they use OCAPS standards to develop curriculum in their vocational programs (M = 4.06); the skill standards they currently use in their vocational program do match with those in business and industry (M = 3.98); they have added standards to OCAPS based upon recommendations of business and industry (M = 3.95); they used OCAPS standards to develop assessment techniques in their vocational programs (M = 3.93); they use employability skills as a means for assessment of students' abilities in the vocational area that they teach (M = 3.90); they would use national skill standards developed by business and industry for their vocational program (M = 3.69); they would adhere to an industry based skill standard system for their vocational program (M = 3.66); and, they would use skill standards as a means for assessment of students within the vocational area that they teach (M = 3.64).

Vocational educators from this sample tended to be undecided that; they currently use portfolios as a means of assessment of students' abilities (M = 3.29) and that they have received assistance from the State Department of Education in implementing OCAPS (M = 3.26).

Table 4 summarizes the teachers' attitudes toward skill standards for the cognitive category. Respondents indicated they tended to agree that; they have a strong understanding of skill standards within the vocational area that they teach (M = 3.77); national skill standards provide a basis for educational goals (M = 3.75); national skill standards provide a bench mark for comparing skill levels (M = 3.68); they are familiar with skill standards that have been set in the vocational area that they teach (M = 3.67); and, national skill standards will help students to focus on their preparation for work (M = 3.56).

This sample of vocational educators were undecided about whether; skill standards provide the basis for measuring an individual's ability (M = 3.47); national skill standards will help to sort out students that are not serious about their vocational programs (M = 3.44); national skill standards are not to rigid (M = 3.15); other countries have successfully used national skill standard systems (M = 3.12); other countries have successfully developed national skill standard systems (M = 3.08); they are familiar with the national skill standards for their vocational program (M = 3.04); knowledge of subject area is adequately assessed by skill standards (M = 3.00); and, national skill standards are too specific (2.95).

Attitudes Toward Skill Standards (Behavioral) (n = 194)

Item Number		Mean	Std. Dev.
32.	I currently use the OCAPS standards developed by the state in the vocational program that I teach.	4.10	.82
55.	I use OCAPS standards to develop curriculum in my vocational program.	4.06	.68
*34.	The skill standards I currently use in my vocational program do not match with those in business and industry.	3.98	.91
3.	I have added standards to OCAPS based upon recommendations of business and industry.	3.95	.84
15.	I use OCAPS standards to develop assessment techniques in my vocational program.	3.93	.85
23.	I use employability skills as a means for assessment of students' abilities in the vocational area that I teach.	3.90	.75
*41.	I would not use national skill standards developed by business and industry in my vocational program.	3.69	.89
35.	I would adhere to an industry based skill standard system for my vocational program.	3.66	.82
*59.	I would not use skill standards as a means for assessment of students within the vocational area that I teach.	3.64	.85
58.	I currently use portfolios as a means of assessment of students' abilities.	3.29	1.07
*40.	I have not received assistance from the State Department of Education in implementing OCAPS.	3.26	1.19
	Total Mean Score for Behavioral Statements	3.77	.88

Note. Rating scale was 1 = SD, 2 = D, 3 = U, 4 = A, 5 = SA
Note. Scores of negative items were reversed
* Denote negatively stated items

The vocational educators in this sample were not aware (M < 1.49) of twenty of the twenty-two occupational skill standards listed (Table 5). They had limited awareness of two occupational skill standards; automotive, autobody and truck technicians (M = 1.50) and welding occupations (M = 1.50). Table 6 summarizes the use of skill standards by respondents. The most frequently used skill standards (Percent > 7%) were from the following occupations; welding (9.8%), computer aided drafting (9.3%), automotive, auto-body, and truck (8.8%), agriscience/biotechnology (7.7%), hazardous materials management (7.7%), and tourism, travel and hospitality (7.7%)

Table 4

Attitudes Toward Skill Standards (Cognitive) (n = 194)

Item Number		Mean	Std. Dev.
53.	I have a strong understanding of skill standards within the vocational area that I teach.	3.77	.97
47.	National skill standards provide a basis for educational goals.	3.75	.74
12.	National skill standards provide a bench mark for comparing skill levels.	3.68	.80
48.	I am familiar with skill standards that have been set in the vocational area that I teach.	3.67	.99
54.	National skill standards will help students to focus on their preparation for work.	3.56	.79
21.	Skill standards provide the basis for measuring an individual's ability.	3.47	.88
52.	National skill standards will help to sort out students that are not serious about their vocational program.	3.44	.93
*60.	National skill standards are too rigid.	3.15	.79
20.	Other countries have successfully used national skill standard systems.	3.12	.47
43.	Other countries have successfully developed national skill standard systems.	3.08	.44
*22.	I am not at all familiar with the national skill standards for my vocational program.	3.04	1.24
*24.	Knowledge of subject area is not adequately assessed by skill standards.	3.00	.96
*5.	National skill standards are too specific.	2.95	.81
	Total Mean Score for Cognitive Statements	3.36	.83

Note. Rating scale was 1 = SD, 2 = D, 3 = U, 4 = A, 5 = SA

Note. Scores of negative items were reversed

* Denote negatively stated items

Table 5
Vocational Educators Awareness of Skill Standards (n = 194)

Skill Standard Area and Grantee	Mean	Std. Dev.
1. Agriscience/Biotechnology (National FFA Foundation)	1.34	.80
2. Air Conditioning. Refrigeration and Power (Southern Association of Colleges and Schools)	1.27	.68
3. Automotive. Auto Body and Truck Technicians (National Automotive Technical Education Foundation)	1.50	.97
4. Biotechnical Sciences (Education Development Center)	1.12	.48
5. Chemical Process Industries (American Chemical Society/EDC)	1.11	.45
6. Computer Aided Drafting (Foundation for Industrial Modernization)	1.45	.91
7. Electronics (Electronics Industries Association)	1.33	.78
8. Food Marketing Industry (National Grocers Association)	1.34	.76
9. Forest/Wood Products (Production and Manufacturing Foundation for Industrial Modernization)	1.22	.63
10. Hazardous Materials Management Technician (CORD)	1.36	.80
11. Health Science and Technology (Far West Laboratory)	1.13	.46
12. Heavy Highway/Utility Construction (Laborers-AGC Education and Training Fund)	1.09	.38
13. Human Services Occupations (Human Services Research Institute/EDC)	1.19	.56
14. Phototonics Technician (CORD)	1.06	.29
15. Printing (The Graphic Arts Technical Foundation)	1.23	.62
16. Welding Occupations (American Welding Society)	1.50	.97
17. Electronics (American Electronics Association)	1.28	.73
18. Electrical Construction (National Electrical Association)	1.38	.83
19. Industrial Launderers (Institute of Industrial Launders)	1.07	.37
20. Metalworking (National Tool and Machining Association)	1.31	.78
21. Retail Trade (National Retail Federation)	1.27	.74
22. Tourism. Travel and Hospitality (Council on Hotel, Restaurant and Institutional Education)	1.32	.76

Note. Rating scale was: 1 = Not Aware, 2 = Limited Awareness, 3 = Somewhat Aware, 4 = Very Much Aware

Table 6

Use of Skill Standards by Ohio Vocational Educators (n = 194)

Skill Standard Area and Grantee	Have Used		Have Not Used		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1. Agriscience/Biotechnology (National FFA Foundation)	15	7.7	179	92.3	194	100.0
2. Air Conditioning, Refrigeration and Power (Southern Association of Colleges and Schools)	6	3.1	188	96.9	194	100.0
3. Automotive, Auto Body and Truck Technicians (National Automotive Technical Education Foundation)	17	8.8	177	91.2	194	100.0
4. Biotechnical Sciences (Education Development Center)	6	3.1	188	96.9	194	100.0
5. Chemical Process Industries (American Chemical Society/EDC)	3	1.5	191	98.5	194	100.0
6. Computer Aided Drafting (Foundation for Industrial Modernization)	18	9.3	176	90.7	194	100.0
7. Electronics (Electronics Industries Association)	10	5.2	184	94.8	194	100.0
8. Food Marketing Industry (National Grocers Association)	11	5.7	183	94.3	194	100.0
9. Forest/Wood Products (Production and Manufacturing Foundation for Industrial Modernization)	9	4.6	185	95.4	194	100.0
10. Hazardous Materials Management Technician (CORD)	15	7.7	177	92.3	194	100.0

Note. Rating scale was 0 = Not Used, 1 = Used

Table 6 (Cont.)

Skill Standard Area and Grantee	Have Used		Have Not Used		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
11. Health Science and Technology (Far West Laboratory)	6	3.1	188	96.9	194	100.0
12. Heavy Highway/Utility Construction (Laborers-AGC Education and Training Fund)	5	2.6	189	97.4	194	100.0
13. Human Services Occupations (Human Services Research Institute/EDC)	7	3.6	187	96.4	194	100.0
14. Phototonics Technician (CORD)	1	0.5	193	99.5	194	100.0
15. Printing (The Graphic Arts Technical Foundation)	7	3.6	187	96.4	194	100.0
16. Welding Occupations (American Welding Society)	19	9.8	175	90.2	194	100.0
17. Electronics (American Electronics Association)	9	4.6	185	95.4	194	100.0
18. Electrical Construction (National Electrical Association)	13	6.7	181	93.3	194	100.0
19. Industrial Launderers (Institute of Industrial Launders)	3	1.5	191	98.5	194	100.0
20. Metalworking (National Tool and Machining Association)	8	4.1	186	95.9	194	100.0
21. Retail Trade (National Retail Federation)	9	4.6	185	95.4	194	100.0
22. Tourism, Travel and Hospitality (Council on Hotel, Restaurant and Institutional Education)	15	7.7	179	92.3	194	100.0

Note. Rating scale was 0 = Not Used, 1 = Used

Demographic information (Table 7) collected indicated that the respondents included more males (52.6%) vocational educators than females (41.7%). The trade and industrial service area had the largest number of respondents (43.3%) followed by business occupations (20.6%). These two service areas represent approximately two-thirds (64%) of the vocational educators within the state of Ohio (Table 1).

From this sample of vocational educators, 35.1% had completed a bachelor's degree and 33.5% had completed a master's degree. Educators with an associate's degree or less represented slightly more than one-fourth (25.7%) of the teachers in this sample. Respondents indicated that slightly more than one-half (53.6%) of the schools they taught at were joint vocational schools.

The most common way that respondents received their initial certification was by the means of a bachelor's degree (49%), which was slightly higher than that of alternative certification (43.8%). More than three-fourths of the respondents (80.4%) indicated that they were technically certified.

Ratio data regarding the respondents is reported in Table 8. Ages of the respondents ranged from twenty-three to sixty-four years. The mean age of this sample of respondents was 45.64 (SD = 8.25). Almost all vocational educators in this sample indicated that they had some work experience prior or concurrent to teaching with a mean of 11.66 years (SD = 7.85). The range of this work experience was from one to forty years. The average number of years taught by respondents was 15.23 (SD = 7.86) with a range of one to thirty-four years.

Table 8
Ratio Demographic Information (n =194)

Variable of Interest	Mean	Std. Dev.
Age (years) Range 23 - 64	45.64	8.25
Number of Years Taught Range 1 - 34	15.23	7.86
Years of Work Experience (excluding teaching experience) Range 1 - 40	11.66	7.85

Implications and Recommendations

The awareness level of this sample of vocational educators about skill standards was low. This awareness level should be increased if educators are to use occupational skill standards. Individuals working with occupations that are identifying and developing skill standards will need to increase their efforts of promoting skill standards to educators. Different methods of increasing this awareness level should be identified for pre-service and in-service vocational teacher education programs.

The respondents' attitudes were most favorable for the use of skill standards (behavioral, M = 3.77). However, they were undecided about their current knowledge level (cognitive, M = 3.36) and their evaluative level (affective, M = 3.45) of skill standards. The affective, behavioral and cognitive attitudes of vocational educators may be increased by them participating in educational programs sponsored by professional organizations related to their service area such as American Welding Society, National Automotive Technical Education Foundation, Electronics Industries Association, and Council on Hotel, Restaurant and Institutional Education. They could also participate in both state and national vocational education associations.

The use of the twenty-two specific occupational skill standards was also quite low. Efforts need to be made to demonstrate how these skill standards can be used to plan, conduct and evaluate vocational programs.

This paper presented the initial analysis of Ohio vocational teachers' awareness, use of and attitudes toward skill standards. More complete results will be available in July, 1996.

Table 7
Categorical Demographic Information (n = 194)

Variable of Interest	Frequency	Percentage
Gender:		
Male	102	52.6
Female	81	41.7
Non-response	11	5.7
Total	194	100.0
Vocational Teaching Area:		
Agriculture	22	11.3
Business Occupations	40	20.6
Marketing	16	8.3
Home Economics	15	7.7
Trade and Industrial	84	43.3
Health	6	3.1
Non-response	11	5.7
Total	194	100.0
Highest Educational Level:		
High School Diploma	31	16.0
Associate Degree	19	9.7
Bachelor's Degree	68	35.1
Master's Degree	65	33.5
Doctorate	0	0.0
Non-response	11	5.7
Total	194	100.0
Type of High School:		
Comprehensive	74	38.2
Joint Vocational School	104	53.6
Non-response	16	8.2
Total	194	100.0
Initial Teaching Certification:		
Alternative Certification	85	43.8
Bachelor's Degree	95	49.0
Master's Degree	4	2.1
Non-response	10	5.1
Total	194	100.0
Technically Certified:		
Yes	156	80.4
No	27	13.9
Non-response	11	5.7
Total	194	100.0

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