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ABSTRACT

A program was developed to improve the targeted high school students' understanding of the relationship of classroom lessons to workplace situations in their "Introduction to Technology" course. The 14 eleventh and twelfth grade students came from a community high school in a middle-class neighborhood. Results of student surveys, teacher surveys, and parent surveys made evident the problem of lack of transfer of learning. Analysis of probable cause data and research indicated that causes for the problem included outside stress, lack of motivation, and teacher's lack of emphasis. Research data also indicated a need for schools to change their curriculum from single subjects to integrated curriculum. In addition, data showed that apprenticeship implementation would be advantageous. A review of solution strategies suggested by researchers in the education field suggested that to improve the relationship between classroom lessons and the workplace, the following solutions should be implemented: curriculum change, apprenticeship programs, and teacher-lead class discussions. Strategies used in the program were guest speakers, career research projects, and classroom discussions. Assessment data (from pre- and post-intervention questionnaires, evaluation of discussions and presentations, and interviews with students) indicated that students demonstrated an improvement in their attitudes toward classroom work and the relationship it has to the workplace. (Contains 20 references.) (YLB)

TRANSFER OF CLASSROOM SKILLS TO THE WORKPLACE

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An Action Research Project Submitted to the Graduate Faculty of the School of Education in Partial Fulfillment of the Requirements for the Degree of Masters of Arts in Teaching and Leadership

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Dedication

To my loving wife Cathie for all her help and support throughout this endever

ABSTRACT

This report describes a program to improve the understanding of the targeted high school students' relationship of classroom lessons to workplace situations in their "Introduction to Technology" course. These students came from a community high school in a middle-class neighborhood. This problem of lack of transfer of learning was evident by student surveys, teacher surveys, and parent surveys.

Analysis of probable cause data and research indicated that causes for the problem include: outside stress, lack of motivation, and teacher's lack of emphasis. Research data also indicated a need for schools to change their curriculum from single subjects to integrated curriculum. In addition, data showed that apprenticeship implementation to be advantageous.

A review of solution strategies suggested by researchers in the field of education suggested that to improve the relationship between classroom lessons and the workplace the following solutions be implemented: change curriculum, start apprenticeship programs and class discussions led by the teacher.

Post intervention data indicated that the students demonstrated an improvement in their attitude toward classroom work and the relationship it has to the workplace.

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

The students of the Survey of Technology course are ambigous towards the relationship between class activities and how they relate to the workplace. Evidence for the existence of the problem includes: surveys and interviews. Also there is a significant amount of counseling time spent on assisting students in career choices.

Immediate Problem Context

The school district includes two high schools, an east and west campus. The two campuses function together as one school. Geography determines the population of each campus. Some classes are only offered at one of the campuses. Students use shuttle buses to attend those classes which are not available at their main campus. The current east campus enrollment is 951 students with 1223 students at the west campus. The east campus population is mainly 95.8% Caucasian, 0.4% Black, 2.9% Hispanic, 0.5% Asian Islander, 0.3% Native American. The socioeconomic background is mostly middle income with only 2.5% qualifying for low income status. School attendance is at 93 % with a low truancy rate of 0.9%.

The number of teachers at the school is 70. District demographics of the teachers and administrators indicate that the average years of teaching experience is 14.9: with 41.8% with a Bachelor's Degree, 58.2% holding a Master's Degree and above. The administrative structure includes the following: one principle, one assistant principle, two

disciplinary deans, two school psychologists, three full time guidance counselors, and one department chair person for special education.

The curriculum is defined by the State Board of Education. The Industrial technology department offers several different elective (not required for graduation) courses. These courses consist of traditional technical education areas, such as drafting, machine shop, automotives, woods, and small engines. In addition, the school participates in a cooperative educational program with a local technical campus, which offers additional technical training. The Industrial Technology department services 19% of the student population. The Survey of Technology course is an elective class which offers an overview of many different technical career choices. The format used is a multi-media approach which covers what each career requires and what each involves. The course is allocated for only one class per semester, thus limiting enrollment to 24 students per semester.

The Surrounding Community

The current population of the community is 19,000. The setting is mainly rural with a recent influx of technology-based businesses. The school population includes students from many small communities in surrounding areas. The demographics of the whole county are as follows: 94.5 % Caucasian, 3.2% Hispanic origin, 0.7% Asian Islander, 0.2% Black, 1.5 % other. The socioeconomic status of the students is a varied one, from the very rich to the very poor.

The school building was built in 1928 with classroom additions in 1948 and 1957. This building was originally designed to serve a maximum of 750 students. The school enrollment is expected to increase to 1300 in the next five years. This school district has

the same problem many growing communities are having, balancing the need for increased taxes to finance school expansion with the need for keeping the taxes affordable for new incoming families. Referenda for the construction of a new building have been on the ballot during the last election, but failed by a narrow margin.

National Context of the Problem

The educational community has acknowledged that there is a need to make a clear relationship between what is taught in school and how it can be used in the work place. An industrial technology teacher wrote a paper about a cognitive learning technique in which a tractor pull was used as a learning tool. This generated excitement in the students who were able to apply technological theory to an actual problem and see direct results. "Ultimately, the gears snap, welds break, glue disintegrates, and the vehicle power trains fail which is so typical of real world tractor pulls and other applications of mechanical power in similar fashions" (Waggoner, 1996, p.22). This helped the students by presenting actual problems that occurred during the tractor pull and using classroom generated skills in solving them.

There is a psychological foundation for this approach to teaching. Heckman (1993) stated that there are three main theories of learning: mental discipline, behavioristic (stimulus and response), and the cognitive. He also stated that the cognitive theory, as applied to learning, means that learning is a process of knowledge construction rather than knowledge absorption (Heckman,1993). The study of the cognitive theory may lead to a better understanding of learning and may also present an improved way to instruct students. This learning theory enables the teacher to develop contextual aspects of real-world activities thus giving a more explicit understanding of real world problems. This

way of learning will enable the students to fill in the gaps and reorganize what they know in order to solve problems. It also gives the students a chance to digest and make sense out of the material presented, which is a form of metacognition. This is known to be the most beneficial way for students to learn (Fogarty, 1992). Technical educators would benefit by using this approach for learning. This could be enhanced with prior knowledge of how the classroom situations relate to each field.

The scope of this problem is recognized on the national level by the fact that companies such as Walgreens, Manpower, Abbott, Motorola, and the United States Navy are getting involved with schools on the state level to come up with solutions to rectify the situation. They have formed partnerships with area schools, offering mentoring type programs, sponsoring school events, and also providing awards and scholarships as incentives for the students. The State Board of Education states that the:

> Learning standards need to incorporate knowledge and skills that will enable students to be successful in the workplace of their choice, as well as in their roles as citizens, family members and participants, in our society. We must create opportunities to integrate the academic and workplace knowledge and skills to enhance the students' ability to see connections between what is learned and practical applications of that learning. (Beauman, 1997, p. 4)

This problem also enters the international arena, with many companies becoming globally minded. A policy research paper by Silverberg, Bergeron, Haimson, and Nagatoshi (1995) states:

> Over the past decade, global competition and calls for upgrading the American workforce have generated greater public interest in the preparation of American

> youths for employment. Some evidence suggests that the American educational system is failing to equip students with the skills necessary to enter the labor market, either directly after high school or after post-secondary education or training. Educators, policymakers, and the business community have become increasingly concerned about improving the relevance and quality of students' learning experiences, and finding effective ways to facilitate their transitions from school to productive career-oriented employment. (p. 1)

In today's society, it is not just good enough to keep abreast of the current technology but one must also keep a step ahead. This requires a technically skilled work force as well as those with post-secondary education. The problem of relating classroom activities to real life situations is readily apparent in the government's involvement. The Department of Labor developed an advisory board on work place training with representation from industry, labor, education, and government (Petrial, 1990), to assist education with this problem. The causes of this problem can be linked with earlier theories on learning and the society's view of the role of the school in the community

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

Many of the students graduating from high school today lack the skills required for the jobs of today. The Department of Labor relates these statistics which support these claims:

> Seventy percent of all high school seniors cannot write a basic letter seeking employment.
>
> Sixty percent of high school seniors cannot correctly add up their own lunch bills.
>
> Four out of every five applicants at Motorola Corporation flunked an entry-level exam which contained seventh-grade English skills and fifth-grade math skills. (Petrial, 1990, p. 18)

These statistics speak for themselves. Many high school seniors are unprepared for the labor market. They do not know how to apply what they learn in the classroom to a real world situation. Results from the analysis of surveys, interviews and time spent on counseling provides evidence that this problem exists at this site.

Results

The students enrolled in the Survey for Technology class participated in a survey regarding classroom work as it relates to the real world, as well as post-secondary school interests. A total of 14 third and fourth year students participated and the results are in Figures 1-4.

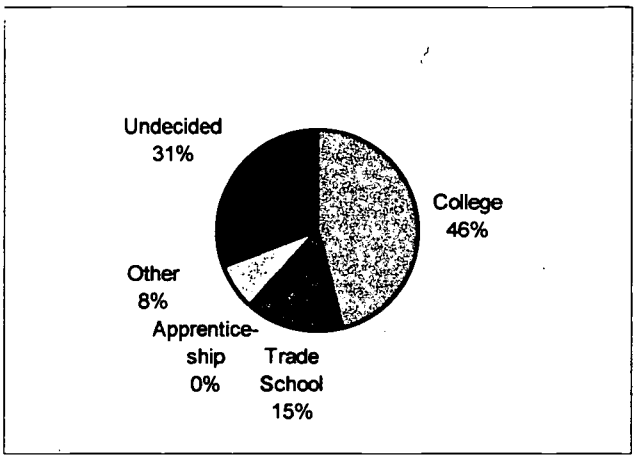

Figure 1. Results to question regarding post-high school plans.

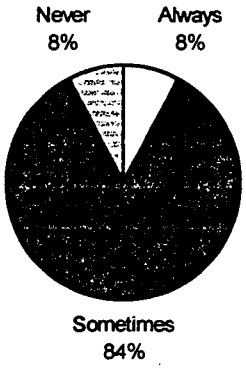

Figure 2 Results to the question on how students perceive how teachers relate classroom experiences to the real world.

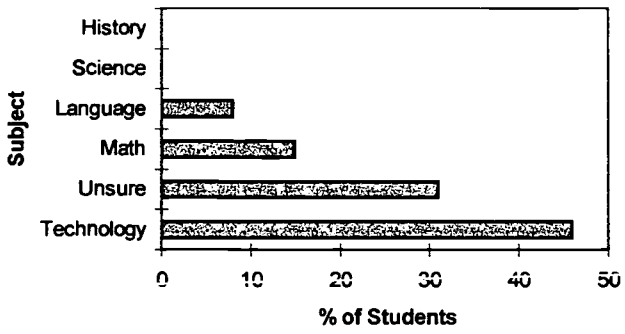

Figure 3. Results to the question on which class the students believe will help them the most with their intended career.

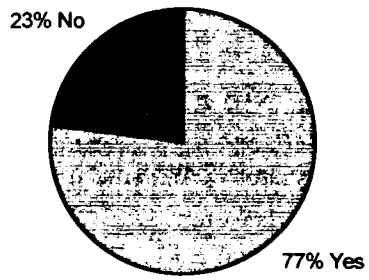

Figure 4. Results to the question of how confident the students were in their knowledge of how to attain their future goals.

The uncertainty felt by the students about their post-high school plans is evident in Figures 1 and 4. The students are confident in their knowledge of how to attain their future goals and yet one/third are not sure of post-high school plans. This may be due to lack of direct, individual counseling in career planning and the different training available aside from college. Currently, the amount of counseling time spent on career guidance is very limited. Plans for expansion in this area are underway, with the implementation of a Work Keys program and the addition of two more counselors. The high level of unsure answers in Figure 3 typifies that most students do not know how classroom work relates to the real world.

Individual interviews with the students revealed many (over 70%) do not understand how math, reading, and communication skills are imperative in every workplace. The responses to questions on skills needed for careers in business and industry often did not include presentation skills or higher math (algebra or calculus). Summarizing the results, it is apparent that students are ambigous towards the relationship between classroom activities and how they relate to the workplace. It is evident that more instruction on linking classroom activities with those performed in the classroom is

necessary. There are many probable causes to the above mentioned problem; changing society, need of school reform and updating teaching skills and curriculum, as well as lack of direction in and after high school.

Probable Causes

Probable causes are documented in the literature and observed at the local site. They include: curriculums of the past, teaching styles, lack of training, and an evolving society.

Curriculum of the Past

The high schools of today are designed as though students will face the same kind of life as their grandparents did.

> In previous generations, students were trained for industrial work. They learned to be punctual, obedient to authority, and tolerant of repetition, boredom, and discomfort often associated with factory work. The jobs today involve many characteristics not emphasized in the classroom. Though some outstanding instructors encourage creativity and critical thinking, the majority of secondary classrooms are teacher-centered, focused on isolated facts, and constrained by standardized curricula and tests. The facts are that times have changed significantly while schools and the way we educate our young people have not. (Edwards, 1991, p. 399)

The local site curriculum does include a survey of technology lab. This lab consists of a multi-media approach for 14 different areas of technology. They utilize computers, videos, specialized software, electrical and mechanical devices to enhance classroom activities on various subjects. Improvements and updates are a necessity with

this type of equipment. There is a need for improved cross-curricular activities at this site. Curriculum must be viewed as living documents and must grow and change with society. The way in which these changes in curriculum are instructed deeply impact how the students absorb the material. The following section pertains to teaching styles and how they can effect how students have difficulty in applying real world context to work done in the classroom.

Teaching Styles

The causes for this problem can be attributed to teachers not emphasizing the importance between what is taught in the classroom and how it fits in with actual career responsibilities. Raizen (1989) states:

> Schools cannot authentically model their subcultures for students. The end result is that since activities in a classroom become classroom tasks and a part of the school culture, the system of learning and using thereafter remain sealed within the self-confirming culture of the school. (p. 38)

The most common didactic teaching techniques are aimed at the acquisition of lower-level cognitive skills. Teachers need to be updated to encourage the students in the kinds of reading, writing, and problem-solving that promote the acquisition of higher-order thinking (Tewel, 1993). At the local site, due to lack of training of the teaching staff the technology lab was poorly maintained and subsequently suffered declining enrollment. The proper use of this lab is a shift from didactic teaching techniques focusing on establishing cognitive skills useful in the workplace. This is also associated with the lack of career-specific training available to high school students.

Lack of Training

For most American students, what they learned in school is not adequately related to what they need to know to succeed after leaving school. Students not planning to immediately go on to college receive little in the way of systematic assistance in preparing for and finding jobs when they leave school, even though 80% of all jobs, while not requiring a four-year college degree, do demand high levels of specialized knowledge and skills. Until recently, schools did not feel responsible for students after they left the classroom (Bouchillon, 1996). Employers blamed schools for entry-level workers' poor academic preparation and lax work habits. Both sectors are in agreement that reform is needed in order to give American business a chance to compete in the global market. In Europe and Asia, most young people move directly into the primary labor market with a set of job skills that are in demand (Byrne, Constant, & Moore, 1992). The promise of higher wages which come with occupations which require specialized training provides an economic incentive to students in classroom activities that relate to these careers. This type of training would require a dramatic shift in curriculum with support from local administrators and local industries. Funding of these programs is imperative for them to succeed. With an every expanding enrollment, the priorities are on building augmentation to handle the increased student load. While special programs, such as the tech prep and other technological based programs, are on the bottom of the list. In this post-industrial era filled with ever-changing technologies, it is a constant challenge for a curriculum to keep up with this fluid society.

An Evolving Society

The proof for this changing society is in the expansion of the various fields while other careers are disappearing. This problem effects non-college bound youths more than any other segment of the population. Silverberg, et al. (1996) stated:

> The problems non-college bound youths face as they enter the labor market are rooted in changes in the U. S. and global economics, technology, and demographic trends. The availability of stable, high-wage employment for high school graduates in manufacturing, communications, transportation, and utilities has declined steadily. Manufacturing jobs and other traditional sources of high-wage employment for youths with only a high school education have dwindled as part of a broader technological transformation of the U.S. and world economies, described by some as an "information revolution" fueled by increasing use of computers, automation, and telecommunication. This transformation has boosted skill requirements for new jobs, placing a premium on workers with a range of competencies and skills and the ability to reason, make decisions, and learn quickly. (p. 4)

Our society today is facing a rapid change in demands on the individuals, both at home and in the work place. Heckman (1993) sums up the problem this way:

> Our students are confronted with rapidly changing societal conditions. The nature and structure of the workplace have changed. The nature and structure of our families have changed. It is generally accepted that we are in a transitional period between an industrial society and an information society known as the post-industrial society. This post-industrial period is characterized by several major

> trends including: (1) rapidly changing technology, (2) downsizing in the business and industrial sectors, (3) changing family profiles, (4) increasing numbers of women entering the workforce, (5) the emergence of trans-national companies, and (6) increasingly diverse work and living communities. (p. 2)

Thomas, Johnson, and Anderson (1992) explain the problem in this way:

> As the nature and structure of the workplace and the family have changed and as roles have become less well-defined, the specific knowledge and skills people need for the future have become less predictable. Future conditions in an era of rapid change will inevitably present learners with problems their education has not " covered." In dealing with such problems, learners will need to find their own meanings and fill in gaps in their knowledge and reorganize what they know on their own. (p. 25)

The causes stated above are prevalent in every community. They all contribute to a confused and angry population of young people due to their lack of economic viability. The need for education reform is being confronted at the national, state and local levels. The site of the study has faced the dramatic changes noted in the above causes. The once farming-centered small town is now home to large national corporations and their manufacturing facilities As the society evolves, and technological advances occur, educational reform is needed in order to enable students to handle these changes. The literature suggests many different solutions to these problems, many are related to educational reform as well as more direct interaction of business with the educational community. The following chapter will review some of these solutions.

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

The causes proposed in the preceding chapter have a variety of solutions. The idea of curriculum reform is not new. The curriculum guides will need to be developed locally to fit the unique needs of the students in the community, be it urban or rural. The causes also suggests that curriculum change needs to be an on going initiative in order to keep up with the demands of modern technology.

New Programs

The Department of Labor and the U.S. Department of Education have developed guidelines that can positively influence the area of school-to-work transitions. These guidelines are outlined in the School-To-Work-Office Act, signed by President Clinton in May of 1994. This act provides funding for implementation grants made directly to local partnerships that are prepared to develop school-to-work systems with their communities. The STW programs have requirements which include a planned program of training and work experience coordinated with school-based learning (Silverberg et al, 1996).

Tech Prep is one type of school-to-work program. Congress re-authorized the Perkins Act in 1990, which allocated funding for Tech Prep programs. These are programs in which the high school works together with a community college, thus providing an integrated way to connect essential skills learned in high school with occupation-specific skills taught at the community college (Scott, 1991). Youth

apprenticeship programs are like the tech prep but have direct work experience in place of a technology based college program to link school-based learning with the skills needed in the work place.

Another way to increase the effectiveness of a technology program is through the development of a Central Project. A Central Project is a topic around which students, teachers, administrators and the community work together to attain a common goal. Students from many different technology classes can participate, each contributing to the Central Project. The project involves coordinating, communicating and consolidating many component projects to work together cohesively to complete the project. This mimics the way businesses and industry orchestrate successful, salable projects and products (McHaney & Bernhardt, 1988).

Technology Learning Activities (Rye, 1988) is a program in which students work in teams that must design, manufacture, test and market a product that will solve a given problem. This program offers a feel for the competitiveness of an actual marketplace much as a corporation in the real world must face. Teamwork fosters socialization skills that are an important part of the workplace. The problems involve cross-curricular activities in which not only math and science are used, but also marketing and economics. This innovative program utilizes competitiveness to motivate students towards the goals of the project and at the same time furthers their knowledge base. The knowledge of how people learn can help in providing a basis for instruction of these innovative programs. The study of cognitive science has enhanced our understanding of how people learn.

Cognitive Science & Instruction

In order to improve on methods of teaching, it is important to understand how students learn. The didactic model assumes that there is a separation between knowing and doing. It also treats knowledge as an integral, self-sufficient substance which is independent of the situations in which it is learned and used. Research into the area of cognitive science can help to identify and establish the valuable connections between knowing and doing, and how they can be used to facilitate competence (Raizen, 1989). By applying functional context principles to instruction in the classroom, teachers can improve students comprehension of the subject.

There is another view of learning as applied to apprenticeships, called legitimate peripheral participation or LPP. The main concept is how cognition/knowledge/learning are tied together. LPP is the type of instruction given in a traditional apprenticeship program. As Friere (1970) explains, some forms of apprenticeship can be oppressive and lacking the impetuousness needed for creativity. This method is centered on following the instructor, or the professional, without deviation. There is a set correct way to perform the outlined task, and creativity or exploration is not tolerated. A new method of instruction allows for a more liberatory and empowered "learning curriculum" that holds up the student as the center of the educational process while at the same time represents and makes available the benefits of the professionals in the field. This concern with situated learning should incorporate a more student-centered education that meets the needs of learners by allowing more freedom during the learning process. Students need to make mistakes and thereby learn from them (Hay, 1993). The process of teaching new sets of skills needed for a job can be enhanced by the use of educational tools.

Educational Tools

Career portfolios can be useful tools in motivating students towards developing a career plan. The building of a portfolio helps the students to look inward and reflect upon their values, interests, and strengths. It can also help to define and demonstrate skills conducive to employment. The portfolios encourage the students to seek out the skills they will need in their chosen career area or intended path of study. The portfolio aides the students in organizing their information, which will be beneficial when filling out applications whether for college or a job. Since these portfolios outline the students accomplishments, they are very useful in applying for scholarships and volunteer positions. (Alberta Department of Education, 1997)

In order to involve students in associating careers with course work there are other tools which require help from the local business community. Programs such as job-shadowing, internships, and summer jobs are practical work place experience. Interaction of students with professionals from various career fields may spark interest in a previously unknown job opportunities. Obtaining equipment, newspapers and journals from local companies can enrich classroom activities (Finch, Scmidt & Moore, 1997).

The computer has emerged as a powerful educational tool and has become more accessible and applicable to career information thanks to the development of computer-based career information systems. Although there are a number of different vendors, all programs provide assessment of the students' interest and skills, match personal characteristics with compatible jobs and career possibilities, provide occupational information, and educational information. These programs are an ideal medium for

delivering career information because they can present current information objectively and are in an interactive format that the students find intriguing (Imel, 1996).

Programs have been implemented and funded to assist in solving the problem of transition of school to work. The need for high school graduates to be better prepared for the workplace is very important to the country's economy. New programs along with updated curriculum can contribute to maximizing the utility of the high school classroom in providing job-related skills. Enhanced ties to communities and their industry through Tech prep, job-shadowing, internships offer some solutions. The understanding of learning theory can also assist instructors in providing a classroom environment conducive to study of technical material. Educational tools such as career portfolios and job shadowing are useful in modernizing programs and keeping classroom activities current. Ideas presented in the above listed solutions will be utilized in this action research project.

Project Objective and Procedures

As a result of increased emphasis on how classroom skills relate to the work place, during the period of September, 1998 to January, 1999, the students of the Survey of Technology class will become more aware of how work in the classroom will and can be applied in the work place, as measured by reviews of career research projects and individual student interviews. In order to accomplish the above stated objective, the following processes will be implemented:

1. Use of materials to expose students to the many career fields available to them.
2. Guest speakers presenting information on their careers and the background they require.

3. Group discussions on setting career goals and how to accomplish these goals.

Action Plan

The following steps will be taken to implement the intervention:

I. Develop a survey for the students of the Survey of Technology class

- A. Who — the researcher
- B. What — provide surveys
- C. When — first week of October and mid-January
- D. Why — to collect data and opinions regarding how classroom skills transfer to the workplace

II. Use of career oriented materials

- A. Who — the students
- B. What — Horizons computer program, Internet data collection
- C. When — two-three days during course (also open to self study)
- D. Why — to increase students knowledge base on careers
- E. Where — computer lab

III. Career Presenters

- A. Who — guest presenters
- B. What — presentations on careers and how to achieve them
- C. When — October through December, four separate presentors
- D. Why — to give careers a real life context
- E. Where — in the classroom

IV. Promote classroom discussion on careers

A. Who the teacher will facilitate the discussions

B. What discussions on careers and how what is learned in the classroom applies to various careers

C. When October through December

D. Why to provide context to classroom activities and how they relate to the workplace

E. Where in the classroom

V. Evaluate career research projects

A. Who the teacher

B. What career research projects

C. When December

D. Why to increase students knowledge base on what is involved in career preparation

E. Where at home

F. How classroom presentations and written reports

VI. Interviews with students

A. Who the teacher

B. What individual interviews on career goals

C. When October and November

D. Why to assess students individual interests

E. Where in the classroom

Methods of Assessments

In order to assess the effects of the intervention, the students' contribution to discussions will be supervised by the teacher/researcher and contents will be noted. In addition, career research will be performed by students to further enhance the objectives of this intervention. Presentation of career research and written reports will be evaluated through the use of a rubric developed by the instructor. Interviews with students will be held as part of the assessment process.

CHAPTER 4

THE PROJECT RESULTS

Historical Description of the Intervention

The objective of this project was to have students be able to transfer knowledge and skills from the classroom to the workplace. The intervention process began in mid-September by having the students complete a survey to define their initial level of awareness in this area. This activity was followed up by peer conferencing. The action plan included exposing the students to different careers through presentations given by guest speakers in different career fields. The students were also required to do career research projects. These projects incorporated the use of Horizons software, cooperative lessons, and lab work in the Survey of Technology lab. In order to determine the effectiveness of the intervention the students were interviewed individually for a comprehensive evaluation of effectiveness of the intervention. The action plan was carried out in the manner presented in the following paragraphs.

Preliminary Evaluations

A survey was given at the end of September to provide a basis for determining the level of knowledge the students had in the area pertaining to the intervention. The survey was given to the Survey of Technology class of junior and senior level high school students. This survey was followed by the first step in the action plan.

Career Presenters

There were four career presenters, starting in October and ending in January. In October, Mr. William LaManna and Mr. Jim Van Bosh presented, followed by Mr. Joel Zolin in November and Mr. Paul Lebolt in January. The first career presenter was Mr. William LaManna a systems engineer for Xerox Connects. He is a Microsoft certified systems engineer and also is A+ certified in hardware repair and maintenance. Mr. LaManna's presentation included what the day to day workload consisted of and what skills are required to have such a job. The students had time to ask many questions of Mr. LaManna. He also provided his business card to the students, along with an invitation to call if they had anymore questions in his career area.

The next career presenter, Mr. Jim Van Bosh, a vocational department director at McHenry Community College, spoke on opportunities in the plastics industry. He explained the diversity of the many jobs that are available in this area. He also described the pay and benefits associated with these careers. As part of the presentation he explained the educational background needed and any training that was available.

Another career presenter was Mr. Joel Zolin. Mr. Zolin is an ex-stuntman who currently manages a commercial bakery which he also helped build. The students were able to talk to this speaker about two entirely different careers. He explained the draw-backs and benefits of both careers and the specialized training required for them.

In January, the final guest speaker was Mr. Paul Lebolt. He is a crew chief for airplane maintenance for Abbott laboratories. Mr. Lebolt discussed the background and formal training involved in his career field. He also explained to the students what subjects in high school were important for this career as well as the post-secondary school which is required for this career. Included in Mr. Lebolt's presentation was the working

conditions and benefits in this career. Mr. Lebolt gave the school informative videos on the training schools and the Gulf Stream airplane manufacturing facility. Overall, the career presenters gave a true-life picture of other jobs and courses of study that the students had not previously been exposed to. These presenters also helped the students in learning about presentation skills and this was important for their career research projects.

Career Research Projects

The career research project was a required assessment, initiated in October, for the Survey of Technology class. The project involved listing careers each student felt related to the class, then researching the careers, narrowing the list down to the one that most interested the student. The final step for the project was a written report followed by an oral presentation. The pupils were taken to the computer lab and shown how to utilize the Horizon's software package that the school has installed on all our computers. This software helps students with career choices by surveying their particular interests. The software package can also be used as an investigative tool for job requirements, work conditions, salary and benefits information for each career. The students were able to work in the computer lab and the library the following week to conduct research for their career presentations. This was followed up by small groups working on cooperative projects on student-targeted career areas. At the end of November the students gave their oral presentations on their career research projects. The presentations were video taped for later self-evaluation. These presentations were followed up by the career portions of their individual modules in the survey of technology lab. The career research projects were often the source of classroom discussions to elaborate on different portions of the project.

Classroom Discussions and Student Interviews

Group (peer) discussions were used frequently throughout the class (October through January) to enhance the absorption of orally presented material. The discussions targeted different aspects of the intervention, as an example, presentation skills and what makes up a good presentation. The individual student interviews was delayed to December, instead of during October through November as stated in the action plan. This was to give the students more opportunity to build their knowledge-base in their particular area of interest. The data obtained from the interviews and post-survey are presented in the following section.

Presentation and Analysis of Results

The measures of assessment utilized to evaluate the success of the intervention are as follows:

1. Survey results, a comparative of before and after the intervention
2. Quality of supervised discussion
3. Evaluation of career presentations from the career research projects
4. Individual interviews on career interests and goals

Each of these will be separately evaluated and results shown in this section. First, the survey results will be presented.

Post-Survey

The initial survey results were presented in Chapter 2. The same survey was given after the intervention and the results were compared. Figures 5-7 illustrate the results.

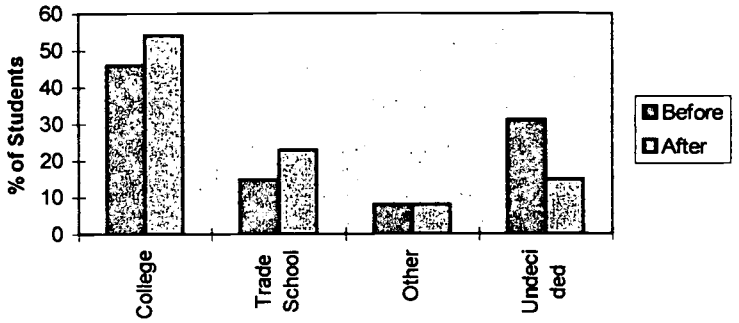

Figure 5. Post survey results to question regarding post-high school plans.

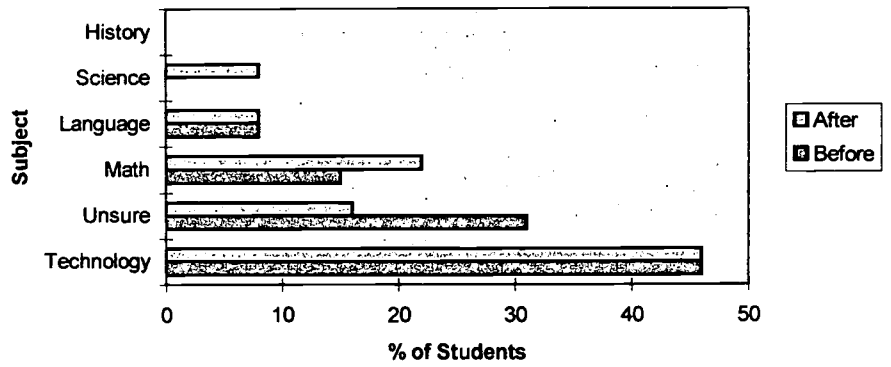

Figure 6. Post survey results to the question on which class the students believe will help them the most with their intended career.

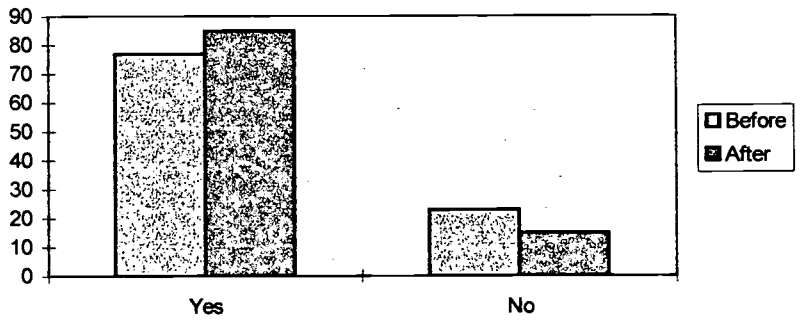

Figure 7. Post survey results to the question of how confident the students were in their knowledge of how to attain their future goals.

The post survey results indicate a increased awareness in the students about their future plans and how they will achieve them, as seen in Figure 5 and 7. In how classroom work relates to careers (Figure 6), students indicated a improved understanding for how science

and math relates to the workplace. As a part of the action plan, discussions were initiated in class to provide an open forum for the students on careers and how class work applies to them. Subjects of these discussions included how math/trigonometry are utilized in machining and how science class work provides problem solving and methods of deduction. Students were also able to relate how physical education classes could improve productivity and health in the workplace. Another aspect of the intervention was career presentations. These were the final part of the career research projects assigned to the students early in the semester. These were also a tool for evaluating the effectiveness of the action plan.

Career Presentations

The career presentations were well organized, visual aids were used and the students researched their topics well. The specifications for each project was provided in detail to the students. The projects were to contain the following information on the career investigated:

1. definition
2. history
3. nature of the work
4. requirements
5. earnings and growth potential
6. employment outlook
7. bibliography

The students chose a variety of topics in computer technology including: company employed hackers, programmers, technicians, graphic design, and computer assisted drafting. One presentation was on a career with the Navy seals. The student obtained

information and pictures from the Internet and also interviewed a recruiter. Other careers presented were airplane and automotive mechanics, composer, and architecture. The depth and level of concentration was a good indication that this portion of the intervention was a success. Individual interviews pertaining to the career research projects were part of the intervention. These were to assess the students levels of interest in their subject matter and to show applicable classroom studies in their subject area

Individual Interviews

These individual interviews contained questions directed at different classes taken and how the student felt about these classes. Were they interesting or just necessary to pass? What classes did they look forward to, which ones did they dread? How do they feel their class work relates to the real world? Most students indicated a lack of interest in English and History classes. Many felt intimidated by math classes. These feelings translated into avoidance of the subject matter. The students, when interviewed, later had a better understanding of how English classes, especially speech, is an important real world skill. The students also had well thought out responses to questions pertaining to their career interests. Many included a plan on how to attain their goals. Prior to the intervention the students had less clear ideas on possible careers and very vague plans for obtaining their goals. These improved responses were another indication that the action plan was succeeding.

Conclusion and Recommendations

The action plan was designed to increase the students' awareness of how classroom skills transfer to the workplace. By involving the students in supervised discussions, assigning career research projects and having career presenters, the ambiguity of how class work related to careers and the work place had some resolution. The many

parts of the intervention worked well together to enhance the current curriculum toward the objective. The career presenters sparked interest in students who were not as motivated at the beginning of the program. This worked well in conjunction with the career research project, which provided individualize study in this area. The use of the computer lab was an instrumental part of the research project. The group interaction also kept the course subjects fresh with new ideas and possibilities.

The recommendations are to continue with the implementation of the intervention. The success of the program was evident in the data but more significantly, in the attitude of the students towards their classroom work. This intervention offered them a look at how the subjects they are currently studying in school have many applications in their future career plans. This tie-in with their future is a great motivator, and this should be kept in mind not only for this Survey of Technology class, but also for many other subjects.

For instance, if students in a trigonometry class were given real life applications instead of abstract problems to solve they would be more motivated to learn. If students could actually see a trig problem utilizing the machine shop where the problem as tangible component being machined, they will get excited about the results of the solution. If the students in nutrition class could see the benefits of healthy lifestyle choices in promoting a better work environment as increasing productivity and or reducing absenteeism, they too will be excited about the results. When students make the connection between what is taught in the classroom and what is used in the workplace the excitement can be contagious. These things directly correlate with the national context of the problem by fulfilling the need to relate classroom work to how it is applied in the workplace.

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