THE ADVANTAGES OF TECH PREP

A Paper

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Introduction

When I started thinking about what area or subject I wanted to pursue for this project, I reflected on all my experiences in teaching and the many workshops and courses I have taken. The area in which I am most interested is School to Work, which has such programs as vocational education and Tech Prep.

Several years ago I began teaching auto tech mathematics and machine tech mathematics along with my college prep mathematics courses. By teaching in a vocational setting and working with outstanding vocational and applied teachers who are masters in their fields, I have learned that we “professional” teachers can gain new and better ways of teaching from these vocational teachers. They make connections with their students by transferring the academic knowledge to everyday work experiences. They make learning relevant to their areas of interest. They focus on contextual and hands-on, active learning.

I have participated in various School to Work and Tech Prep workshops. I have taught an integrated Algebra 2 class within an Engineering Tech Prep program where I team taught with a science and Tech Prep teacher. What a great opportunity for students. Our school has since stopped team teaching, or integrating, the classes. Why? I am not sure. My school system has since added several more Tech Prep courses, and to my knowledge there still is little integration. I am sold on the Tech Prep concept, but only when offered to its full potential. Contextual learning is a major component and should be part of these programs.

Statistics I have seen show that only 25-30 percent of high school students go to college and 15-20 percent choose vocational education. We need another avenue for the middle 50 percent of
students to get some kind of skill to become successful, productive citizens. I believe and hope to show
the advantages of Tech Prep for high school students and their future employers.

Educational Reform

Our educational system has not kept up with changing times. For most school systems, the
educational calendar is still based on an agricultural society with two to three months of summer
vacation. But in our country there are few jobs that need the summer months off. Instead of helping
parents in the farm fields, kids are home without adult supervision during the summers. Also, when the
educational system was created in this country, only 15 percent of students finished high school. The
vast majority of students either went to work on the family farm or filled unskilled labor jobs where
education was not a prerequisite (Public Forum Institute, Jan. 2002).

After the agricultural society, our country moved to the industrial era where almost 30 percent
of students went on to post-secondary schooling. The remaining 70 percent found unskilled
manufacturing jobs after high school. The industrial era was followed by the information age, then the
global society which we are currently experiencing. Both the information age and the global society
brought the need for more technical jobs that do not require four-year degrees, but rather need highly
skilled workers trained in technology. Regardless of these current needs, some 30 percent of students
are still beginning four-year, post-secondary programs. Job needs continue to change and employees
need to be able to adapt easily to compete in the global job market. But the education system is not
meeting the current needs of society (Public Forum Institute, Jan. 2002).

The internet is another example of how our society has changed. In 1969 there were four
primitive web sites. In 1990 the number of web sites grew to more than 330,000. In 1998 some 20
million webs sites competed for our attention. In that same year, the U.S. Secretary of Education
explained the vast information available on the internet as trillions of bits of knowledge moving in nanoseconds across the World Wide Web (Riley, 1998).

Our new era of education must give our children the power to use the expanding horizons of knowledge exploding around them. “We cannot sit still rooted to the chalkboard and pencil at a time when a 12-year-old can literally touch his or her mouse pad and travel from web site to web site around the world” (Riley, 1998).

Schools are doing a good job teaching the basics such as reading, writing, science, mathematics and history. But these subjects are not being taught in a way that will prepare students for the current job market. To do this, we must understand the needs of employers.

In 1990, the U.S. Department of Labor created the Secretary’s Commission on Achieving Necessary Skills (SCANS). The group’s goal was to outline the skills needed to succeed in today’s world of work. The skills identified were categorized as hard skills and soft skills. Hard skills include proficiency in basic skills, including mathematics, reading and writing. The soft skills include critical thinking, problem solving and interpersonal communications (Public Forum Institute, Jan. 2002).

Even though 70-75 percent of high school graduates do not go to college, they get very little guidance for their transition into the working world because schools are set up to assist college-bound students. Because of that, many high school graduates waste time “in a string of dead end jobs that teach them few new skills until they finally move into the mainstream labor force” (ASCD, 1994).

As part of the transition to the working world, America’s teachers must learn how to integrate technology into their lesson plans. “We really ought to be past the time when many students know more about computers than some of their teachers” (Riley, 1998). Hundreds of thousands of information technology jobs are going unfilled because we do not have enough skilled workers. Untrained, entry-
level jobs are disappearing. High school graduates can no longer step into factory jobs armed only with skills in the basic courses. There are many good school-to-work (STW), Tech Prep and vocational program that are giving more Americans skills for the future (Riley, 1998).

Tech Prep

The School to Work (STW) Act was written in 1994. The general purpose of the School to Work Act is to provide the framework for changing the focus of education to meet the needs of all students. The act strives to make the transition from school to work a successful process. The North Central Regional Educational Library (NCREL, n.d.) list six strategies for implementing STW programs:

1. Develop an applied and integrated curriculum
2. Implement career-based developmental career guidance
3. Create articulation between K-12 and post-secondary education
4. Develop work-based learning opportunities
5. Work in partnership with business, industry, labor and the community
6. Provide professional development activities

School to Work emphasizes career awareness to find areas of interest. Students should be given opportunities to investigate career alternatives throughout the educational process. As students go through elementary and junior high they should be introduced to many career areas while learning the core curriculum. By the time these students reach high school they might have narrowed down their career choices, or at least eliminated some of them (NCREL, n.d.).

Tech Prep and School-to-Work programs are specifically designed to assist with the transition from high school to either college or work. Many School-to-Work programs report high rates of college enrollment. The Baltimore Finance Academy reports that 98 percent of its students go to
college, and the Los Angeles Medical Magnet School reports that almost all of its students plan to attend college (ASCD, 1994). These students go to college with a specific area of study in mind, as well as previous training in the area. This gives them a head-start in college and can shorten some programs of study.

A study of a Tech Prep program in Wayne Township, Indiana, showed that Tech Prep students had more focused career goals than the general track students. The study showed that Tech Prep students had better grades, as well as better attitudes toward teachers and further education. Data suggests that School-to-Work and Tech Prep programs may be able to improve grades, attendance and graduation rates, as well as further education (ASCD, 1994).

Tech Prep is the educational initiative of the future. Through the Tech Prep program, students get real-world working experience, career exploration, training in today’s newest technologies, and the academic foundation they need to succeed in college. Tech Prep takes the best things about college prep classes and technical education, and combines them into a seamless program that begins in high school and continues through an associate degree in college, and beyond (OHTPCS, July, 2004).

One of the advantages of Tech Prep is its ability to respond to employment needs of the community. “The greater the collaboration of business, industry, parents, teachers, and community members in the education process, the greater the ability of the school to prepare students for successful employment” (Hull, 1995, p. 17).

Because Tech Prep programs have the ability to respond to the needs of the community, different programs of study are available in different locations. But regardless of the area of study, all Tech Prep programs have the following elements in common:
1. Recognition of different learning styles, emphasis on contextual learning and use of applied academic courses

2. Emphasis on preparing all students for a career

3. Involvement of business and industry as partners in the delivery of education

4. Expectations of high achievement for all students

5. Strong cooperation with other secondary and post-secondary schools

6. Results and evaluations based on demonstrated skills

7. Cooperation of business and industry, schools and parents acting as a group (Hull, 1995, pp. 16-17).

Tech Prep Teaching Methods

Tech Prep’s focus on career preparation has not lowered the academic standards expected of its students. It’s success lies in the emphasis on transferring classroom knowledge to the “real world.” There are two ways to ensure student success: make the curriculum easier or change how it is taught. Tech Prep focuses on changing how the curriculum is taught by using contextual, work-based learning (Hull, 1995).

At the beginning of this inquiry seminar project, the main advantage of Tech Prep was thought to be its career orientation. Upon the review of literature, the main advantage of Tech Prep moved to the way it is taught. The use of hands-on, contextual learning strategies are used in the Tech Prep classroom. Research shows these types of teaching methods have the best result.

A good example of teaching methods used in Tech Prep is the training used by our armed forces. The armed services are our nation’s largest employers of young adults, as well as operators of the largest education and training program in the country. The military has concluded that contextual
learning, that is teaching basic skills and training skills together, reduces the time spent in training (Parnell, 2001). In the classroom, teachers often spend too much time re-teaching concepts. By using contextual learning methods, we can spend less time going over concepts students should have learned the first time.

The Contextual Learning Institute and Consortium conducted a project on contextual learning in the School of Education at Oregon State University. The purpose of the project was to experiment with contextual teaching methodologies in a variety of subject matter settings. By the end of the project, teachers were much more enthusiastic about contextual learning. The consensus of the teachers in the contextual teaching classes was that:

1. Students tried harder and were more interested in their studies
2. Students behaved better
3. Absenteeism and tardiness were down
4. Students seemed to enjoy the contextual classes more than the traditional classes
5. Students seemed to accept more responsibility for their learning (Parnell, 2001, p 70).

Teachers involved in the project said that helping students make the connections between knowing and doing, and between one subject and another, is the heart of contextual teaching. They added that while utilizing contextual teaching, the role of the teacher changes from the one-way lecturer approach to an interactive, facilitator-of-learning approach (Parnell, 2001).

As mentioned previously, Tech Prep programs strongly encourage applied, contextual learning. As a result, much more emphasis is placed on programs that have a connection to employment and contribute to a smoother school-to-work transition or work-based learning (Hoerner and Wehrley, 1996c, p. 9).
There are two definitions of work-based learning. The first definition is more traditional. It is as follows:

Learning experiences and activities that are based on and in some type of work setting or simulated work setting, that is, apprenticeship internship, co-op, on-the-job training, career academies, school-based enterprises, occupational/technical labs, job simulation, and the like (Hoerner and Wehrley, 1996c, p. 10).

The second definition of work-based learning is more broadly based:

The knowledge/learning imparted to every student from the beginning of schooling that maintains a theme or focus that people work to live and that there is a positive connectedness between the schooling process and productive lives (Hoerner and Wehrley, 1996c, p. 12).

This second definition is greatly needed in our schools. All educators need to see the need for a positive connection for all students between the educational process and living productive lives. Teachers need to relate content areas from elementary school through college to the students’ futures. Teachers who are discipline- or content-oriented often do not use, or know how to use, work applications for their areas of study (Hoerner and Wehrley, 1996c).

Work-based learning strategies can be divided into two main categories based on the location of the learning: job based and school based. School-based work experiences could include senior class projects, job-simulation assignments, mock business/industry projects or vocational/occupational labs. Job-based work experiences could include youth apprenticeships, one-the-job training, co-operative education, clinical experiences, mentorships or school-linked summer employment (Hoerner and Wehrley, 1996b).
Problem-based learning (PBL) is another teaching method used in Tech Prep programs. PBL helps students learn and retain knowledge in a usable manner. When teachers hand students facts without giving them a chance to investigate or develop their own questions, students “may memorize the material but will not fully understand or be able to use it” (Delisle, 1997). Roots of problem-based learning can be traced back to the early 1900s and John Dewey. Dewey believed that teachers should teach by appealing to students’ natural instincts to investigate and create, not just lecture material (Delisle, 1997).

“Educators who use problem-based learning recognize that in the world outside of school, adults build their knowledge and skills as they solve a real problem or answer an important question - not through abstract exercises” (Delisle, 1997). In fact, PBL was first created to train doctors in approaching and solving medical problems. Doctors were gaining a lot of head knowledge, but needed help using it. By utilizing PBL, new physicians learned an essential body of knowledge, were able to use that knowledge, and could adapt that knowledge to future problems. This is the main focus of Tech Prep (Delisle, 1997).

“Problem-based learning fits right into the movement for higher standards and greater achievement” (Delisle, 1997). Teachers using PBL teach students to demonstrate an understanding of the material, not just regurgitate learned information. Research indicates that PBL can motivate bored students while raising their learning and achievement. “These student-centered strategies build critical thinking and reasoning skills, further students’ creativity and independence, and help students earn a sense of ownership over their own work” (Delisle, 1997). Again, this is an advantage and main focus of Tech Prep programs.
An big advantage of Tech Prep and School-to-Work programs is that they both have funds for teacher training. Professional development can help educators shift their paradigms about education and help them obtain the skills necessary to teach the connections between school and work (Hoerner and Wehrley, 1996a, p. 102).

The key to all keys to making work-based learning succeed is professional development because it has the potential to open all the doors (e.g., counseling, curriculum development, philosophical changes) for creating the necessary linkage between school and work. Without professional development, the chance of any significant change is remote (Hoerner and Wehrley, 1996a, p. 99).

Educators need to develop three areas of competency in their students: (1) knowledge of content area, (2) knowledge of content utilization, and (3) competence in the art and skill of facilitating learning (Hoerner and Wehrley, 1996a). The first and last areas are often cited in teacher requirements, but the knowledge of content utilization is not required enough in our schools.

Research has shown that another advantage of Tech Prep programs is that it helps alleviate student apathy. Student apathy is a concern in classrooms all over the United States. Tech prep is a program that tries to get students interested in their subjects by making the lessons applicable to real life situations. Job shadowing is a professional development component of Tech Prep that helps teachers gain the knowledge and information necessary to do that (Jordan, 2001).

In one school district, the local tech-prep consortium and Dow Chemical fund job-shadowing internships each year. These internships have placed teachers with the sheriff’s department, wildlife agencies, hospitals and on an archaeologist’s shipwreck project. This school district also contacted leaders in business, industry, education and community and asked them to help define a profile of the
ideal graduate. With this information, listings of cross-disciplinary skills were created which outline expectations from the community (Jordan, 2001).

Job shadowing allows teachers to get a better understanding of what business and industry are doing today. It helps teachers “identify concrete connections to the curriculum” (Jordan, 2001). It helps teachers create projects and make connections with academic applications. Rather than getting word problems out of a textbook that often have little connection beyond the classroom, problems can be created from actual experience (Jordan, 2001). This can help with student apathy in the classroom.

Articulation/Partnerships

Articulation is a formal working relationship between certain high schools and post-secondary institutions to help foster the successful transition of students between the educational programs in certain areas of study. Articulation agreements help reach the second educational phase of “2+2” Tech Prep high-school-to-college programs (CSCC, 2003).

Students benefit most from articulation agreements. Benefits of articulation agreements for students include, but are not limited to, saving money (tuition and books), earn college credit in high school, accelerated programs once in college, and confidence to continue in post-secondary education programs. Articulation agreements align curriculum between the high schools and the post-secondary institutions to avoid content repetition and provide for continuation of the programs involved. After high schools, students will not have to start over in the subject areas and duplicate information he or she has already mastered (CSCC, 2003).

Another benefit for Tech Prep students is a lower drop-out rate in college. Statistics indicate that Tech Prep college students “persevere in their college degree programs at higher rates than the
general population, regardless of whether they need to take developmental course work” (CSCC, 2003).

Tech Prep articulation agreement benefits for employers include lower training costs and overhead, a voice in the development of school and college curricula, and opportunities for companies to respond more quickly to changing trends in employment needs (CSCC, 2003).

Articulation agreements benefit teachers by providing job shadowing which can lead to students responding well to subject content that they find relevant to their future working careers (CSCC, 2003).

The cooperation between schools and business/community partners is a vital aspect of Tech Prep. It links what kids learn in the classroom with what businesses need from their employees. It helps schools tie their curriculum to current employment needs. Columbus State Community Colleges lists on its web site all the central Ohio Tech Prep consortium Partners. These are the same businesses that open their doors for teacher and student job shadowing experiences, apprenticeships and internships, as well as hire employees with Tech Prep training. The web site lists information for each business so students and graduates can see the current openings. These businesses cover a range of work areas. The businesses listed include Childrens Hospital, First Service Federal Credit Union, Giant Eagle, Inc., Goodyear Auto Service Center, Indianapolis Veterinary Specialists, Peabody Landscape Design, Ricart Automotive, Scioto Reserve Golf and athletic Club, The Ohio State University, Time-Warner Communication, Trugreen Chemlawn and Wexner Heritage Village (CSCC, n.d.). Many more businesses are listed on the website. These are just a few of the growing partners in Tech Prep.

Authentic Assessment

The purpose of assessment is to document student achievement and development while providing useful feedback. Traditional assessment models focus on knowledge and skill, use tests and
grades, are external to the teaching process and are school focused. On the other hand, authentic assessment is learner focused, observes tasks, is part of the teaching process and is real-life focused (Urschel, 2004).

Effective assessment focuses on students’ demonstrations of learning outcomes. It is comprehensive, allows students to monitor their own progress. It is valid and reliable and reflects social justice principles (Urschel, 2004).

It is important to use a variety of assessment techniques to follow a student’s progress. Some options include: observation, interviewing, writing, performance, portfolios and written tests (Urschel, 2004).

A rubric is one of the best-known types of authentic assessment. A rubric takes “the qualities of a behavior or characteristic and constructs a qualitative scale for evaluating each behavior or characteristic” (Urschel, 2004). A good scoring rubric will:

1. define excellence and plan how to help students achieve it
2. communicate to students what constitutes excellence and how to evaluate their own work
3. communicate goals and results
4. help teachers be accurate, unbiased and consistent in scoring
5. document the procedures used in making important judgments about students (Urschel, 2004).

Another method of assessment used in most high schools is the Career Passport. The Career Passport is a customized portfolio each high school student receives. It includes items such as a resume,
letters of recommendation, list of competencies achieved, certificates of program completion, high
school transcript and employability credentials (Fessler, 1997).

The list of competencies included in the Career Passport relate to the area of study, or career
cluster, the students choose. Some career clusters from which the students can choose are as follows:
arts and communications; business and management; health services; human resources; industrial and
engineering systems; automotive technology; biotechnology; and environmental and agricultural systems.
Career clusters group occupations from different industries that share common skill requirements. This
helps organize the thousands of career choices and their corresponding skills into the high school
curriculum. Ohio’s Career Passports are standardized across the state and recognized throughout the
country (Fessler, 1997). This is important to make sure they are useful to students outside the high
school setting.

Summary

Unfortunately, education has not kept up with changes in the work environment. Because of
this, education needs to catch up. Politicians think that the creation of higher standards will bring the
needed changes in education. But raising standards without changing the way students are taught does
nothing to engage the student. If students are not told why the higher standards are being added, they
see them as just another test.

Higher standards without engaging relevant curriculum and instruction will not improve public
education. Students need to be given opportunities to investigate their career interests and choose
educational paths that help them achieve their career goals. We, as educators, must help them do just
that. Some students will need to take a path toward a four-year degree (college prep). Some students
will pick a vocation and get needed skills and training in career and technical program (vocational). But
for those wishing to pursue careers that need both college and technical skills, needing a two-year or four-year degree, Tech Prep is the best avenue.

Tech Prep has the college prep academics taught with career and technical, applied methods. It is an educational path where the curriculum and instruction are designed to provide students with specific skills needed for a specific career cluster. Tech Prep is taught in ways to fit the many different learning styles, and instructors are trained in many effective instructional methods.

Statistics show that only 25-30 percent of high school students go to college and 15-20 percent chose vocational education. Colleges and universities tell college prep students what requirements are expected. Vocational students know what skills are expected of them. Tech Prep will fill the need for the middle 50 percent of students to get guidance and skills necessary to become successful, productive citizens. “Tech Prep - Another Way to go to College.”
References


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About The Author

Jack Cheek is currently teaching mathematics at Lancaster High School, Lancaster, Ohio. He has 18 years of experience, 8 years at the junior high level and 10 years at the high school level. He completed his BS in secondary education at Ohio University, Athens, Ohio in 1986. He is married to his wife, Kathryn and has 4 children, Ryan, Nathan, Chet, and Kim. Jack plans to become more involved with the Tech Prep programs by promoting the many advantages and one day teach within an integrated Tech Prep program because it is a great way to engage students in the learning process.