

Boarding the Global Train of Success Implementing the Dual Education System In America.... An Academic and Apprenticeship Model



Career Technical Education Foundation, Inc.

"Changing the face of education today to meet the needs of tomorrow"

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EXECUTIVE SUMMARY

Dual System – Academic and Apprenticeship Model, a Collaborative Partnership between Industry and Education for Career Academies

INTRODUCTION

During the week of November 10, 2008, a small delegation from Tampa Bay visited Germany and Austria to understand the differences between American and German/Austrian school systems and apprenticeship programs, and to learn how the German/Austrian dual education system (academic and apprenticeship) is structured. This team was a party of three individuals consisting of an educator from Pinellas County, an elected official of the Pasco County School Board, and a local industry representative from Pasco County. The team members were:

Kathryn Starkey – Chairwoman for the Pasco County School Board and Vice-Chair for the Florida School Board Association’s Learning First Council. The council includes all education associations and many business associations in the State of Florida.

Paul Wahnish – Director of the Engineering Career Academy at East Lake High School in Pinellas County, and founder of CTEF (Career Technical Education Foundation, Inc.); a not-for-profit career education foundation.

Bryan Kamm – Director of Government/Public Relations and International Development, Coastal Caisson Corp., a foundation engineering and construction company and wholly-owned subsidiary of the Bauer Group headquartered in Schrobenhausen, Germany.

This executive summary addresses the findings of this trip and concludes with a decisive dual system model proposed to be implemented in the Tampa Bay area.

PURPOSE OF THE TRIP

Prior research, and extensive conversations with German nationals familiar with the German apprenticeship program, suggested that the German/Austrian education and apprenticeship programs produce a more sophisticated level of student with a higher degree of professionalism and advanced skill-sets. These claims purported that these students/apprentices become technically superior and more productive than US workers even before they officially enter the workforce.

To learn how this system might work in the U.S., research led the team to a successful apprenticeship program here in the US. Two of the team took an earlier trip to Blum, Inc. in North Carolina, which confirmed that a dual education system could be implemented in the U.S. In 1995, Blum, Inc., a US subsidiary of Julius Blum GmbH launched their own apprenticeship program similar to their system in Austria.

After unparalleled local success, Blum later took their model in 1999 to local companies launching Apprenticeship 2000. Five other companies, Ameritech, Timken, Daetwyler, Sarstedt and Pfaff Mold joined the program which has since been a huge success for all participating firms, the educational system and the local community. This model encouraged the investigative team to visit Europe to observe first-hand the companies and schools, and to determine why their companies are so successful in training a loyal, skillful and productive workforce.

OBSERVATIONS FROM TRIP TO AUSTRIA AND GERMANY

The trip to Europe included a full week of travel to Austria and Germany visiting the following companies, schools and organizations:

Dornbirn, Austria

- Julius Blum GmbH
- WIFI – IHK (Chamber of Industry and Commerce)

Aalen, Germany

- Aalen IHK (Chamber of Industry and Commerce)
- Aalen Technische and Berufsschule

Hiedenheim, Germany

- Heidenheim IHK (Chamber of Industry and Commerce)
- Carl Zeiss AG
- Berufsakademie University – Heidenheim

Pforzheim, Germany

- Kramski GmbH

Schrobenhausen, Germany

- Bauer AG

COMPANIES VISITED

Julius Blum GmbH

The worldwide headquarters for Blum is in Hoechst, Austria. Blum is a 1.9 Billion Euro company. They have 6 plants in Dornbirn totaling about 2.3 M square feet (SF). They are building a seventh plant there which will be another 100,000 SF. Blum also has a 450,000 SF facility in North Carolina and a 30,000 SF plant in Brazil and a plant in Poland. Blum has 5,100 employees worldwide, 4,000 in Austria with 237 apprentices. The US plant has 430 employees with 17 apprentices. There are no apprentices in Brazil. Blum manufactures drawer runners and hinges for furniture and cabinets.

The quality skill-sets of the apprentices coming from the US are equal to those coming out of Austria. Blum is all about automation. They have an automated assembly machine that assembles 50 parts to a hinge in 0.73 seconds. Their employees and apprentices need to be top notch manufacturing specialists. They are given the choice of eight career tracks: mechanical technician, tool & die maker, CNC, electronic technician, plastics injection molding, CAD design, production technician and IT technician. Blum sends them to Berufsschule for 4 to 6 week academic courses, then they come back to learn the practical hands-on skills. The students are also taught social competence (how to be responsible and accountable), and are given bonus incentives (Blum card points for performance, social work, and behavior, patronizing local restaurants, etc.) These Blum points can be cashed in on a St. Moritz ski trip or a Formula One race. The apprentice's first year application process consists of:

- Career information day
- Practical orientation day
- Open house for parents
- Qualification test
- 6 week internship in summer

Carl Zeiss AG

Carl Zeiss AG was founded in 1846 and has 14 production facilities with over 12,000 employees worldwide and 5,500 employees in the Aalen/Oberkochen area. They are the largest contributor to the IHK. They have 1,500 applications for the apprenticeship programs each year, but will only accept 95 this year; 75% from Realschule, 25% from Hauptschule and 17% from the Gymnasium. There are 215 apprentices in Aalen/Oberkochen; 61 of the apprentices are specializing in administrative sales management and customer service.

Zeiss is a 2.6 Billion Euro company with divisions in Medicine, Microscopes, Semiconductors, Measurements and Optiks. They acquired an American company named Sola International, Inc.

Kramski GmbH

Kramski is a tool and die and plastics injection molding company starting business in 1978 and headquartered in Pforzheim with production facilities in Germany, Sri Lanka and India. They have a US subsidiary in the Tampa Bay area. The machine tooling is done in Pforzheim. The plant in Clearwater is for assembly for customers in the US. At this point, all apprentices are in Germany. They employ about 200 have 20 apprentices and 1 full-time instructor. In the first year, apprentices are given projects that are simple, but actual tool and die products for use in the company. If the product is not useable, they scrap it, or reuse it if possible. By the second year, the apprentice is actually productive and taking on more responsible projects. Senior employees supervise the work process and mentor the apprentice. By year 3, the student is so advanced they could start work for the company, and it is only a formality requiring they finish the apprenticeship program.

Bauer AG

Bauer has worldwide headquarters in Schrobenhausen, Germany. Bauer has three divisions, Bauer Maschinen (equipment manufacturing), Bauer Spezialtiefbau (Deep Foundation Construction), Bauer Resources (environmental resources). Bauer AG employs 8,103 worldwide with operations in 70 countries. There are 5,100 employees in Germany. Coastal Caisson Corp., a foundation engineering and construction company, with US Corporate headquarters in Odessa, Florida (Pasco County) is a wholly-owned subsidiary of Bauer Spezialtiefbau GmbH, and part of the Bauer AG group of companies. Coastal Caisson Corp. employs 160 and plans to begin an apprenticeship program for drilling rig operators, welders, mechanical, hydraulics and electrical technicians.

Bauer has 192 apprentices, 130 are in Schrobenhausen. Bauer is a 2.0 B Euro worldwide company. They took on 46 new apprentices this year. Apprentices make up 2% of their employees.

SUMMARY OF GERMAN SCHOOL SYSTEMS

The German School system is further defined as such:

Kindergarten (ages 3 to 6)

(Kindergarten is not part of the Primary School)

It is an extra institution which is voluntary. In the last Kindergarten year the children go to the Pre-school class (5-6) which belongs to the Kindergarten

Grundschule (Primary School) (ages 6-10) - At the end of the 4th primary school -year (at age 10) based on grades and aptitude the student will advance to a secondary level into one of the following schools:

- **Hauptschule (General Secondary School) (ages 10-15)** - students receive basic academic certificate after the 9th year. If they also participate in a special 10th grade class they can receive an advanced academic certificate which is similar to the Realschule graduation.
- **Realschule (Intermediate Secondary School) – (ages 10-16)** - better grades are required to get into Realschule and students receive an advanced academic certificate after the 10th year.
- **Gymnasium (Advanced Secondary School) – (ages 10-18)** - This is an advanced high school equivalent to our IB program, after the 13th year of schooling (at the age of 18), students take the Abitur (a final exam) – if the student passes the Abitur, the student may enter any University, Fachhochschule or Technische University of their choice in Germany.
- **Berufschule** – students who don't go on through Gymnasium and the path to the university apply for an apprenticeship program at a company which offers this kind of program. In an apprenticeship program they go to Berufschule after Hauptschule, Realschule or Gymnasium to apprentice in a vocational skill to receive an occupational academic certificate after a 3 year apprenticeship period. The Beruf-schule teaches the academic curriculum with practical background, while the student becomes an apprentice at a company and learns the practical (hand-on) curriculum.

Special schools to take the Abitur (final exam) on the “second way of education”:

FOS: Fachoberschule

After the Realschule students have the possibility to go to the FOS. After two years, the student can also take a special Abitur (a final exam in their special-sector: e.g. technical) which offers them the opportunity to visit the Fachhochschule (e.g. civil engineer).

BOS: Berufsoberschule

After an apprenticeship-program, students have the possibility to go to the BOS. After two years they take the Abitur (similar to the Gymnasium-Abitur) and they may enter any University, Fachhochschule or Technische University.

Special Education-Institutions in the technical sector:

(exam takers and post-graduate courses)

- **IHK** (Industrie- and Handelskammer = Chamber of Industry and Commerce)

Task of the Chambers of Industry and Commerce (IHK)

The principal tasks undertaken by the IHK in vocational training are the following:

- Looking after and supervising training matters

One of the most important task of the Chambers is advising training employers on all problems connected with training, e. g. the training occupations to be considered, how training should be structured, the use of training aids, and educational, psychological and legal questions. The Chambers of Industry and Commerce also advise trainees. Any employer wishing to engage trainees must fulfill certain conditions as regards to his suitability for this task. The firm must be able to offer facilities, production programs or services on the basis of which the prescribed knowledge and skills may be imparted. In addition, the training employer and any training officers must have specific personal, professional and teaching qualifications. The Chamber of Industry and Commerce will ascertain before the start of training and also during the course of training whether these qualifications are present. This is done on the basis of a vocational training register kept by the Chamber of Industry and Commerce, in which all vocational training contracts must be entered. The task of looking after and supervising training matters is assigned to the training counselors on the staff of each Chamber of Industry and Commerce.

- Interim and final examinations

Generally, every trainee must take an interim examination in the course of his period of training. The examination serves to ascertain the level the trainee has reached. The responsible Chamber of Industry and Commerce establishes boards of examiners to hold these examinations. Every trainee sits for a final examination at the end of his period of training in order to show that he has acquired the necessary professional qualifications. The examination includes practical and theoretical tests. After having passed the examination, the trainee will receive an examination certificate issued by the responsible Chamber of Industry and Commerce.

After the Berufsschule and apprenticeship program the students attend the IHK for final occupational exams (they must have 2 years work experience) where their practical skills are tested. If they pass, they receive their Meister Zertifikat (Master Technicians Certificate).

The IHK also retrains employees transitioning into other professions (through the state unemployment office)

The IHK has tracked where the students come from and go into a Berufsschule on a national basis. Students taking their tests for the Meister's come from:

- 41% from Realschule

- 22% from Hauptschule
- 10% to Gymnasium
- **Techniker Schule** - After the graduation of the Berufsschule which includes a successful finish of the apprenticeship program in the company, and 2 years work experience after the apprenticeship program, students have the possibility to become a Techniker. The Technical school is a general term used for two-year college (fulltime) or four-years (part-time) which provide mostly employment preparation skills for trained labor, such as welding, culinary arts and office management, etc.

An Illustration of the German dual education system follows below on the next page (See below).

BERUFSAKADEMIE UNIVERSITY (UNIVERSITY OF COOPERATIVE EDUCATION)

The dual system was so successful in Germany that the German education system needed a university level to provide practical training for graduates of the Gymnasium. Stuttgart started the first Berufsakademie University in 1975 in Stuttgart (this was the model used for others; there are now 7 total in Baden-Wuerttemberg). The Heidenheim Berufsakademie University has 91,500 square foot facility, and they will be adding an additional 22,000 square foot facility (\$30 M Eu investment). Students can only apply to the Berufsakademie if they have been contracted by a company. The student (and/or) the company must pay 500 EU tuition per student for each semester. The contract is binding with the company and the apprentice becomes an employee of the company with full benefits, but has the choice to go with another company after the student receives a diploma. 80% of companies want employees to stay and only 14% of students leave the original company for another.

The Berufsakademie in Heidenheim has 1600 students and there are 23,000 in Baden-Wuerttemberg. Graduates become more valuable and employable with a greater depth of practical knowledge. Students take 6 to 12 weeks theory at the University, then 6 to 12 weeks at the company alternating throughout the school year. The company Voith sends 50 to 80 applicants to the university each year. Students can receive a Bachelors of Arts, Bachelors of Engineering, a Bachelors of Science, a Masters degree, and a Diplom Ingenier (Diploma Engineer) (which is equivalent to a P.E. in the US).

Due to decisions made at the European Union, the German university system is adding a Bachelors and Masters Program to its recognized degrees. This is new to Germany and most believe it is diminishing the standards of the German university system. The Bachelors and Masters programs only teach the academic curriculum now, but they will add the practical curriculum soon. In a Masters program, the student thesis must address and resolve a problem at the company sending the student.

At the Berufsakademie in Heidenheim, 60% of the students are in the business program and 40% are in social sciences. The university has 500 lecturers, with 50% part-time lecturers, 40% full time and 10% foreign exchange lecturers. All professors must have a minimum of 5 years business experience. 37% of the students do an international exchange program where they go overseas to work for a foreign company.

IHK (CHAMBER OF INDUSTRY AND COMMERCE)

In Aalen, the IHK, Berufsschule and Technical School are all co-located in one campus with 4,500 students. The buildings and equipment are paid for by the county and the teachers are paid for by the state. The campus totals about 250,000 square feet. The IHK provides training for students with a contract with a company to receive training during the day, and offers retraining opportunities for unemployed workers looking for a new career. The IHK also provides written and practical tests for final exams for the Meister Technicians Certificate. In the 16 German States there are a total of 82 IHK's. In the state of Baden-Wuerttemberg, there are 12 IHK with 4 in Osthalbkreis (the County) in the Heidenheim area.

The IHK is funded by the industries in Baden-Wuerttemberg and has a budget of \$1.3 M. It is funded by a percentage of profits from local companies and state unemployment for workforce retraining. The company funding to the IHK is mandatory by Federal government. The local companies must pay a percentage of their net profits. The IHK can charge part-time students relearning skills (actually paid by unemployment).

There is one major difference our team observed in the IHK, which are the economic development agencies in Germany. In Germany, the IHK's primary focus is on developing workforce training through apprenticeships to prepare the student for the workforce and to assist in business retention. The IHK's focus on assisting new businesses to move into their area is minimal. In the US, the focus is the opposite, with a primary focus almost entirely on new business development, where workforce training preparation and growing the strengths of local businesses takes a back seat and suffering a severe lack of attention in most U.S. states.

RECOMMENDED MODEL FOR DUAL SYSTEM SUCCESS IN US

Continued prosperity, social development and the competitive nature of our economy are increasingly becoming dependent upon the importance we attach to education in our country. The development of a certified Career Academy Dual System training program is vital to keep students engaged in the educational process allowing them to smoothly enter the world of work while furthering their knowledge and skill-sets.

What is the dual system of education supported by industry for career academies with an internship/apprenticeship model? Two partners share the responsibility for education and training. The Career Academy assumes the responsibility for teaching the required curriculum content including theory and practical

application. Industry provides the career academy financial support and the training necessary to familiarize the trainee with the technological and organizational aspects of the work processes within the company.

Advantages of the Dual System for the Industry partner:

- Secures the skilled labor needed
- Reduces the costs to train for positions within the company
- Increases motivation and loyalty to the company
- Trainee receives job specific qualifications
- Productive performance of trainee

Advantages of the Dual System for the Student:

- Recognized Industry Certification
- Increased prospects for employment upon completion
- Theory and practical application of curriculum
- Certain degree of independence through an “earn while you learn” program

Financing of the Dual System of Education and Training

- Industry partners who provide training contribute the largest share
- Perkins and other District funding as available from State and Federal Agencies Grants
- Dual System of Education and Training provides the opportunity for the successful Career Academy Graduate to:
 - Earn Industry Certification and/or
 - Earn college credit upon successful completion of each course while attending the Career Academy
 - Apply to the University of their choice

or

 - Earn Industry Certification
 - Enter gainful employment either with their own training company or another company
 - Continue education process by:
 - Working with the training company 3.5 days/week
 - Attending University or Continuing Education facility 1.5 days/week with company assistance where needed until coursework completed.

CAREER ACADEMY MODEL CURRICULUM

9th Grade

- Theoretical and Practical knowledge related to chosen professional field or occupation.
- Classes on core curriculum and electives

10th Grade

- Theoretical and Practical knowledge related to chosen professional field or occupation
- Classes on core curriculum and electives
- Supporting Industry presentations at mid-year to students
- Student application process for Industry positions
- Six-week Summer internship with Industry Partner; process-oriented training based on specific in-house requirements

11th Grade

- Theoretical and Practical knowledge related to chosen professional field or occupation
- Classes on core curriculum and electives
- Supporting Industry presentations at mid-year to students
- Student application process for Industry positions
- Six-week Summer internship with Industry Partner; process-oriented training based on specific in-house requirements

- Industry Partner and student may elect for student to continue Internship while attending Career Academy, working up to 20 hours per week
- or
- At the election of the Industry Partner or the student, student may seek Internship with a different Industry Partner

12th Grade

- Theoretical and Practical knowledge related to chosen professional field or occupation
- Classes on core curriculum and electives
- Industry Certification Testing
- Supporting Industry presentations at mid-year to students
- Student application process for Industry position or for University
- Industry Partner and student may elect for student to continue in Pre-Apprenticeship while attending Career Academy; student may be allowed to leave school early under the **On the Job Training Program**
- If student elects not to attend University but to begin Apprenticeship upon graduation, Industry Partner and student will enter into “contract”.

After Career Academy Graduation

- Student attends University
- or
- Student enters Apprenticeship Program under the Dual System Model Program

The Creation of Career Technical Education Foundation, Inc. (CTEF)

CTEF, a 501 (c)(3) non-profit corporation, was founded by J. Paul Wahnish, SAE, as a means to drive a collaborative effort between schools and businesses, to encourage educational and career opportunities and provide companies in the region better trained and prepared workers. The organization initially served students from East Lake High School located in Pinellas County, Florida, but in 2008 expanded to include students in High School level Career Academies across regional counties, beginning with Pasco County. The primary function of the organization is to work with and influence the local educational system through community and industry partnerships. The establishment of the Academy of Engineering at East Lake High School formed the cornerstone of its success and is the driving force introducing its “*Footprint for Sustainability*” to all levels of education.

Human Capital is the most critical production factor in a knowledge-based economy. Our current U.S. educational system will experience difficulty producing a competitive workforce in this global market. It is apparent that industry must drive this change. One of the goals of Career Technical Education Foundation, Inc. (CTEF) is to introduce a dual education system combining theoretical and practical knowledge into Career Academies. This change will revolutionize the level of competence in our workforce and dramatically increase our competitiveness in the global economy.

CTEF’s industry led board of directors understands the needs of the market and industry, as well as the student apprenticeship needs. The CTEF Board of Directors consists of executives from six leading companies in the Tampa Bay region (and Blum, Inc. in North Carolina) including:

- SRI International
- Coastal Caisson Corp., (A subsidiary of Bauer AG)
- Jabil Circuit, Inc.
- The Nielsen Company
- Pall Aeropower
- MicronPharmaworks, Inc.
- Blum, Inc. (founder of Apprenticeship 2000)

This industry knowledge input from the business sector places CTEF in a unique position to insure an optimal fit between the student’s basic and advanced career training, to understand and advance the personal aspirations and aptitudes of young people, and to assess and understand the qualifications required by Industry. The joint

efforts of Education, Industry and Student will insure companies will recruit competent staff. High quality standards need to be established, secured and further developed throughout the entire education system.

It is CTEF's initiative for Education to offer students a future; an opportunity to take their life into their own hands and to develop and use their talents. These talents are vital to Industry, our society and the future of our country. The development and production of technology based commodities and other goods decisively influence the competitiveness of U.S. business. Innovative ideas, as well as new technologies and management processes secure prosperity and jobs in the face of international competition.

CONCLUSION

The trip to Germany confirmed the German dual education system is far superior to the U.S. education system and apprenticeship programs when comparing the student's abilities and skill-sets. The German system combines practical application with academic theory producing a highly advanced and sophisticated workforce at the age of 22 that is ready for work, not only as a shift worker, but as a major contributor to the company. The worker has the skill-sets and the innovative skills necessary to implement new technologies and to assure the company remains progressive and competitive in the global market.

The implementation of a Dual System of Education in America will truly insure "no child" is "left behind". Disengagement from the educational process will become nearly impossible for those students who in the past found education "boring". These students will be given the opportunity to discover their passion adding the missing link of practical application to the theory, the lack of which created the "boredom" in the first place. The "why?" will now become evident to the student through hands-on practical application of theory.

Currently, CTEF's application of industry specific educational processes begins in the seventh grade giving the student a taste of his/her "Pathway for the Future". The introduction to various career opportunities local Industry offers and supports at the Career Academy, gives the student an unprecedented path through a Career Academy High School and into post-secondary training at the Community College level or on to a University The Career Academies Bill introduced by Senator Gaetz and the Florida Legislature is clearly a step in the right direction. Implementing a dual system of education with theory taught in conjunction with practical application through an apprenticeship model will insure the competitiveness of our workforce in U.S. industries to the level necessary to compete globally with the best companies in the world.