

***Benchmark Analysis of Career and
Technical Education in Berrien County***

September 1998

by

Kevin Hollenbeck, Senior Economist
W. E. Upjohn Institute for Employment Research
300 South Westnedge Avenue
Kalamazoo, Michigan 49007-4686

Acknowledgments

The author acknowledges gratefully the financial support of the Berrien County Intermediate School District (ISD). The ISD staff, particularly Ms. Jeanne Morris and Mr. Paul Bergan, were extremely cooperative and helpful in facilitating the data collection efforts for the study. In addition, I thank all of the Berrien County Superintendents and their study liaisons for their time and effort in completing the data requests. Also, I appreciate the time taken by Dr. Richard Pappas at Lake Michigan College, Dean Wes Schultz of Andrews University, and Mr. James Benny of Southwest Michigan College to answer my questions about the role and interests of the county's postsecondary institutions.

Two individuals at the Upjohn Institute contributed substantially to the study and report. Research assistance was provided by Ms. Becky Jacobs, and the report was expertly prepared by Ms. Claire Black. Of course, the usual disclaimer applies. All errors are the sole responsibility of the author. Furthermore, all opinions expressed are solely the author's and do not necessarily represent the Berrien County ISD or the W. E. Upjohn Institute for Employment Research.

Table of Contents

	<u>Page</u>
List of Tables	iv
Executive Summary	v
1. Purpose of the Study	1
2. Career Development and the Career and Technical Education “System” in Berrien County	4
Middle Schools	6
High Schools	7
Postsecondary Institutions	9
Employers	11
Summary	13
3. Benchmark Enrollment and Labor Market Information	14
District and High School Enrollments	14
Enrollments in Career and Technical Education	15
Labor Market	19
4. Resources: Instructors and Technology	26
Instructors	26
Technology	27
Discussion	29
5. Projections	30
Projections of CTE Course Enrollments	33
Projections of Overall High School Class Offerings	34
6. Findings and Recommendations	37

List of Tables

	<u>Page</u>
Table 1. District and High School Enrollments, 1997-98	14
Table 2. Enrollment in Certified CTE Courses, by District	15
Table 3. Unduplicated CTE Enrollments in 1996-97 and 1997-98, by District	17
Table 4. Unduplicated CTE Enrollments in 1996-97 and 1997-98, by Program Area	18
Table 5. Occupation of Berrien County Employed Residents, 1980 and 1990	22
Table 6. Industry Employment in Berrien County, 1990-1995	24
Table 7. Factors Used to Project Course Enrollments, by District	31
Table 8. Projected CTE Course Enrollments in 2000/01, by District	34
Table 9. Projected Number of Classes Needed in School Year 2000/01	36

Executive Summary

The starting point for this study is the belief that the scope of public, K-12 education in Berrien County will best serve students if it includes high quality instruction in traditional curricular and co-curricular content areas and a world-class system for career development and the development of technological skills. The purpose of the study is to benchmark where the local districts of Berrien County are with respect to their attention to career development and with respect to their ability to provide students with technological skills. In addition, the study makes short-term projections about the demand for career and technical education courses in the future.

All in all, Berrien County is fortunate to have a career development system for its students that is much farther advanced than many school districts' systems in the State or nation. Most of the districts have integrated career development activities into their curriculums. Starting with elementary grades and continuing through comprehensive career pathway programs in high schools, Berrien County districts are providing their students with career awareness, exploration, and preparation activities. The career development "system" in the public schools is enhanced by the solid support and involvement of postsecondary institutions and many county employers.

To develop a benchmark picture of the career development system in Berrien County, project staff reviewed documents supplied by local districts, analyzed enrollment data, examined labor market information, and collected and analyzed data on teacher retention and age of technology. To develop enrollment projections, we analyzed district enrollment projections, trends in high school student retention, and changes in course offerings due to block scheduling.

Enrollment data supplied by the Michigan Department of Education (MDE) and supplemented by a survey conducted as part of this study suggest that wage-earning career and technical education

programs have significantly penetrated student class-taking in the county. We estimate that around 3,200 students took career and technical education classes in 1997-98. The largest program area in terms of enrollment is Business Services Technology (BST). It accounts for over half of the total course enrollment as reported by the MDE and represents about 40 percent of the student enrollments from the districts that responded to our survey. The high BST enrollments reflect the importance that students and districts are placing on developing skills with personal computers and software. The courses with the next largest enrollments are auto mechanics/auto technology, drafting, and graphic arts/printing. Machine trades, woodworking/ cabinetry, and marketing follow closely behind.

The data indicate that there is a healthy upward trend in the county in enrollments in almost all program areas. The few exceptions were nearly stable enrollments in metals, and slightly downward trends in BST, food service, and radio and TV.

In addition to enrollment data, the study examined labor market information for the county.

All together, the labor market data suggest the following:

- The durable goods manufacturing sector accounts for a large share of employment. Within that broad category, ferrous and nonferrous metals and transportation equipment were the major sectors. The plastics industry also has a substantial share of the durable goods manufacturing sector. Wood products is an important sector in Northern Indiana and, particularly, the southern part of Berrien County.
- The employment share of machine operators significantly declined during the 1980s. In 1980, this occupational class comprised 13.9 percent of the county employment. By 1990, its share had shrunk to 10.3 percent. However, three other occupations that held their own were technicians, precision production workers, and materials handlers. In 1980, these comprised 19.6 percent of the county's employments; by 1990, this percentage had increased to 20.8 percent.
- Occupational employment statistics show that the county followed the national trend in shifting toward white collar occupations. In 1980, the percentage of employed individuals in the administrative/professional/management categories was 20.8 percent. By 1990, this had grown to 24.6 percent.

- The wholesale and retail trade sectors are a significant share of the economy, although their employment shares are growing slowly. In 1990, 21.0 percent of workers in the county were employed in wholesale and retail trade. By 1997, 22.4 percent were in that sector.
- Demonstrating the diversity of the county's economy, several industrial sectors account for nontrivial shares of employment—health services (about 8 percent); educational services (7.3 percent); finance, insurance, and real estate (4.3 percent); construction (5 percent); and agriculture, forestry, and fishing (3 percent).

The study's survey of local districts asked respondents to estimate the number of teachers who were likely to retire or leave the district in the next 3-5 years, by career and technical education subject. The data suggest that projected teacher retention is not even across subjects or across districts. The nine districts that reported data at the high school level indicated that there were about 60 instructors of career and technical education courses, and that about 40 percent of them (23) would be leaving within 3-5 years. Of course, the extent to which the 40 percent turnover is a problem depends on the flow of available new teachers that may be needed as replacement staff. That flow is not promising. There is a severe shortage of vocationally certified teachers in Michigan as well as across the Nation. The fields that may be critical for Berrien County districts are auto mechanics, machine tools and manufacturing, and drafting.

Data about the age of technology that is being used suggest that two programs seem to have older equipment—auto mechanics and woodworking/cabinetry. Four of the five respondents with the former program indicated that at least half of their major equipment was four years old, and all three of the respondents who provided information about woodworking/cabinetry had older equipment. For Business Services Technology, the program with the largest share of enrollment, exactly half of the districts (4/8) had a technology concern, which was defined as having at least half of the program's major equipment be four or more years old. No major concerns were identified for any of the other program areas.

As a whole, there is only one program that seems to be problematic both in terms of probable turnover in instructors and in terms of outdated equipment—auto mechanics. Woodworking/cabinetry seems to have outdated equipment, but little expected teacher turnover. Machine tools/manufacturing and drafting programs seem to have potentially high teacher turnover, but not significant technology concerns.

In order to develop course enrollment projections, we examined data from all 14 districts and tried to project three types of course enrollment growth (or decline). First, growth in a district's overall student enrollment or changes in the demographics of that enrollment were projected to cause high school enrollments to change. Second, trends in the retention rates of high school students were projected to influence course enrollments. Where retention rates are increasing (i.e., decreasing dropout rates), there will be increases in enrollment in high school courses whether or not the overall enrollment in the district is increasing. Third, as block scheduling gets implemented for more grade levels, there will be increases in enrollment because students need more courses and credits for graduation. For all three of these factors, we estimated a low and high estimate of the rate of change. Then we interacted multiplicatively the three low estimates and the three high estimates to bracket the projected changes in course enrollments.

Findings and Recommendations

Berrien County districts have much to be proud of in their career development activities and technological facilities. However, there is room to systematize, expand, and improve curriculum and facilities in order to achieve a world-class system. The districts need to build on their strengths and, where appropriate, meet their challenges. This study identified two key strengths of the career and technical education “system.”

The first major strength that Berrien County offers is the career and technical education “infrastructure” that has been established. The administrative and professional development capacity that the ISD offers is first-rate. The collaboration between educators and employers through the EFE Council and program advisory committees is also a strong element of the infrastructure. The accessibility to Andrews University, Lake Michigan College, and Southwestern Michigan College and the interest that these postsecondary institutions have in working with the county’s districts also offers many fine opportunities for students.

The second major strength that Berrien County has is the progress that it has made in establishing career pathways high schools. As more and more of the districts get further along in their implementation of career pathways, a larger number of students will begin to see the relevance of high school education and understand how serious effort in grades 9-12 can give them an advantage in their postsecondary and career pursuits.

Two major challenges face the county’s districts, however, in their pursuit of high quality career and technical education programs. The first challenge is the underdevelopment of work-based learning opportunities. Certainly, the On Location program, existing co-ops, and programs at Lakeland Hospital, Weldun Bosch, and Oselka Marina are a good beginning. But if the county’s programs can get to a point where a significant portion of their students have work-based experiences that have been jointly designed and coordinated by educators and employers to re-enforce academic and employability skills, they will greatly enhance the quality of the students’ motivation and effort.

The second major challenge is the development of programs that prepare students for white-collar or professional occupations. Like most of the Nation, the county’s labor force has become more “white-collar.” Jobs now and in the future will place greater premium on thinking and problem-

solving skills than on physical strength. County districts can assist their students to successfully prepare for these jobs with more pre-professional programs.

Relying on the data that were gathered about existing programs and facilities, employment patterns, and the strengths and weaknesses of the county's career and technical education "system," the study recommends an expansion to and reorganization of its clusters and career majors. Two operating characteristics that would need to be applied if the recommended system were to be implemented would be (1) to build in flexibility so that students could move between areas without great penalty should their interests change, and (2) to develop a system that is more "real world" relevant than the traditional high school, but is not as occupationally-specific or technically rigorous as existing postsecondary programs. That is, the system should complement not compete with the fine community colleges that are in the county.

What is recommended is a system that would be uniform throughout the county. All districts would participate in it through a consortium arrangement. All districts would offer some parts of the system and would accept the responsibility of transporting their students to other school or work sites for programs not offered locally. The system would be comprised of ten general occupational clusters. Each cluster would have a number of career majors. As the system gets developed, each cluster might offer "certificates of initial mastery" and "certificates of advanced mastery."

Each cluster would organize and maintain an active cadre of employers, and should locate at least one work-site classroom for formal instruction in the field. Flexibility would be enhanced by having open enrollment for any student, and by having a minimum of prerequisites.

Considering the labor market needs of Berrien County and the existing career and technical education infrastructure, the following ten clusters would comprise the system (listed in alphabetic order):

- Allied Health Systems

(Specific career majors might include health technologies, pre-vet, EMT)

This cluster would expand on the current health offerings, but would attempt to attract students who would be interested in becoming medical doctors, veterinarians, etc. Potential employer partners would include hospitals, clinics, physicians, dentists, veterinarians, or other health care professionals.

- Business Finance and Management

(Specific career majors might include BST, entrepreneurship, accounting)

This cluster would build upon the county's existing strength in its BST programs and enrollments. It would add occupational preparation for accounting, entrepreneurship, and finance to that base. Potential employer partners would include banks, insurance agents, accountants, real estate brokers, and large businesses with administrative assistant/clerical positions.

- Communication and Fine Arts

(Specific career majors might include printing/graphic arts, radio and TV, LAN/WAN networking, theater tech)

The county has generated student excitement about its graphic arts offerings and the CISCO networking course in New Buffalo. Building on those programs, this cluster would attract students interested in journalism, fine arts, or computer networking. Potential employer partners would include radio and TV stations, the Mendel Center, newspapers, printing businesses.

- Construction and Skilled Trades

(Specific career majors might include plumbing, building trades, welding and cutting, woodworking/cabinetry)

This cluster would include the traditional T&I courses but would allow students to specialize in skilled trades such as electrician or plumbing occupations. The woodworking/cabinetry field would involve modern high tech and skilled craftsmanship, not just traditional wood shop skills. Potential employers would include contractors, plumbers, masons, wood products manufacturers.

- Education/Human Services

(Specific career majors might include pre-education, pre-law, child care, protective services, cosmetology)

County districts have a few course offerings in this cluster area, but the idea would be to expand the courses substantially. For example, students who might be interested in becoming teachers would be offered classroom experiences. Protective services is an occupation that has a number of openings annually in the county and which traditionally attracts a number of students. Potential employer partners would include the school districts, law enforcement agencies, attorneys, child care establishments, cosmetology practitioners.

- Electrical Engineering

(Specific career majors might include electronics, machine office equipment repair, computers - hardware and software)

The intent of this cluster would be to establish a pre-engineering focus for students particularly interested in electronics. The main focus would be on hardware. Potential employer partners would be computer repair businesses, electronics repair, manufacturers of electronics components.

- Manufacturing Systems

(Specific career majors might include pre-engineering, MT3, plastics, materials, drafting)

This cluster would build upon the county's successful program at Weldun Bosch and its courses in drafting. It would attract students interested in mechanical or industrial engineering. Potential employer partners would include manufacturers and engineering concerns.

- Natural Resources

(Specific career majors might include agri-science, environmental protection, parks and recreation, marine life)

This cluster would be new to the county, and is intended to attract students who are interested in outdoors-type occupations. Berrien County has a marvelous resource in its lakefront and associated natural resources that can be used in this cluster. Potential employers would include orchards, nurseries, county parks and recreation department, recreation activities such as golf courses.

- Retail and Customer Relations

(Specific career majors might include marketing, advertising, food service and hospitality, travel and tourism.)

This cluster would build upon existing courses and emphasize occupations that require customer interaction. Potential employer partners include discount stores, hotels and motels, restaurants, retail establishments.

- Transportation Technologies

(Specific career majors might include auto, marine, or aviation technologies)

This cluster would expand upon existing courses in auto technology to include diesel mechanics, marine mechanics, agricultural mechanics, and aviation mechanics. Potential employer partners include auto dealers and mechanics, truck mechanics, aircraft mechanics and airlines, marinas.

Much work and further design needs to be invested in each of these clusters to project student interest and enrollment and to develop curriculums. The financial implications of the expanded clusters are likely to be substantial. Some clusters require substantial capital investments in technology and equipment. Under the constraints of Proposal A, funding of such major capital items is difficult, and collaboration throughout the county would ease the funding problem.

Some clusters are amenable to distance education, whereas others would not be. Establishing appropriate curriculum and instructional materials and acquiring distance learning equipment could be a substantial financial burden as well.

However, an investment in expanding the clusters into a uniform collaborative system across the county would pay off handsomely in terms of student benefits and economic benefits to the county. It will build on an already strong system. It will provide tremendous educational and career advantages to students, and it will send a signal to high-tech companies that Berrien County is serious about providing a skilled, knowledgeable work force.

1. Purpose of the Study

The starting point for this study is the belief that the scope of public, K-12 education in Berrien County will best serve students if it includes high quality instruction in traditional curricular and co-curricular content areas and a world-class system for career development and the development of technological skills. The purpose of career development is to give students a broad, general awareness about work and careers to help them focus their curricular and effort choices throughout the course of their elementary and secondary education. In addition, students can explore different career options to determine their interests and aptitudes and to learn about the educational requirements of their potential career choices. Career and technical education (CTE) courses in high school allow students to begin to acquire skills and knowledge for their career choices. Career development in school will motivate students to higher levels of achievement in all of their courses, and it will facilitate career and lifetime success after students graduate from high school.

Development of technological skills means that students will learn and become familiar with technology. Computers have become pervasive elements in the economy and in society for communication, information retrieval, and computational speed and accuracy. Students must become adept with computers or they will be relegated to secondary occupations with little or no opportunity for advancement. Furthermore, individuals without technological skills may be disadvantaged at daily living if they cannot access the communication and information available in cyberspace. But technology goes beyond personal computers. Today's economy is replete with robotics, automated systems, computer-controlled equipment, bioengineering mechanisms, and other technology. Students who are facile with technology will be able to navigate the economy and find well-paying

jobs that will support themselves and their families. They will be contributing citizens and workers. Students with little technological ability will find it more difficult to enter successful careers.

The purpose of this study is to develop a benchmark measurement of where the public, K-12 districts of Berrien County are with respect to their attention to career development and with respect to their ability to provide students with technological skills. In addition, the study makes short-term projections about the demand for career and technical education courses in the future.

Two caveats are in order. First, the 14 districts within the county have different needs and different resources with which to work. As a whole, the county districts have accepted the importance of career development, and are implementing career pathway approaches in their secondary schools. However, districts are at different points in planning and implementing those approaches. Furthermore, districts differ by enrollment size, location and local economic health, community support, and access to technology. Thus when this report refers to the county, it is referring to an amalgam of districts with widely varying characteristics.

The second caveat is that the study does not attempt to fully inventory the equipment and computer hardware and software that are available throughout the county. Each district has a technology plan, and we reviewed these plans. However, these plans are not comparable—they were produced at different points in time for different purposes. They have different formats. Thus they could not be used to compile a county-wide inventory of technology. Instead, they give a general notion of where each district is with respect to technology, and of each district's priorities.

This study is organized as follows. The next section will benchmark the current “system” in Berrien County for career development and career and technical education. It will document the curriculum and instruction in schools and will describe the role played by external parties—postsecondary institutions and employers. The third section provides data about students

in the system—current enrollments and student outcome information—and it describes the Berrien County labor market. The fourth section addresses two key inputs to the educational process: technology and instructors. It provides data about them and their characteristics, such as age and tenure. Section five presents projections of the “system” under different scenarios about future developments. Finally the last section presents the study's major findings and recommendations.

2. Career Development and the Career and Technical Education “System” in Berrien County

Career development for any one individual is a complex process that typically involves changing directions several times and that involves considerable serendipity—being in the right place at the right time. However, conceptually we can think of career development in a simple, straightforward model. It is composed of three elements: career awareness, career exploration, and career preparation. In formal education, *career awareness* occurs in the elementary grades as students learn at a rudimentary level what different careers involve and how jobs and careers fit into society. *Career exploration* occurs in middle grades and in the early years of high school as students begin to self-actualize themselves in careers. Schools can guide career exploration with aptitude assessments and interest inventories, curriculum units in which students research the educational requirements and possible ladders through various careers, structured job shadowing opportunities, and educational development plans (EDPs) that lay out educational and training pathways into careers of interest. *Career preparation* involves formal course work or activities to acquire the skills and knowledge needed for a particular career.

Over the past few years, career awareness and career exploration activities have been integrated into elementary and early secondary curricula in Berrien County and elsewhere. Generally, costs have been modest—for example, costs associated with having guest speakers or with visiting sites; costs associated with interest and aptitude assessments; or costs associated with accessing occupational information references such as the Michigan Occupational Information System (MOIS). Local districts can and should be the locus of decisionmaking with respect to career awareness and career exploration activities. The role of the ISD, as administrator of the career and technical

education system in the county, is one of sharing information across districts and acting as a resource to local districts.

On the other hand, cooperation and collaboration can significantly enhance the effectiveness of career preparation. Effective career preparation, through high quality career and technical education (CTE) courses with work-based learning components, requires much more time and resources than do the first two stages of career development. Because they impart skills and knowledge that students need to succeed in their careers, CTE courses must have up to date content and use the most recent technology. Furthermore, because they are more specific than career awareness or exploration activities, CTE courses in any one area tend to have lower enrollments. Keeping curriculum and equipment current and small class sizes cause CTE courses to be expensive relative to general education. Thus it makes sense economically for school districts to offer them in a coordinated fashion. Since occupational preparation typically extends past high school, it makes sense for postsecondary institutions to coordinate with the school districts as well. Finally, including work-based learning components in programs means that educators and employers need to interact. The EFE consortium is the primary means for bringing together career and technical educators, postsecondary staff, and employers in Berrien County.

For the most part, the districts in the county have instituted some sort of career development activities for students in all grades, K-12. We did not attempt to formally collect information about elementary programs, however, so we begin our analysis with middle or junior high schools. We then discuss career development in high school. We end the chapter with a brief description of the roles of postsecondary institutions and employers.

Middle Schools

Our information about middle schools' career development activities comes from course of study information supplied by the local districts and from plans submitted to the Michigan Jobs Commission for School-to-Work funding. In general, most districts are engaged in career exploration activities in the middle grades. Students participate in career units that involve research activities and, in some cases, job shadowing. The types of research activities include choosing one or more careers and locating information (from automated sources such as the MOIS) about their careers. In many instances, the students prepare summary reports. Job shadowing involves visiting the workplaces of individuals who are engaged in a career that is of interest to observe the daily activities of the incumbent and to learn more about the career.

An activity that specifically supports career awareness and career exploration is the Junior Achievement (JA) curriculum that is delivered to students at a number of the elementary and middle schools in the county. The Berrien County Intermediate School District (ISD) school-to-work administrators indicated in their planned school-to-work activities that they intended to form a partnership with JA and the Community Partnership for Lifelong Learning to develop a generic K-14 career counseling model.

The Community Partnership for Lifelong Learning has been active in the development of the On Location program. On Location is another middle grades activity in several districts. In this program, several students and a school staff member (teacher, counselor, or administrator) spend a week in an area business in order to reinforce, for the students, how skills and knowledge learned in the classroom are used in the workplace. Both students and teaching staff are exposed to the direct application of communication, math, problem solving, reading, and writing skills in the workplace.

In addition to these special programs, local districts offer several career- or technology-related electives to middle grade students. Virtually every district in the county offers a keyboarding/computer or technology education elective in their middle or junior high school curriculum. In addition, a number of districts have electives in career-related fields, i.e., drafting, machine tool, woodworking, auto mechanics, small engines, or graphic arts.

High Schools

Berrien County districts are way “ahead of the curve” in their career development and systemic curricular changes at the high school level. Twelve of the 14 high schools in the county have either implemented or are in the midst of planning for career pathways. Niles has finished two years of successful implementation of career pathways, for example.

The career pathways “model”¹ that is being implemented in the county includes increased graduation requirements, alternative scheduling to increase the number of classes that students take, career exploration and guidance, and career pathway curriculums. Recognizing the need to prepare students for careers that require increasingly complex skills, the career pathway high schools have increased graduation requirements by increasing math, science, and technology credit requirements. In order to accommodate the increased requirements as well as to allow students more opportunities for career-related electives, the high schools have opted for more flexible scheduling, such as block scheduling. The career pathways “model” offers both a professional path and a technical path in each of four clusters that are comprised of 19 career majors. For example, students at Niles High School can choose either a professional or technical path in the business core (comprising agri-science,

¹The term model is intended to mean a structure whose components are similar across the districts. The exact structure is not prescribed by any administrative authority, and each district’s adaptation of career pathways is unique.

marketing, accounting, computer-information systems, or office technologies), the engineering and industrial core (building construction, manufacturing technologies, research occupations, drafting and design, electronics, or transportation), the fine arts and communications core (fine and performing arts, graphic arts, journalism), or the health and human services core (health, teaching, hospitality and food services, public safety, or child and adult care). Each local district maintains flexibility in how many pathways are offered and how they are organized.

Career and technical education courses are among the electives that students can choose as they pursue their pathway. CTE courses are administered in two different ways in the county. They are offered through either a countywide consortium or by local districts. The two administrative mechanisms result from the way that the State of Michigan funds education. General education is funded by the state through a per pupil foundation grant. In addition to general school aid, the State has a categorical special fund for career and technical education. The latter is intended to provide funds for “added costs,” i.e., the costs of operating a course over above what the district would receive through the foundation grant. To receive added cost funds, the programs must be certified by the State. Berrien County has formed a P.A. 56 consortium of local districts, titled Education for Employment, to administer the courses that receive added cost funding. All of the county districts except for St. Joseph belong to the consortium, and all except for St. Joseph and Watervliet offer certified courses. In addition, some of the courses are delivered in a work setting. The Education for Employment consortium is administered by the Berrien County Intermediate School District. For the most part, the students in EFE courses are juniors or seniors in high school.

Many other career and technical education courses are offered by local districts in the county. These courses are not certified by the State of Michigan for added cost funding (they are mostly pre-requisite courses offered to freshmen or sophomores), and so they are funded and administered by

the local district. (St. Joseph's extensive offerings in career and technical education at the high school level are not state-certified and not part of the EFE consortium, for example.)

Postsecondary Institutions

Proponents of the career pathway "model," in general, and members of the EFE consortium, in specific, realize that formal education cannot end in high school. The pathways that have been developed for students are intended to lead them to formal education after high school.

An important resource to the residents of Berrien County are the postsecondary institutions that operate there. Lake Michigan College (LMC) in Benton Harbor is a two-year public community college that offers many majors in both transfer/general education areas and occupational programs. LMC will soon be opening a campus in Niles to serve the southern end of the county. Andrews University is a small four-year, private college that offers some applied majors leading to both baccalaureate and sub-baccalaureate degrees. Southwestern Michigan College is a two-year, public community college that has its main campus in Dowagiac (Cass County), and has a substantial number of programs at its campus in Niles. Finally, Western Michigan University, a public research university, operates a regional campus at St. Joseph High School.

Except for Western Michigan University, there are clear ties between the career and technical education courses in the county and the postsecondary institutions. The collaboration with Andrews is perhaps the most unique. All across the State of Michigan, career and technical education programs have linked up with public community colleges through Tech Prep consortia. However, it is rare to have private institutions with substantial involvement. Nevertheless, Andrews has piloted a dual enrollment program in graphic arts that will be considerably expanded next year.

There is, understandably, considerable competition between Lake Michigan College and Southwestern Michigan College. They are both two-year public community colleges located in adjacent counties. Each college offers some programs that are not duplicated in the other, and each offers several programs that are overlapping. A Berrien County high school graduate who wants to attend a community college to pursue an occupational program would probably make his or her decision based on the chosen program. If the occupational area is one of those that is only offered at one of the two colleges, then the obvious choice would be to attend the institution that offers the program. If the program is offered at both institutions, then the students would need to weigh location, quality, and cost differentials.

In terms of interacting with career and technical education courses in Berrien County, it appears as though LMC is the predominant institution. LMC houses a dental assistant program that enrolls a few high school students, and will house a theater technician program that it will be offering to school districts within the consortium next year. Furthermore, it has worked out articulation agreements with all districts in the county to award both high school and college credit to high school students who take certain courses at their home schools. The document, "Guidelines for Articulated Credit: High School to College, 1997-1998," listed 14 programs at the college that would grant credit for course work accomplished at high schools (in courses with formal articulation agreements). The student must earn a grade of B or better in the course for him or her to earn LMC credit.

Another unique arrangement that LMC has offered to local districts is co-investment in facilities and equipment. The college and local districts would jointly finance programs that are housed at LMC. The co-invested facilities would house college courses for LMC students, and when the facilities were not in use, they would house high school courses. According to Dr. Pappas, President of LMC, co-investment could be an important trend because it exploits the time

complementarity between the public schools and the college. The college's capacity is least utilized in the afternoon hours, which is when it could be used for high school programming.

Southwestern Michigan College links to high school courses through a different manner. It has a dozen academy programs that allow high school students, who meet certain academic criteria, to take courses on campus and earn both college and high school credit for the program. These academy programs are offered in lieu of articulation agreements with local high schools.

In short, motivated Berrien County students can and have earned college credits in an occupational field through articulation or dual enrollment. The postsecondary institutions complement the career development of youth in the public school systems in many ways. They enroll high school students in courses on their campuses; they offer college credits for various high school courses that have been formally articulated; postsecondary faculty serve on advisory committees; the institutions co-invest in facilities or offer facilities for use; and they are in the process of developing the ability to deliver courses through video or Internet.

Employers

Another resource that Berrien County districts rely on for career development is employers. Many employers have invested much time and energy into helping the public schools, and have played many roles in the career development system in the county. The EFE governing council is an active group of educators and employers who advise the career and technical education system in the county and who serve as a resource for Berrien County for the region's workforce development board. The employers who serve on this council are among the most educationally proactive in the county. They recently developed and implemented a program entitled "Yes School Counts," wherein employers pledged to ask for transcripts from their applicants and to develop and provide young persons with

career ladders that provide information on the educational and training requirements of career progression in their companies.

The county also has a number of employers who serve on career and technical education program advisory committees or who supervise co-op placements or other work-based learning activities. Instructors and CTE administrators organize advisory committees to get input into their curriculum and instructional methods. The educators want to be sure that the skills and knowledge that they are teaching are up to date, so they ask the advisory committee members to review course materials. Co-op opportunities allow students to gain high school credit by working for pay at a job site. Other types of work-based activities range from short-term job shadowing to longer-term internships that may be paid or unpaid. In all cases, there is an explicit agreement about the educational content and means of assessment between the school district and the job site supervisor. The purpose of work-based learning arrangements is to give the students practical experiences that supplement the material that they are learning in the classroom.

Some less traditional ways that employers are getting involved in the career development of youth include visiting schools to help deliver career-oriented educational material (the Junior Achievement material, for example), or to provide students with information about careers and work. Employers also host student job shadowing experiences. They also host teams of middle school students through Berrien County's called "On Location," which is administered by the Community Partnership for Lifelong Learning.

Maybe the most intensive form of employer involvement is work-based education, where formal instruction occurs on site. This is perhaps the least well-developed part of employer involvement in the county, but still Berrien County students are fortunate to have several opportunities. At Weldun Bosch, students participate in the MT3 program, which is a machine

trades/automated assembly program. At Lakeland Hospital, students have the opportunity to pursue an Allied Health program. Oselka's Marina in New Buffalo houses a marine mechanics course.

Summary

All in all, Berrien County is fortunate to have a career development system for its students that is much further advanced than many school districts' systems in the State or nation. Most of the districts have well-integrated career development activities in their curriculums. Starting with elementary grades and continuing through comprehensive career pathway programs in high schools, districts are providing their students with career awareness, exploration, and preparation activities. The career development "system" in the public schools is enhanced by the support and involvement of postsecondary institutions and staff and by county employers.

The next section of this report will begin to present a quantitative picture of the career development system. It presents enrollment data, and labor market information about the county's economy.

3. Benchmark Enrollment and Labor Market Information

Enrollment data across districts and over time are difficult to collect and compare on a consistent basis. Students move into and out of districts on a daily basis, and students add and drop courses during semesters. Furthermore, career and technical education enrollment statistics are often

tracked by course, and

Table 1. District and High School Enrollments, 1997-98

District	Total Enrollment	Grade 9	Grade 10	Grade 11	Grade 12
Benton Harbor	6,177	498	283	269	195
Berrien Springs	1,769	147	146	112	99
Brandywine	1,612	141	115	121	108
Bridgman	968	94	67	77	70
Buchanan	1,819	151	148	129	96
Coloma	2,369	219	260	142	113
Eau Claire	894	79	97	58	61
Galien	456	62	23	37	27
Lakeshore	2,975	302	219	205	226
New Buffalo	623	56	59	59	40
Niles	3,920	354	273	214	165
River Valley	1,308	105	97	106	86
St. Joseph	2,780	232	233	229	201
Watervliet	1,261	108	92	80	54
TOTAL	28,931	2,548	2,112	1,838	1,541

because students can take

more than one course, the

enrollments overcount the

number of students that are

engaged in career and

technical education.

District and High School Enrollments

The first data to be

presented are total

enrollment and high school enrollment, by district, to give a picture of the scale of public education

in the county. Table 1 presents these data. That table shows total 1997-98 enrollment in each of the

14 districts comprising the study and enrollments in grades 9 through 12.

These 14 districts educated approximately 29,000 students in the most recent school year, of which about 8,000 were in grades 9 through 12. A noteworthy aspect about table 1 is the dramatic decline in enrollment during the four high school years. The last column of the table shows that the

12th grade class in the county was approximately 60 percent as large as the 9th grade class. The reasons for this discrepancy are twofold. First, demographics may explain part of it. Class sizes are partially determined by birth rates and migration patterns, which are naturally cyclical. Consequently the 9th and 10th grade classes may be larger than the older classes simply because of demographics. However, the bulk of the difference likely comes from students dropping out of school (presumably at age 16). Note that the 12th grade column reflects 12th grade enrollment, and not graduation numbers. Not all 12th graders will graduate. A reasonable assumption is that countywide, 95 percent of the 12th graders graduated. This implies that 1,470 students graduated from county public high schools in May or June 1998.

Enrollments in Career and Technical Education

One source of enrollment data for career and technical education courses is the Michigan Department of Education (MDE). That state agency supplies enrollment data for certified career and technical education courses by district to determine added cost payments. These data are presented in table 2. The first column of entries provide enrollment data for all of career and technical education course offerings. Life

Table 2. Enrollment in Certified CTE Courses, by District

District	Total CTE Enrollment	LME	Total Wage Earning	Total Grade 11 + 12 Enrollment
Benton Harbor	744	219	523	464
Berrien Springs	448	88	360	211
Brandywine	435	165	270	229
Bridgman	211	0	211	147
Buchanan	245	89	156	225
Coloma	683	188	495	255
Eau Claire	203	179	24	119
Galien	154	90	64	64
Lakeshore	638	230	408	431
New Buffalo	138	90	48	99
Niles	949	66	883	379
River Valley	207	0	97	192
St. Joseph	0	0	0	430
Watervliet	0	0	0	134
TOTAL	4,943	1,404	3,539	3,379

Management Education (LME) enrollments are shown in the second column of numbers. They are netted out of the total enrollments in the third column to derive what MDE refers to as enrollment in wage earning courses. To provide a sense of scale, the last column shows the total number of students in grades 11 and 12 (which account for the preponderance of students in certified courses).

The data in the third and fourth columns are not easily compared. The third column displays course enrollments, some of which may include 9th and 10th graders. The fourth column displays student counts, not course enrollments. But even though they are measured in different units and have different universes, the data do suggest that wage-earning career and technical education programs have significantly penetrated student class-taking. Even if the entries in the third column of the table were reduced to adjust for students who may be enrolled in more than one CTE course and to adjust for students in the 9th and 10th grade, they would still represent a large percentage of the unduplicated counts of juniors and seniors in the last column.

Table 2 presents enrollment data for certified courses only. We attempted to supplement that information by sending a survey to the districts in the county to collect data on enrollments in all career and technical education courses. The wording of the survey asked for unduplicated counts of students enrolled in various wage earning programs that were listed in the high schools' courses of study. To explain, suppose that a district offers programs in Business Services Technology (BST) and auto mechanics. Each of these programs are comprised of several courses including co-op opportunities. Any student who took one or more courses in the BST curriculum would be counted once in the enrollment total for BST and any student who took one or more courses in auto mechanics would be counted once. The only doublecounting that might have occurred if the survey were correctly completed would be students who took courses in both BST and auto mechanics.

Thirteen of the 14 districts responded to our survey, but one response did not have enrollment data. Thus we have usable responses from 12 of the districts.

Table 3 presents data from our survey, and repeats the course enrollment data from the third column of table 2 for comparison purposes. The table demonstrates that, with only a few exceptions, enrollments grew over the past two years, and it demonstrates that enrollment in certified courses

Table 3. Unduplicated CTE Enrollments in 1996-97 and 1997-98, by District

District	Total 1996-97 Enrollment in CTE Courses (Cert. and noncertified)	Total 1997-98 Enrollment in CTE Courses (Cert. and noncertified)	Total 1997-98 Enrollment in Wage Earning CTE (from Table 2)
Benton Harbor	643	720	523
Berrien Springs	209	431	360
Brandywine	225	255	270
Bridgman	141	158	211
Buchanan	83	87	156
Coloma	481	473	495
Eau Claire	—	205	24
Galien	53	60	64
Lakeshore	nr	nr	408
New Buffalo	nr	nr	48
Niles	1,014	1,081	883
River Valley	185	220	97
St. Joseph	240	288	0
Watervliet	25	20	0

nr means district did not respond to the survey, or that enrollment data were missing.

underestimates the total number of students enrolled in career and technical education programs. Benton Harbor, Berrien Springs, Eau Claire, Niles, River Valley, and St. Joseph apparently all have significant enrollments in noncertified courses. These districts are not receiving State “added cost” funds for a substantial number of students, so they must be financing their enrollments in noncertified courses with foundation grant funding or from other revenue sources.

Table 4 presents the data from the previous table disaggregated by program area. The table displays the districts' estimates of unduplicated counts of students in programs over the past two years and the MDE data for certified courses. In examining the data, recall that 12 of the 14 districts had usable data.

Table 4. Unduplicated CTE Enrollments in 1996-97 and 1997-98, by Program Area

Program/Course	Total 1996-97 Enrollment in CTE Courses (Cert. and noncertified)	Total 1997-98 Enrollment in CTE Courses (Cert. and noncertified)	Total 1997-98 Enrollment in Wage Earning CTE
Agriculture	na	14	0
Allied Health	52	72	114
Auto Mechanics/ Auto Technology	313	369	204
BST	1,609	1,537	2,160
Child/Adult Care	42	94	63
Construction Trades	35	48	27
Cosmetology	nr	nr	8
Drafting	226	295	3
Electronics/ Electrical Repair	139	165	86
EMT	nr	nr	12
Food Service/Hosp./ Travel & Tourism	82	35	78
Graphic Arts	194	354	269
Machine Shop/ Manufacturing	188	279	124
Marine Mechanics	nr	nr	4
Marketing	102	142	166
Metals/Welding/Cutting	32	33	27
Plastics	na	30	0
Principles of Tech.	53	180	0
Radio/TV	48	42	38
Woodworking/Cabinetry	153	229	24

na means not applicable because program not offered

nr means enrollment data not available because of survey nonresponse.

The enrollment data are dominated by Business Services Technology. It accounts for over half of the total course enrollment as reported by the MDE and represents about 40 percent of the student enrollments in 1997-98 from the districts that responded to our survey. Eau Claire and St. Joseph are the only two districts that do not offer BST courses. The high BST enrollments may reflect the importance that students and districts are placing on developing skills with personal computers and software.

The courses with the next largest enrollments after BST include auto mechanics/auto technology, drafting, and graphic arts/printing. Machine trades, woodworking/cabinetry, and marketing follow closely behind. These courses are more closely tied to specific occupational skills than is BST.

It is difficult to determine a trend based on only two points of data, but the first two columns of data seem to indicate that there is a healthy upward trend in enrollments in almost all of the program areas. They were nearly stable in metals and slightly downward in BST, food service, and radio/TV.

In the next section, I examine what the labor market is like in the county to determine whether there is a match with the courses that students are taking.

Labor Market

Measuring the strength and characteristics of an area's labor market is not an exact science. The concepts and statistics that are used are not always consistent, so comparisons over time or across places need to be made carefully. First of all, labor markets may vary in geography depending on the occupation or industry being considered. The labor market for a relatively small retail establishment such as a neighborhood grocery store or a fast food restaurant may be quite small—the

immediate surrounding neighborhood. On the other hand, the labor market for a large manufacturing firm would be much larger, perhaps the entire county or multi-county southwest Michigan and northern Indiana region. For some specialized occupations, such as teacher or business professional, the labor market may be the entire state or country. For purposes of this cursory review of the labor market, we have chosen the county as the area of interest.

A second confounding factor about labor market data is that some statistics are collected from employers, and some statistics are collected from workers. Employment data as reported by employers count all workers, no matter where they reside; so they include individuals who do not reside in the county. Furthermore they doublecount individuals who may hold more than one job. Statistics that are collected from workers through household surveys do not doublecount individuals, but they will include employment in other counties if the workers commute. In Berrien County, it turns out that employer-reported data are not very different from worker-reported data. There is roughly a balance between workers in Berrien County who reside outside the county and residents of Berrien County who work elsewhere. (There is a large net outflow of workers from Berrien County to St. Joseph, Indiana County that is approximately offset by net inflows from Cass and Van Buren Counties.²)

Two characteristics of the labor market that are often examined are employment by occupation and employment by industry. Occupational data are collected from workers since employers are typically not required to provide data other than employment totals. Industry employment may be derived from workers or employers. Note that because of the differences noted above, industry data reported by workers are unlikely to be consistent with that reported by

²Source: "Business and Demographic Profile of Berrien County," unpublished report by Michigan Small Business Development Centers, Wayne State University, September 1994.

employers. At the county level, comprehensive occupational data are only available from the decennial census, and so the most recent data would be for the year 1990. Employer-supplied employment data by industry are much more readily available because they are derived from administrative sources such as unemployment insurance tax payment data.

A final distinction to make when examining an area's labor market is the difference between gross and net employment changes. Net employment growth refers to the year-to-year change in levels of employment. For example, the 4th quarter data for 1997 total employment in the county was approximately 72,500 and, for the 4th quarter of 1996, it was about 71,500. So we can say that net employment grew by about 1,000 jobs, which is approximately 1.4 percent. However, net employment changes may mask a considerable amount of job turnover and openings. Every year, workers retire, leave their jobs for voluntary or involuntary reasons, or get promoted and open up positions into which other workers are hired. These gross flows determine how tight or loose the labor market is for new workers. Even though the changes in the level of employment do not suggest rapid growth, it may be the case that the labor market is still favorable for young workers entering the labor market if that market has a lot of dynamic changes due to gross employment flows.

Table 5 shows the occupational distribution of (worker-reported) employment for 1980 and 1990. Note that these data are based on the Census of Population, and so they represent the occupation of Berrien County residents. The employment may be outside of the county. The main positive trends that are shown in the table are net movement into (1) the white-collar classifications of "Executive, administrative, and managerial occupations," and "Professional specialties," (2) "Technicians and related occupations;" and (3) "Sales." All together, these occupations went from 32.7 percent of employment to 38.3 percent. The biggest growth was in the "Executive,

Table 5. Occupation of Berrien County Employed Residents, 1980 and 1990

Occupation	1980		1990	
	Number	Percent	Number	Percent
Executive, administrative, and managerial occupations	6,393	9.2	8,274	11.3
Professional specialties	8,048	11.6	9,704	13.3
Technicians and related support	1,603	2.3	2,301	3.1
Sales	6,663	9.6	7,737	10.6
Administrative support, including clerical	10,273	14.8	10,403	14.2
Protective service	1,038	1.5	936	1.3
Private household and other service occupations	8,083	11.7	8,520	11.6
Precision production, craft, and repair occupations	9,267	13.4	9,890	13.5
Machine operators, assemblers, and inspectors	9,670	13.9	7,523	10.3
Transportation and material moving occupations	3,405	4.9	3,076	4.2
Handlers, equipment cleaners, helpers, and laborers	2,681	3.9	3,054	4.2
Farming, forestry, and fishing	2,218	3.2	1,736	2.4
Total	69,342	100.0%	73,154	100.0%

Source: Bureau of Census

administrative, and managerial occupations.”

The offsetting losses were in the following occupations: “Administrative support occupations, including clerical,” “Machine operators, assemblers, and inspectors,” “Transportation and material moving occupations,” and “Farming, forestry, and fishing.” These occupations went from 36.8 percent of the work force to 31.1 percent. The largest decline was for “Machine operators, assemblers, and inspectors,” which lost over 2,100 jobs during the decade. In short, during the 1980’s, Berrien County seemed to have followed the national trend from blue-collar unskilled and semi-skilled occupations to white-collar, technician, and sales occupations.³

³These data confirm a substantial shift from occupations like “machine operators,” which are semi-skilled to “machinists,” which are highly skilled, precision production workers.

Table 6 provides data on changes in the distribution of employment by industrial sector during the 1990's. These data are derived from employer-reported administrative data, and so they represent county employment, without regard to the residence of the workers. (Note that total employment in 1990 of 75,000 is approximately equal to the employment level from the previous table, which was 73,200.) These data show that the only sectors with employment growth during this period, from 1990 to 1995, were "Retail trade" and "Services." Manufacturing employment held its own, with "Nondurable goods manufacturing" declining slightly, while "Durable goods manufacturing" stayed fairly constant. Other sectors with virtually no change in employment between 1990 and 1995 were "Transportation, communications, and public utilities;" "Finance, insurance, and real estate;" and "Government."

All together, the labor market data that were reviewed suggest the following:

- The durable goods manufacturing sector accounts for a large share of employment. Within that broad category, ferrous and nonferrous metals and transportation equipment were the major sectors. Presumably the county economy supplies and is supplied by the iron and steel industry of northern Indiana and the auto industry in Michigan. The plastics industry also has a substantial share of the durable goods manufacturing sector. Wood products is an important sector in northern Indiana and, particularly, the southern part of Berrien County.
- Occupational shifting in the 1980's occurred in the durable goods manufacturing industry. The employment share of machine operators significantly declined over time. In 1980, this occupational class comprised 13.9 percent of the county employment. By 1990, its share had shrunk to 10.3 percent. However, three other occupations that held their own were technicians, precision production workers, and materials handlers. In 1980, these comprised 19.6 percent of the county's employment; by 1990, this percentage had increased to 20.8 percent.
- Occupational employment statistics show that the county followed the national trend in shifting toward white collar occupations. In 1980, the percentage of employed individuals in the administrative/professional/management categories was 20.8 percent. By 1990, this had grown to 24.6 percent.

Table 6. Industry Employment in Berrien County, 1990-1995

Industry	1990		1991		1992		1993		1994		1995	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<u>Total Wage and Salary Employment</u>	67,800	100.0	66,000	100.0	66,600	100.0	67,600	100.0	69,700	100.0	70,800	100.0
<u>Goods Producing</u>	23,700	35.0	22,400	33.0	22,000	33.0	21,800	32.7	22,400	32.3	23,100	32.6
Mining	X	--	X	--	X	--	100	0.2	100	0.1	100	0.1
Construction	X	--	X	--	X	--	1,700	2.6	1,700	2.5	1,800	2.5
Manufacturing	21,800	32.2	20,600	30.4	20,100	30.2	19,900	29.9	20,600	29.8	21,200	29.9
Durable Goods	15,800	23.3	14,900	22.0	14,500	21.8	14,500	21.8	15,000	21.7	15,700	22.2
Nondurable Goods	6,000	8.8	5,700	8.4	5,600	8.4	5,400	8.1	5,600	8.1	5,500	7.8
<u>Service Producing</u>	44,100	65.0	43,600	64.3	44,500	66.8	45,800	68.8	46,700	67.5	47,600	67.2
Private Service Producing	35,200	51.9	34,700	51.2	35,500	53.3	36,800	55.3	37,800	54.6	38,800	54.8
Transportation/Communication/ Public Utilities	2,700	4.0	2,700	4.0	2,800	4.2	2,800	4.2	2,900	4.2	2,900	4.1
Wholesale Trade	2,400	3.5	2,300	3.4	2,200	3.3	2,300	3.5	2,200	3.2	2,300	3.2
Retail Trade	11,800	17.4	11,800	17.4	11,800	17.7	12,300	18.5	12,800	18.5	13,200	18.6
Finance/Insurance/Real Estate	2,700	4.0	2,600	3.8	2,600	3.9	2,600	3.9	2,700	3.9	2,600	3.7
Other Services	15,600	23.0	15,200	22.4	16,100	24.2	16,700	25.1	17,300	25.0	17,800	25.1
Government	8,800	13.0	8,900	13.1	9,100	13.7	9,100	13.7	8,900	12.9	8,800	12.4
Federal	500	0.7	900	0.6	500	0.8	400	0.6	500	0.7	500	0.7
State	600	0.9	600	0.9	500	0.8	500	0.8	500	0.7	600	0.8
Local	7,800	11.5	7,900	11.7	8,100	12.2	8,100	12.2	7,900	11.4	7,800	11.0

Source: MESCS.

X = data included in total Goods Producing because of confidentiality.

- The wholesale and retail trade sectors are a significant share of the economy, although their employment shares are growing slowly. In 1990, 21.0 percent of workers in the county were employed in wholesale and retail trade. By 1997, 22.4 percent were in that sector.
- Demonstrating the diversity of the county's economy, several industrial sectors account for a nontrivial share of employment—health services (about 8 percent); educational services (7.3 percent); finance, insurance, and real estate (FIRE) (4.3 percent); construction (5 percent); and agriculture, forestry, and fishing (3 percent).

4. Resources: Instructors and Technology

Instructors

Our survey of local districts asked respondents to estimate the number of teachers who were likely to retire or leave the district in the next 3-5 years, by career and technical education subject. In general, we assumed that the reason for the teachers' departures was retirement, but it is possible that a survey respondent knew of a circumstance where a teacher would be leaving for another reason. In any case, these data are imprecise, and should be interpreted with caution.

The data suggest that projected teacher retention is not even across subjects or across districts. The nine districts that reported data at the high school level indicated that there were about 60 instructors of career and technical education courses, and that about 40 percent of them (23) would be leaving within 3-5 years. To give an idea of how uneven the responses were, though, five of the reporting districts indicated that at least 50 percent of their teachers would be leaving, whereas the other four districts reported that only one out of a total of 24 teachers would be leaving.

Across subject matter, the data project that BST will have an average rate of turnover. Respondents indicated that 7 out of 18 teachers would be leaving in 3-5 years (39 percent). Programs for which respondents indicated that 50 percent or more of the teachers would be gone in the next 3-5 years were auto mechanics, machine trades/manufacturing, and drafting. (A total of 11 instructors out of 18 were expected to leave within 3-5 years in these three programs.) Woodworking/cabinetry and graphic arts were the only programs that had at least 5 instructors, but for which few instructors were expected to leave (only one of the woodworking instructors and none of the graphic arts).

In summary, about half of the responding districts were expecting to have considerable teacher turnover in the next 3-5 years in career and technical education programs, whereas the other half expected very little turnover. In aggregate, turnover is expected to be around 40 percent in that time frame. Of course, the extent to which turnover is a problem depends on the flow of available new teachers that may be needed as replacement staff, and it is well known that there is a severe shortage of vocationally certified teachers. The fields that may be critical for Berrien County districts are auto mechanics, machine tools and manufacturing, and drafting.

Teacher turnover may be a larger problem for county middle schools and junior high schools. Six of the districts provided data about the number of career and technical education teachers and estimated retirements. At this level, 14 out of 19 teachers were reported to be leaving in the next 3-5 years.

Technology

The survey asked respondents to provide an age distribution of the major technology used in various programs. The survey used a \$1,000 value as the definition of major technology. Again the data are probably imprecise and should be considered as indicative only. The age classes that were used were less than 2 years old, 2-4 years, 4-6 years, and greater than 6 years. For purposes of this study, we have identified programs as having *technology concerns* if the survey data reports that more than half of the program's major equipment is 4 years old or older. The responses show that over half of the programs in the county (26/48) have technology concerns, i.e., the majority of their major technology was at least 4 years old. The responses were reasonably similar across districts. Most of them reported that around half of their programs had technology concerns. There were a

couple of outliers. Two districts reported that all of their career and technical education programs had more than half of its major equipment being at least 4 years old, and another district indicated that only one out of its nine programs had technology concerns.

In examining technology age by program area, we find a couple of programs that seem to have older equipment—auto mechanics and woodworking/cabinetry. Five of the six respondents with the former program indicated that at least half of their major equipment was 4 years old, and all three of the respondents who provided information about woodworking/cabinetry had older equipment. For Business Services Technology, the program for which we received the most survey responses, about half of the districts (5/9) had a technology concern, as we have defined it. No major concerns were identified for any of the other program areas.

Cost. Respondents were also asked to estimate the costs of upgrading their programs. It is hard to interpret the data because in some instances respondents indicated that they did not need any major equipment for a program or that they only needed a small sum, between \$0 and \$1,000 to upgrade their equipment. On the other hand, some respondents provided “wish lists” that totaled into the hundred’s of thousands of dollars.

There were a couple of consistencies in the data, however. Four of the six respondents with auto mechanics programs indicated that most of their major equipment was at least four years old (as mentioned above). All four of these respondents estimated that it would take \$40,000 to \$55,000 to upgrade their equipment.

The other consistency was in the BST program responses. Eight respondents provided estimates of upgrading costs. Seven of the eight ranged from \$65,000 to \$92,000. (The other one was \$10,000.) The survey did not ask for detail underlying these estimates, but they seem sensible

if they represent the costs of providing hardware and software for a lab of 20 to 30 personal computers.

Discussion

As a whole, there is only one program that seems to be problematic both in terms of probable turnover in instructors and in terms of outdated equipment—auto mechanics. Woodworking/cabinetry is reported to have outdated equipment, but little expected teacher turnover. Machine tools/manufacturing and drafting programs seem to have potentially high teacher turnover, but not significant technology concerns.

BST is the dominant program offering in career and technical education in the county. It seems to be right in the middle in terms of teacher turnover and equipment concerns. About half of the BST programs in the county expect significant teacher turnover, and about half have outdated technology. This suggests that staffing BST is a major problem for some districts, but not others.

Having qualified instructors who relate well to students and having modern up-to-date facilities and equipment are the most important issues facing local districts that want to offer first-class career and technical education programs. Student interest and enrollment will be driven by labor market and career opportunities. Curriculums and instructional materials are widely available. But projected shortages in career and technical education teachers and constantly changing technology are challenges that districts are going to have to confront if they wish to offer students the best.

5. Projections

The purpose of this chapter is to present short-term projections of enrollments in career preparation courses. These projections span various optimistic and pessimistic assumptions about factors that may affect future enrollments.⁴ The forecast period is 3 years, so the scenarios that are presented roughly represent the school year 2000/01.

Change generally occurs slowly in education. However, substantial change factors are operating in the current environment that are causing districts to take various responsive actions. For example, the political climate is fostering competition for public school districts in the form of charter schools and, potentially, voucher schemes. Public sentiment has resulted in an expansion of interdistrict and school choice. Furthermore, publicity is being accorded to disappointing achievement measures and high school retention rates. Berrien County districts, partly in reaction to some of these factors and partly because they represent sound educational reforms, have moved aggressively toward the adoption of career pathways and block scheduling. These changes suggest that the county districts are in a transition period, and it is difficult to project enrollments with confidence.

In order to develop projections, we have examined data from all 14 districts and tried to project three types of course enrollment growth (or decline). First, growth in a district's overall student enrollment or changes in the demographics of that enrollment will cause high school enrollments to change. Second, trends in the retention rates of high schools will influence course

⁴One factor that we have totally ignored is the possibility of having the Benton Harbor desegregation order lifted. The "deseg. order" has influenced enrollments in the northern county high schools and its annulment would have an impact on future enrollments. I have not tried to make any adjustment in the baseline numbers or the projections for this factor.

enrollments. Where retention rates are increasing (i.e., decreasing dropout rates), there will be increases in enrollment in high school courses whether or not the overall enrollment in the district is increasing. Third, as block scheduling gets implemented for more grade levels, there will be increases in enrollment because students need more courses and credits for graduation.

For all three of these factors, we have estimated a low and high estimate of the rate of change. Then we interacted multiplicatively the three low estimates and the three high estimates to bracket the projected changes. Table 7 provides the estimates that were used to develop projections.

Four different statistics were used to estimate the first factor, which is the annual growth rate in overall high school enrollment (displayed in the first column of numbers): trends between 1995/6

Table 7. Factors Used to Project Course Enrollments, by District

District	Range of Annual High School Enrollment Growth	Range of 3-year Pctg. Point Increase in Retention	Current High School Retention Estimate	Range of 3-year Pctg. Point Increase in Course Enrollments due to Block Schedule	Range of Total Effect
Benton Harbor	-3%, 0%	5%, 15%	.52	20%, 30%	1.137, 1.449
Berrien Springs	1%, 3%	0%, 5%	.72	20%, 30%	1.237, 1.465
Brandywine	0%, 2%	0%, 2%	.81	0%, 5%	1.000, 1.128
Bridgman	1%, 3%	0%, 2%	.74	5%, 10%	1.082, 1.150
Buchanan	-1%, 2%	0%, 5%	.69	20%, 30%	1.164, 1.424
Coloma	-3%, 0%	5%, 15%	.56	20%, 30%	1.136, 1.442
Eau Claire	1%, 3%	0%, 3%	.80	20%, 30%	1.237, 1.446
Galien	-2%, 0%	0%, 5%	.75	0%, 5%	0.941, 1.082
Lakeshore	-2%, 1%	0%, 0%	.95	0%, 5%	0.941, 1.082
New Buffalo	-2%, 1%	0%, 3%	.71	20%, 30%	1.157, 1.462
Niles	1%, 3%	5%, 15%	.57	15%, 25%	1.228, 1.514
River Valley	-2%, 0%	0%, 3%	.82	5%, 10%	0.988, 1.119
St. Joseph	0%, 2%	0%, 0%	.95	0%, 5%	1.000, 1.114
Watervliet	-2%, 0%	5%, 15%	.51	0%, 5%	0.978, 1.172

to 1997/8 in total district enrollment, enrollment projections if they were provided by the district, trends between 1995/6 to 1997/8 in 8th grade enrollment, and the 1997/98 ratio of 7th grade class to 10th grade class. The entries in the table are intended to be a low and high estimate. So, for example the high school enrollment in the Lakeshore district is projected to grow between -2 percent per year and 1 percent per year over the next three years. Benton Harbor's high school enrollment is projected to grow between -3 percent and 0 percent per year.

The statistics that were analyzed in order to determine whether there was a likelihood of a change in high school retention rates were the ratio of grade 12 to grade 9 enrollments over the three years from 1995/96 to 1997/98 and the changes in enrollment of 10th graders from 1995/96 to 11th graders in 1996/97 to 12th graders in 1997/98. The baseline retention estimates, given in the third column of data in the table, were the ratio of 12th graders to 8th graders in 1997/98. The entries in the second column of numbers are a low and high estimate of the percentage point change in the high school retention rate that is projected to occur over the next three years. For example, the data in the table estimate that the retention rate in Brandywine is about 81 percent, and we have projected that by 2000/01, the retention rate will lie between 81 percent and 83 percent. In Niles, the retention rate is currently about 57 percent, and our projection is that it will be between 62 and 72 percent in three years.

The third factor used to project enrollment growth (or decline) in career and technical education classes accounts for implementation of career pathways and block scheduling. As detailed below, implementation of block scheduling and increased graduation requirements will significantly increase the number of courses that students take. Generally, when block schedules are fully implemented, graduation requirements are increased by around 25 percent. Consequently, students

will be taking about 25 percent more courses. In the table, we have factored in 20-30 percent more courses in those districts that are most likely to have fully implemented block scheduling by 2000/01: Benton Harbor, Berrien Springs, Buchanan, Coloma, Eau Claire, New Buffalo, and Niles. (In Niles, we reduced the projection factors to 15-25 percent to reflect the fact that Niles had already made progress toward full implementation of block scheduling in the benchmark year of 1997/98.) In the other districts, we used much smaller factors, generally from 0-5 percent to reflect much lower likelihoods that they will implement block scheduling during the projection period.

The final column of the table provides our low and high estimate of the percentage increase (decrease) in career preparation course enrollments. For example, in Eau Claire, we estimate that 2000/01 enrollments will be between 23.7 percent and 44.6 percent bigger than they were in 1997/98. In River Valley, they will be between 1.2 percent smaller and 11.9 percent bigger.

Projections of CTE Course Enrollments

Table 8 provides the course enrollment projections, by district. The first column of the table gives a base enrollment estimate, which comes from MDE for certified courses, plus additional enrollments as supplied by our supplemental survey for the districts with usable responses. The entries in this column are assumed to be for courses as defined under traditional scheduling, i.e., 55-60 minute courses that meet 180 times per year. The second and third columns are the low and high estimates using the factors from the final column of table 7. The definition of a course in these columns will change to 80-90 minute blocks that meet 90 times per year in those districts that fully implement block scheduling. The projections suggest that there will be somewhere between a 12.1 percent and a 35.1 percent increase in the course enrollments over the three year period.

Table 8. Projected CTE Course Enrollments in 2000/01, by District

District	1997/98 CTE Course Enrollments	2000/01 CTE Course Enrollments, LOW	2000/01 CTE Course Enrollments, HIGH
Benton Harbor	700	796	1,014
Berrien Springs	415	513	608
Brandywine	270	270	305
Bridgman	211	228	243
Buchanan	156	182	222
Coloma	475	540	685
Eau Claire	24	30	35
Galien	60	56	65
Lakeshore	408	384	441
New Buffalo	40	46	58
Niles	1,080	1,326	1,635
River Valley	220	217	246
St. Joseph	288	288	321
Watervliet	20	20	23
TOTAL	4,367	4,896	5,901

Projections of Overall High School Class Offerings

The implementation of block scheduling will typically have impacts on a high school's class offerings. For example, moving from a traditional six-hour day to a 4-block or an 8-block implies that students can increase the number of classes that they take. In the traditional schedule, a full course load would be six credits per year. In this context, a credit is awarded for a class that meets 55-60 minutes per day for 180 days. This is referred to as a

Carnegie credit. In the 4-block or 8-block schedule, students will have an opportunity to earn eight credits per year. Note that a credit is slightly different in this context; it is awarded for a class that meets 80-90 minutes per day for 90 days. Thus, with a transition from a traditional six-hour day to a block schedule, a student could potentially increase the number of courses that they would take by 33 percent (i.e., the percentage increase from six to eight).

Because the credits are slightly different and because students can take more courses, districts typically increase their graduation requirements in tandem with the implementation of block scheduling. In looking at the course guides from several high schools in Berrien County, it appears

as though districts are requiring about 25 percent more credits for graduation. More accurately, they are requiring about 25 percent more credits earned through block classes than they were previously requiring Carnegie credits. For example, a district may have required 22 credits to graduate, and now they require 27.5 “block class” credits.

The increase in the opportunity to take more courses with a block schedule and the increase in graduation requirements mean that students will want additional courses available to them. The additional courses need not be new because some of the new demand may be filled by students taking existing courses that they otherwise would not have taken under the traditional schedule. For example, a student may have wanted to take a fine arts elective or a 4th year of science, but he or she could not fit those into his or her schedule with a 6-period day. The block schedule now allows him or her to take those courses.

With the increase in graduation requirements of 25 percent, we assume that there will be a 25 percent increase in the number of courses desired by students. This increased demand will likely (but not necessarily) mean that some new classes will need to be developed.⁵ It is extremely difficult to determine exactly how many new courses would be needed, but we have made projections here that assume that 60 percent of the increased student demand will be met through new courses and 40 percent through additional sections or increased class sizes for existing courses.

With these assumptions, and with the growth rate assumptions presented in table 7, we can project the number of total class offerings needed in each district and the number of new classes needed to fully implement block scheduling by 2000/01. Table 9 presents these projections.

⁵The way that block classes are developed is typically to convert a whole year of curriculum into a block class. In other words, the development of curriculum and instructional material for block schedules requires two traditional (semester-long) classes for each block class. Alternatively, an entirely new class may be developed in the block format.

Table 9. Projected Number of Classes Needed in School Year 2000-01

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
District	1997/98 High School Enrollment	Estimated Avg. Classes/Year per Student	Estimated No. of Classes/Sections per Year (1997/98)*	2000/01 Projected High School Enrollment**	Estimated Avg. Classes/Year per Student	Estimated No. of Classes/Sections per Year (2000/01)*	Estimated No. of New Classes to be Developed to Fully Implement Block Schedule***
Benton Harbor	1,245	7.5 (4-block)	467	1,284	7.5	482	53
Berrien Springs	504	7.5 (8-block)	189	544	7.5	204	22
Brandywine	485	11 (6-period)	267	503	11	276	-
Bridgman	308	12.5 (7-per.)	193	320	13	208	-
Buchanan	524	7.5 (block)	197	541	7.5	203	22
Coloma	734	11 (6-period)	404	754	7.5 (block)	283	31
Eau Claire	295	7.5 (4-block)	111	316	7.5	119	13
Galien	149	11 (6-period)	82	147	11	81	-
Lakeshore	952	11 (6-period)	524	938	11	516	-
New Buffalo	214	11 (6-period)	118	220	7.5 (block)	83	9
Niles	1006	7.5 (8-block)	377	1145	7.5	429	47
River Valley	394	7.5 (block)	148	386	7.5	145	16
St. Joseph	895	11 (6-period)	492	922	11	507	-
Watervliet	334	11 (6-period)	184	350	11	193	-

* Assumes average class size of 20. Note that if you divide this number by the average number of classes taught per year by a faculty member, then you will derive the number of FTE faculty members in the school.

** Derived by taking an average of the estimated enrollment using the lower annual high school enrollment growth factor times the lower 3-year

percentage increase in retention and the higher values of these two factors.

*** Estimates derived by calculating 60 percent of increased demand in classes. The increased demand in classes is equal to 25 percent of one-half of the number of annual classes needed if the District were on a traditional schedule.

6. Findings and Recommendations

Berrien County districts have much to be proud of in their career development activities and technological facilities. However, there is room to systematize, expand, and improve curriculum and facilities. The districts need to build on their strengths and, where appropriate, meet their challenges. This study was not an evaluation or assessment of the career and technical education system in the county, but based on the information that was collected, we have identified two key strengths of that system. (An in depth examination may have identified other strengths.)

The first of these strengths is the career and technical education “infrastructure” that has been established. The administrative and professional development capacity that the ISD offers are first-rate. The collaboration between educators and employers through the EFE Council and program advisory committees is also a strong element of the infrastructure. The accessibility to Andrews University, Lake Michigan College, and Southwest Michigan College and the interest that these postsecondary institutions have in working with the county’s districts also offers many fine opportunities for students.

The second major strength that Berrien County has is the progress that it has made in establishing career pathways high schools. As more and more of the districts get further along in their implementation of career pathways, a larger number of students will begin to see the relevance of high school education and understand how serious effort in grades 9-12 can give them an advantage in their postsecondary and career pursuits.

As we examined data from the county, it appeared as if there were two major challenges that the county’s districts faced in their pursuit of the highest quality career and technical education

programs. The first challenge is the underdevelopment of work-based learning opportunities. Certainly, the On Location program, existing co-ops, and programs at Lakeland Hospital, Weldun Bosch, and Oselka Marina are a good beginning. But if the county's programs can get to a point where a significant portion of students have work-based experiences that have been jointly designed and coordinated by educators and employers to re-enforce academic and employability skills, they will greatly enhance the quality of the students' education and motivation.

The second major challenge is the development of programs that prepare students for white-collar or professional occupations. Like most of the Nation, the county's labor force has become more "white-collar." Jobs now and in the future will place greater premium on thinking and problem-solving skills than on physical strength. Schools can assist their students successfully prepare for these jobs with more pre-professional programs.

Any major enhancement of the career and technical education system should build on the strengths of existing programs and facilities, and should be tailored to the skills needed in the Berrien County labor market. This chapter suggests an approach that Berrien County's districts might consider. Two operating characteristics that would need to be applied if the recommended system were to be implemented would be (1) to build in flexibility so that students could move between clusters and majors without great penalty should their interests change, and (2) to develop a system that is more "real world" relevant than the traditional high school, but is not as occupationally specific or technically rigorous as existing postsecondary programs. That is, the system should complement not compete with the fine community colleges that are in the county.

The recommendation that we offer is to expand the number of clusters in the county, and offer world-class curricula in each cluster through a uniform system throughout the county. All districts

would participate in the system it through a consortium arrangement. All districts would offer some parts of the system and would accept the responsibility of transporting their students to other school or work sites for programs not offered locally. Ten clusters would be established in general occupational areas. Each cluster would have a number of career majors, and would offer five types of courses: a core introductory class that provides instruction about the skills and knowledge required in any career major within the cluster; introductory, intermediate, and advanced courses in career majors; and interdisciplinary courses. As the system gets developed, each cluster might offer “certificates of initial mastery” for accomplishing the core and career major introductory courses, and a “certificate of advanced mastery” for more advanced course work.

Each cluster would organize and maintain an active cadre of employers, and would locate at least one work-site classroom for formal instruction in the field. Flexibility would be enhanced by having open enrollment for any student in the county and by having a minimum of prerequisites.

After examining the labor market of Berrien County and enrollment and resource data about the existing career and technical education infrastructure, we recommend the following ten clusters (listed in alphabetic order):

- Allied Health Systems

(Specific career majors might include health technologies, pre-vet, EMT)

This cluster would expand on the current health offerings, but would attempt to attract students who would be interested in becoming medical doctors, veterinarians, etc. Potential employer partners would include hospitals, clinics, physicians, dentists, veterinarians, or other health care professionals.

- Business Finance and Management

(Specific career majors might include BST, entrepreneurship, accounting)

This cluster would build upon the county's existing strength in its BST programs and enrollments. It would add occupational preparation for accounting, entrepreneurship, and finance to that base. Potential employer partners would include banks, insurance agents, accountants, real estate brokers, and large businesses with administrative assistant/clerical positions.

- Communication and Fine Arts

(Specific career majors might include printing/graphic arts, radio and TV, LAN/WAN networking, Theater Tech)

The county has generated student excitement about its graphic arts offerings and the CISCO networking course in New Buffalo. Building on those programs, this cluster would attract students interested in journalism, fine arts, or computer networking. Potential employer partners would include radio and TV stations, the Mendel Center, newspapers, printing businesses.

- Construction and Skilled Trades

(Specific career majors might include plumbing, building trades, welding and cutting, woodworking/cabinetry)

This cluster would include the traditional T&I courses but would allow students to specialize in skilled trades such as electrician or plumbing occupations. The woodworking/cabinetry field would involve modern high tech and skilled craftsmanship, not just traditional wood shop skills. Potential employers would include contractors, plumbers, masons, wood products manufacturers.

- Education/Human Services

(Specific career majors might include pre-education, pre-law, child care, protective services, cosmetology)

County districts have a few course offerings in this cluster area, but the idea would be to expand the courses substantially. For example, students who might be interested in becoming teachers would be offered classroom experiences. Protective services is an occupation that has a number of openings annually in the county and which traditionally attracts a number of students. Potential employer partners would include the school districts, law enforcement agencies, attorneys, child care establishments, cosmetology practitioners.

- Electrical Engineering

(Specific career majors might include electronics, machine office equipment repair, computers - hardware and software)

The intent of this cluster would be to establish a pre-engineering focus for students particularly interested in electronics. The main focus would be on hardware. Potential employer partners would be computer repair businesses, electronics repair, manufacturers of electronics components.

- Manufacturing Systems

(Specific career majors might include pre-engineering, MT3, plastics, materials, drafting)

This cluster would build upon the county's successful program at Weldun Bosch and its courses in drafting. It would attract students interested in mechanical or industrial engineering. Potential employer partners would include manufacturers and engineering concerns.

- Natural Resources

(Specific career majors might include agri-science, environmental protection, parks and recreation, marine life)

This cluster would be new to the county, and is intended to attract students who are interested in outdoors-type occupations. Berrien County has a marvelous resource in its lakefront and associated natural resources that can be used in this cluster. Potential employers would include orchards, greenhouses, county parks and recreation department, recreation activities such as golf courses.

- Retail and Customer Relations

(Specific career majors might include marketing, advertising, food service and hospitality, travel and tourism.)

This cluster would build upon existing courses and emphasize occupations that require customer interaction. Potential employer partners include discount stores, hotels and motels, restaurants, retail establishments.

- Transportation Technologies

(Specific career majors might include auto, marine, or aviation technologies)

This cluster would expand upon existing courses in auto technology to include diesel mechanics, marine mechanics, agricultural mechanics, and aviation mechanics. Potential employer partners include auto dealers and mechanics, truck mechanics, aircraft mechanics and airlines, marinas.

Much work and further design needs to be invested in each of these clusters to project student interest and enrollment and to develop curriculums. The financial implications of the expanded clusters are likely to be substantial. Some of the clusters require substantial investments in technology and equipment. Those clusters would be the following:

- Communications and fine arts
- Construction and skilled trades
- Electrical engineering
- Finance and management (computer labs)
- Manufacturing systems
- Transportation technologies

Under the constraints of Proposal A, funding of major capital items such as the up-to-date equipment that would be needed for these clusters is difficult. A uniform collaborative system throughout the county would hopefully ease the problem somewhat.

Some of the clusters are quite amenable to distance education, whereas others would not be. Hands-on instruction would be more appropriate for the latter. Establishing curricula and distance learning equipment access for the clusters for which it is appropriate could be a substantial financial burden on the districts as well. The clusters that could make use of distance education would be the following:

- Allied health systems (core classes)
- Communications and fine arts (networking fields)
- Electrical engineering
- Finance and management
- Retail and customer relations (core classes)

In closing, we believe that an investment in expanding the clusters into a uniform, collaborative system across the county would payoff handsomely in terms of student benefits and economic benefits to the county. It will build on an already strong system. It will provide tremendous educational and career advantages to students, and it will send a signal to high-tech companies that Berrien County is serious about providing a skilled, knowledgeable work force.