

# spotlight

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## CAREER AND TECHNICAL EDUCATION

*Meeting the needs of the 21st century economy isn't rocket science*

**KEY FACTS:** • According to the Employment Security Commission of North Carolina, only a handful of fast-growing occupations require a four-year degree.

• A U.S. Department of Education report found that North Carolina devotes a relatively small share of its resources to vocational schools.

• North Carolina's public schools will need to offer more intensive and extensive programs in allied health, management, business, accounting, sales, food service, and various trades in order to meet the demands of the job market.

• Rather than throw money at short-term dropout prevention initiatives that appear to have little impact, North Carolina should address the dropout crisis by refocusing on career and technical education in middle and high school.

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**f**or occupations that do not require a two- or four-year degree, policymakers often argue that the public and private sectors must devote considerable resources to community college courses, induction programs, and job-training initiatives.<sup>1</sup> Their implicit argument is that these "investments" are required because primary and secondary schools fail to provide high school graduates with the knowledge and skills necessary to be successful in the workforce.

This report focuses on improving K-12 schools.<sup>2</sup> While a strong K-12 school system would not eliminate the need for additional education and training, it would substantially reduce public and private resources required to train North Carolina's future workforce.

### Job Growth in North Carolina

The Employment Security Commission of North Carolina predicts that most of the job growth from 2006 to 2016 will occur in occupations that require a high school diploma and some on-the-job training (see Table 1). Only a handful of fast-growing occupations (teachers, business managers/specialists,

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**Table 1. Annual Average Job Openings in North Carolina: Top 50 Occupational Groups<sup>3</sup>**

Rank	Occupation	Jobs Added By 2016	Annual % Change	Annual Avg. Job Openings	Educational Level
1	Retail Salespersons	23,510	1.62	6,510	Short-term on-the-job training
2	Waiters & Waitresses	15,870	2.11	5,310	Short-term on-the-job training
3	Cashiers	4,190	0.41	5,190	Short-term on-the-job training
4	Combined Food Preparation & Serving Workers	25,970	2.36	4,470	Short-term on-the-job training
5	Customer Service Representatives	19,410	2.48	3,890	Moderate-term on-the-job training
6	Registered Nurses	25,100	2.79	3,820	Associate degree
7	Home Health Aides	27,860	3.32	3,440	Short-term on-the-job training
8	Laborers & Freight, Stock, & Material Movers	6,090	0.73	3,200	Short-term on-the-job training
9	Office Clerks, General	10,130	1.48	2,190	Short-term on-the-job training
10	Supervisors/Managers of Retail Sales Workers	6,990	0.94	2,190	Work experience in a related occupation
11	Janitors & Cleaners	10,310	1.83	2,020	Short-term on-the-job training
12	Executive Secretaries & Administrative Assistants	11,060	1.86	1,980	Moderate-term on-the-job training
13	Food Preparation Workers	7,490	2.20	1,820	Short-term on-the-job training
14	Bookkeeping, Accounting, & Auditing Clerks	9,150	1.48	1,820	Moderate-term on-the-job training
15	Team Assemblers	4,900	0.79	1,740	Moderate-term on-the-job training
16	Heavy & Tractor-Trailer Truck Drivers	7,070	1.17	1,730	Moderate-term on-the-job training
17	Personal & Home Care Aides	13,900	5.80	1,700	Short-term on-the-job training
18	Elementary School Teachers	8,770	2.17	1,680	Bachelor's degree
19	Receptionists & Information Clerks	8,350	2.38	1,610	Short-term on-the-job training
20	General & Operations Managers	2,390	0.42	1,570	Work experience plus bachelor's degree
21	Wholesale & Manufacturing Sales Representatives	6,020	1.31	1,560	Moderate-term on-the-job training
22	Secretaries	4,250	0.70	1,360	Moderate-term on-the-job training
23	Restaurant Cooks	6,330	2.18	1,340	Long-term on-the-job training
24	Supervisors/Managers of Construction Trades	8,420	2.13	1,340	Work experience in a related occupation
25	Teacher Assistants	7,270	1.81	1,330	Short-term on-the-job training
26	Supervisors/Managers of Office & Administration	4,580	1.08	1,290	Work experience in a related occupation

(Continued on the following page.)

accountants, construction managers, and computer systems analysts) require a four-year degree.<sup>4</sup>

Occupations that require short-term on-the-job training need workers who have sufficient skills in reading, writing, interpersonal communication, arithmetic, and problem solving. Clearly, our public schools should provide these skills to all students, regardless of their career path.<sup>5</sup>

On the other hand, occupations that require moderate-term or long-term on-the-job training and/or work experience in a related occupation often require basic *and* specialized skills. Given the demand for these workers, North Carolina's public schools will need to offer more *intensive* and *extensive* programs in allied health, management, business, accounting, sales, food service, and various trades in order to meet the demands of the job market.<sup>6</sup> The state's institutions of higher education must be able to meet the need of professions that require an associate or bachelor's degree, but elementary and secondary public schools will have, by far, the heaviest burden in preparing North Carolina's future workforce.

### The National Picture: Vocational Schools and Enrollment

According to the U.S. Department of Education, North Carolina devotes a relatively small share of its resources to vocational schools (see Table 2).<sup>7</sup> During the 2006-07 school year, only 0.4 percent of schools in North Carolina were

**Table 1, cont. Annual Average Job Openings in North Carolina: Top 50 Occupational Groups<sup>3</sup>**

<i>Rank</i>	<i>Occupation</i>	<i>Jobs Added By 2016</i>	<i>Annual % Change</i>	<i>Annual Avg. Openings</i>	<i>Educational Level</i>
27	Carpenters	7,840	1.96	1,270	Long-term on-the-job training
28	Landscaping & Groundskeeping Workers	8,100	2.17	1,260	Short-term on-the-job training
29	Hosts & Hostesses	3,160	2.16	1,230	Short-term on-the-job training
30	Maids & Housekeeping Cleaners	5,920	1.62	1,230	Short-term on-the-job training
31	Construction Laborers	9,370	2.37	1,210	Moderate-term on-the-job training
32	Business Operations Specialists	8,270	2.58	1,140	Bachelor's degree
33	Stock Clerks & Order Fillers	-1,970	(0.42)	1,130	Short-term on-the-job training
34	Tellers	3,970	2.30	1,080	Short-term on-the-job training
35	Accountants & Auditors	5,260	1.64	1,050	Bachelor's degree
36	Security Guards	5,180	1.95	1,010	Short-term on-the-job training
37	Light or Delivery Services Truck Drivers	4,180	1.20	1,010	Short-term on-the-job training
38	Child Care Workers	4,300	2.00	990	Short-term on-the-job training
39	Social & Human Service Assistants	8,340	5.22	980	Moderate-term on-the-job training
40	Secondary School Teachers	3,250	1.44	960	Bachelor's degree
41	Electricians	4,340	2.01	940	Long-term on the job training
42	Construction Managers	5,860	2.46	920	Bachelor's degree
43	Preschool Teachers	5,920	2.84	890	Postsecondary vocational training
44	Middle School Teachers	4,360	1.96	880	Bachelor's degree
45	Counter Attendants	1,730	1.60	870	Short-term on-the-job training
46	Nursing Aides, Orderlies, & Attendants	6,580	2.67	860	Short-term on-the-job training
47	Automotive Service Technicians & Mechanics	4,100	1.69	860	Postsecondary vocational training
48	Computer Systems Analysts	4,380	2.61	840	Bachelor's degree
49	Supervisors/Managers of Food Preparation & Service	5,860	1.88	810	Work experience in a related occupation
50	Counter & Rental Clerks	2,820	1.91	800	Short-term on-the-job training
<b>TOTALS</b>		<b>406,500 jobs</b>	<b>1.95% per year (avg.)</b>	<b>90,320 openings</b>	

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vocational schools. This trailed the national average and states in the southeast like Mississippi, Kentucky, and Alabama.

Likewise, student enrollment in vocational schools was a small percentage of the state's total student enrollment, 0.01 percent. The national average share (0.40 percent) was only slightly higher than North Carolina's enrollment share. Interestingly, states in the northeast had much larger shares of student enrollment in vocational schools, but this picture is incomplete, as enrollment data for vocational schools was unavailable for 22 states.

### **Vocational Education: Beyond the Basics**

Currently, hundreds of thousands of North Carolina students enroll in the state's Career-Technical Education (CTE) courses. In 2005-06, over 550,000 students took at least one of the 129 CTE courses offered to students in grades 6-12, but this figure is somewhat misleading. Compared to introductory CTE courses, there is significant enrollment attrition in more advanced career and technical courses (see Table 3). This suggests that many students "try out" CTE courses, but do not (or cannot) proceed to more advanced instruction in the program area. To meet the needs of the economy, our public schools will have to graduate more students with advanced skills in career and technical fields.<sup>8</sup>

**Table 2. Vocational Schools and Student Enrollment by State<sup>9</sup>**

<i>Jurisdiction (Rank)</i>	<i>Number of Vocational Schools As a Share of Total Number of Schools</i>	<i>Jurisdiction (Rank)</i>	<i>Enrollment in Vocational Schools As a Share of Total Enrollment</i>
Mississippi	8.4%	Delaware	5.06%
Kentucky	8.2%	Pennsylvania	3.12%
Arizona	5.7%	Massachusetts	2.81%
Vermont	4.5%	District of Columbia	2.52%
Alabama	4.4%	Connecticut	1.74%
National Average	1.3%	National Average	0.40%
<b>North Carolina (33)</b>	<b>0.4%</b>	<b>North Carolina (22)</b>	<b>0.01%</b>

Note: These figures do not include regular schools with a vocational component. Rather, schools must meet the definition of a vocational education school: “A public elementary/secondary school that focuses primarily on vocational, technical, or career education, and provides education and training in one or more semiskilled or technical occupations” (p. B-4). Student enrollment in one or more Career and Technical Education (CTE) course at non-vocational schools is also not included. Enrollment figures include only students enrolled at schools that meet the definition of a vocational school.

**Table 3. Selected Career and Technical Education (CTE) Course Enrollment, 2006-07<sup>10</sup>**

<i>Course</i>	<i>Program Area</i>	<i>Students Enrolled in Introductory Course (Level I)</i>	<i>Students Enrolled in Advanced Course (Level II or III)</i>	<i>Difference</i>
Air Condition/Refrigeration	Trade and Industrial Education	86	9	-77
Allied Health Sciences	Health Occupations	10,638	6,363	-4,275
Automotive Service Technology	Trade and Industrial Education	5,677	1,243	-4,434
Collision Repair Technology	Trade and Industrial Education	489	35	-454
Construction Technology	Trade and Industrial Education	7,530	692	-6,838
Diesel Mechanics	Trade and Industrial Education	52	44	-8
Early Childhood Education	Family and Consumer Sciences	4,593	9	-4,584
Electrical Trades	Trade and Industrial Education	1,443	18	-1,425
Plumbing	Trade and Industrial Education	73	30	-43

There are many possible explanations for enrollment attrition in more advanced career and technical courses. Some attrition is expected, particularly as students find that they do not have an interest in pursuing advanced instruction or have academic difficulties in the program area. However, advanced courses are not always available, particularly in rural parts of the state, and qualified faculty are sometimes difficult to find. One overlooked explanation is the close relationship between the public schools and community colleges. The North Carolina Community College System administers one-third of the federal funding for the state’s CTE programs, and the public schools serve as feeders to the CTE programs offered by the community college system.<sup>11</sup> Students may defer enrollment in an advanced CTE course if they plan to enroll in that course in a community college program.

CTE enrollment is not evenly distributed across program areas. According to state data, business and information technology education enrolls the largest share of CTE students. Forty percent of all CTE students are in the business and information technology program. Family and consumer sciences (18 percent), trade and industrial education (10 percent), and career development (10 percent) make up the next largest program areas. Finally, technology education (8 percent), agricultural education (5 percent), marketing education (5 percent), and health occupations (4 percent) are the four smallest program areas.<sup>12</sup>

**Table 4. Advanced Course Enrollment and Annual Average Job Openings<sup>13</sup>**

<i>Advanced Course</i>	<i>2006-07 Advanced Course Enrollment</i>	<i>Estimated Annual Average Job Openings</i>	<i>Difference</i>
Air Condition/Refrigeration III	9	370	-361
Automotive Service Technology III	1,243	890	+353
Collision Repair Technology II	35	170	-135
Construction Technology III	692	3,540	-2,848
Diesel Mechanics II	44	300	-256
Early Childhood Education III	9	990	-981
Electrical Trades III	18	940	-922
Plumbing II	30	940	-910



The small percentage of students enrolled in health occupation courses is particularly problematic. According to state estimates, the state will need an additional 73,440 additional registered nurses, home health aides, personal care aides, and nursing aides by 2016; however, only four percent of students who enroll in a CTE course study health occupations. While enrollment in allied health programs has grown steadily over the last five years, so has demand for skilled health care workers.<sup>14</sup>

Similarly, the demand for workers in skilled trades remains strong, but only 10 percent of students who enroll in a CTE course study a trade. As mentioned above, most students enroll in the business and information technology program or the family and consumer sciences program. By 2016, state estimates indicate that North Carolina will need an additional 9,370 construction laborers, 7,840 carpenters, 4,340 electricians, and 4,100 automotive service technicians and mechanics. Skilled workers in trades like plumbing and pipefitting (5,370 new positions by 2016) and air condition/refrigeration (2,110 new positions by 2016) will also be in high demand. In sum, North Carolina’s economy will need at least 33,000 additional skilled tradesmen by 2016.<sup>15</sup>

**Filling the Need**

While thousands of students take introductory CTE courses, far fewer enroll in advanced CTE courses. Again, the looming problem for North Carolina’s economy is that many occupational groups will be unable to find high school graduates with advanced, intensive training in their field.

In this study, I define advanced training as the most advanced course offered to CTE students in a given occupational group. Clearly, in most fields, the number of students enrolled in advanced courses is far fewer than the estimated number of annual average openings (see Table 4). While the area of automotive service technology appears to be promising, the problem is that not all students enrolled in advanced courses graduate every year. Thus, the actual number of students entering the workforce with advanced skills is likely a fraction of the number of students enrolled in advanced courses. Because graduation rates for students taking advanced courses are not available, there is no way to know how many of those students enter the workforce every year.<sup>16</sup>

**Recommendations**

Four-year college degrees are not for everyone. Career and Technical Education allows students to gain valuable knowledge and experience in a specialized area of interest to them, while meeting the needs of our economy for skilled workers.<sup>17</sup>



That being the case, this report makes the following recommendations:

1. Give students the *choice* to pursue CTE programs in middle school, when many lose interest in the traditional academic setting. Doing so would give students ample time to change their CTE program areas, obtain advanced skills in multiple areas, or switch to a college-preparatory course of study.<sup>18</sup>
2. Work with the private sector to develop middle and high school CTE programs that would allow students to obtain the knowledge and skills necessary to enter the workforce with a high school diploma.
3. Conduct a longitudinal research study that would examine student attrition, as well as supply, demand, and distribution of CTE courses around the state.
4. If sufficient demand exists, channel existing funds to increase advanced course offerings in CTE areas. In addition, use existing funds to increase the number of middle schools, high schools, vocational education centers, and community colleges that offer CTE programs to public-school students.
5. Ensure that all CTE students receive intensive instruction in math, science, language arts, social studies, and electives. If possible, integrate this instruction into CTE courses.
6. Remove the cap on charter schools and urge them to focus on (or offer courses in) CTE areas.
7. Provide school choice to families, particularly low-income families, which would include education tax credits, vouchers, and individual/corporate scholarships. A broad school-choice effort may encourage entrepreneurs to develop specialized career and technical schools suitable for students in their community.
8. Re-conceptualize career and technical education. Mojkowski and Washor (2007), for example, offer a number of interesting possibilities for the future of career and technical education, including the use of alternative delivery systems like “locating entire CTE programs within a business or non-school organization” and “connecting learners and mentors, experts and expert practitioners via video conferencing and related online networks.”<sup>19</sup>
9. Consider Career and Technical Education (CTE) the state’s primary dropout prevention effort.

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## End Notes

1. The John Locke Foundation has made a strong case that policymakers should rely on private providers of job training. See Jon Sanders, “Job Training That Works: Public programs stagnate, while private and charitable training excels,” John Locke Foundation *Spotlight* No. 344, February 28, 2008, [johnlocke.org/spotlights/display\\_story.html?id=194](http://johnlocke.org/spotlights/display_story.html?id=194).
2. Of course, one must be mindful of the point made by Walt West, who said, “The trouble with doing something right the first time is that nobody appreciates how difficult it was.”
3. The Employment Security Commission of North Carolina (NC ESC), “North Carolina Occupational Projections 2006-2016,” [www.ncesc.com/lmi/occupational/occupationMain-new.asp](http://www.ncesc.com/lmi/occupational/occupationMain-new.asp), accessed October 20, 2008. Notes: the column “Annual Average Job Openings” includes new and replacement openings. The column “Job Openings By 2016” was calculated by subtracting the 2006 employment count from the estimated 2016 employment count.
4. *Ibid.*
5. James R. Stone, III, Corinne Alfeld, and Donna Pearson, “Through Career and Technical Education Relevance: Enhancing High School Students’ Math Skills and Rigor,” *American Educational Research Journal* 45:3 (September 2008), pp. 767-795; Matthew E. Pundt, Michael Beiter, and Nora Dolak, “Academic Standards in Career and Technical Education,” *Techniques* 82:7 (October 2007), pp. 28-29.
6. Government job-training programs are not a sound alternative to a sound system of primary and secondary schools, as well as private sector job training. See Jon Sanders, “Job Training That Works: Public programs stagnate, while private and charitable training excels.” As Sanders points out, “Allowing greater freedom in education would help concerned educators and entrepreneurs incorporate ideas in school curricula tailored to meet their individual communities’ needs, even the inclusion of teaching life skills, personal responsibility, and the importance of soft skills or other programs that keep students from later being among the hard to employ” (p. 5).
7. Lee Hoffman, “Numbers and Types of Public Elementary and Secondary Schools from the Common Core of Data: School Year 2006-07 (NCES 2009-304),” National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, October 2008, pp. 6-9, [nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009304](http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009304).
8. North Carolina Department of Public Instruction (NC DPI), Career and Technical Education Program, “Career and Technical Education Data Profile,” Summer 2007, [www.dpi.state.nc.us/cte/publications/index.html](http://www.dpi.state.nc.us/cte/publications/index.html); NC DPI, “Consolidated Annual Performance, Accountability, and

## Appendix: A Better Approach to the Dropout Crisis

In the 2006 report, “The Silent Epidemic: Perspectives of High School Dropouts,” researchers commissioned by the Bill & Melinda Gates Foundation surveyed a national sample of 467 public-school dropouts to determine why they dropped out of school. Some highlights included:

- Nearly half (47 percent) said a major reason for dropping out was that “classes were not interesting”
- Nearly 7 in 10 respondents (69 percent) said they were not motivated or inspired to work hard
- Forty-five percent said they started high school poorly prepared by their earlier schooling
- Four out of five (81 percent) said there should be more opportunities for real-world learning and some in the focus groups called for more experiential learning. They said students need to see the connection between school and getting a good job
- Seven in ten (71 percent) said their schools did not do enough to make school interesting.<sup>20</sup>

According to the report, students at risk of dropping out of school want 1) an interesting, relevant, and practical curriculum, 2) a school environment that inspires them to work hard, and 3) strong academic foundation in elementary and middle schools. Rather than throw money at short-term dropout prevention initiatives that appear to have little impact, North Carolina should address the dropout crisis by refocusing on career and technical education in middle and high school.<sup>21</sup> A strong, statewide effort to increase opportunities for students to pursue career and technical education would clearly address all three of the students’ concerns listed above.<sup>22</sup>

Financial Status Report for State-Administered Vocational Education Programs,” January 2008, [www.dpi.state.nc.us/cte/publications/index.html](http://www.dpi.state.nc.us/cte/publications/index.html); NC DPI, “Statistical Profile 2007,” March 2008, pp. 68-75, [www.ncpublicschools.org/fbs/resources/data](http://www.ncpublicschools.org/fbs/resources/data).

9. *Op. cit.*, note 7. Admittedly, there appear to be some discrepancies between the number of vocational schools and student enrollment. For example, the study reports that Minnesota has 12 vocational schools and total vocational student enrollment of one student. For this reason, the school count and enrollment figures should not be compared.
10. *Op. cit.*, note 8.
11. NC DPI, “Consolidated Annual Performance, Accountability, and Financial Status Report for State-Administered Vocational Education Programs,” p. 3.
12. NC DPI, “Career and Technical Education Data Profile.”
13. NC DPI, “Statistical Profile 2007”; NC ESC, “North Carolina Occupational Projections 2006-2016.”
14. NC DPI, “Career and Technical Education Data Profile”: “Health Occupations is growing rapidly, up 60 percent from its 2001-2002 enrollment of 22,110” (p. 3).
15. NC ESC, “North Carolina Occupational Projections 2006-2016.”
16. As an additional concern, because these are statewide figures, they cannot account for the distribution problem; that is, the school districts that offer advanced courses may not be located in areas of highest demand.
17. For a good examination of the history of vocational education, I recommend W. Norton Grubb and Marvin Lazerson, “The Education Gospel and the Role of Vocationalism in American Education,” *American Journal of Education* 111 (May 2005), pp. 297-319. The authors conclude, “Overall, then, vocationalism has ushered in substantial advancements over prevocational practices, particularly in expanding the roles of schooling, promoting both public and private goals, changing the nature of skill acquisition, enhancing our collective ability to address equity, and expanding choices and the flexibility of educational institutions” (p. 319).
18. North Carolina’s The Middle Grades Task Force recommended that “The required healthful living curriculum as well as a variety of elective courses including arts education, second languages, and career and technical education are important and should be available to all students” (p. 16, emphasis added). See NC DPI, “Last Best Chance 2004: Educating Young Adolescents in the 21st Century,” Middle Grades Task Force Report, Fall 2004.
19. Charles Mojkowski and Elliot Washor, “Seeding the Edge of Career and Technical Education,” *Techniques* 82:7 (October 2007), pp. 34-37.
20. John M. Bridgeland, John J. DiIulio, Jr., and Karen Burke Morison, “The Silent Epidemic: Perspectives of High School Dropouts,” Bill & Melinda Gates Foundation, March 2006, [www.silentepidemic.org/index.htm](http://www.silentepidemic.org/index.htm).
21. Terry Stoops, “Dropout Prevention Grants: Good Money for Bad Ideas,” John Locke Foundation *Spotlight* No. 342, February 20, 2008, [www.johnlocke.org/spotlights/display\\_story.html?id=192](http://www.johnlocke.org/spotlights/display_story.html?id=192); Terry Stoops, “Dropout Prevention Grants: An Update,” John Locke Foundation *Spotlight* No. 358, September 16, 2008, [www.johnlocke.org/spotlights/display\\_story.html?id=209](http://www.johnlocke.org/spotlights/display_story.html?id=209).
22. N. Susan Emeagwaia, “At-Risk Students Find a New Beginning,” *Techniques* 83:2 (February 2008), pp. 14-17. See James R. Stone III and Marisa Castellano, “New Roles for Career and Technical Preparation Programs in Educating At-Risk Students: Promises and Possibilities,” in *Yearbook of the National Society for the Study of Education* 101:2 (2002), pp. 248-268. For a more cautionary view, see Harry L. Legum and Carol H. Hoare, “Impact of a Career Intervention on At-Risk Middle School Students’ Career Maturity Levels, Academic Achievement, and Self-Esteem,” *Professional School Counseling* 8:2 (December 2004), pp. 148-155.