



The Face of Career and Technical Education in New York State

Year 2 Evaluation Report

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MAGI Educational Services



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CTE Evaluation Report

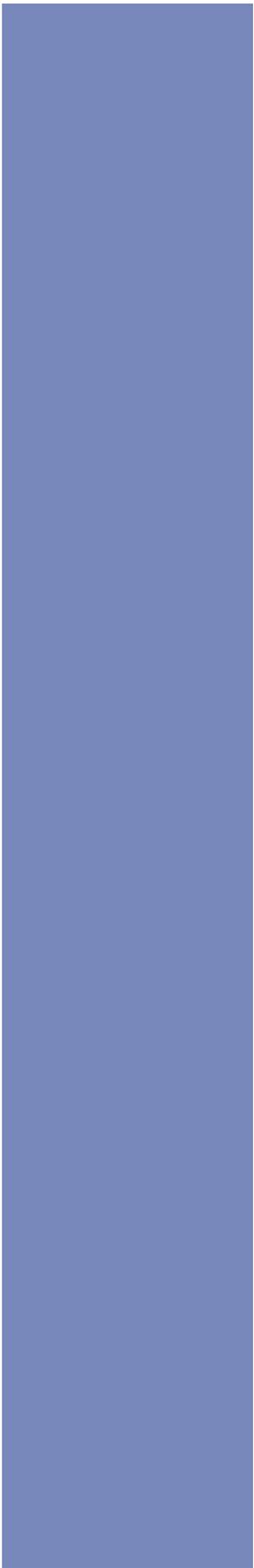
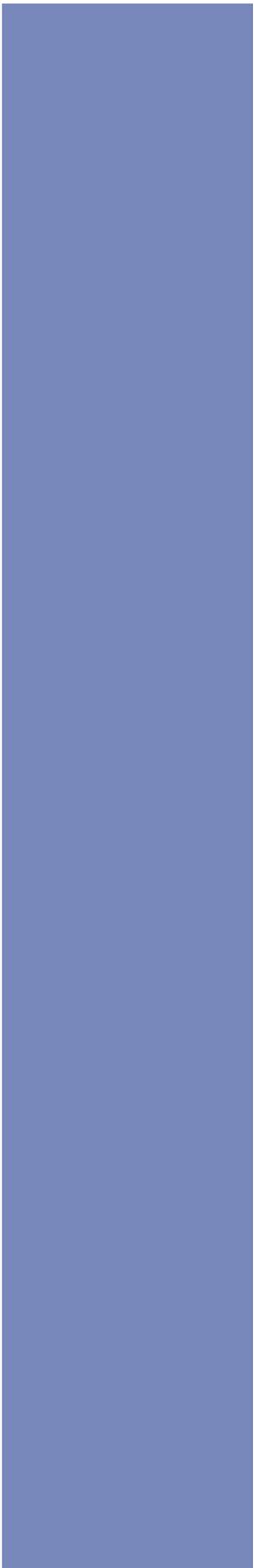


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CTE Evaluation Report



EXECUTIVE SUMMARY

“There is no realistic way to significantly improve high schools’ outcomes in this country without tackling secondary career and technical education.”

**Richard Kazis,
Jobs for the Future (2005)**

Overview

A major component in New York State’s high school reform model has been the Career and Technical Education (CTE) Policy of 2001. At its core, the CTE Policy is a programmatic effort to raise the academic and technical rigor of CTE programs, while at the same time allowing students a flexible pathway to graduation. Through such measures, the CTE policy is designed to better prepare high school students to develop the universal work and technical skills that can lead to high paying careers, as well as the academic competencies to pursue further education and training. Over a period of four years, school districts and Boards of Cooperative Educational Services (BOCES) throughout the state have increasingly embraced this high school reform model. In 2004, MAGI Educational Services, an independent research and consulting firm, conducted the first statewide evaluation of the CTE policy. Findings indicated several positive outcomes as measured by enrollment increases, academic and technical skills attainment, and stakeholder satisfaction. The study also pointed to some additional areas of inquiry—those that could help to more fully understand the quality and utility of the CTE policy at the grassroots level, as well as inform the CTE recertification process.

This report represents the second annual evaluation of the CTE initiative. Using quantitative and qualitative methods, MAGI surveyed coordinators and teachers of approved CTE programs and high school principals, as well as conducted intensive case studies of CTE sites. In addition, we analyzed CTE student enrollment and outcome data from NYSED’s Career and Technical Education Database (CTED), to describe trends and patterns over a period of four years. Finally, telephone

interviews were conducted with high school principals to probe the reasons for their non-participation in the CTE policy process. In combination, these different forms of data allowed us to furnish a comprehensive and balanced evaluation of the progress and continued impact of New York State's CTE Policy.

KEY FINDINGS

Implementation of CTE Policy

A. The CTE Application/Approval Process

- For the most part, all components of the application process were thoroughly completed.
- The CTE approval process helped to raise the overall quality of career and technical education.

B. The CTE Program

(i) Hallmarks of Approved CTE Programs

- As a result of the CTE approval process, curricula were distinguished by value-added features.
- There was commencement-level rigor in academic and technical course content in most programs.

(ii) Professional Development

- Professional development in topics specific to CTE curricula was not widespread in 2004-05.

(iii) Program Equity

- Approved CTE program requirements were fair and appropriate for most, but not all student populations.

(iv) Program Variation

- BOCES-based programs offered students academic credit in one or more of the content areas, whereas district-based programs that we visited did not.
- CTE technical quality was stronger in BOCES-based than in district-based programs.
- Work-based learning was managed more systematically in BOCES-based programs.

- Work-based learning opportunities in career and technical/comprehensive high schools were superior to those in local school districts.
- Planned collaboration between CTE and academic teachers was evident in career and technical/comprehensive high schools but not in local school districts.
- Approved CTE programs that offered college-articulated and industry-accredited courses were of higher quality than non-approved CTE programs.

(v) Changes Since Inception

- The curriculum has improved and reflects more rigor.
- Methods of student assessment have been upgraded.
- CTE programs enjoy greater resources.
- There have been more postsecondary and industry-articulated courses in 2005 than in 2004.
- CTE programs have made stronger connections with industry.
- Overall, there has been improved accountability.

(vi) Obstacles to Implementation

- Scheduling difficulties, inadequate resources, and work overload were the most frequently cited barriers to program implementation in both BOCES-based and district-based programs.
- There was concern surrounding the validity and cost of the industry-based technical assessment.
- In some programs, CTE staff noted that overcrowded classrooms and a shortage of skilled CTE teachers posed the risk of hazardous conditions.
- Shifts in local demographics affected CTE program viability.

High School Non-participation

- By far, the primary reason principals chose not to participate in the CTE approval process was satisfaction with existing approved programs at off-campus locations.
- Principals would consider participation if they were better informed of the added value of approved CTE programs and given State assistance to implement them.

Impact of CTE Policy

A. Impact on Students

According to CTE teachers,

- students showed improvement in academic and technical achievement, as well as in their attitudes toward learning, and
- more students were furthering their education beyond high school.

According to parents,

- their children had a clear and goal-oriented future, as a result of CTE programs, and
- their children had gained real world, practical skills from work-based experiences.

According to students,

- CTE programs fit with their graduation, college, and career plans.
- they had experienced growth in personal drive and ambition.
- their high school experience had added value as a result of CTE programs.

B. Impact on Program, School, and Community

- Approved CTE programs had resulted in system-wide benefits, chief among which was a challenging curriculum for students.
- An improved image of career and technical education was emerging.
- Greater collaboration had occurred between schools and the business community, colleges, and public and private donor organizations.

C. Student Enrollment Trends

- The majority of approved CTE programs experienced enrollment increases in 2004-05.
- Enrollment trends reflected shifts in New York State's economic trends.
- Relative to the overall CTE population pattern, there were differences between CTE programs in gender, race, and special education enrollment.

D. Student Outcome Trends

- Overall, students in approved CTE programs surpassed New York State's benchmarks in both academic and technical skill proficiency.
- In eight out of 10 program clusters, more students in 2004-05 met the State's technical standard than in the previous year.
- There were gender, racial, and special education student disparity in CTE outcomes [academic and technical achievement].

Conclusions and Recommendations

New York State's approved CTE programs have continued their course of improvement as was evident from the findings of this study. In fact, New York was one of three states cited in the recent literature whose progress in bringing CTE into the 21st century provided a basis for optimism (Hughes, 2005). What conclusions can we draw from the second evaluation study?

1. CTE programs have improved in quality but inequity of local resources results in considerable variation between programs.

To a greater or lesser extent, all CTE programs had seen improvement since their inception. The application procedure served as a mechanism for internal review and prompted many programs to upgrade the quantity and quality of curricula and equipment, internal and external assessments, representation of key stakeholders, and college articulations. Yet CTE programs, like all reform initiatives competed for sustainability of resources in a time of shrinking local budgets.

2. Commencement-level academic and technical rigor is apparent. Still, obstacles remain.

The course content of a vast majority of CTE programs was characterized as rigorous and at the commencement level. CTE programs had ratcheted up their academic and technical caliber and most students rose to the challenge by working harder and achieving higher standards. However some localities lacked the support necessary to deliver the enhanced curricula in a manner that allowed students—of all abilities—to achieve success. Professional develop-

ment in both their specific CTE areas and special education support were needed.

3. Enrollment in CTE approved programs has increased, particularly in the health occupations.

CTE programs saw higher enrollments in eight out of 10 occupational clusters. The upward trend in health occupations enrollment matched projections in New York State for 2002 to 2012.

4. Enrollment disparities prevail in gender, racial, and special education.

Despite the overall rise in CTE enrollment, disaggregated data reveal under-representation of male and female students, minorities, and those with special needs in a sizeable proportion of approved CTE programs. While factors such as sociocultural bias may influence enrollment in non-traditional occupational programs, availability and access seem to also be part of the equation.

5. CTE students have met New York State's benchmarks for academic and technical skill proficiency.

An improvement over last year was the finding that *both* NYS academic and technical standards were met and surpassed by CTE students. Additionally, more students this year had been successfully placed in postsecondary education, the military and in employment. However, relative to their enrollment, there were disparities for student subgroups: more males than females, more White students than African-American and Hispanic students, and fewer students in special education achieved CTE outcomes.

6. Local stakeholders are very satisfied with the implementation and outcomes of the CTE policy.

Coordinators, teachers, students and their parents gave strong endorsement to CTE policy and the programs that it has spawned. As a result of the policy, curricula were stronger and aligned to both high school graduation requirements as well as to the dynamic needs of business and industry. Schools and BOCES had won greater credibility in their communities as career and technical education was increasingly viewed at par with its academic counterpart.

Finally, students claimed that the CTE component was instrumental in giving added meaning to their high school experience.

7. More schools would seek CTE approval if they were better informed about the application process, given sufficient technical assistance, and convinced of its value.

High schools that had not elected to submit their programs for state endorsement were satisfied with the CTE programs offered by their regional BOCES. They were interested in learning more about the CTE application process and the added value of approved programs.

To summarize, improvements in program quality, academic and technical rigor, increases in enrollment, and higher percentages of students meeting outcomes were some of the accomplishments noted in this report. Nonetheless, there were barriers to full implementation for some students, as well as in extending the statewide reach of CTE programs. BOCES and districts considering the implementation of approved programs needed greater support to expand the CTE Initiative.

Recommendations

Our findings suggest several recommendations at the State and local levels.

At the State level,

1. Promote the legitimacy of career and technical education in New York State's school improvement agenda

The findings of our report together with those from national studies suggest that it is time to link CTE policy to the bigger picture—improving the quality of education for all students through higher learning standards. Under the CTE policy, enrollments in career and technical education have started to climb; more students are passing Regents exams, and achieving technical proficiency; and greater numbers of students are going to college. These outcomes have particular significance for schools that are struggling to meet their accountability requirements under the *No Child Left Behind* mandate. In these schools, problems of CTE program access and availability

should be seriously challenged because CTE is a promising strategy for helping to raise student academic achievement. For all these reasons, the State should ensure that CTE policy is accorded a rightful place among the players in educational reform.

2. *Increase awareness of, and market the CTE program approval process*

All respondent groups—administrators, teachers, students, parents, and non-participating high school principals—shared the sentiment that the CTE policy needed broad-based marketing. This could be achieved through NYSED’s existing communication system with school districts, career and technical professional organizations, parent organizations, and through regional conferences. In order to effectively engage a broad swath of stakeholders, different forms of media should be used, such as statewide webcasts, promotional videos and CDs, newsletters, and public access television.

3. *Simplify the CTE recertification process*

The CTE recertification process could be made more efficient by streamlining and clarifying several components of the application package. For example, the process could set a uniform standard by which all local schools determine if a CTE integrated course warranted academic credit. A representative sample of local CTE coordinators could be helpful in determining which aspects of the application process needed refinement and how best to implement that.

4. *Provide systematic technical assistance*

Through its newly founded Career and Technical Education Resource Center (CTERC) and the Regional School Support Centers (RSSC), NYSED can chart a multi-tiered system of technical assistance to approved CTE programs, as well as to those considering approval. Assistance in CTE application completion could take the form of regional face-to-face training sessions, manuals that furnish step-by-step guidance, and resource material, such as where to turn for industry-specific technical assessments. Follow-up assistance should focus heavily on professional development surrounding topics such as integrated course design, work-based learning,

postsecondary articulation, performance assessments, teaching diverse learners, involving business and industry, and marketing CTE programs. In addition, opportunities for CTE teachers to share and learn from their counterparts in other regions of the state should be considered.

5. *Facilitate an ongoing dialogue between high schools and post secondary educational institutions*

Making the pathway from high school to further education seamless and easily navigable is essential to preparing young people for the future. While our report indicates that schools and BOCES had increased the number of college articulated CTE courses and that there were more students going on to college, by and large, there continues to be a significant chasm in communication between educators at both levels. Far too many high school staff and their counterparts in community and four-year colleges are unaware of each other's expectations for student success and their respective issues and challenges. It is here that the State can play a critical role. By engineering a process for continuous conversation, through regional and/or statewide forums, the State can lead the way in bridging the gap between high school CTE staff and their postsecondary colleagues.

At the local level,

1. *Ensure that CTE funding resources are distributed according to program need and in a timely manner*

We found that many promising CTE programs were unable to deliver high quality instruction in a consistent manner, either because their budgets had been cut or because their equipment and supplies had not arrived in a timely manner. Local leadership should reexamine criteria for resource distribution vis-à-vis program need and establish a delivery system that maximizes program operation.

2. *Consolidate concurrent funding streams to benefit CTE programs*

Since a considerable portion of the operational budget for CTE programs was derived from state and local sources, CTE administrators should strive to pool resources across multiple funding initiatives

so that redundancies are minimized. We observed several CTE programs that attributed their success to a consolidation of funding streams—both public and private—enabling recipients to experience a quality program that was at par with current trends in industry.

3. *Ensure greater involvement of academic teachers in the design and improvement of CTE curricula, and increase opportunities for collaboration between CTE and academic teachers*

While CTE instructors were technically adept in their specific program areas, it took methodical and sustained input from academic teachers to ensure that CTE programs had academic content that was at commencement level. This was especially true for those programs offering students academic credit. Districts should devise ways to build in common planning time and opportunities for co-teaching and co-assessing students in CTE courses.

4. *Develop a plan to market CTE in the middle schools*

In keeping with our observations last year, there remains a need to publicize approved CTE programs in feeder schools/classes. Programs that had designed middle-school articulation packages (videos, presentations, tours, career days, etc.) had healthy enrollments and some, waiting lists of entering freshmen.

5. *Seek NYSED assistance to conduct differentiated follow-up studies on graduates of CTE programs*

In no area was the need to conduct follow-up studies greater than in building credibility for CTE programs. Some localities had recruited university consultants to initiate such studies but readily admitted that the process was labor intensive and beyond their programmatic means. Yet we know that the most compelling evidence for CTE lies in how its graduates fare in postsecondary education and employment. These data should be collected in a differentiated manner—separately for college, military, and employment—because these outcomes represent very different results for students and for society.

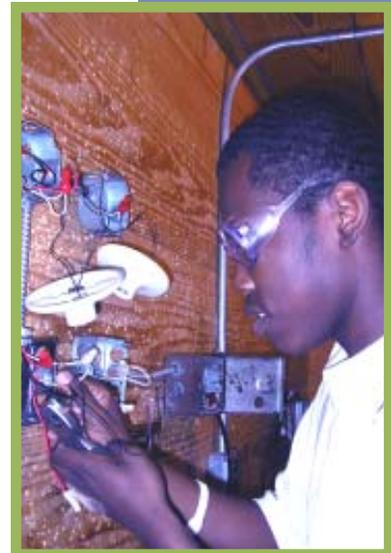
The Face of Career and Technical Education in New York State

Introduction

Career and technical education (CTE) programs across the country have undergone considerable reform, largely in response to the need to better prepare young people for college and employment. In New York State, the CTE Policy Initiative of 2001 encouraged all high schools and Boards of Cooperative Educational Services (BOCES) to offer students a flexible pathway to graduation—one that maintained rigor in academic and technical content without duplication of coursework. Educational institutions could accomplish this by designing or improving CTE programs to meet the higher standards set by the State.

MAGI Educational Services, an independent research and evaluation firm undertook the initial evaluation of New York State's CTE policy in 2004. Findings indicated several positive outcomes as measured by enrollment increases, academic and technical skills attainment, and favorable stakeholder perception.¹ The study also pointed to some additional areas of inquiry—those that could help to more fully understand the quality and utility of the CTE policy at the grassroots level, as well as inform the CTE recertification process.

In 2005, a second study of approved CTE programs was undertaken to explore these additional areas of inquiry. Using a *systems-based model* of evaluation, we more fully examined the continuing context, implementation, and impact of approved CTE programs. These were assessed by administering surveys, conducting site visits, examining student enrollment records, and analyzing student outcomes—academic and technical skill attainment, technical assessment results, and student placement. Our research questions were the following.



¹ MAGI's 2004 CTE Evaluation report can be found at <http://www.regents.nysed.gov/2004Meetings/December2004/1204emscvesidd2att.pdf>

1. Does the CTE application/approval process influence the quality of approved CTE programs?
2. What do approved CTE approved programs look like and what obstacles to full implementation exist?
3. To what degree are approved CTE programs implemented with commencement-level academic and technical rigor?
4. What factors influence high school non-participation in the CTE approval process?
5. What is the impact of CTE policy on students, programs, and the community? What can we learn from trends and changes in CTE student enrollment and outcomes?

EVALUATION METHODS

We used a combination of methods to address the above research questions. Both *quantitative* and *qualitative* data collection procedures were employed to provide reliability, validity, and a balanced perspective to our findings.

CTE Surveys—three separate surveys were developed for the study:

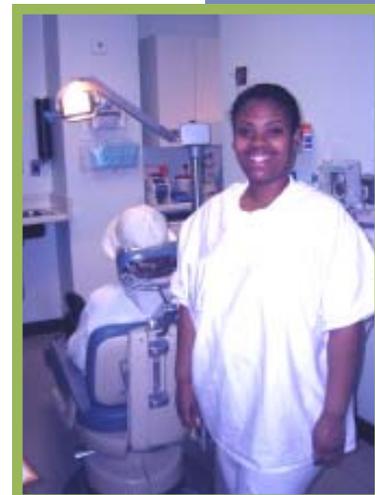
- (1) an administrator survey was sent to 88 CTE coordinators of 56 statewide CTE sites (18 high schools and 38 BOCES).² Of these, 84 surveys were completed, resulting in a return rate of 95%.
- (2) a teacher survey was sent to 756 CTE instructors. Of these, 729 surveys were completed, accounting for a return rate of 96%.
- (3) a geographically stratified random sample of 460 high school principals across the state were given a brief survey to determine their perception of the rigor and quality of approved CTE programs. Of these, 244 surveys were completed, resulting in a return rate of 53%.

² NYC has 32 CTE coordinators due to its unique configuration of CTE programs.

Telephone interviews of non-participating high schools—from the Year 1 study sample of 50 non-participating schools, we determined that 38 high schools (accounting for 120 CTE programs) had no intention of participating in the CTE endorsement process. MAGI researchers conducted telephone interviews with principals and guidance counselors from these schools to probe the specific nature of their reluctance to participate. Twenty-eight principal interviews were completed, resulting in a return rate of 74%. Major themes were identified through systematic content analyses of the telephone transcripts and translated into key findings.

Site Visits—Twenty new sites were selected by stratification according to geographic area (6 in NYC, 2 each in Buffalo, Rochester, and Yonkers, and 8 in the rest of the state), number of site programs, and a balance between BOCES and local school districts. Interviews and focus groups were held with CTE coordinators, teachers, parents, and students. In addition, we visited work-sites to observe and interview students on-the-job. Qualitative data were content analyzed for themes and patterns, and major findings were cross validated with results of the quantitative analyses.

Review of Electronic Databases—student data from NYSED’s 2004-2005 Career and Technical Education Database (CTED) were compared with those of previous years to explore changes and trends in enrollment outcome variables (academic and technical skill attainment, technical assessment results, and student placement) between CTE programs. Where appropriate, data were disaggregated according to race, gender, and special education status.



KEY FINDINGS

This section is organized into five parts, addressing each of the research questions of the study.

1. The first part addresses thoroughness with which the application process was conducted, its perceived effects on program quality, and recommendations for improving it.
2. Part two describes the face of approved CTE programs in the field. Specifically, it reports on the research-based characteristics of approved programs, professional development, program equity, program variation, changes since inception, and perceived obstacles to full implementation.
3. The third part presents findings that address the question of academic and technical rigor in approved CTE programs. It describes the perceptions of high school principals and offers their suggestions for improving program rigor.
4. Part four describes possible reasons why high schools choose not to participate in the CTE endorsement process. Suggestions to broaden the scope of approved CTE programs are provided.
5. The final part addresses the outcomes of CTE policy, as seen by school administration, teaching faculty, students, parents and the community. It also presents changes and trends in CTE enrollment and outcomes.



1. Does the CTE application/approval process influence the quality of approved CTE programs?

The chief vehicle that drove the CTE approval process was the CTE application³. The application consisted of a detailed, step-wise process of internal (self-study) and external review of current CTE programs. Applicants were required to adhere to a series of standards for each of several CTE component features. In this process, applicants refined their CTE programs—adding elements, eliminating others, and ensuring that their curricula were in keeping with the NYS Learning Standards as well as those dictated by industry. Upon completion of both the internal and external reviews, schools and BOCES submitted their application to NYSED for approval.



For the most part, all components of the application process were thoroughly completed.

- 93% or more CTE coordinators claimed to have completed all phases of the self-study and external review—the major components of the application process. These included, but were not limited to the following activities.
 - ▣ Taking the necessary steps to ensure that all CTE teachers had relevant certification and industry-based experiences;
 - ▣ Ensuring that teachers had access to professional development related to CTE program enhancement; and
 - ▣ Securing external review team members who were qualified to review the application material.
- Likewise, 88% or more CTE teachers reportedly carried out all parts of the CTE application process. Examples of completed activities follow.
 - ▣ Conducted curricular crosswalks to determine alignment w/ CDOS, academic, and industry standards;
 - ▣ Revised curricula so that integrated and specialized courses reflect commencement-level academic and technical content; and

³ These terms—CTE approval process and CTE application—are used synonymously throughout the report.

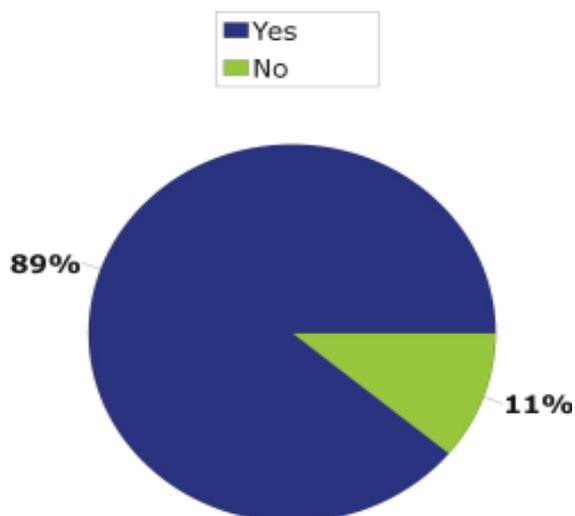
- ▣ Secured an appropriate technical assessment.

Content analyses of site visit data corroborated the above findings. Researchers noted documentation of curricular crosswalks and samples of integrated CTE curricula and student projects.



The CTE approval process helped to raise the overall quality of career and technical education.

Figure 1.
Has the CTE approval process helped to raise the quality of career and technical education?



n=729 teachers

As seen in Figure 1,

- 89% of teachers reported that the application process improved the quality of career and technical education.
- of the 11% who answered “no”,
 - ▣ most of these teachers claimed that CTE programs were of high quality—many with industry and NYSED endorsements—prior to the CTE approval policy.
 - ▣ others felt that the emphasis on academic instruction “takes time away from hands-on instruction and practice.”
 - ▣ a few respondents reported that their programs had not been in effect long enough to determine if the CTE approval policy had enhanced career education.

The above themes were, for the most part echoed in the content analyses of interview and focus group data gathered during site visits. Specifically, two perceptions emerged:

The application process was a catalyst for self-assessment and improvement.

- While the self study and external review processes were long and arduous, they gave applicants a chance to scrutinize their programs in ways they had not previously considered. Applicants were pleased to note the degree of academic and technical rigor and standards alignment that already existed, but of which they had been unaware. With the help of academic content area specialists, CTE teachers conducted gap analyses and bridged discrepancies with authentic learning opportunities.

The CTE policy was one among several influential reform efforts.

- In some schools, teachers attributed CTE program quality to concurrent initiatives—such as the Smaller Learning Communities grant and High Schools That Work. It was not the CTE approval process per se, but a combination of reform initiatives that resulted in raising the caliber of career and technical education.



There were several ways in which the CTE application process could be improved.

Respondents offered many suggestions to improve the CTE application that are relevant to the CTE recertification process.

- Both coordinators and teachers of approved CTE programs suggested that NYSED make the process clearer, by providing:
 - ▣ consistency with respect to its stand on academic integration—in its definition and in what constitutes credit;
 - ▣ a mechanism that enables all local school districts to uniformly award academic credit where warranted in integrated CTE courses.⁴

⁴ Within BOCES regions, it appeared that some school districts currently choose to award academic credit for a CTE course, while others refuse to do so.

- ▣ clearer expectations for the external review—as distinct in purpose and membership from the self-study team;
- ▣ more technical assistance in the completion of the process—for e.g., the provision of model booklets/step-by-step manuals that could be explained and reviewed in regional training sessions.

- Teachers and coordinators of CTE programs suggested that the application process should take into account the current accreditations/endorsements that applicants have (e.g., ACF, NCCER, NATEF, Middle States) and find ways to align CTE endorsement with these. This would avoid what is seen as duplication/redundancy in program accreditation.
- Respondents also felt that NYSED should open a conversation with applicants about alternative approaches to the technical assessment, such as a BOCES-wide assessment in the different trades, or a statewide uniformity in technical assessment within trade areas.⁵ Also, many respondents expressed a need for NYSED resource assistance in covering the financial cost of the technical assessment. MAGI’s student focus group data supported this need as students spoke of their inability to afford the technical assessment.
- With respect to the CTE recertification process, coordinators suggested that it be simplified and that CTE directors be involved in its design.
- On their part, applicants felt that they could improve the process by soliciting greater involvement of high school academic teachers. They felt that the design and review of CTE curricula, with particular reference to the integrity of academic content, would have been better gauged by more directly using the expertise of content area teachers.

⁵ At present, there are different technical assessments for the same CTE programs.

In sum, the CTE application was viewed as a useful and significant procedure, resulting in the overall improvement of career and technical education programs in New York State. It enabled schools and BOCES to review and enhance extant CTE programs, as well as to design new ones that better met the career goals of students vis-à-vis industry.

2. What do approved CTE approved programs look like and what obstacles to full implementation exist?

Our evaluation took into account approved CTE programs that had been in effect for some years, as well as those that were in their first year of implementation. Taking root across the state, these programs portrayed a picture that was both rich and diverse. In this section, we report on the hallmarks of approved programs, professional development, program equity, program variation, changes since inception, and challenges to full implementation.

(a) Hallmarks of approved CTE programs

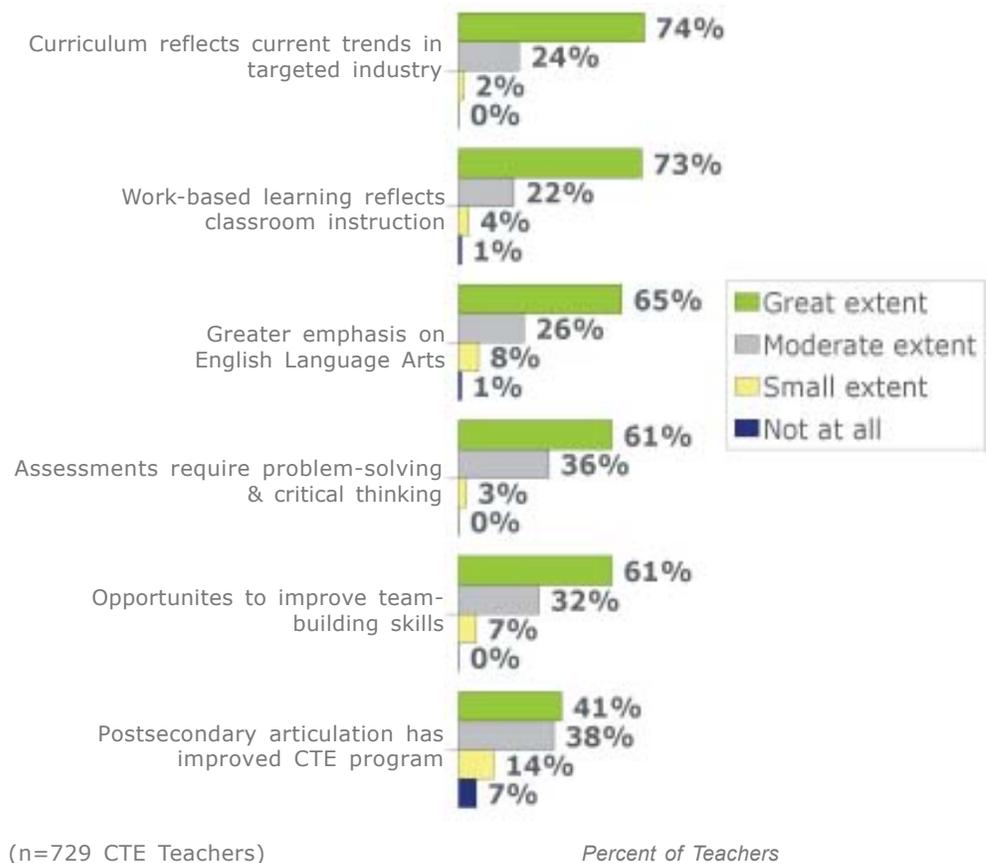
Respondents who claimed that the CTE approval process had raised the quality of career and technical education supported the assertion by describing several characteristics that were true of approved CTE programs. These attributes are also cited in the national CTE literature as some of the features of high-quality career and technical education (The High School Leadership Summit, 2003; ACT News Release, 2005).





As a result of the CTE approval process, CTE curricula were distinguished by value-added features.

Figure 2.
Features of Approved CTE Programs



According to Figure 2,

- Over 70% of teachers claimed that to a great extent, CTE curricula were closely connected with business and industry—in work-based experiences for students and in reflecting current trends in the field.
- A majority (over 60%) also felt that approved programs required students to demonstrate better communication, problem-solving, and team-building skills.
- 41% felt that approved CTE programs that were articulated with postsecondary institutions had better quality.

(b) Professional Development

In order to meet the higher learning standards of the CTE policy—in both academic and technical skill proficiency—CTE students needed to have access to well-qualified teachers. They were to be skilled in teaching not only in their specific trade areas, but also in teaching the academic concepts that were embedded within the CTE curricula, at a level commensurate with high school graduation requirements. Additionally, they were responsible for the development of the various elements that comprised approved CTE programs, such as work-based learning, industry assessments, and postsecondary articulations. Therefore, professional development for CTE teachers was viewed as a critical component of quality career and technical education.



Professional development in topics specific to CTE curricula was not widespread in 2004-2005.

Figure 3.
CTE Professional Development Offered and Attended by Teachers in 2004-05



(n=729 CTE Teachers)

Percent of Teachers

According to Figure 3,

- in just three topics did more than 50% of teachers claim that they received professional development. These workshops were in *integrated course development* (offered to 59% of teachers), *teaching diverse learners* (56%), and in *standards alignment* (52%).
- the remainder of the topics was offered to less than 50% of the respondents.

These findings suggest that overall, at the local level, professional development in areas of significance to CTE teachers was inadequate. Content analyses of site visit data indicated the following.

- Professional development was, for the most part of a generic nature. CTE teachers reported attending mandatory training in “stress management, using humor in the classroom, or in alternate ways to set up your classroom.”
- Some exceptions were evident. In certain CTE programs, such as CISCO networking and some auto mechanics programs, the industry financed release time for teachers to upgrade their skills and learn about new developments in their field.
- Many teachers were eager for more opportunities to improve their teaching skills in their particular CTE area, but were told that budget cutbacks in the district prevented the administration from honoring those requests.
- Several staff suggested that professional development could include a CTE forum where CTE teachers could exchange ideas about best practices with their counterparts in other regions of the state.

“It would be really helpful to know how others are running approved CTE programs, how they overcome obstacles. We could share solutions.”

CTE Teacher

In response to our follow-up question, “In what areas do you need additional training?”, CTE teachers listed much of the array of topics cited in Figure 3. They are rank ordered by priority below.

- Marketing CTE programs
- Soliciting business and industry
- (More) integrated course development
- Developing postsecondary articulations
- Designing effective work-based learning experiences
- Conducting performance assessments
- (More on) meeting the needs of diverse learners



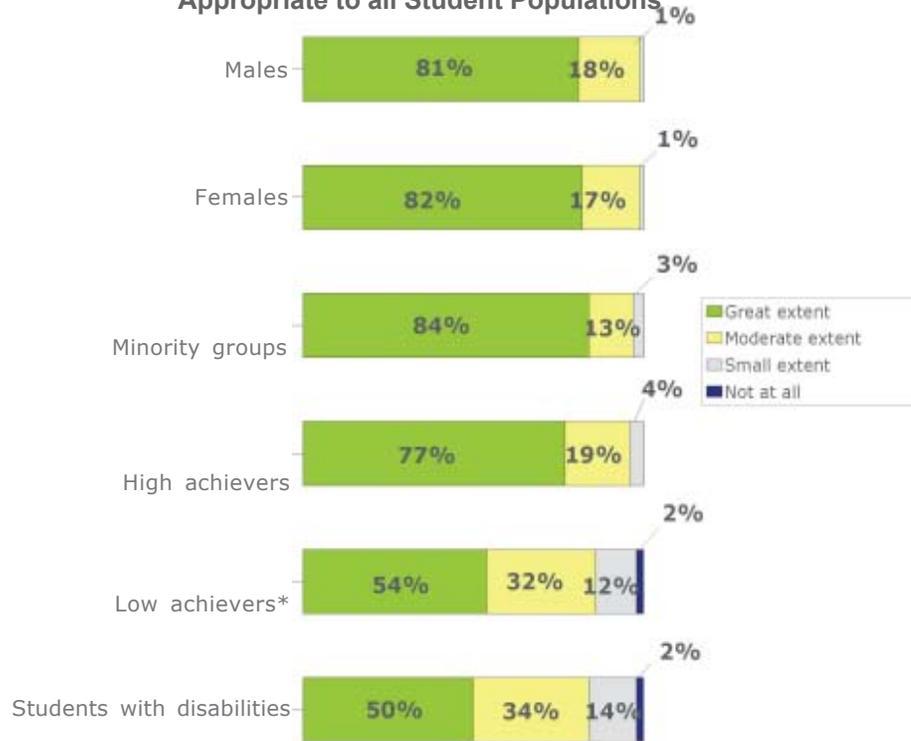
(c) Program Equity

Like all high school reform movements, the CTE policy was designed to address the learning needs of a broad population, reaching out to students with differing levels of ability, ethnicity, gender, and those with special learning needs. Coupled with the policy’s inherent expectation of higher learning standards, achieving such equity presented challenges. How have approved CTE programs fared?



Approved CTE program requirements were fair and appropriate for most, but not all student populations.

Figure 4.
Extent to which CTE Program Requirements are Fair and Appropriate to all Student Populations



n=729 teachers

Percent of Teachers

*Students whose academic performance is lower than their potential.

- To a great extent, over 80% of teachers felt that the requirements of approved CTE programs provided equity across gender and ethnicity.
- Almost as many (77%) reported the same was true for high achieving students.
- However, 54% or fewer respondents claimed that CTE programs were fair and appropriate to low achieving students and those with disabilities.

Interview and focus group data showed that teachers used all resources at hand to address the differentiated needs that special populations warranted.

- In the main, CTE coordinators and teachers felt that the experiential quality of CTE programs lent itself particularly well to students with diverse learning needs. Teachers spoke of recent immigrants and refugees who approached CTE courses with a strong work ethic, and some of them, with pre-existing knowledge of advanced math and science concepts.
- Special needs students and low achievers appeared to require more differentiated instruction now that the academic content of CTE programs had increased. Some of the technical assessments (e.g., MOUS, FAA) were timed and this posed a challenge for students whose individual education plans allowed extended time for test completion.
- Schools and BOCES had responded to these needs by utilizing their special education personnel—as in-class consultants and as supplementary resources. Even so, resources were stretched in some high schools, where up to 30% of the student body were classified as students with disabilities.
- Some comprehensive high schools developed “companion courses” for special needs students who needed a slower paced curriculum.



CTE Evaluation Report

Qualitative data analyses also indicated that some CTE programs experienced a certain tension between increased program rigor and the challenges that presented in addressing the needs of students with diverse learning needs. Even as these educational communities welcomed the



superior quality of CTE programs that has accrued through NYSED endorsement, they had concerns about its immediate effects on students who have traditionally struggled with academic learning. Attempts to achieve equity were evident, but questions remained about how best to do so, without compromising program quality.

“We’ve ratcheted up the standards of all State-approved programs. But we’re also seeing many more entering freshmen who are not reading at a 6th grade level. How to meet their needs in the same classroom is a constant challenge.”

CTE Teacher

(d) Program Variation

Individual site visits to a sample of 20 approved CTE programs around the State confirmed that high-quality programs were in operation, but also that individual differences existed between them. These distinctions may be characterized as shown below.

(i) BOCES-based vs. District-based CTE programs



BOCES-based CTE programs offered students academic credit in one or more of the core content areas, whereas district-based programs did not.

Integrated CTE courses housed on BOCES campuses issued academic credit to students who had met all requirements. By contrast, in no district that we visited did we observe CTE courses that offered academic credit. The chief reason for this was that students in school-based CTE programs could avail themselves of academic credit in their regular academic classes within the same building. Therefore, schools did not see any added value to the provision of academic credit in their CTE programs. On the other hand, BOCES-based programs clearly had an incentive in offering academic credit—both to preserve their programs and to offset the loss of instructional time that students experienced in travel between their home schools and the BOCES centers.



CTE technical quality was stronger in BOCES-based than in district-based programs⁶.

BOCES-based programs, because of their historical role in providing technical education, had much of the infrastructure (space, equipment, and fiscal resources) needed to deliver large-scale CTE programs that were at par with industry. For most districts on the other hand, the CTE concept was a newer one, and many were involved in efforts to harness community support for their CTE programs that often competed with academic ones.



Work-based learning was more systematically managed in BOCES-based CTE programs than in district-based programs.

BOCES-based work experience programs generally provided supervision (either by a certified work experience coordinator and/or the CTE teacher), opportunities for student reflection (either in a formalized seminar or during CTE class time), and a system for monitoring student's work performance. By contrast, in no school that we visited did we observe a structured approach where students in internships could discuss and internalize their learning.

(ii) Career and Technical High Schools vs. Local Educational Agencies



Planned collaboration between CTE and academic instructors was evident in career and technical/comprehensive high schools but not in local educational agencies.

In vocational and comprehensive high schools, academic and vocational teachers collaborated closely in the implementation of approved CTE programs. For example, in Commercial Art, when students wrote a paper that had social studies content, they received two grades: in English

⁶ Nursing and Cosmetology programs were the exceptions. Regardless of where they were housed, they were of high technical and academic quality. Pre-dating the CTE policy of 2001, they are governed by NYSED licensing regulations. As a result, their curricula are subject to annual external reviews that encourage ongoing program improvement.

and in social studies. The English teacher worked with students on writing, and the social studies instructor emphasized the historical aspects of the project. In local high schools, this was not the case. The CTE teacher worked in isolation from his/her peers. As a result, the academic content in these courses was limited.



Work-based learning opportunities in vocational/comprehensive high schools were superior to those in academic schools.

There were several noteworthy work-based learning experiences in vocational and comprehensive schools. Aviation/Flight Technology provided work-based learning at a local airport. Students worked alongside licensed traffic air controllers and were permitted to communicate with aircraft on the ground, as well as to “hand off” air and ground traffic to the next control center. All students could earn up to 40 hours of flight training leading to the FAA private pilot flight test to earn a pilot’s license. In another vocational/comprehensive school, BMW of America adopted an Auto Mechanics program as a “model program”. Internships for students were coordinated through the car company. By contrast, work experiences in academic schools were loosely configured. Teachers claimed that it was difficult to obtain quality internships in their CTE fields and that they were limited to the choices within their immediate geographical area.

Ethics at Work (excerpt from a site report)

At one work site the student was not there for the interview because he had been shot in a “drive-by” the night before. The sponsor, although concerned about the student, had obviously worked hard to instill a work ethic in this particular student, because even though he was wounded, he called in from the hospital to say he would not be in that day. During the interview, the sponsor indicated that he had dealt with “calling in when you will be late or absent” just the week before and it apparently made an impression on this student.

(iii) Articulated/Accredited vs. Non-articulated/non-Accredited CTE courses



Approved CTE programs that offered college-articulated and industry-accredited courses were of superior quality than those that were not CTE approved.

CTE courses that were articulated with colleges had a high degree of academic content and technical content. Students were involved in projects that demanded advanced mathematics, physics, and technology. This was also true of CTE programs that were endorsed by trade unions (Building Construction and Transit Authority) and those that had State (NYSED) and national professional accreditation (MOUS, NATEF, NCCER, FAA). By comparison, CTE courses that were not articulated with colleges and those that did not have professional accreditation were less rigorous.

Taken together, these variations in CTE program implementation indicate that a school's configuration (BOCES, academic, comprehensive or vocational) and its connections with postsecondary and professional organizations influenced program quality. However, each program was a work in progress, adjusting to local need, and therefore these differences should not be viewed as static or fixed. Several programs we visited had witnessed considerable change since they were first approved. It is to these changes that we now turn.



(e) Changes Since Inception

Approved CTE programs underwent considerable refinement over time. There were enhancements in the areas of curriculum, assessment, resources, postsecondary articulations, connections with industry, and accountability.



The curriculum has improved and reflects more overall rigor.

- There was increased academic integration, facilitated by push-in consulting and co-teaching between academic and CTE teachers.
- More students used academic credit in integrated courses to fulfill their graduation requirements.
- Courses and teaching assignments were reconfigured and textbooks were changed to include more in-depth treatment of course content.
- Improved technical content was included in keeping with the needs of industry. For example, “high-end” courses such as digital technology, manufacturing, forensic science, and robotics were introduced.

“7 out of 8 enrolled seniors are receiving their English 12 credit through the Early Childhood Education program.”

CTE Teacher





CTE courses have improved methods of gauging student performance.

- There were many more national technical assessments.
- More students took and passed the technical assessments.
- Student portfolios were of better quality.
- Teachers demanded more authentic project-based learning.
- Overall, students were required to engage in more communication and writing.
- Teachers assigned more homework.

“I have refined (the) student project, made it more specific and required more decision-making/problem-solving skills.”

CTE Teacher



CTE programs enjoy additional resources.

- In many programs, physical space, equipment and tool upgrades, and uniforms for students were added.
- Overall, technology had improved, including new computers and software upgrades.
- There was increased special education support in some programs.
- In some districts, CTE teachers had been offered professional development in their CTE areas of instruction.

“Our program has been given furniture, books, computers, supplies—materials to update our classroom for the learning environment to improve.”

CTE Teacher



Approved CTE programs have more postsecondary and industry articulated courses in 2005 than in 2004.

- Most CTE courses were articulated with two-year technical colleges but there were a growing number that were articulated with four-year colleges.
- In those programs we visited, graduating students could transfer between two and six credits of coursework, an increase over that in past years.
- Articulation agreements were developed with apprenticeships, particularly in the building and electrical industries. Graduating students from approved CTE programs were readily accepted into the trade unions that after a probationary period, funded their college education.

“In my first year as an apprentice, I found the lectures very easy because our high school teacher had taught us all this stuff. So I was able to advance more quickly than the others.”

CTE High School Graduate



CTE programs have made better connections with industry.

- The number of work-based learning experiences had greatly expanded through additional business partnerships.
- Programs saw increased membership on consultant committees.
- There was greater adherence to regulations—OSHA and labor laws.



Overall, there has been improved accountability.

- There was better record keeping.
- Courses were more organized and schedules had improved.

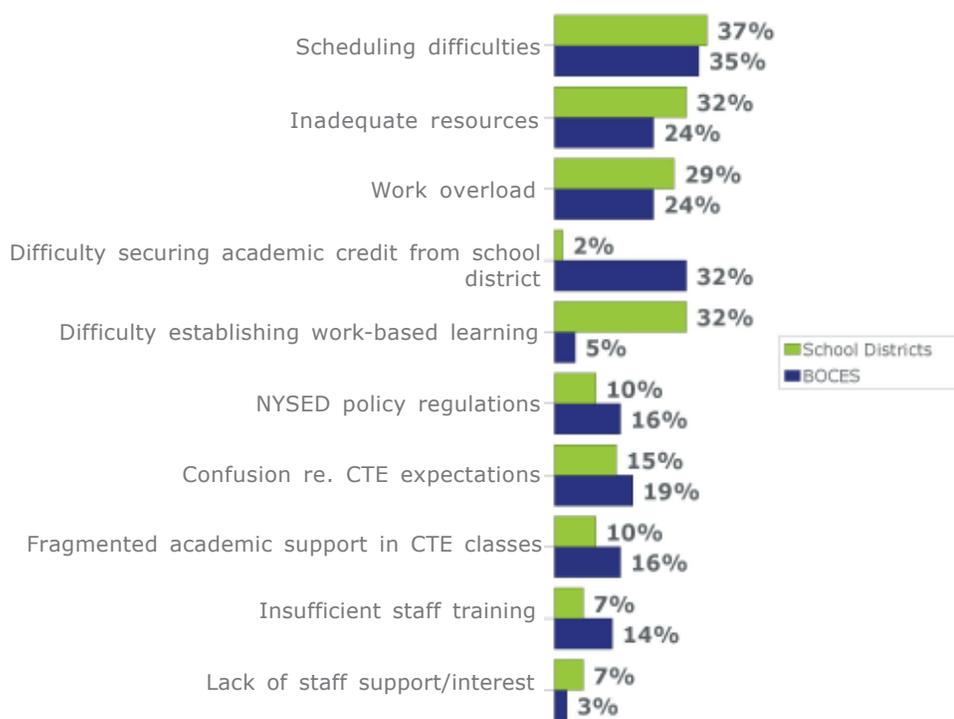
(f) Obstacles to implementation

By and large, approved CTE programs shared common barriers to full implementation. However, some obstacles were more typical of certain programs than others. Also apparent were difficulties in implementation that arose mostly a function of local context (regional economic health, population stability, and community support for CTE programs).



Scheduling difficulties, inadequate resources, and work overload, were the most frequently cited barriers to program implementation in both BOCES-based and district-based approved CTE programs (Figure 5).

Figure 5.
Obstacles to Implementation of Approved CTE Programs



n= 88 CTE coordinators

Percent of Coordinators

- More than 33% of CTE coordinators claimed they experienced scheduling problems, primarily due to the need to reconfigure time to meet increased demands of academic and work-based learning.
- A large number—about 25% or more—also noted work overload and inadequate resources as barriers. On the resource front,

administrators were often forced to make the difficult choice between maintaining staff positions and adding new programs/ courses to operate at a level “that is current with the field.”

“\$1000 is a huge budget for an academic teacher but to us, it’s nothing- it’s the equivalent of 50 bucks. If it weren’t for donations and hitting up companies, we’d be turning on the machines and saying, ‘It would look like this, kids.’”

CTE Teacher



Some obstacles were more prevalent among BOCES programs than school districts and vice versa.

- For example, 32% of BOCES coordinators experienced difficulty in securing academic credit for integrated CTE courses from component school districts. Only 2% of school district CTE coordinators reported the same, probably because the approval process was internal.
- On the other hand, 32% of school-based CTE coordinators claimed difficulty in designing work-based learning experiences, while just 5% of their BOCES counterparts attested to the same. Some of the cited barriers were the following.
 - (i) Federal, industry, and union regulations prohibited students under the age of 18 to be on a worksite.
 - (ii) Students were in need of academic credit for graduation and thus could not be released for an internship during the school day.
 - (iii) A shortage of willing and appropriate industry “hosts” in the CTE field resulted in students having very few internships.⁷
 - (iv) Transportation issues prevented many students from taking advantage of work-based learning experiences.

To a smaller extent, a few aspects of CTE policy were regarded as impediments.

- Respondents who cited NYSED regulations as obstacles (a combined 26% of BOCES and district coordinators) specified the following.

⁷ As a way to address the shortage, in some CTE programs, work based learning was considered a privilege: students had to demonstrate superior academic and technical achievement and work attitude to be considered as candidates.

- ▣ lack of consistency in determining what constitutes academic credit, and
- ▣ lack of clarity in what constitutes acceptable industry assessments.

Creative Solutions to Challenges in Work-Based Learning Programs

Issue: In some CTE trade areas, local industry gives preference to college interns for a limited number of off-campus internships, resulting in few if any such opportunities for high school CTE interns.

Solution: The computer networking/repair class set up a MOUSE squad whose members addressed the school's needs for repair and cabling. Additionally, they repaired teachers' personal computers. The experience gave students real time exposure to customer relations and trouble shooting.

Issue: The Cosmetology field requires students to be licensed before they can work on customers in a commercial salon. As high school CTE interns receive their license upon passing a State exam at the end of a two-year Cosmetology course of study, they do not have exposure to off-campus, cosmetology-based work experiences while in school.

Solution: A school-based Cosmetology program used its long-term affiliation with a nursing home to provide regular manicuring services to its residents. Supervised by a licensed instructor, students spent one half day a month providing nail care services to elderly residents, many of whom had become regular "clients." The time students spent in this off-campus setting accrued towards the necessary clinical hours for their Cosmetology licensure.

From our site visits, we noted additional challenges that localities experienced in operating approved CTE programs. Some of these were expressed as concerns and ambiguities in their attempts to implement CTE policy as intended, while others were reflective of changes in local context.



There was concern surrounding the validity and cost of the industry-based technical assessment.

- While all coordinators and teachers felt that the industry-based assessments (and subsequent endorsements) added credibility to their programs, other stakeholders were not as unanimous in their approval. For example, business representatives on advisory councils were unaware of the NOCTI (National Occupational Competency Testing Institute) exam and did not require it of their employees. Some students claimed to take a CTE course because they had an interest in the subject, not because of an industry endorsement. On the other hand, passing a professional test in programs such as information technology (MOUS), computer networking (CISCO), and auto mechanics (NATEF) was viewed by other students as added value.
- Those CTE programs that elected to use the NOCTI exam did so reluctantly. Its cited drawbacks were (a) that it was more of an industrial test than a learner test; (b) that it required equipment and materials far beyond those supported by the CTE curriculum; and (c) that it was not possible to see some tests beforehand to determine if the CTE curricula were aligned to them.
- In programs where a national industry test was unavailable, CTE programs designed their own, either independently or in a consortium with neighboring BOCES and/or high schools that offered the same CTE programs. However, these were homegrown tests, and their administration and scoring criteria may not have been standardized.
- A common concern to all CTE programs was the high cost of taking the industry-approved assessment. Many students organized fund raising events but these alone did not adequately cover the cost.



Teachers lacked opportunities to plan collaboratively.

- Several CTE teachers requested more collaboration time with their academic counterparts to improve the level of academic content in their CTE areas.

“I am not a trained math teacher. But if the administration made it possible for me to work with our HS math teacher, I would find a way to incorporate more math in my curriculum.”
CTE Teacher



Classrooms were overcrowded and understaffed.

- As CTE programs experienced marked increases in enrollment, they were simultaneously faced with overcrowded classes and a shortage of skilled CTE teachers.⁸ This often posed the risk of hazard, especially in programs that employed machinery and electrical equipment.



Inadequate publicity contributed to weak enrollment.

- Very few CTE programs that we observed had a system for middle-school articulation. Parents, teachers, and coordinators voiced concern that stronger communication channels needed to be established between high schools/BOCES and their feeder schools—to dispel myths about career and technical education, to give middle school guidance counselors, students, and their

“We realize that we need to do a better job of selling ourselves.”
High School Principal

⁸ To address the shortage of skilled CTE teachers, an urban vocational school offered the Substitute Vocational Assistant (SVA) program, a joint venture between the district and the teacher union. The SVA program is open to graduates who are interested in pursuing a career as a teacher of technology. It is a 5-year tuition-free college program, during which student teachers are placed in part-time positions in private industry to develop their technical skills, and get paid 90% of a first-year teacher’s salary. Upon completion, SVA graduates are offered full-time CTE teaching positions.

parents timely and useful orientation to high quality programs, and to recruit capable students who otherwise may not consider CTE as a high school pathway.



Shifts in local demographics affected CTE program viability.

- Some rural areas of New York State had witnessed dwindling resident populations. This demographic change impacted on local school enrollments and in turn, on BOCES program enrollments. CTE coordinators were challenged to find new approaches to maintaining their staff and keeping their programs viable. Also, in these regions, the agriculture industry, which had long been the mainstay of the local economy, had all but vanished. Agriculture-related CTE programs struggled to offer courses of study that had career connections in the local region.



There was insufficient time to do CTE “full justice.”

- Inasmuch as CTE programs were valued, parents, students, teachers and administrators felt the need for more time to accomplish these “lofty goals.” Several respondents suggested that an additional year—a five-year graduation plan—would better allow students the in-depth attention to content knowledge and practical skills required of high quality CTE programs.

“In some programs we have seen student attrition, between 9th and 12th grades. We feel this is because students are overwhelmed with all the requirements—both Regents and CTE. So they drop out for a less-intense pathway, which is a shame because we know they are capable. Perhaps the State can look into a 5-year plan more seriously.”

CTE Coordinator

In sum, the wide range of approved CTE programs was marked by complexity, ingenuity, and resolve. In responding to the State policy, schools and BOCES not only reached for higher standards, but also did so in the face of complex, and often trying local conditions. Programs that had seen dwindling enrollments made attempts at self-preservation by creating flexibility in course-taking with allied CTE programs and developing new course electives. Similarly, CTE programs with large numbers of special needs students, designed companion courses so that through differentiated instruction, all students had access to the CTE classroom. Over a period of three years, approved CTE programs showed a certain dynamic quality that according to program staff was largely absent prior to the CTE policy.

3. To what degree are approved CTE programs implemented with commencement-level academic and technical rigor?

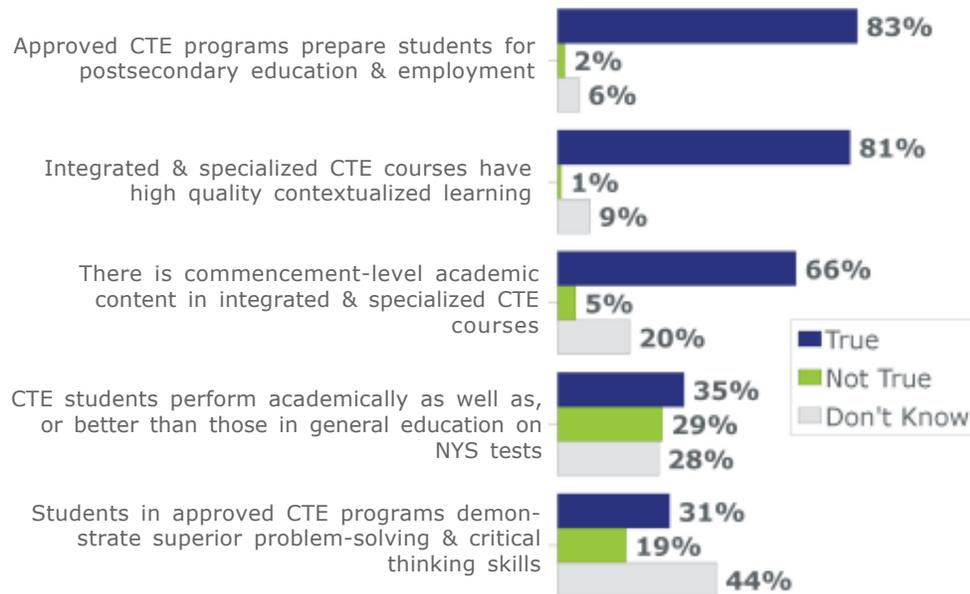
A required feature of approved CTE programs is that they offer students academic and technical content that is considered to be at commencement level. In the previous section, we discussed findings from surveys, interviews, and focus groups—those gathered from members responsible for the delivery of CTE programs. In this section, we address the question of CTE program rigor from a different angle, one that solicited the perception of high school principals. Our rationale for this approach was two-fold:

- (a) The majority of approved CTE programs are housed in BOCES/off-campus locations and principals from component high schools are responsible for authorizing their students to participate in these programs. Therefore, they have a direct stake in program quality.
- (b) High school principals are close to the “customer-base” of approved CTE programs, i.e. students who attend these programs-off campus and within their buildings, and their perceptions would cross-validate those from other sources of data.



Approved CTE programs reflected rigor in their academic and technical content (Figure 6).

Figure 6.
High School Principals' Perceptions
About CTE Program Quality



n=244 principals

- With respect to *content*, two-thirds or more of high school principals felt that approved CTE programs were of high quality.
 - ▣ Academic content was perceived to be at the commencement level (according to 66% of principals).
 - ▣ Over 80% reported that contextualized CTE coursework prepared students for college and employment.

- Principals were less confident/knowledgeable about *outcomes* for students in CTE programs.
 - ▣ For example, just 31% of them claimed that students in approved CTE programs demonstrated superior problem solving and critical thinking skills, while 44% of them were unsure.
 - ▣ Only 35% agreed with the assertion that CTE students performed academically as well as, or better than those in general education on NYS assessments. Of the remaining respondents, 29% disagreed with the assertion, and 28% did not know.

CTE Evaluation Report

That high school principals were more aware of CTE program content than CTE student outcomes, suggests that *comparative* student outcome data may not have been available to them. While schools and BOCES annually report student outcome information to the State, they do not have a systematic procedure for conducting their own studies on student achievement.

Qualitative data analyses revealed additional themes that enhanced and lent support to the above findings. We present these below.



By and large, high school principals were pleased with off-campus, approved CTE programs.

- They were impressed with the curricular materials and the self-study process.
- Academic rigor of BOCES programs improved each year.
- Their students who attended off campus CTE courses passed Regents-level exams.
- Students took advantage of the academic credit offered in integrated and specialized CTE courses.

“Our BOCES is very responsive to our needs and works hard to ensure that the individual (CTE approved) programs are appropriately rigorous.”

High School Principal



Academic quality was uneven in a few off-campus, approved CTE programs.

- In some CTE courses, materials were “watered down”.
- Some CTE courses were not as rigorous in academic content as core subjects taught in the district.
- As is true of teacher quality in general, CTE teacher quality varied a great deal.



Principals recommended strategies for CTE program improvement.

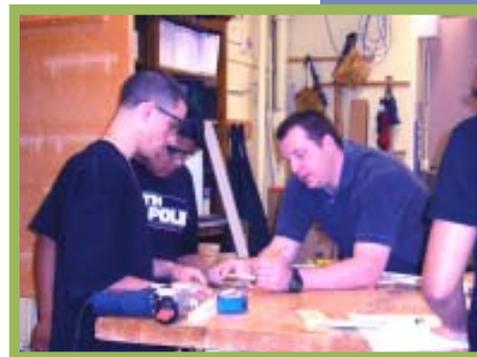
- More special education support,
- Professional development in core subjects for CTE teachers,
- Separate grades for core academic and technical areas,
- Integration of Career and Financial Management (CFM) credit, and
- Better collaboration between BOCES and districts staff to facilitate mutual review of CTE/integrated course material.

Taken together, these findings suggest that in general, high school principals were satisfied with the rigor of approved CTE programs. While they noted variations in individual program caliber, principals were aware that CTE programs had taken steps towards improvement. Finally, they offered their own suggestions to enhance CTE program quality.

4. What factors influence high school non-participation in the CTE approval process?

In the 2004 study, MAGI surveyed 50 non-participating high schools across the state that offered 141 career and technical education programs of their own. We learned from their principals that about 80% of these programs (120 in all, housed in 38 high schools) had no intention of applying for CTE approval—citing lack of resources as their chief obstacle.

In the present study, we probed the issue of non-participation more extensively, by conducting half-hour telephone interviews with the 38 principals from the previous year's study. A content analyses of the telephone interview responses resulted in the following findings.



By far, the primary reason principals chose not to participate in the CTE approval process was satisfaction with existing approved CTE programs.

- Principals felt that their regional BOCES provided their students with “cutting edge” CTE programs, in ways that districts were unable to do.
- Principals wanted to avoid duplication of course offerings between their district and their BOCES. On the other hand, they would consider applying for NYSED endorsement of a CTE course that was not offered by their BOCES.

Apart from satisfaction, five other issues emerged as reasons for non-participation.

(i) Lack of Awareness

- Principals were unaware of the NYSED CTE policy and requested to be directed to pertinent information.

“Have SED make a presentation to the Capital Region CTE Association and the Capital Region Technology Association. Our members would be very interested in learning more about the process.”

High School Technology Coordinator

- Principals wanted to see the “added value” of approved CTE programs before they invested major resources in creating their own.

“The current CTE model would have to be more attractive to supplant what we already offer.”

High School Principal

- Principals were interested in seeing evidence of long-term benefits for students who had participated in a CTE pathway.

“Prove that the endorsement has really improved CTE, that it has made it high quality....that it helps students after they graduate.”

High School Principal

(ii) Insufficient Demand

- High schools were small and offered CTE courses as electives.
- Low enrollments did not justify the expense of undertaking the CTE application process.

“We don’t have enough money to hire teachers or have enough students to make it worthwhile.”

High School Principal

(iii) Inadequate Resources

- Schools lacked the time and staff to complete the CTE application process, one that they had “heard was laborious and difficult.”
- There was insufficient staff, equipment, and space to operate approved CTE programs.

(iv) Lack of Community Support

- A primarily academic focus in their schools resulted in diminished district and community support for approved CTE programs.
- It was becoming more difficult for students to meet the higher standards demanded by the Regents exam *and* meet approved CTE program requirements.
- Teachers were concerned that the introduction of approved CTE programs could result in staffing cuts in the core academic subjects.

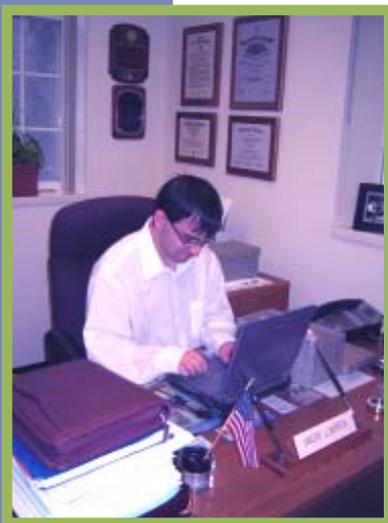
CTE Evaluation Report

- There was a notion that CTE postsecondary articulations were with colleges not regarded as academically rigorous.

(v) State Demands

- With respect to teacher certification, districts felt that “one size doesn’t fit all”, and that applications should be weighed on the merit of the credentials CTE teachers possessed vis-à-vis industry needs.
- Consideration should be given to alternate technical assessments.

What these findings suggest is that non-participating high schools were satisfied with the quality and utility of approved CTE programs. However, in order to consider their own participation in the CTE approval process, they would need (a) to be better informed about the CTE approval process and shown evidence of its added value, (b) greater flexibility in meeting approval requirements, and (c) financial and technical assistance in operating approved CTE programs.



5. (a) What is the impact of CTE policy on students, programs, and the community?

Impact on Students

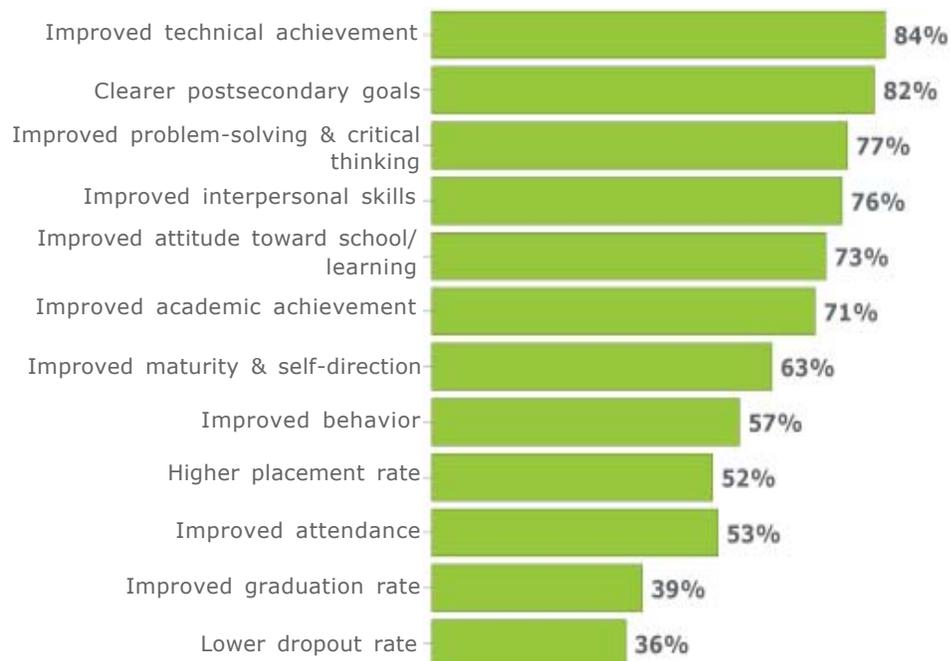
In this section, we report teacher, student, and parent perceptions about the effects that CTE programs had on students. Gains in student achievement, skill, and attitudes towards learning, goal-orientation, and behavior were some of the favorable outcomes noted.

(i) Teacher Perceptions



Students showed gains in achievement and attitude (Figure 7).

Figure 7.
Percent of Teachers who Perceived Student Benefits



n=729 teachers

Percent of Teachers

CTE Evaluation Report

- Most teachers (70% or more) reported student benefits in achievement—technical and academic—as well as in attitude to school, learning habits, and clarity of goals.
- Between 50% and 60% of teachers claimed that CTE programs had influenced student improvement in maturity, attendance and placement rate.
- By contrast, fewer teachers claimed that CTE programs had improved student graduation rates (39%) or lowered dropout rates (36%).

“Students want to do well. I definitely see improvements in their desire to complete quality work.”

CTE Teacher

What the above findings suggest is that teachers perceived many immediate benefits for CTE students—those that they could recognize in a span of two to five years. What was less certain for them was whether CTE programs had resulted in improved graduation and lower dropout rates—outcomes about which teachers may have little direct information. While CTE programs are expected to collect, track, and disseminate outcome data, schools and BOCES may not have had adequate resources to do so in a systematic manner.



CTE participation had an impact on college enrollment.

- More students had applied to 4-year colleges.
- Students were admitted to prestigious colleges and scholarships were awarded to students who excelled academically.

“Now students can get a Regents diploma, learn work-skills, meet state standards, earn college credits, and get a vocational degree.”

CTE Teacher

(ii) Parent Perceptions

CTE programs gave their children a clear and goal-directed future.

- CTE programs helped to steer them to college and gainful employment.



Their children's skills and attitudes to learning had improved.

- Their grades and the quality of schoolwork had improved.
- They showed increased maturity and responsibility.
- They had acquired skills for lifelong learning.

“In this school, students take their studies seriously.”

CTE Parent

“My child is now motivated to do well—not just pass.”

CTE Parent

“My child would have dropped out at 16 were it not for this program.”

CTE Parent



Their children had gained from work-based learning experiences.

- They learned real-world practical skills.
- They had opportunities to try out careers without a major financial investment.

(iii) Student Perceptions



CTE programs were aligned to their graduation, college, and career plans.

- Students expressed aptitude and interest in their chosen CTE fields.
- They were eager to pursue college in a related field.
- Many students wanted to work or begin entrepreneurial businesses.
- They took advantage of the academic credit offered in integrated CTE courses.

“BOCES gets a bad rap because kids are seen as slower; they put the vocational and technical, mental health and special needs students all in one bag. We get the last laugh. We are way ahead of the game by being ahead of the others.”

CTE Student



Students reported that they benefited from CTE instructional programs.

- They experienced rigor in academic and technical areas of their programs.
- Their English language and math skills improved.
- Small classes gave them additional teacher attention.
- They were encouraged by teachers to strive to do better.
- They valued the hands-on experience in CTE classes.





Students experienced growth in personal drive and ambition.

- They were more ambitious, mature, and responsible.
- They felt more motivated to excel.
- They felt confident that they could succeed in a non-traditional program.
- They were determined to break the generational cycle of unemployment, crime, and poverty.

What CTE students said about the program....

“The curriculum is very rigorous, challenging college stuff. Our work is more advanced than most kids our age.”

“We want a longer school day and more off-campus internships.”

“Learning is never boring here.”

“You cannot slip in your grades here. You’ve got to be on top of your game.”

“English and math teachers really help. I got the chance to learn math...I saw how it fit in with what I’m interested in..I started focusing more.”

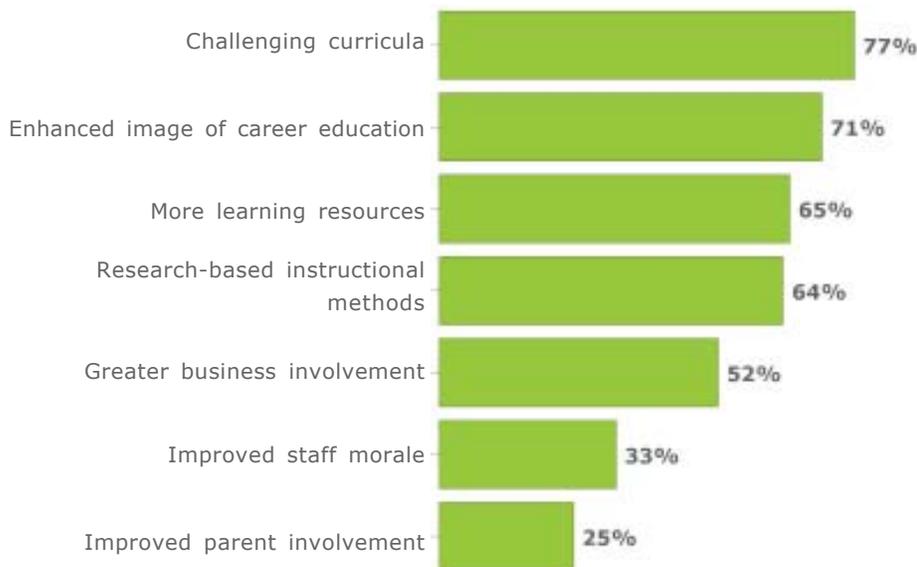
“The program has separated us from the average group of teenagers. I stopped hanging out with certain people.”

Impact on Program, School, and Community



According to teachers, approved CTE programs had resulted in system wide benefits, chief among which was a challenging curriculum for students (**Figure 8**).

Figure 8.
Teacher Perception of Program, School, and Community Benefits



n=729 teachers

Percent of Teachers

- Nearly 80% of teachers felt that students were now challenged by an enriched CTE curriculum. Almost as many (71%) reported that the image of CTE had been enhanced.
- Over 60% claimed that CTE programs enjoyed greater access to learning resources, and that instruction was governed by research-based methods.
- Less than half the respondents reported that staff morale had improved (33%) or that CTE approval had resulted in increased parental involvement (25%).

Content analyses of qualitative data lent further support to the above findings.



An improved image of career and technical education was emerging.

- The CTE community had begun to dispel myths about BOCES programs.
- CTE programs enjoyed greater credibility in the business world.
- CTE coordinators had received invitations to speak at local school board meetings.
- Students purposefully choose to be enrolled in CTE programs, as opposed to being assigned by guidance counselors.



Greater collaboration had occurred between school/BOCES and the business community, colleges, and funding organizations.

- Advisory council members took greater interest in CTE curricula.
- Industry made equipment donations to nationally certified CTE programs.
- CTE was addressing the needs of local and regional industry.
- CTE classes saw an increase in guest speakers from industry.
- CTE programs had access to more meaningful work-based learning experiences.
- There were many more articulation agreements between CTE programs and postsecondary educational institutions.
- Colleges offered more scholarships to CTE students who took articulated courses.
- CTE programs were eligible for academic grants.

Unexpected Outcomes as Perceived by CTE Teachers and Coordinators

“My disabled students have been able to accomplish much learning and are enjoying the success.”

“Students have taken an interest in medical fiction/nonfiction because they are surprised how much they understand.”

From the above, we can infer that many favorable outcomes were perceived as a result of CTE policy. It had influenced programs to add rigor to their curricula, thereby enhancing their public image and marshalling community/business support. On the other hand, in some schools where local support for teacher professional development was weak, teachers may have felt overwhelmed by the increased demands. Parent involvement continued to be a challenge for a sizeable portion of CTE programs. There was one exception at a school we visited. Here, parents were so involved that in their spare time, they recruited students to CTE programs!

5 (b). What can we learn from trends and changes in the student enrollment and outcome data for approved CTE programs?

What impact did NYSED’s policy have on CTE enrollment and outcome trends? To address this question, we used the Career and Technical Education Data System (CTEDS) to compare student data from the most current year with those from previous years.

Program enrollment trends

From the CTEDS database, we isolated a cohort of approved CTE programs that had been in operation over a period of two consecutive years, i.e., from 2002 to 2003 and from 2004 to 2005. We organized them into occupational clusters⁹ and compared changes in enrollment within the same programs.



The majority of approved CTE programs experienced enrollment increases in 2004-2005 (**Table 1**).

Table 1
CTE Enrollment Trends: 2002 to 2004
(n=274 programs)

| Program Cluster | Percent Change From 02-03 to 03-04 | Percent Change From 03-04 to 04-05 |
|-----------------------------------|------------------------------------|------------------------------------|
| Agriculture & Renewable Resources | 11% | -15% |
| Business & Office Management | -11% | -27% |
| Child Care & Education | -3% | 8% |
| Food Service & Hospitality | 6% | 11% |
| Health Care | 13% | 21% |
| Marketing & Distribution | 44% | 23% |
| Personal & Other Services | 3% | 7% |
| Public & Protective Services | -1% | 10% |
| Technology & Communications | 16% | 2% |
| Trade & Industry | 9% | 15% |

Note: Percent change was calculated as shown in the following example. Difference in the enrollment between 2002-03 and 2003-04 was divided by the enrollment in 2002-03.

⁹ Individual CTE programs were grouped into larger clusters according to a national taxonomy for vocational programs in secondary schools. A detailed breakdown is listed in Appendix 1.

- CTE enrollment had increased in eight out of 10 occupational clusters from 2003-04 to 2004-05.
- The largest increases occurred in the marketing and distribution (23%) and healthcare (21%) clusters. The smallest increase appeared in the technology and communications cluster (2%).
- CTE enrollment showed a downward trend in the business and office management (-27%) and in agriculture and renewable resources (-15%) clusters.



CTE enrollment trends reflected shifts in New York State’s economic trends (Table 2).

Table 2
Ten Fastest Growing Occupations in New York State for 2002-2012
 (n=274 programs)

| Occupation | Employment | | Percent Change |
|--|------------|---------|----------------|
| | 2002 | 2012 | |
| Medical Assistants | 20,390 | 29,550 | 45% |
| Network systems & data communication analysts | 13,570 | 19,000 | 40% |
| Physician assistants | 6,240 | 8,710 | 40% |
| Physical therapist aides | 2,580 | 3,570 | 39% |
| Medical records & health information technicians | 6,440 | 8,710 | 36% |
| Hazardous materials removal workers | 3,750 | 5,070 | 35% |
| Physical therapist assistants | 3,530 | 4,750 | 35% |
| Personal & home care aides | 83,690 | 112,110 | 34% |
| Occupational therapist aides | 620 | 830 | 33% |
| Personal financial advisors | 19,740 | 26,190 | 33% |

When compared to the statewide employment trends for 2002-2012 shown in Table 2, CTE enrollment patterns suggest the following.

- A 21% enrollment increase in the healthcare field matched New York’s projected employment trend: of the 10 fastest growing jobs, seven were in the health-related occupations.
- Similarly, a 2% rise in Technology course taking also aligned to the state trend: only one technology-related occupation figured in the top 10 occupations.¹⁰

¹⁰ It should be noted that the statewide employment trend projected for 2002-2012 was a marked shift from the trend described for 2000-2010. For example, the latter was dominated by computer technology-related occupations (six out of 10), while the projected trends for 2002-2012 shown in Table 2 listed only one such occupation among the top 10—network systems and data communication analysts.

Student enrollment trends

Relative to the statewide student enrollment in high schools, enrollment in CTE programs showed disparity¹¹ in gender and special education status (Table 3). In other words, more male students (59%) and fewer female students (41%) took CTE courses than would be expected. Also, more students with special needs (25%) enrolled in CTE programs than were represented in the general high school population. These trends appear to be fairly typical of career and technical education.

However, when enrollment distribution was looked at within CTE program clusters, a different picture emerged.



Relative to the overall CTE population, there were differences between programs in gender, race, and special education enrollment (**Table 3**).

Table 3
CTE Program Cluster Enrollment in 2004-2005
by Gender, Race, and Special Education Status

(n=599 CTE Programs)

| | Gender | | Race | | | General Education | Special Education |
|---------------------------------------|--------|--------|-------|------------------|----------|-------------------|-------------------|
| | Male | Female | White | African-American | Hispanic | | |
| Overall High School Population | 50% | 50% | 56% | 19% | 17% | 85% | 15% |
| Overall CTE Programs | 59% | 41% | 70% | 15% | 12% | 75% | 25% |
| By Program Cluster | | | | | | | |
| Agriculture & Renewable Resources | 60% | 40% | 89% | 6% | 3% | 66% | 34% |
| Business | 43% | 57% | 41% | 41% | 17% | 85% | 15% |
| Child Care & Education | 3% | 97% | 87% | 7% | 5% | 65% | 35% |
| Food Service & Hospitality | 50% | 50% | 69% | 20% | 10% | 71% | 29% |
| Health Care | 13% | 87% | 42% | 41% | 15% | 88% | 12% |
| Marketing & Distribution | 31% | 69% | 74% | 15% | 10% | 76% | 24% |
| Personal & Other Services | 2% | 98% | 80% | 10% | 8% | 80% | 20% |
| Public & Protective Services | 60% | 40% | 90% | 5% | 4% | 77% | 23% |
| Technology & Communication | 71% | 29% | 58% | 21% | 17% | 79% | 21% |
| Trade & Industry | 90% | 10% | 71% | 11% | 14% | 71% | 29% |

¹¹ Disparity is defined as greater than + or - 5%.

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- Out of ten program clusters, gender parity was achieved in three programs, but was absent in six.
 - ▣ Male students enrolled in Food Services (50%) and Protective Services (60%) at a rate consistent with that of the general CTE population (59%). Female students took courses in Agriculture and Protective Services (40% each)—in numbers proportional their expected CTE enrollment (41%).
 - ▣ On the other hand, male students were under-represented in the Child Care (3%), Health Care (13%), Marketing (31%), and Personal Services (2%) fields. Also, just 29% and 10% of female students enrolled in the Technology and Trade and Industry fields, respectively—as against 41% female students in the general CTE population.

- Minority student enrollment was at par with their overall CTE representation in 40% to 60% of program clusters, but below their expected enrollment in 40% of programs.
 - ▣ African-American and Hispanic students were adequately represented in four and six CTE program clusters, respectively.
 - ▣ Conversely, there were fewer than expected minority students enrolled in Agriculture, Child Care, Personal Services, and Protective Services.

- In 60% of program clusters, students with special needs were enrolled in numbers proportional to their overall CTE representation; in 20% of the programs, they were not.
 - ▣ Fewer special needs students were taking courses in Business (15%) and Health Care (12%).



What are possible explanations for these differences in enrollment? Firstly, the specific program areas in which gender disparities occurred are considered non-traditional occupations for male/female students. CTE teachers and coordinators in focus group interviews spoke of their explicit attempts to recruit students to non-traditional programs but cultural and social biases often exert a powerful influence in the educational community. During site visit interviews, students recounted incidences where they were discouraged from enrolling in a non-traditional CTE field by their guidance counselors and peers. Secondly, racial inequities in programs such as Agriculture may be accounted for by local population demographics: these programs operate in rural regions of the State where the dominant population is White. Therefore, the issue here is one of availability rather than access. Finally, the under representation of special education students in Health Care and Business fields may be due to the curricular/cognitive demands of these programs. Course content and requirements in these occupational areas emphasize a significant amount of reading, writing, factual recall, speed, accuracy, and critical thinking. In site visit interviews with CTE staff, we were told “very few special needs students would pass the exit exams in the Nursing and Business Education programs.”

Student outcome trends

In keeping with the requirements of The Carl D. Perkins Vocational and Technical Education Act, New York State has established CTE benchmarks in several areas of student proficiency—academic skill, technical skill, technical assessment, and placement. We analyzed the 2004-05 student outcome data according to standards in these areas, and disaggregated the results by gender, race, and special education status.





Overall, students in approved CTE programs surpassed New York State’s benchmarks in both academic and technical skill proficiency (**Table 4**).

Table 4
Percent of Students Meeting NYS Performance Levels in
Approved CTE Programs in 2004-05
(n=525 CTE Programs)

| | Academic Skill Attainment | Vocational/ Technical Skill Attainment | Technical Assessment Takers | Technical Assessment Passers | Placement |
|---|---|---|---|---|--|
| Measurement Definitions | Percent of CTE completers who passed all applicable Regents exams | Percent of CTE completers who achieved an average of 75% in CTE courses | Percent of CTE completers who took an industry-defined technical exam | Percent of CTE completers who passed an industry-defined technical exam | Percent of CTE completers/graduates who were successfully placed in postsecondary education, the military, or employment |
| NYS Benchmarks for all CTE Programs | 72.9% | 76.9% | N/A | N/A | 93.6% |
| Results for all NYSED-Approved CTE Programs | 78% | 78% | 68% | 72%* | 85% |
| Gender | | | | | |
| Male | 55% | 54% | 54% | 51% | 56% |
| Female | 45% | 46% | 46% | 49% | 44% |
| Ethnicity | | | | | |
| White | 78% | 80% | 81% | 81% | 80% |
| African-American | 12% | 10% | 9% | 8% | 10% |
| Hispanic | 8% | 8% | 7% | 8% | 8% |
| Special Education Status | | | | | |
| Students with disabilities | 12% | 17% | 15% | 59%* | 20% |

Notes

The above percentages were based on the number of CTE program completers.

N/A- Technical assessments apply only to approved CTE programs.

* Technical Assessment Passers were based on percent of CTE completers who took an industry-defined technical exam.

- Over 75% of students in 2004-05 met and exceeded academic (72.9%) and technical (76.9%) proficiency standards.
- More than two-thirds of all students attempted (68%) and passed (72%) industry-based technical exams in their CTE program areas.
- 85% of CTE completers were successfully placed in postsecondary education, the military, or employment in 2004-2005, up by 10% from the previous year.



There was gender, racial, and special education student disparity in CTE outcomes.

- In general, between 51% and 56% of males achieved all CTE outcomes; between 44% and 49% of females did the same.
- A greater proportion of enrolled White students achieved CTE outcomes than did their African-American and Hispanic peers.
- 12% of completers who had passed all Regents exams were special education students.



Table 5

Percent of Students Meeting NYS Benchmarks in Approved CTE Programs
By Program Cluster in 2003-04 and 2004-05

| Measurement Definitions | Academic Skill Attainment | | Technical Skill Attainment | | Technical Assessment Takers | | Technical Assessment Passers | | Placement | |
|--|---------------------------|-------|----------------------------|-------|-----------------------------|-------|------------------------------|-------|-----------|-------|
| | 03-04 | 04-05 | 03-04 | 04-05 | 03-04 | 04-05 | 03-04 | 04-05 | 03-04 | 04-05 |
| NYS Benchmarks for all CTE Programs | 48.9% | 72.9% | 76.9% | 76.9% | N/A | N/A | N/A | N/A | 93.6% | 93.6% |
| Program Clusters | | | | | | | | | | |
| Agriculture & Renewable Resources | 61% | 77% | 78% | 82% | 80% | 63% | 56%* | 51%* | 78% | 89% |
| Business | 85% | 70% | 82% | 88% | 31% | 54% | 57%* | 91%* | 86% | 88% |
| Child Care | 68% | 79% | 74% | 84% | 72% | 77% | 78%* | 75%* | 78% | 89% |
| Food Service & Hospitality | 71% | 75% | 76% | 74% | 75% | 66% | 78% | 77%* | 81% | 91% |
| Health Care | 74% | 76% | 90% | 83% | 62% | 69% | 85%* | 83%* | 76% | 76% |
| Marketing & Distribution | 68% | 85% | 77% | 80% | 86% | 34% | 65%* | 79%* | 83% | 91% |
| Personal & Other Services | 74% | 81% | 74% | 78% | 77% | 81% | 78%* | 80%* | 79% | 85% |
| Public & Protective Services | 70% | 85% | 78% | 80% | 77% | 75% | 79%* | 79%* | 86% | 90% |
| Technology & Communication | 81% | 81% | 72% | 76% | 62% | 67% | 66%* | 61% | 78% | 84% |
| Trade & Industry | 78% | 76% | 70% | 75% | 66% | 63% | 69%* | 67%* | 70% | 85% |

Notes
 The 03-04 data is based on 312 CTE programs, and the 04-05 data is based on 525 CTE programs.
 The denominator for all calculations is the number of CTE program completers, except where noted otherwise (see* below).
 N/A- Technical assessments apply only to approved CTE programs.
 * Technical Assessment Passers were based on the percent of CTE completers who took an industry-defined technical exam.

How have CTE students fared in their individual CTE program areas? The data in Table 5 reveal many noteworthy findings.



In nine out of 10 program clusters, CTE completers met NYS benchmarks for academic skill proficiency in 2004-05.

- A higher proportion of CTE completers—in seven out of 10 program clusters—passed all Regents exams in 2004-05 than in the previous year.



Technical achievement was evident in several program clusters.

- In eight out of 10 program clusters, more students in 2004-05 met the State's technical skill standard, the highest proportion in the Business field.
- In 50% of program clusters, there were a higher percentage of students attempting technical exams than in the year before.
- Of those students who took technical exams, 51% to 91% passed them—again, the highest percentage in the Business field.

Taken together, the findings in Table 4 and Table 5 indicate that CTE outcomes had improved in many areas. Academic and technical skill proficiency had exceeded the State's benchmarks. More students had passed technical assessments in their program areas than in the previous year. Higher proportions of completers were successfully placed in 2004-05. At the same time, the data when disaggregated by gender, race, and special education status reveal gaps that deserve attention. Relative to their enrollment:

- More males achieved CTE outcomes than did females.
- More White students than African-American and Hispanic students achieved CTE outcomes.
- Fewer students with disabilities achieved CTE outcomes.

Summary & Conclusions

The second year evaluation of New York State’s CTE Program Approval policy charted the progress of Career and Technical Education as a viable and important high school program—one that presented students with an alternative pathway to graduation. What conclusions can we draw?

1. CTE programs have improved in quality, but inequity of local resources results in considerable variation between programs.

To greater or lesser extent, all CTE programs have seen improvement since their inception. The application procedure served as a mechanism for internal review and prompted many programs to upgrade the quantity and quality of curricula and equipment, internal and external assessments, representation of key stakeholders, and college articulations. Yet CTE programs, like all reform initiatives competed for sustainability of resources in a time of shrinking local budgets. This was apparent in urban and small rural districts where gaps existed in professional development, space and materials, technology, work-based learning, and staffing. By contrast, in well-funded suburban districts, CTE programs had stable leadership, were housed in spacious, state-of-the-art facilities, and CTE staff had multiple opportunities for professional growth.

2. Commencement-level academic and technical rigor is apparent. Still, obstacles remain.

The course content of the vast majority of CTE programs was characterized as rigorous and at the commencement level. CTE programs had ratcheted up their academic and technical caliber and most students rose to the challenge by working harder and achieving higher standards. However for some localities, increasing program rigor produced a tension: on the one hand, CTE administrators and teachers were proud of their programs, attesting to the improved quality; but on the other hand, they lacked the support necessary to deliver the enhanced curricula in a manner that allowed students—of all abilities—to achieve success. Professional development in both their specific CTE areas and special education support were needed.

3. Enrollment in CTE approved programs has increased, particularly in the health occupations.

CTE programs saw higher enrollments in eight out of 10 occupational clusters. The upward trend in health occupations enrollment matched that projected in New York State for 2002 to 2012.

4. Enrollment disparities prevail in gender, racial, and special education.

Despite the overall rise in CTE enrollment, the data when disaggregated reveal under-representation of male and female students, minorities, and those with special needs in a sizeable proportion of approved CTE programs. While factors such as sociocultural bias may influence enrollment in non-traditional occupational programs for male and female students, availability and access seem to also be part of the equation.

5. CTE students have met New York State's benchmarks for academic and technical skill proficiency.

An improvement over last year was the finding that *both* NYS academic and technical standards were met and surpassed by CTE students. Additionally, more students this year had been successfully placed in postsecondary education, the military and in employment. However, relative to their enrollment, there were disparities for student subgroups: more males than females, more White students than African-American and Hispanic students, and fewer students in special education achieved CTE outcomes.



6. Local stakeholders are very satisfied with the implementation and outcomes of the CTE policy.

Coordinators, teachers, students and their parents gave strong endorsement to CTE policy and the programs that it has spawned. As a result of the policy, they felt curricula were stronger and aligned to both high school graduation requirements as well as to the dynamic needs of business and industry. Schools and BOCES had won greater credibility in their communities as career and technical education was increasingly viewed at par with its academic counterpart. More students were going to postsecondary education and in fields related to their CTE programs. Finally, students claimed that the CTE component was instrumental in giving added meaning to their high school experience.

7. More schools would seek CTE approval if they were better informed about the application process, given sufficient technical assistance, and convinced of its value.

High schools that had not elected to submit their programs for state endorsement were satisfied with the CTE programs offered by their regional BOCES, but were largely unaware of the Regents CTE policy. They were interested in learning more about the application process and welcomed NYSED's assistance in its completion. Most of all, they sought information about the policy's added value to stakeholders, that would warrant supplanting their current CTE configurations.



Recommendations

Based on the findings of the present study, we suggest the following recommendations to assist localities build capacity for CTE programs.

At the State level,

1. Promote the legitimacy of career and technical education in New York State’s school improvement agenda.

The findings of our report together with those from national studies suggest that it is time to take more aggressive steps to link CTE policy to the bigger picture—improving the quality of education for all students through higher learning standards. Under the CTE policy, enrollments in career and technical education have started to climb, more students are passing Regents exams, and achieving technical proficiency, and greater numbers of students are going to college. These outcomes have particular significance for schools that are struggling to meet their accountability requirements under the *No Child Left Behind* mandate. In these schools, the problem of CTE program availability should be seriously challenged because CTE is a promising strategy for raising student academic achievement. For all these reasons, the State should ensure that CTE policy is accorded a rightful place among the players in educational reform.

“Following our first full year of integration, we have found that despite a 37% special education population, CTE students have performed as well on the five Regents exams required for graduation, as students in their home district.”

CTE Coordinator

2. Increase awareness of, and market the CTE program approval process.

All respondent groups—administrators, teachers, students, parents, and non-participating high school principals—shared the sentiment that the CTE policy needed broad-based marketing. This could be achieved through NYSED’s existing communication system with school districts, career and technical professional organizations, parent organizations, and through regional conferences. In order to effectively engage a broad swath of stakeholders, different forms of media should be used, such as statewide webcasts, promotional videos and CDs, newsletters, and public access television.

3. Simplify the CTE recertification process.

The CTE recertification process could be made more efficient by streamlining and clarifying several components of the application package. For example, the process could set a uniform standard by which all local schools determine if a CTE integrated course warranted academic credit. A representative sample of local CTE coordi-



nators could be helpful in determining which aspects of the application process needed refinement and how best to implement that.

4. Provide systematic technical assistance.

Through its Career and Technical Education Resource Center (CTERC) and the Regional School Support Centers (RSSC), the Department can chart a multi-tiered system of technical assistance to approved CTE programs, as well as to those considering approval. Assistance in CTE application completion could take the form of regional face-to-face training sessions, manuals that furnish step-by-step guidance, and resource material, such as where to turn for industry-specific technical assessments. Follow-up assistance should focus heavily on professional development surrounding topics such as integrated course design, work-based learning, postsecondary articulation, performance assessments, teaching diverse learners, involving business and industry, and marketing CTE programs. In addition, opportunities for CTE teachers to share and learn from their counterparts in other regions of the state should be considered.

5. Facilitate an ongoing dialogue between high schools and post secondary educational institutions.

Making the pathway from high school to further education seamless and easily navigable is essential to preparing young people for the future. While our report indicates that schools and BOCES had increased the number of college articulated CTE courses and that there were more students going on to college, by and large, there continues to be a significant chasm in communication between educators at both levels. Far too many high school staff and their counterparts in community and four-year colleges are unaware of

each other's expectations for student success and their respective issues and challenges. It is here that the State can play a critical role. By engineering a process for continuous conversation, through regional and/or statewide forums, the State can lead the way in bridging the gap between high school CTE staff and their postsecondary colleagues.

At the local level,

1. *Ensure that CTE funding resources are distributed according to program need and in a timely manner.*

We found that many promising CTE programs were unable to deliver high quality instruction in a consistent manner, either because their budgets had been cut or because their equipment and supplies had not arrived in a timely manner. Local leadership should reexamine criteria for resource distribution vis-à-vis program need and establish a delivery system that maximizes program operation.

2. *Consolidate concurrent funding streams to benefit CTE programs.*

Since a considerable portion of the operational budget for CTE programs was derived from state and local sources, CTE administrators should strive to pool resources across multiple funding initiatives so that redundancies are minimized. We observed several CTE programs that attributed their success to a consolidation of funding streams—both public and private—enabling recipients to experience a quality program that was at par with current trends in industry.



3. Ensure greater involvement of academic teachers in the design and improvement of CTE curricula, and increase opportunities for collaboration between CTE and academic teachers.

While CTE instructors were technically adept in their specific program areas, it took methodical and sustained input from academic teachers to ensure that CTE programs had academic content that was at commencement level. This was especially true for those programs offering students academic credit. Districts should devise ways to build in common planning time and opportunities for co-teaching and co-assessing students in CTE courses.

4. Develop a plan to market CTE in the middle schools.

In keeping with our observations last year, there remains a need to publicize approved CTE programs in feeder schools/classes. Schools and programs that had designed middle-school articulation packages (videos, presentations, tours, career days, etc.) had healthy enrollments, and some, even waiting lists of entering freshmen.

5. Seek NYSED assistance to conduct differentiated follow-up studies on graduates of CTE programs.

In no area was the need to conduct follow-up studies greater than in building credibility for CTE programs. At each of the 20 CTE sites we visited, attempts to track graduates were at best, rudimentary. Some localities had recruited university consultants to initiate such studies but readily admitted that the process was labor intensive and beyond their programmatic means. Yet we know that the most

compelling evidence for CTE lies in how its graduates fare in postsecondary education and employment. These data should be collected in a differentiated manner—separately for college, military, and employment—because these outcomes represent very different results for students and for society.



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Appendix 1

Vocational Programs Grouped by the Secondary School Taxonomy (Revised, 1998)¹²

Vocational programs: Vocational programs (also called specific labor market preparation or occupationally specific programs) are offered at both the secondary and postsecondary levels, although the classifications differ somewhat at the two levels. The examples given are not exhaustive of the courses offered in each area. At the secondary or high school level, vocational coursework is grouped by the 1998 revised Secondary School Taxonomy into the following occupationally specific program areas:

Agriculture and renewable resources: Includes courses in Agricultural Mechanics, Horticulture, Animal Sciences, and Environmental Management.

Business: Offers training in business services and business management, including courses in Bookkeeping, Accounting, Data Entry, Office Procedures, Business and Management, and Banking and Finance.

Marketing and distribution: Includes courses related to the selling and distribution of goods and services, including Distributive Education, Distribution and Marketing, Fashion Merchandising, and Entrepreneurship.

Health care: Includes courses intended to prepare students for careers in the health professions, such as Health Occupations, Dental Assistant, Medical Laboratory Technologies, and Practical Nursing.

Public and protective services: Includes courses in Criminal Justice, Fire Protection, Public Administration, and Social Work.

Trade and industry: Includes coursework in construction trades, mechanics and repair, precision production, and transportation and material

¹² Levesque, K., Lauen, D., Teitelbaum, P., Alt, M., & Librera, S. (2000). Vocational education in the United States: Toward the Year 2000, NCES 2000-029. National Center for Education Statistics. Washington, D.C.: U.S. Department of Education.

moving. The construction trades program area includes courses in Electricity, Carpentry, Plumbing, and General Construction. Mechanics and repair includes courses in Industrial Maintenance; Radio and T.V. Repair; Air Conditioning, Refrigeration, and Heating; and Auto Mechanics. Precision production includes courses in Drafting, Graphic Arts, Machine Shop, Woodworking, Plastics, Electronics, and Leatherwork and Upholstery. Transportation and material moving includes Aviation Technology, Marine Engine and Boat Repair, and Truck Driving.

Technology and communications: Includes coursework in computer technology, communication technology, and other technologies. The computer technology field includes courses in Computer Applications, Computer Programming, and Data Processing. The communication technology field includes courses in Broadcast Management, Film Making, and Radio and Television Production. Other technology courses include Electronic Technology, Industrial Production Technology, and Chemical Technology.

Personal and other services: Includes courses in Cosmetology, Clothing and Textiles, Vocational Home Economics, and Institutional Maintenance.

Food service and hospitality: Includes courses in Food Service and Nutrition, Hospitality, and Travel and Tourism.

Child care and education: Includes courses in Teacher Assisting, Child Care, and Elder Care.

Prepared by:

