



Report on the Status of Career Education¹

East Greenbush Central School District

Prepared for Jeffrey Simons
Superintendent of Schools

Conducted by the Career and Technical Education
Technical Assistance Center of New York (CTE TAC)

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The Career and Technical Education Technical Assistance Center of NY

The Career and Technical Education Technical Assistance Center of New York (CTE TAC) assists the New York State Education Department (NYSED) in carrying out its mission of improving the quality, access, and delivery of career and technical education (CTE) through research-based methods and strategies resulting in broader CTE opportunities for all students.

The CTE TAC operates as part of the Successful Practices Network (SPN) under a contract with the NYSED. The CTE TAC increases the capacity of the NYSED to serve, support, and expand CTE across the state.

CTE TAC services are provided to leaders, teachers, and students in:

- Local education agencies
- BOCES
- High needs school districts
- CTE professional organizations
- CTE student leadership organizations

CTE TAC Work Plan

- Provide CTE Professional and Leadership Development
- Advance and Review CTE Approved Programs
- Conduct Research into Delivery of CTE Programs and Advance Best Practice CTE Models
- Provide Support for Multiple Pathways Initiatives and NYSED priorities
- Enhance and Support CTE Communications and Marketing
- Networking to strengthen CTE

BACKGROUND

The East Greenbush Central School District under the leadership of Jeffrey Simons, Superintendent of Schools, seeks to assure that the grades 6-12 career and education offerings of the district are widely available to meet the needs and interests of all students, are of high quality, and are offered in the most cost effective manner possible. Mr. Simons initiated this study to secure an independent review the career education offerings of the district and assess their conformance to these goals. The CTE Technical Assistance Center of NY (CTE TAC) was selected to conduct this assessment and to provide support for the development and enrichment of the career education efforts of the district.

We are grateful for the time provided by the East Greenbush leadership and faculty to conduct this study. Fieldwork such as this can disrupt the daily flow of a school. Everyone was giving of their time, forthright in their responses, and welcoming. Thank you.

The district believes that college and career readiness is a set of student characteristics and that career education can play an important role in their development. A strong portfolio of career education assets is key to meeting these needs. At the 9-12 level, the district has an emerging STEM program based in Project Lead the Way (PLTW), business programs, and technology programs but no NYSED approved CTE programs. About 35 students participate in Questar III BOCES CTE programs. The district seeks to enrich and align its middle level Family and Consumer Sciences (Home and Career Skills) and Technology programs with the 9-12 offerings. Existing programs need to be reviewed and possibly repurposed to extend the district's ability to address student career needs. The district seeks to do this without any reduction in the teaching force. In short the district wants options for students, well run programs, and cost effective delivery.

In addition to middle school and high school alignment, district offerings should be aligned with post-secondary opportunities and consistent with the local, state, and national employment needs of the next decade. The dataset to reflect this will be based in NYS Department of Labor (NYSDOL) information and the priority employment focus of the Capital Region Regional Economic Development Council plan.

PROJECT OBJECTIVES

1. Provide recommendations for the enhancement and alignment of middle level career education offerings in STEM, Technology, and FACS to create a seamless flow from middle school through commencement and permit students to take full advantage of the multiple pathways to graduation recently approved by the Board of Regents.
2. Review the district's STEM offerings and provide guidance for the next steps in program development.
3. Explore the possibilities for program enrichment/redesign of the 9-12 business and

technology programs and provide recommendations for program development and the potential to create NYSED approved programs.

4. Explore the role of BOCES CTE programs and make recommendation as to how they can contribute to providing a comprehensive portfolio of career education offerings for district students.
5. Provide a crosswalk of the district offerings in career education to the Capital Region Regional Economic Development Council priority employment areas and the regional NYSDOL employment trends.

METHODOLOGY

In September 2016, a conference call was held with the CTE TAC project principals and the district and school leadership of the middle school and high school. The project was reviewed and discussion was held about key issues and the data needs of the CTE TAC concerning career education programming and offerings. Assistant Superintendent for Curriculum and Instruction Dr. Lynne Pampel was designated as the primary contact for the project.

On October 3 and 4, 2016, Dr. Shafer and Ms. Zygo visited the district and participated in meetings and visitations at the middle school and high school. The visits included meetings with teachers in the 6-12 STEM, FACS, technology, and business programs, building principals and assistant principals, and school counselors and visitations to classes in the career education programs at the middle and high school levels. All classrooms used for career education were visited and all teachers were observed providing instruction. This allowed the team to review space allocation, the condition of the facilities and other program resources and to observe instruction and the level of student engagement.

The CTE TAC team used a standard set of questions concerning career education programming for the district team, school leaders and teachers, and school counselors. During the visit, the CTE TAC team was also able to review numerous key documents and program and student information. This included:

- a) Key documentation and plans addressing career education
- b) Student performance information in middle and high school STEM, technology, FACS, and business education programs
- c) Course offerings and locations
- d) Curriculum documentation
- e) Teaching and industry certifications of STEM and CTE personnel
- f) Facilities/facilities plans for career education
- g) Equipment
- h) Funding sources
- i) Relationships with business and industry
- j) Articulations with post-secondary programs
- k) Participation in BOCES CTE programs and associated costs for the past three years

- l) The Questar III CTE Annual Report on East Greenbush student performance in CTE programs
- m) Participation numbers in East Greenbush, BOCES, and Tech Smart programs
- n) Others as identified by the CTE TAC and district and school leadership

On October 5, 2016, Mr. Andrew Zefarano, a CTE TAC consultant and retired technology teacher who taught and trained teachers in Project Lead the Way (PLTW), met with the assistant superintendent, assistant high school principal, chair of the CTE program, and school counselors. He provided an assessment of the PLTW program and made recommendations for future directions, which will be addressed later in the report.

Dr. Shafer conducted a phone interview with the Questar III BOCES Director of CTE to assess the status of the relationship between the district and his programs. This discussion included a review of the performance of district students in the BOCES CTE programs and the BOCES plans for program review, revision, and development.

Although desired, the CTE TAC team was unable to meet with representatives of the post-secondary institutions and business partners that collaborate with the district. The response from district leadership was that although some opportunities exist for students to benefit from dual enrollment programs and work-based learning, these relationships were not systemic nor fully developed. The view was that discussions with these representatives would be premature.

A crosswalk was completed of district career education offerings as they related to the 16 National Career Clusters, the Capital Region Regional Economic Development Council Focus Industries and NYSDOL information. This provides a picture of the alignment of district CTE programs to employment opportunities in the region consistent with the economic development and labor market needs of the region (Appendix A).

FINDINGS

First, a word of caution. Schools have a rhythm, and each part of the year has a different focus and relationship with and between the content, assessment, and social opportunities. These affect the focus of the school and the attention of the faculty and staff. The CTE TAC team visited in the early part of the school year, just after the introduction of the students to new courses and expectations. Further, the team visited for a total of five person days out of the 180 days students and faculty will experience. This should be taken into account in considering the findings and recommendations.

Second, outside consultants often seek perfection. While the findings are an attempt to be comprehensive and grounded in a passion for CTE, no district can work on everything at once. Educators will always know more than they can do. An extensive set of recommendations is provided in this report. It will be important for the district and school leadership, faculty, and

Board of Education to review, discuss, and prioritize the actions the district should pursue.

East Greenbush is an average wealth district of 4,000 students; 23% are on free or reduced lunch and 16% are students with disabilities. The district has five elementary schools, a middle school, and a high school. The outcome data on the 2015-16 School Report Card for the district is positive, with 97% of students completing high school with a Regents diploma and 48% earning an advanced designation. The dropout rate is 1%, which equates to 11 students each year and 44 students over a four-year cycle. Only 3% of completers earned a CTE technical endorsement on their diploma. This designation is arguably the gold standard when earned in conjunction with a Regents diploma or Regents diploma with advanced designation. Of the graduates, 39% went on to four-year colleges, 47% to two-year colleges, 5% to the military, and 5% to employment. The district ranks well among the Suburban Council Schools in the Albany region.

General Grades 6-12

The school district and community are focused on academic success and sending students to college, and they have been very successful in these pursuits. However, with the recent national interest in career education and the need to have students graduate college **and** career ready, little has been done in the district to define the *career ready* aspect of this mantra. Moreover, with nearly 60% of the district students going to two-year schools, the military, or employment, the need exists to set them on a path to benefit from a post-secondary experience directed at a career, as a high percentage of these students may not move on to four-year college programs.

Recent additions to career education offerings and a return of programs from BOCES following a reduction in offerings over the past few years (i.e., FACS) seem to reflect a notion that what is unique, popular, or high profiled is the way to go. While this may make for good public relations and respond to community, school, and staff interests or views of the future, this expansion has been done without a clear board philosophy and policy on career readiness. At the same time, more traditional CTE programs for which there are employment opportunities or that serve as a base for career offerings at the college level have been neglected and are adrift. The most important jobs of the future are those that cannot be exported or where Americans can successfully compete with other economies.

The high school course guide provides no clear outline of five unit sequences with the exception of noting that students completing a five-unit sequence are exempt from the Regents foreign language requirement. The business program defines four career clusters, but none is five units in scope. The career education offerings appear to be a set of uncoordinated electives that are in competition with the robust elective offerings in the district. Thus, there are no programs of study, only career education courses and are not chosen as part of a student's pathway to college and a career.

While the newly offered courses in PLTW and information technology are billed as a STEM Academy, the offerings and their organization do not reflect a career academy model. A true academy model is a school within a school with a career focus, cohort student scheduling, common planning time for the career and academic teachers, and a set of personalized student supports.

The district has made an investment in Naviance, a comprehensive K-12 college and career readiness platform that helps districts and schools align student strengths and interests to post-secondary goals. Guidance staff report that the resource is used at several key junctures in the school experience for the students. However, it was unclear if career plans are formulated for students in grades 6-12, reviewed regularly, and used to prepare them to make post-secondary and college choices. Using Naviance as a base for comprehensive career and education planning may be effective in more clearly aligning student electives with career aspirations. This may help mitigate the competition for students among electives.

After interviewing school and district leadership, it became apparent that the career education programs have not undergone a significant review of student performance. As a result, there has not been a review of data and the establishment of program/course improvement goals.

The district has established a minimum class size of 20 for offering a course, with exceptions made for PLTW and IT Essentials. This is of concern among the CTE faculty, who note that in some instances, 20 students cannot be adequately handled in their courses in the space provided and yet students with interest in other of their courses are denied access because they do not run.

There are no regularly scheduled meetings of the 6-12 career education faculty, let alone including the math and science faculty teaching PLTW, Computer Programming, and IT Essentials. This lack of intentionality to staff collaboration makes vertical coordination difficult and inhibits program improvement discussions and embedded professional development. In addition, there is a little systemic interaction between the career education faculty and academic faculty in the schools. This inhibits proper reinforcement of academic skills in the career courses, development of a common understanding on the scoring of ELA and math assignments, and faculty calibration for the use of a common rubric for evaluating student work.

The district offers a number of dual credit courses with local colleges and Rochester Institute of Technology. However, it appears that systemic communication with these organizations is absent. There are instances of collaboration with local business and industry, which appears to be more of a solicitation for resources than a true partnership wherein the businesses provide advice, offer work-based learning opportunities, and assist in student assessment of career skills.

Goff Middle School

The middle school serves 950 students in grades 6-8. It is divided into three houses and operates on a 9-period day, with one period used to provide student support. Recently, the school moved from a team to departmentalized junior high school model. The design of the schedule does not permit technology and home and careers (FACS) faculty to meet regularly with their academic peers, as they are scheduled in a manner that permits academic faculty to hold team meetings. The school meets the requirements of a $\frac{3}{4}$ unit of home and careers instruction and 1 unit of technology instruction. The programs are staffed with two home and careers teachers and 2.6 technology teachers. There are few opportunities for career education and academic faculty to meet, share information, collaborate, or discuss the needs of individual children.

The technology and home and career skills faculty use curriculum resources found on the NYSED website, which are somewhat dated. There is no clear indication that the Career Development and Occupational Studies (CDOS) standards are incorporated into the curriculum. No specialized third-party sourced curriculum, such as Gateway (PLTW), Engineering by Design, or the resources of the Curriculum Center for Family and Consumer Sciences (Texas Tech University) are utilized. Faculty are left to their own devices to design the curriculum content from the NYSED resources and refine them based upon their professional judgment and interests. Currently the NYS Association of Family and Consumer Sciences is rewriting a home and careers curriculum, which could serve as an essential resource for that faculty.

The district and school leadership are concerned about the modest level of articulation of the middle level career offerings to the programs at the high school. Middle school technology faculty report that no full CTE 6-12 faculty meeting has been held in several years or longer.

Space, budget, and equipment at the middle school are limited. Home and career sections numbered between 20 and 29 with a median of 26. Technology sections numbered between 20 and 28 with a median of 25. No space was designed to adequately address student needs for direct instruction or projects. Teachers are under-resourced with technology and in one instance a teacher was observed using an overhead projector. The home and careers program lacks appropriate furniture, current textbooks, and student netbooks, or laptops. The technology classrooms were dated, small, and un conducive to contemporary instructional practices. Faculty complained about budgets that prevented the purchase of critical resources and materials for projects.

The middle school has experienced a succession of principals of short duration, which may account for the low level of resources. If the current principal remains in place, perhaps he will successfully lobby for and compete with the high school for adequate resources.

Columbia High School

The high school serves approximately 1,200 students in grades 9-12. It operates on an 8-period schedule and has a small range of career education programs with courses in art, technology, science, math, business, PLTW, and criminal justice. Since 2008, career education has experienced a significant reduction in offerings — from 48 to 17 plus the STEM and criminal justice offerings. The FACS programs, which had 4.0 faculty in 2008, has been eliminated. These reductions are most likely due to the move to an 8-period day, competition from other electives, and budget pressures. The school has no in house NYSED CTE approved programs and therefore no opportunity for students to use CTE as a pathway to graduation.

Recently, the district established a STEM Academy at the high school by reinstating a PLTW program and added IT Essentials (Cisco Computer Networking) and Criminal Justice. None of these programs are taught by CTE certified teachers but instead by those certified in science, math, or social studies.

The high school offers two PLTW courses: Introduction to Engineering Design and Principals of Engineering. (Findings and recommendations for PLTW are on p. 13.) Enrollment in Cisco Computer Networking Academy (CCNA) I and II totals 12 students, and they are taught concurrently. CTE faculty are concern over the provision of instruction in this program by a teacher who, while Cisco trained and certified in math, has little real-world practical experience in networking. Currently, the technology and business programs are staffed with 1.6 and 2.0 faculty respectively.

It was reported that the STEM and criminal justice offerings were instituted rather rapidly as the previous district leadership desired more independence from BOCES. There was a transfer of cost from BOCES to support this change. Current BOCES enrollment is 36 in 16 programs and an additional three students in New Visions. Students are afforded the opportunity to earn academic credit in their BOCES CTE Approved Program. The 2015 report on BOCES student performance indicates that 91% of students enrolled in year one on BEDS day completed their two-year program, and 18 of 18 students who challenged a technical assessment passed. Ten of these students earned a technical endorsement on their diplomas.

Many students participating in the BOCES programs are pursuing careers in the trades and technical areas. There appears to be a gap in the coordination of career education programs offered during grades 9-10 with the BOCES offerings. School leadership and school counselors expressed concern about the constriction on student participation in BOCES programing.

Four students participate in the TEC SMART (Clean Technologies Early College HS) operated by the Ballston Spa Central School District and Hudson Valley Community College. The district does receive BOCES aid on this participation. Currently, no students are enrolled in the Tech Valley High School operated by Questar III and Capital Region BOCES.

In 2016, five half unit and four full unit business courses are being offered; classes in Microsoft essentials are particularly crowded. In technology four offerings are available for 2016-17 (Design, Drawing and Production (DDP), Woods, Metals, and Modern Mechanisms). The CADD program did not run this year. The DDP classes and Metals and Modern Mechanisms are strongly subscribed, with space at a real premium. Numerous pieces of equipment are outdated or in ill repair; however, there are 3D printers. Reports are that the budgets for materials tight but are adequate.

Curriculum documents were provided for the STEM Academy courses, which provide dual credit with Rochester Institute of Technology (PLTW) and Hudson Valley Community College (IT Essentials (CCNA)/Networking I and II). CCNA prepares students for Cisco certification examinations such as CompTIA A+ certification and Cisco ICND1 (CCENT) certification. These are clearly linked to the third-party and college standards implied by the program offerings. What was unclear is if the tests are taken by students and who pays for them.

No curriculum documents were provided for other technology and business programs. The resources on the NYSED website are dated, and it is assumed that the course curricula is developed by the faculty using self-updated versions of the NYSED documents or third-party curriculum, i.e. Microsoft Office Suite. District leadership report that this is an area of concern. Further, the district does not consistently track student achievement in CTE programs to monitor program improvement. Staff report that there has been no concerted effort to crosswalk the curriculum with the state learning standards in ELA and math or to current science standards. Academic integration in career education courses and career relevance in academic offerings are not fostered with collaborative planning and curriculum work between academic and career education faculty.

The laboratories for PLTW are adequate in size and technology resources. Budgets for the programs were reported to be adequate. The space for IT Essentials is not well designed for the function. The business and technology program spaces need serious updating in technology and curriculum-based equipment to reflect modern workplace settings.

At the high school, there are no well-defined sequences of courses that students can complete to achieve entry employment skills. Nor is there a clearly articulated pathway from middle school to high school and on to a two-year college program or employment. Due to the extensive set of electives, the competition for students is fierce and may work against students pursuing a functional pathway in STEM, CTE, Humanities, Arts, or LOTE.

Business faculty reported that one section of Career and Financial Management (.5 unit) is currently offered. The 12th grade economics course offerings are focused on American and world micro and macroeconomic concepts, with little focus on the individual management of career choices and personal finance. This means that numerous students pursuing some level of career interest are not receiving this instruction. Of course, a case can be made that all students should be exposed to these concepts.

There are few work-based learning opportunities at the high school. The business department has a Career Exploration Internship Program (CEIP), which is not offered this semester. Real-life experiences in the workplace help students to evaluate their desire to pursue a particular career choice. The CEIP option are not considered by students pursuing other career based programs. With the exception of BOCES participants, high school students taking career education courses do not complete an employability profile, which documents students' career ready practices (soft skills) and technical skills.

The English department offers a course in practical English for the CTE invested student. While a practical course makes sense, it appears that this one is a bit heavy on fiction. More focus on reading non-fiction may serve career directed students better. The professional writing and communication course is well suited to students interested in technical careers and/or post-secondary programs where a high level of technical writing is required. The CTE TAC team did not explore whether the teachers teaching this course are provided with regular opportunities to visit workplaces and interact with employees who must produce this type of work to assure that the course is contemporary. Additionally, it was unclear if the students in the "STEM Academy" are actually taking these courses as part of their electives.

Overall, this raises the question of how to make sure students are following a clear career pathway to conclusion of high school and on to college, or are the electives a smorgasbord of choices. Exploring is good, but those students headed to a two-year career program are not set up well for success by developing an understanding of the challenges and satisfactions of their future career choice. One way to incentivize students to complete a CTE pathway may be to offer a NYSED CTE Approved Program in business and technology or even in engineering and networking.

Over the past several years, the Board of Regents has opened up a number of additional ways to complete high school, including a 4+1 pathway, which requires passing four Regents and one additional approved alternative. Technical and industry certifications are among the alternatives that NYSED has approved. In addition, there are new pathways for students with disabilities (CDOS Credential) and the use of CDOS assessment to obtain a diploma. These options are now being explored at the high school to determine how to add them to the graduation portfolio.

Alignment with Regional Economic Outlook

Although our public schools are not primarily intended to produce potential workers for the labor market, students are more likely to go to post-secondary experiences and into the workforce in close proximity to where they live. This is especially true in the Capital Region, with its rich mix of colleges and universities and a varied employment sector that is among the best in the state. So there is a tension between the education of the whole child accounting for their learning styles and interests and preparation for the post-secondary and employment opportunities they face.

Appendix A: Regional Economic Labor Outlook Alignment looks at the career education offerings available at or through Columbia High School and their alignment with the labor market. The alignment is of courses and pathways within the 16 Career Clusters. This alignment has limits, such as accountants who work in the Tourism and Hospitality Industry cluster and many others, but it does produce a picture of where career education offerings are consistent with employment needs. There are a couple of takeaways from a review of this information:

1. Manufacturing is the largest industry sector in the Capital Region. It has added 3,000 jobs in the past five years, with the most significant growth in chemical, fabricated metal product, machinery, and computer and electronic manufacturing. While there is a need for engineers and engineering technicians, the sector requires a host of assembly, tradespersons, and repair and maintenance employees.

At the high school, there are no offerings or participation in a full pathway study in metal fabrication, although there are introductory offerings in Metals and Modern Mechanisms. The district has the capability to offer two levels of Computer-Aided Design, but neither offering is made. The only available option is welding and metal fabrication at the BOCES

2. Architecture and Construction anticipates job growth of almost 19% in a sector where employment is top heavy with folks who are nearing retirement. This sector includes Heavy and Civil Engineering and Specialty Trades Construction and all forms of tradespersons, engineering support, and operating engineers.

The high school offers an introductory course in woods, and a small number of students participate in the BOCES Construction and Heating, Ventilation and Air Conditioning (HVAC).

3. Business Management and Administration is a sector in the Capital Region expected to grow at 23%. This work includes entrepreneurial in and professional, scientific, and technical services; accounting; legal; software development; research analysts; and marketing specialists.

There are two career cluster offerings at Columbia in Management and Marketing through the business department. These are 3.5 unit sequences. There is no data on completions.

4. Finance is the second largest industry sector in the region. Securities, commodity, contracts, and other investments had 15% growth and insurance and related activities has added 800 jobs since 2009.

The high school has a 3 unit sequence in Accounting/Finance at an introductory level, with a full unit in Accounting for Investing. Again, there is no information on completion of the sequence.

5. Health Science and Human Services are significant growth areas at almost 21% and 21%, respectively, with opportunities in ambulatory care services, hospitals and nursing, and residential care. Some of these positions are for direct care assistance with certifications and are entry level with low pay. While this may not seem an area to explore, physicians, nurses, and technicians are well paid, and often entry-level work can help introduce individuals to the broader health area and assist in paying for more education and access to better paying work.

The BOCES offering in Nurse Assisting has three enrollees from the district, and all students are exposed to CPR, which is included in their health course. This is a promising area for exploration.

6. Information Technology and other information services anticipates growth at 62%. This includes software and applications developers and network support.

Columbia HS is rich in these offerings, with access to the IT program at BOCES, computer programming offered at three levels in the math department, the IT Essentials program, and an IT focus sequence in the business department. What is unclear is how many students complete which programs and to what level of depth. Enrollment in IT Essentials program is modest, and its cost effectiveness vs. the BOCES offering is in question. Providing clear pathways with incentives to complete them and developing a coherent presentation to students should be undertaken. Consideration of becoming a CTE Approved Program is possible with the involvement of the CTE certified business teachers.

Project Lead the Way — Findings of Andrew Zefarano, CTE TAC Consultant

PLTW has been geared toward students who intend to move into a college engineering or technical program. With the number of AP courses offered at East Greenbush and the number of students attending two- and four-year colleges, the PLTW program is a good match. The present offering consists of two PLTW courses: Introduction to Engineering Design (IED) has one section of 25 students and Principles of Engineering (POE) has one section of 12 students. IED is offered to sophomores, and POE is offered to juniors and seniors. Very few females are enrolled in the PLTW classes.

PLTW has three different pathways for the district to move in:

- Bio-Medical Science
- Computer Science
- Engineering

The Bio-Medical Science 9-12 curriculum would cost \$112,000 to implement. Given that there are few bio-medical industries in the area, this may not be the way to go.

The Computer Science curriculum is less costly to implement, but the district already has three related courses in which students can earn college credit: IT Essentials and Networking 1 & 2. Since a path already exists, it does not seem wise to have to competing programs.

The Engineering curriculum is a good fit, given that two courses are already implemented and the school has some supplies and materials for additional courses from the previous PLTW attempt. In the Engineering strand, PLTW offers three additional courses. The district should consider one of these courses:

- Civil Engineering and Architecture
- Digital Electronics
- Computer Integrated Manufacturing (CIM)

RECOMMENDATIONS

1. **College and Career Readiness.** Have the Board of Education and senior leadership, in conjunction with school leadership and staff, parents, and critical community stakeholders, carefully define the career readiness aspect of college and career readiness for all students. Strategies and metrics should be established to implement and measure the level of attainment of the definition. Each course, program, or pathway should measure student achievement and establish long-term improvement goals.
2. **Planning.** As part of district strategic initiatives and/or planning, develop a five-year plan for the review, development, funding, sourcing, curriculum mapping, and delivery of career education courses and programs consistent with the definition of career readiness. This should include the following activities:
 - a. Explore a 6-12 career pathways model based in the Career Clusters and the Common Career Technical Core².
 - b. Explore academy models from around the country, such as Nashville and Philadelphia, and assess the ability of the high school and its students and parents to embrace a true academy model.
 - c. Unify the various career-based courses in the academic and CTE departments into a

² Advance CTE (formerly National Association of State Directors of Career and Technical Education)

coherent set of offerings and pathways of study within the high school course guide. This would allow students to see how they can select a set of electives consistent with their career goals and plan. Think of a student with engineering interests who takes the three units of PLTW (3), courses in metals (½) and woods (½), Senior English Ethics & Contemporary Studies (½), and Professional Writing & Communication (½).

- d. Explore the opportunity to offer a NYSED CTE Approved Program consistent with the previous example. There are several ways to put this together and enable students to obtain technical certifications and a technical endorsement.
 - e. Have PLTW students challenge the NOCTI Engineering assessment to document skills consistent with industry standards.
 - f. Analyze the cost/benefit of local programming vs. opportunities at Questar III BOCES or participating in programs at other school districts to access BOCES aid.
 - g. Develop a comprehensive, board-approved curriculum, with maps and pacing guides, for all local career education courses and programs offered in any department.
 - h. Establish goals and track the number of students earning a technical endorsement on their diplomas and or passing certification or industry based examinations.
 - i. Assure that all faculty have practical experience in the area of career instruction or are provided with the opportunity for externships to businesses in their instructional area.
3. **Facilities.** Modernize the facilities, equipment, and technology at the middle school and high school other than the PLTW classrooms. The middle school in particular is cramped, dated, under-resourced with technology and other instructional resources, and absent the space and furniture required to deliver content and technical concepts. At the high school, the course enrollments in technology and business courses strain available space, and the facilities are also dated, lack adequate technology, and have limited space to deliver theory. The district is apparently considering a referendum to do additions and renovations to existing facilities. Addressing these needs should be a priority in that effort.

As part of the district's presentation to the public in the spring 2017 on its proposal, the significant career education facilities needs for the middle school technology and home and career programs and the high school technology, IT, and business programs should be addressed. The incorporation of these needs into the referendum should follow a comprehensive review and conform to desired changes in curriculum designs and offerings. A preliminary design that can be followed by an intensive review and plan for project approval should be developed over the next several months.

4. **Alignment of Courses and Curriculum.** Conduct a review of the district's complete portfolio of courses and their curriculum. This will help assure that the district has control of the curriculum content, that the courses are vertically articulated and aligned from middle school through high school and with local post-secondary and employment opportunities. This will require the following actions:
- a. Align the middle level technology and FACS (Home and Career Skills) programs with the

- PLTW, IT, technology, and business programs at the high school
- b. Commit to offering dual credit programs with fidelity.
 - c. Establish or participate in forums for working with the Capital Region community colleges and business/industry. Use this group to advise on program offerings and curriculum, provide work-based learning opportunities, help assess students' technical skills, and assist in aligning the 6-12 career offering with post-secondary options.
5. **Schedule.** Balance the career offerings at the high school with other electives to assure access, opportunity, and the ability to deliver full career sequences with incentives for completion. This may require a review of the 8-period schedule and the option to move to a full or modified block schedule. Minimally the schedule should include double or triple periods based upon the content and skills needs of the program
 6. **Middle Level Program, Curriculum, and Projects.** Give consideration to using a third-party program as the curricular base for the middle level technology program, such as the PLTW Gateway or the ITEEA Engineering by Design programs. This would give all middle level students a foundation for current offerings at the high school. The Home and Career Skills faculty should review the soon to be released FACS 3.0 from the NYS Association of Family and Consumer Sciences and build a new curriculum and program around this resource. The technology and home and careers faculty at the middle level should review the curriculum base for each program to identify mutually beneficial content to reinforce and joint learning projects for their students. Consideration should be given to providing accelerated CTE courses with high school credit for eighth graders.
 7. **Cross Curriculum Planning.** Establish systemic structures for curriculum and cross curriculum planning that includes regular meetings of the career education 6-12 faculty and the opportunity for them to co-plan with their academic colleagues, calibrate faculty to the rubrics for scoring extended ELA and math student responses, and collaborate on project-based learning.
 8. **Work-Based Learning.** Upon establishing a solid vehicle for working with regional employers, enter into discussions about how to provide students with significant work-based learning opportunities to include shadowing, internships, business/industry lectures, and other experiences to allow all students explore the world of work. Students completing a career sequence or CTE Approved Program should have an employability profile documenting their career ready practices and technical skills. This can serve as a portfolio for college admissions or employment.
 9. **Program Alignment and Development.** Alignment with the Regional Economic Labor Outlook presents an opportunity for the district to consolidate and intensify its options for career pathways. Recommendations are as follows:
 - a. Continue your investment in engineering. This should include an engineering-based

technology education program at the middle school to feed PLTW. Critical to this effort will be guiding students into the PLTW program who are truly interested, likely to complete, and have incentives to do so. Such incentives include dual credit, industry-based certification, work-based learning opportunities in local firms, and hands-on experiences in building things and applying concepts.

- b. Increase exposure and access to the trade offerings at Questar III BOCES. The trades are no longer for “those kids’. They require significant mastery of academic and technical skills to pass certification examinations, the ability to work with clients and are rich in hands on work that requires the intellectual skills to read manuals and problem solve. Be sure students are fully exposed to these opportunities and benefits and provide open access to BOCES programs for students who meet modest prerequisites. There is significant demand, earning power, and professional opportunities in these careers. The trades are a path to a middle level income, often provide an entrepreneurial opportunity, and can serve as the source of support for additional education. They also have the added value of being very difficult to export or digitize. This gives them an important share of the jobs of the future. The focus should be on offerings related to manufacturing, construction, and transportation. These are the leading industry sectors in the region.

Continued participation in TEC SMART Green Tech/Sustainable Industry program would be consistent with this recommendation.

- c. Review all information technology course resources at BOCES and in the math and business departments. There are significant employment opportunities in this area, but the offerings are varied, located in different places in the school and course guide, and in competition with each other. Development and presentation of coherent pathways will be critical to raising enrollments. Extending the opportunities to earn industry-based certificates and increasing work-based learning opportunities should help incentivize completions of a sequence.
- d. Consider developing an NYSED CTE Approved Program using the current business sequence offerings in management, marketing, and accounting. This will require that it be taught in the main by the business faculty, have the intensity of at least five units of study, and result in a certification examination including written, practical, and portfolio elements. A focus in accounting and finance would be consistent with the area’s number two industry.
- e. Explore program possibilities in healthcare. Anticipated growth is nearly 21%, and demographics imply continued growth for the next several decades. The BOCES offers two health-related New Visions programs that should be investigated as potential options and profiled if determined to be of high quality. In the alternative and assuming sufficient enrollment, planning with a health-related institution in proximity to the high

school to foster a partnership should commence. An option to explore is creating a senior year program in Allied Health that includes instruction from a clinician, provides senior English credit, requires a senior project and presentation, and includes visits to various health service facilities to understand the full realm of the industry including logistics, business, professional development, etc.

- f. Related academics in career education courses should always be fostered. Each of these recommendations requires close collaboration of academic and CTE faculty. The BOCES programs all offer some academic credit, which should be accepted and transcribed by the high school. In local programs combinations of career courses and academic courses should be aligned. CTE teachers must reinforce academic skills required to master the technical skills they convey, and academic teachers must make their instruction relevant to the career interests of the students. This will require collaborative professional development and planning.

10. **Professional Development.** Typically, high expectation school districts like East Greenbush do not concentrate on career education. However, with the economic downturn, soaring college costs and debt and the large number of unfilled jobs across the country, there is renewed interest. East Greenbush is properly taking a closer look at career education. Expanding the focus on career education will require a shift in perspective for the leadership, faculty, students, and community. In particular, all faculty will need to have their awareness raised and to alter instructional approaches and content. Key, of course, will be the Board of Education policy on college and career readiness. Instructional leadership at the district and building levels will need to develop embedded and explicit professional development consistent with that policy and strategies for its implementation. This will require deep involvement of the leadership to help faculty grasp the need for career education and embrace the change.

11. **BOCES.** Recent changes in the district's participation in BOCES may not have served you well relative to efficiency and opportunities for students. Enrollments in the high school IT program are very low, and the continued investment in equipment and staff training may not be cost effective. Exploration of the cost of IT and other offerings may result in true cost savings with the application of aid. Additionally, consider looking at what neighboring districts are doing that you might do jointly. Under the education law, the sending district would contract with the BOCES who would contract with the host, and the sending district(s) would receive aid. This is now occurring with TEC SMART program at Ballston Spa. These collaborations are worthy of exploration to determine cost effectiveness and maintain offerings.

There is good will at the high school with leadership and guidance staff for BOCES and a sense that the recent pull-backs have limited student options. It may be worthwhile for the district leadership to meet with BOCES leadership and review the recent "dust-up." This should of course be done with the expectation that BOCES will deliver quality services at a

responsible cost. The district uses BOCES in a variety of ways, and a healthy and open relationship will benefit the district and its students.

12. Project Lead the Way Recommendations

- a. Consider ways to assure that students complete the three units of PLTW. It is assumed that these students are seriously exploring engineering. Completion of the sequence will assist them in this analysis and give them a head start at the post-secondary level. The absence of incentives will create a pyramid effect, where many students start the program and very few finish. If this happens, it will raise serious questions about the efficiency of the program.
- b. Initiate efforts to attract more females to the program.
- c. Move the Introduction to Engineering Design (IED) class to the 9th grade level.
- d. Keep the Principles of Engineering (POE) classes at 11th or 12th grade level, because physics and higher level math concepts are necessary.
- e. Implement the Computer Integrated Manufacturing (CIM) curriculum in the 10th grade. This would be the best fit due to the type of high-tech manufacturing industries within the areas. The CIM course deals with four major areas that local industries well: 3D Design, Robotics; CNC Machining, and Automated Manufacturing.
- f. In the Columbia High School College in the High School course listing, “Topics in 2D Auto CAD” is offered. If this is offered for just for the college credit, then the district should consider offering Auto CAD Inventor, which is a 3D design package, or Solid Works, which is the industry standard, instead. Mr. Zefarano’s recent experience as a quality control inspector leads him to believe that the 2D Auto CAD course is outdated.
- g. To insure the district has a feeder program into the high school PLTW program, consider offering a unified middle level technology program from a third-party provider. There are several good choices that can serve as feeder programs into PLTW and other technology and IT programs at the high school. These include Engineering by Design, which is a high-quality low-cost program, and the PLTW Gateway to Technology program. This would introduce engineering concepts to both males and the under-represented female population.
- h. Act on allowing the IED course to fulfill the Fine Arts requirement for graduation. Most of the people interviewed were surprised that this was not the case. Counselors were positive about having another option to fulfill this graduation requirement.
- i. Consider very carefully the aerospace engineering or civil engineering program that

leadership in the district is proposing be offered as the third part of PLTW. Although students and faculty have expressed interest, due to the strong local manufacturing base, it may not serve students well for future employment opportunities. While the donation from 3M is a real positive, engaging them on this recommendation should result in the awarding of the funds for Computer Integrated Manufacturing (CIM) implementation. We recommend a focus on Recommendation "C" above.

13. A Moonshot. The New York State Association for Career and Technical Education has proposed a change in graduation requirements that would require every student to graduate in one of the career pathways: Humanities, CTE, STEM, Arts, and Languages Other than English (LOTE). Every student would take a base program that includes all of the 9-10 academics (and 11th ELA) plus one CTE credit and ½ credit in Career & Financial Management. This would be a 15-credit base. At that point, students would move into a pathway of 7 credits, with differing requirements to graduation depending on the pathway. In addition, every student would leave with a career plan and often a credential or certification on the diploma. This 22-credit model would require very few changes in the graduation requirements or your current offerings but a significant reorganization of how it is presented to students and parents and delivered by all faculty. Just about everyone must end up employed to sustain themselves and perhaps a family. This proposal creates a career focus and offers students real choice in different pathways to complete high school. This would be a real revamping of high school and a challenge to implement, but you may want to look at it. We can provide more information and lead a discussion if there is interest.

CONCLUSION

This is a lot to digest, and we encourage the district to engage in broad-based conversations about the findings and recommendations. At that point, select what you want to do first and go to work. This will be a long-term project over multiple years. There will be challenges as you ask leadership, faculty, community, and students to embrace change. Think big, start small, and gather your successes.

Much of what you need is in place with staff, professional development resources, courses, curriculum development resources, leadership, and interest. Significant investments in infrastructure at the middle school and high school and in instructional resources, technology, equipment, and texts and manuals will be required. Much of this can be accomplished through the anticipated facilities project and building aid and careful use of available technology aid as outlined below.

It will be important to be clear that adding a career focus in no way diminishes the value of the Humanities and Fine Arts. Nothing could be more damaging than presenting this work on careers as an either/or investment of time and resources. We all should remember that the arts and humanities are the things that make us human. They also offer many career opportunities and are the building blocks of many jobs.

If we have made factual errors in our findings or analysis, please forgive the oversight and let us know so we may correct the report.

Finally, the CTE TAC can assist you in this work. Our main offices are close by in Rexford, and you will have access to our field team associate, consultants, and national contacts with schools and CTE leaders who have done similar work, often at no cost. We stand ready at the request of the superintendent and Board of Education to present our work to faculty members, school and district leadership, the community, and/or the Board of Education. Please contact Edward Shafer at ed@spnet.us for additional assistance