The Directors’ Report: Assessing New Hampshire’s Career and Technical Education

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Executive Summary

This report details the findings of a needs assessment study of New Hampshire’s twenty-eight center statewide Career and Technical Education (CTE) system. The needs associated with bringing about necessary change to the current system were categorized based on three goals pertinent to success for students in CTE. These goals are:

- to require high academic achievement;
- to offer training in careers that will sustain a family;
- and to create a seamless transition between secondary and postsecondary education.

Does New Hampshire successfully provide quality career and technical education for high school students, and does this system meet these three goals? In the fall of 2005, career and technical education directors were asked to respond to a survey that focused on these three goals. Written in asp.net programming language and accessed online through a password protected website, this survey collected the responses of career and technical education center directors electronically; 78.5 percent of the directors responded.

The data generated from the directors’ responses serves two purposes. First, the data will be used by the Department of Education to identify centers that will benefit from action plans developed to address these three focus areas. In addition, the collected responses measure the current status of CTE in New Hampshire from the perspective of the directors of these centers. This report details their responses to the needs assessment survey.

The following conclusions ascertained from this report are:

- CTE must be widely recognized as a different educational experience than vocational education programs from the past;
- Academic content in CTE must be rigorous and demanding, aligning with other secondary and postsecondary education programs;
- Some CTE programs are not adequately preparing students with training that will eventuate in family supporting careers;
- Guidance personnel in schools must actively engage students and help them choose rigorous academic courses needed to achieve their career goals;
- Students need to be encouraged to view their entire educational experience as a meaningful step toward their life’s work.

When career and technical education is recognized as a learning experience beneficial to all students, the goals that are the focus of this study will be attainable.
Unfortunately, many still do not perceive CTE as a challenging, academically rigorous, and productive educational platform. Career and technical education in the 21st century is not vocational education that trained workers for a single skill set. Work is complex and so is the career and educational training required for success in today’s economy. Academically rigorous career and technical education that prepares students for postsecondary educational opportunities and a family-supporting career should be included with all other high school reform initiatives.
Introduction

Recent attention to the educational system in our country has resulted in improving teacher qualifications, standardizing curriculum, and revamping learning environments. Unfortunately, many schools are still not preparing students for success. More students are finding education, as it currently exists, to be an un.rewarding and irrelevant enterprise. The world they face is dauntingly different than a century ago when most public high schools were last redesigned.

Currently, a powerful movement to reform public education in America has attracted the attention of business leaders, government officials, community members, parents, and students who want something better than the educational system that exists today. Too many high school graduates find they are ill-prepared for college or careers. The dropout rate continues to climb. How can this crisis of underachievement be resolved?

Redesigning an educational system that is more than a century old is difficult, perhaps because no one is sure what a good public education should provide. What do we want for our children? Is our goal to create a high tech working class to compete in a global economy, or are we trying instead to develop scholars who will master critical thinking and solve complex world issues? Our educational system in this country needs to do both.

Some states have developed a system of secondary education that makes career and technical education a mandatory component in every child’s public school experience (Richard, 2005). In South Carolina, for example, The Education and Economic Development Act of 2005 requires each high school freshman to choose, with the help of parents and guidance counselors, a career major. Then, over the course of the next four years, students are able to select electives that build toward self-designed career goals. This positive approach to relevant and rigorous education helps students connect to the work their education requires.

In New Hampshire, the Department of Education supports a new vision for high school. Embracing the new 3R’s of education, relationships, rigor, and relevance, the Department also supports a fourth major component of successful redesign, and that is results. How well are each of these components represented in the statewide career and technical education system as it currently exists in New Hampshire? The small classrooms and laboratories of CTE offer students the opportunity to develop relationships with instructors and peers. Rigorous academic content is currently embedded in much of the CTE curricula. When students can see their knowledge applied in a contextual learning experience, they are better able to understand the relevance of their academic studies.
The first steps in a statewide assessment have been completed. Findings from the questionnaire sent to career and technical education directors across the state in 2005 reveal what they understand to be the challenges and successes in meeting the three goals for this study.

Clearly, education is at a crossroads. Today, work is more technical and demanding, and this means education must also be more technical and demanding. Public education in the 21st century must reflect our changing world. Improving the quality of education for all high school students requires meaningful, relevant and preparatory education that will lead to meaningful and rewarding work in life.

**Methods and Materials**

In order to determine the quality of career and technical education being offered to high school students in New Hampshire, an assessment tool was designed and distributed to the directors of career and technical education centers across the state currently receiving federal funds through the Carl D. Perkins Vocational and Technical Education Act of 1998. This assessment tool addresses three goals of current and anticipated legislation related to this act (survey, Appendix A). Questions pertaining to these goals required rating, multiple choice, and short answer narrative responses. Written in asp.net programming language, the assessment tool was distributed via email using a link to a website where the survey resided. When a significant number of respondents had answered the survey, the data was gathered and analyzed. Their narrative responses offered valuable insight into what directors perceive as the strengths and weaknesses of the current system of career and technical education in New Hampshire. These narratives are incorporated throughout this report as directors’ comments.

**Procedure**

On October 21, 2005, directors of twenty-eight CTE centers offering programs for New Hampshire high school students were sent an email directing them to the website with a brief explanation of the purpose of the assessment and a request for participation. Over the next several weeks directors accessed the site, entered a login and password, and then answered the questions before submitting them to the password protected website. Each time a survey was completed, an email to the researcher was generated notifying her of new data. Seventy-eight and half percent, that is, 22 of the 28 directors participated, and on December 15th the link to the survey was closed with the data collection phase of the study complete. The graphs and tables generated from the data were analyzed. Short answer narratives offered the directors’ voices to the data, and these comments were collected in an MS Word document.
Results

The survey consisted of twenty questions concerning the three goals that are the focus of this study: to require rigorous academic coursework in CTE, to provide training in careers with family-supporting wages, and to improve transitions between secondary and postsecondary education.

**Goal: to promote high academic achievement in CTE**

The first question in this category asked directors to estimate how well students in CTE perform academically in their programs. Most directors stated that their students were performing midrange or slightly lower than the average. It is important to note that what directors considered average was a subjective measure. All directors said that they believe academic achievement is expected of students in their programs and that their instructors are using varied methods of evaluation for the academic content embedded in CTE; these methods include labs and tests, portfolios and other writing assignments, research projects, and observed performance.

As a tool to ensure uniform standards and academic course content that aligns well with technical teaching, statewide core competencies were developed by focus groups consisting of CTE teachers, directors and Department of Education personnel. This was completed prior to and separate from this study. The directors stated that their instructors find these statewide competencies very useful or somewhat useful when planning lessons and coursework. Survey question 1.3 asked, “How useful do your CTE instructors find the statewide technical core competencies when planning their courses?” The following bar chart (Figure 1) shows that directors believe their instructors are effectively using the competencies in lesson planning and assessment. Twenty-two directors (all respondents) stated that their instructors found the competencies very useful or somewhat useful.
Although the CTE course content is defined by state standards, not all students are benefiting from a holistic approach that includes academic coursework to support their career and technical education. Unfortunately, the directors believe that CTE students are not receiving adequate guidance in choosing the academic courses they need relative to their career goals. When asked if guidance counselors and students use career cluster planning outlines to help them choose the courses they need, only a third of the directors responded that these outlines are being used to help students choose the right academic courses for their career choices (Figure 2).

Career planning outlines, based on a career cluster of the student’s choice, serve as a visual map of the coursework students need while moving successfully through their high school years (sample, Appendix B). These planning outlines clearly indicate a
balanced, grade-by-grade direction for students interested in any of the sixteen career clusters. Students, parents and counselors that use these outlines will know exactly what academic coursework the student must take to complement career goals before and during career and technical education in the student’s sophomore or junior year of high school.

Many schools have customized these outlines to focus on the career clusters that are available to their students and to align with the academic courses necessary to prepare for CTE in high school and at the postsecondary level. This planning tool should be revisited by parents, students, guidance counselors and career counselors frequently to ensure that students are successfully receiving the academic background they need in CTE.

It is imperative for students to enroll in academic coursework that is challenging and provides them with the knowledge they will need for their career and technical education. High school must prepare students for college, whether or not students choose to go. Unfortunately, the results of this survey from the directors revealed that most students are not being counseled to enroll in challenging math, science and English courses that support their CTE, thus limiting what career and technical educators can expect academically from those students who enroll in their programs.

Please note: Since the data from this survey was generated, a training session on the use of career clusters and career pathways was well-attended by guidance counselors, teachers and directors from both the middle schools and high schools around the state. The researcher expects that this training will positively affect the use of these outlines by guidance counselors and academic and technical educators in the future.

**Directors’ Comments:**

When the directors were asked what obstacles stand in the way of academic achievement in CTE programs, the responses were insightful. Some directors disparage the quality of students that are sent to their programs; old school ideas persist, and some educators continue to think of CTE as the only option for those who are unable to succeed elsewhere in the system. This has two effects. First, an overpopulation of students who are underachieving in a particular program will skew the performance indicators suggesting the program is flawed. Second, some students who might otherwise be interested in a program may “shy away,” unwilling to be identified with a population of students perceived as underachievers.

Directors also faulted the structure of the system of CTE delivery. Career centers leave CTE instructors with little control over the academic education their students receive in their home school (please note: Students are often sent from their home high school to a school that has a CTE center based on agreements with surrounding school
districts). Some centers, for example, have several sending schools (as many as twelve) with different academic requirements for each. Without being familiar with the academic coursework students have experienced, it is difficult to cross-reference the students’ level of knowledge in math, science and English to what they are experiencing in CTE. Planning time that would allow academic and career teachers to work together developing relevant teaching materials rarely exists. Even when students are in their home schools for CTE, connections between CTE and academic departments are sometimes difficult to make.

Directors also voiced concern over the quality of education students experience before they reach high school, even before they enroll in CTE programs. Often students are below grade level for reading, math and science when they leave middle school. Remediation has not always successfully addressed these problems before these students enter CTE, usually in their sophomore or junior year. Formal assessments should help students identify their strengths and weaknesses, but these tools are not effectively directing students to remediation when it is needed, before they leave middle school. Not enough students think about their education and their goals in life early enough for them to find the motivation to attain high academic achievement. All directors in the survey agreed that this has to change. Currently, the last formal assessment of students takes place at the end of tenth grade. By then, remedial efforts are less than substantive, with the intention of getting students through high school and graduation rather than preparing them for postsecondary opportunities in college or careers.

Directors’ comments revealed another academic weakness in the current structure of CTE in high school. Good CTE instruction continues to grow in complexity and content. CTE teachers battle the clock to find enough time to provide their students with state-of-the-art information in their subject. Because school-year calendars are defined by sending schools and those districts schedule vacation weeks and other days off for their students, it is not unusual for students to miss several days or weeks of CTE instruction during the school year.

CTE teachers want to teach the course content defined for their technical field without also having to assess and then teach academic content in their courses. In addition to time constraints, some instructors do not feel comfortable teaching or testing their students in math, science, and English; they are not certified to teach those subjects and feel it is enough to be experts in their technical field. For teachers who may have acquired alternative certification (ALT IV) with the State, academic lessons and planning could be supported with professional development opportunities and assistance from academic teachers, but this is difficult to achieve in the current system. Federal mandates from No Child Left Behind require highly qualified teachers to teach academic subjects. This further hampers the successful integration of academic content in CTE by requiring teachers to hold academic degrees in addition to their technical
expertise. A severe shortage of experts willing to teach often compounds this problem, especially in fields like information technology, nursing and engineering that offer jobs at much higher wages than that of a typical teacher.

Directors also cite the lack of credit for embedded academic content as an obstacle to meeting the goal of high academic achievement. Students are unwilling to commit time and effort to work that does not translate into something measurable like a credit or a grade. As a possible solution, one director wanted to incorporate academic courses in English, math, and science as part of CTE in her center, but this was misconstrued by her colleagues as a lower level alternative (a form of tracking), even though these courses were based on college level courses offered at the local community college.

Finally, one director commented that the culture of high school is one that is non-conducive to academic or technical learning. We need to rethink the structure and delivery of education at this level and define what high school is supposed to mean for students.

Goal: To provide training for careers with family-supporting wages

The second goal measured in this study pertains to the need for training in careers that offer family-supporting income. Family-supporting income in New Hampshire varies by county (Appendix C). The most recent study to measure the cost of raising a family in New Hampshire was conducted in 1999 by The Josiah Bartlett Center for Public Policy (Kenyon, 2000). They concluded that the minimum hourly wage needed for a single parent with one child would be, on average, $15.72 per hour. Since 1999, rents and fuel costs, as well as other expenses have skyrocketed, but wages have not increased significantly to keep pace. In 2006, it is unlikely that most high school graduates with training in any of the secondary career and technical programs will be able to earn wages that are enough to support a family. Some will be fortunate to enter the workforce with certifications in their fields; that will assist them toward this goal, and many will be better prepared than students without any career training.

It is, therefore, surprising that eighty percent of the directors responded that most of their CTE students will be prepared to find careers with family-supporting income, when they were asked to rate their graduates with this question: “Based on the 1999 livable wage study, how many of your program concentrators (not including students who will eventually own a business) will graduate with the skills necessary for family supporting employment from career training they received at your center?” (Figure 3)
Only twenty percent of the directors believe that less than half will be prepared to meet this goal.

When deciding which programs to offer at their centers, directors should consider how much students can earn with the training they receive, even if it is not the terminal point of their CTE education. As much as educators hope that high school will not be the final stage of a student’s education, for many students it is. Students are expected to continue in their fields of study, but to believe this goal will be achieved without some postsecondary effort is not wise.

Students choose career paths for a variety of reasons, ranging from what their parents and teachers suggest to the careers of their favorite television characters. Often CTE directors promote programs that students would want to explore and find interesting, hoping to attract participants that will continue as second year students. In general, students’ personal interests in the field of study seem to be the main reason most enter and stay in CTE. Directors indicated that local employment opportunity and earning potential are sometimes factors, but these reasons are not as important to students as their own career interests.

How well are advisors (mainly teachers and counselors) guiding students toward careers that will sustain a family? Gender seems to affect the career directions suggested. Directors were asked “When students are guided toward career choices, rate the level of importance advisors (teachers and counselors) place on family-supporting income.” For male students, 90 percent believe that careers with family-supporting wages are medium high to very high in importance; for females, however, family-supporting wages were important to only 55 percent. That leaves 45 percent of advisors suggesting female students in CTE do not need to focus on careers that will provide wages capable of supporting a family.

Figure 3

Only twenty percent of the directors believe that less than half will be prepared to meet this goal.
Even though 80% of the directors feel most of their CTE students will be prepared to find family-supporting careers, female CTE students are less likely to be successful in this pursuit even after postsecondary degree programs. Directing students toward careers that may be nontraditional for their gender and considering elimination of some programs that do not have promising earning potential may be necessary steps.

What are some reasons for offering career and technical courses that may not provide a livable wage? Student interest is, of course, one obvious reason. CTE classes are interesting and often quite fun. Another reason might be local employment opportunity. Funding new programs is usually determined by the local community, based on what they would be willing to support financially in terms of equipment and staffing. Although CTE is supported by federal Perkins legislation, and funds are distributed and monitored by the state, decisions at the local level ultimately determine whether a teacher is hired or if equipment will be provided. (Current legislation does, however, allow budgeting that supports initial funding for hiring and equipment for new programs.) A new program needs support from the local community, and local officials must perceive and be able to defend a need for it to the taxpayers. The same local control problem exists when trying to eliminate programs that do not offer training in family supporting careers. If the community sees a need for cosmetology or childcare, and there are students that want to enroll in these programs, it is very difficult to rationalize discontinuing them.

**Directors’ Comments:**

Most directors agree that CTE in high school is an educational strategy and not a final step in preparing for a career. It is difficult to prepare students for immediate entry into the workforce at the top end of their chosen fields. High school graduates need to work their way up to an acceptable wage. Overall, CTE students, like other high school students, are encouraged to continue their education beyond high school. With only a few exceptions, students will require additional training to achieve employment in family-supporting careers.

For most directors, choosing which programs to offer is not an easy decision. As one director stated, “I can’t include a new program if the school board won’t let me hire a teacher to teach it!” Local control frequently determines new programs, and often area businesses hold the most clout. It is unfortunate, then, that many directors do not consider local businesses as the potential employers of their students.

Only five respondents suggested that most of their graduates will be able to find local employment that can support a family, while nine directors felt that less than half of their students would be successful in this regard. Surprisingly, more than thirty percent did not know or felt the question was not applicable in their centers when
asked: If local employment opportunity is a deciding factor when choosing which courses to offer, how many of your graduates find local employment that can support a family? (Figure 4)

Focusing on the importance of quality CTE that provides a realistic path toward financial security would, perhaps, eliminate some programs, but it is difficult to initiate new programs due to a lack of resources. It is important to reconsider the value of any CTE program that will not eventuate in family-supporting income. One director suggests that part of the issue is the need to increase minimum wage and decrease the dependency on cheap student labor, especially in areas of the state where employment opportunity is limited.

Another director summarized the feelings of many when she said, “Our center can’t give up the programs we have. We need to explore ways to expand the students’ understanding of employment opportunities from these programs.”

Goal: To strengthen links between secondary and postsecondary education

Before students begin to plan for college and careers, they experience years of guided study. Every year builds toward the ultimate goal of becoming educated and ready to take one’s place in the world. How well CTE students are informed of the academic requirements for their chosen field is a fundamental indicator for success in high school and beyond. It is too late to wait until the tenth or eleventh grade, when most students are first entering CTE, to discover that a student is ill-prepared for the academic rigor that will ensure success.

When directors were asked, “Rate how well guidance counselors help CTE students choose academic coursework to support their CTE programs and college or employment plans” the results were dishearteningly weak (Figure 5).
The directors’ responses shown in figure 5 indicate that they recognize a need for improvement in guiding CTE students toward appropriate academic courses. More than 45 percent of the directors feel guidance counselors are either “below average” or “poor” in helping students choose the right academic coursework necessary for students to continue their CTE at the postsecondary level. A misunderstanding of CTE courses may be part of the reason for this problem. This further shows the disconnect that exists between sending schools and centers, the academic side of the schoolhouse and the CTE side.

What students will do and how well they will succeed after high school depend on the choices they make in school and in life. Successful CTE students may enter into the workforce with certifications in their chosen industry. Other students may take several classes in high school that allow them to advance more quickly through college coursework, satisfying prerequisites through articulation agreements between their school and postsecondary institutions. Some high school students are able to earn college credit for the classes they have taken in dual enrollment opportunities like Project Running Start or Project Lead the Way. Postsecondary options are ingrained in the structure of career and technical education environments, reinforcing the idea that high school is not the terminal curriculum of a student’s educational agenda.

It is expected that increasing academic rigor in high school CTE will help students better prepare for college level studies. In fact, 63.5 percent of the directors believe most of their students continue their career training at the postsecondary level. In figure 6 it is clear that directors are confident that their students continue their education after high school (Figure 6).
While strengthening partnerships between secondary and postsecondary education has been a function of The Department of Education in New Hampshire, the Department does not have regulatory control over the college systems in the state; that is the function of The New Hampshire Postsecondary Education Commission. Currently, statewide Memoranda of Understanding (MOUs) have been negotiated with the New Hampshire Community Technical College System (NHCTCS) for many CTE programs. The development of these articulation agreements continues, tying secondary CTE program curricula with those offered by postsecondary institutions. It is the goal of the Department to continue orchestrating these agreements between the two entities until all CTE programs in New Hampshire high schools have program continuity at the postsecondary level.

Directors’ Comments:

All directors agree that improved links between secondary and postsecondary schools will benefit students. Articulation agreements are being standardized with help from the state. Almost all directors cited the need for better articulation agreements and increased opportunity for dual credit courses. It is discouraging for students to sit through (and pay tuition for) classes that cover the same material they already mastered before they went to college; better alignment is necessary to prevent this. Dual credit courses offer students the greatest advantage, but the high school teacher must often have a master’s degree to teach these. This limits the opportunities available, since some CTE instructors are certified without advanced degrees through alternative certification agreements designed to accommodate critical shortages in some fields.

Also, directors say they would like to see a two-way effort to streamline transitions with more involvement from postsecondary institutions. Some sense efforts
toward streamlining the two levels of education are one-sided, with little effort on the
part of postsecondary institutions. Directors frequently shared their frustration with the
lack of college recruitment, suggesting that more could be done to attract students to
college campuses and programs. One director suggested that Career and Technical
Student Organizations (CTSOs) could help high school students establish connections
with their college cohorts by inviting them to events on campus. Also, could college
recruiters visit high school CTE centers? This would demystify the college experience
for some students who may have few higher education role models among family and
friends.

**Further comments from the directors concerning all three goals:**

Directors shared many candid observations concerning the three goals that were
the focus of this study, indicating their sincere desire to improve the quality of CTE as
well as their deep understanding of possible solutions to the problems our current
system of CTE delivery presents. Here are some additional comments and concerns
directors voiced in the survey:

- Students often seek out careers related to what they see around them. Career
days bring in people from all walks of life to show students what is out there for them. Expanding the opportunities for student awareness of the community beyond high school will lessen the influence of peers and pop culture.
- Getting to guidance counselors is vital. Directors often hear negative feedback from students about choosing CTE. Guidance counselors are telling students that if they want to be successful in life they should not take a “vocational” program, and that only dummies take “voc” programs.
- Training for guidance counselors is needed to familiarize them with CTE versus vocational training. It is a continuous struggle to overcome the misconception that vocational education is a second-class education.
- Recommendation: Teams of teachers working with the same group of students over years would help build rapport (this is one of the benefits of career academies). Students are with us for the last two years of high school. Trying to amend all that was not accomplished during the previous ten years of education is not realistic or possible.
- Hold students accountable for their learning from K-12, and be sure all students are at the necessary academic level to proceed to the next grade. Make learning the constant and time the variable in our educational system.
• These three focus areas need to be included as part of a much larger total school reform initiative to be effective.

Each of these comments and suggestions provide the researcher with valuable insight into the current status of CTE in New Hampshire schools and the State’s ability to advance the objectives of this study.

Discussion and Summary

Academic Rigor and Student Achievement in CTE

The first goal addresses academic rigor and student achievement in CTE. It is necessary for all students to meet high academic standards as they prepare for postsecondary opportunities, whether it takes them to college or directly into careers. According to the research of James R. Stone, CTE enhances academic achievement by translating abstract concepts (ex. geometry and chemistry) into concrete contexts (ex. carpentry and cosmetology); this seems to help many students (Alfeld, 2005). So, why are directors’ responses rating academic achievement on the midrange to lower level for CTE students?

Perhaps the answer to this question lies in the misconception of what CTE is and how it differs from a traditional understanding of vocational education. Some educators still believe that students in CTE do not need to perform well academically, but CTE is not the same educational platform as vocational education of old. It is no longer an alternative for the non-college bound. Some directors suggested that this misunderstanding of CTE by other educators and guidance counselors is damaging the image of their programs, making some students “shy away” from participating in classes they see as being populated by underachievers. The performance indicators that measure the success of a program are also skewed when a program, like Horticulture for example, is treated as a place to park students that are unable to achieve elsewhere in the system. Some directors stated that in, certain programs, more than 75% of the students are in Special Education programs with Individual Education Plans (IEPs). This imbalance can diminish the heterogeneous classroom that benefits all students.

A robust, challenging high school curriculum must include math, science, and English; learning these academic subjects gains relevance when students can apply their knowledge in career and technical coursework. By expecting more from students, they in turn, will ask more of their education. Career and technical education today can no longer be considered the domain of underachievers. The negative perception of CTE will change when more students are permitted to demonstrate that it is not the “Voc Ed” of previous generations.

Compounding the problem of lowered expectations is the persistent divide between academic and career education. Many directors find this problem
insurmountable. With centers having little contact with or control over the academic learning students experience in their home schools, it is difficult to incorporate and evaluate academic content in CTE programs.

This problem has been successfully addressed with the introduction of career academies. These new high school delivery systems group students with teaching teams that have co-developed the curriculum they are teaching. Academic and career and technical education become part of an integrated secondary-postsecondary collaborative that is naturally intertwined (Hull, 2003). Instead of the “learn this” approach, students understand the “why” of what they learn and this increases their motivation to learn it. Many career academies have been established across the country, and some schools have explored the career academy concept here in New Hampshire.

Quite often students don’t know what they will need to know when planning for postsecondary opportunities; it is the responsibility of caring adults in the student’s environment to guide them, directing them to those classes required for success in reaching their goals. Parents, the first teachers, are role models that can begin the task of helping their children know who they are and what they would like to achieve in their lives. Other important adults need to assume the responsibility of guiding children through the myriad opportunities that await them. When students set and create goals for themselves with the help of parents and other adults involved in their education, they find relevance in what they are being asked to accomplish. Students need to take a personal stake in their future, and this needs to happen early.

It is necessary to initiate a conversation of career choice when middle school students begin to express their individual interests. When these interests are paired with an understanding of their abilities, career pathways can be planned. Some believe that middle school, and perhaps even high school, is too early to choose a career path. Experts don’t agree. According to Ric Seager, an administrator and professional development consultant, “In vibrant Career Pathway high schools students change their pathway an average of three times” (Seager, 2005, p. 3). It is better to change career paths two or three times while in high school than to change majors once students get to college. The luxury of exploring career options can be better managed financially if students are not paying high tuitions while they experiment (Seager, 2005). It is also less devastating personally to explore a field than to fail in one. Some college students might deeply regret a wrong choice that leads to either dropping out or changing majors.

Earlier focus on where education is expected to take students serves another purpose. It is much too late to begin addressing the need for remediation, in any of the academic subjects, when a student is entering high school. Strong foundations in language skills, mathematics and science are necessary, and need for remediation should not wait until the tenth or eleventh year of public education. When this happens, the measures of success shift from helping students develop a pathway toward a desired career goal to just trying to keep the student in school long enough to graduate.
Providing Training in Family-Supporting Careers

This next goal examines whether or not students are receiving training in fields that will result in family-supporting careers. The education students receive should improve the quality of their lives and the world they live in while helping them be self-supporting members of society. Most understand that everyone needs to plan for a career and find a path in life that will be meaningful. Unfortunately, directors don’t usually feel they have control over this goal. The CTE delivery system, as it currently exists in New Hampshire, was created in the early 1970s to remedy pockets of poverty in the state (S. McKevitt, personal communication, June 10, 2005). Local employment opportunity may not offer careers that would support a family, yet this is, oftentimes, how many centers decide on what programs they develop. Since many students are forced to relocate for job opportunities, it would make sense to think of program offerings with a more expansive understanding of where students will find their careers.

In the survey, a table indicated livable wage by county in 1999 for the directors to reference when answering questions about programs in their centers that lead to family-supporting careers (Appendix C). It was surprising to the researcher and counterintuitive on the part of a majority of directors to believe that their centers were satisfying this goal. Program improvement to provide training in family-supporting careers must be recognized as a need before it can become an initiative. Helping directors meet this goal in their centers may require elimination of some programs and the introduction of new ones to replace them. Directors find this a cumbersome task. Also, it is hard to dismiss the popularity of some programs that do not meet this goal.

Research supports the need for promoting programs that train both males and females in careers that can sustain a family; this should be a priority for CTE. According to economist Ross Gittell, “Roughly fifty-seven percent of workers in the state earning minimum wage are women, yet sixty percent of the graduates from New Hampshire colleges are women. Those women with higher degrees have lower level jobs and earn less money than men” (Arsenault, 2005). Jobs that are traditionally filled by women, like teaching and healthcare, pay less even though they require postsecondary degrees.

Directors encourage students to continue their CTE at the postsecondary level. Still, more needs to be done to direct students toward careers that will be rewarding financially for both men and women after a degree is earned. Social demand for childcare providers and healthcare workers will not diminish, and this may one day drive up wages in these careers. Until then, it is important for all young people to believe in and understand their great worth and future potential when choosing careers. Directors must help students break free of stereotypes and seek careers that will sustain them and their families regardless of their gender.
Improving the Transition between Secondary and Postsecondary Schools

All students must be prepared for postsecondary education, regardless of their current postsecondary plans. If students choose to go directly into careers, most agree that high school will not be the end of their education. Today’s careers demand more than basic skills. College prep is not the exclusive, liberal arts alternative of choice for smart kids heading for the university. More students are discovering that two and four-year college degrees are necessary for achieving most professional goals, especially those that were once considered “vocational”. The Executive Director of the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc), Kimberly Green (2005) reiterates this understanding. She explains, “Our labor market demands that most individuals will need some postsecondary education to maintain a marketable skill set” (p. 3). CTE programs begin in high school but continue in college. Leaving high school prepared for college is a first step students can take toward improving the transition between secondary and postsecondary education.

How well are students prepared for postsecondary opportunities once they graduate from New Hampshire’s high schools? A method of data collection to follow students throughout their education is currently being developed. Right now the state does not have a standardized means for tracking students beyond high school, and this prevents high schools from truly knowing how functional and effective their curriculum is in preparing students for postsecondary education.

Research shows that, nationally, the statistics are not encouraging. Last fall, at the NASDCTEc conference, Dr. Corinne Alfeld shared some startling statistics: of 100 ninth graders, only 40 will start college four years after they begin high school. Of those 40 students that start college, 31% will leave before the end of their freshman year with zero credits (Alfeld, 2005). This indicates serious flaws in how high schools are preparing students for postsecondary education, including those students enrolled in CTE programs. Improvements must be made at both the secondary and postsecondary levels to prepare all students for the challenges ahead. This could begin with a system of common measures shared by secondary and postsecondary schools.

To successfully link the two levels of CTE programs and know that students will be prepared for college coursework requires some system of shared accountability measurement. Kimberly Green states, “Data is expected to determine a system’s or program’s effectiveness, while at the same time providing practitioners with meaningful and useful information used to guide student success and program improvements” (Green, et al, 2005). Most educators do not see accountability measures in a positive light. Some are concerned that the data will be used to question the value of their programs or their teaching ability. To tie secondary and postsecondary programs together effectively, however, some common measures need to be used. Data
that is shared across systems will promote shared responsibility for student success. A better understanding of educational pathways is needed for both educational levels. This would result in a common accountability measurement. Better prepared high school students will succeed when they reach college. Better prepared students will reduce attrition and increase postsecondary completion rates, a measure of success for both levels of education.

Recommendations

The following recommendations are derived from the survey results and research that supports these findings. These suggest statewide initiatives meant to improve career and technical education currently offered to high school students in New Hampshire.

1. **Improve access to career and technical education so these programs are available to all eligible students.**

   The current system of delivery and access to career and technical education is based on a design that is now outdated. Many centers must limit the number of students they can accept from sending schools. Some programs have fewer seats available in the second year than the number of students that want to enroll and complete programs. Often, the time it takes to transport students to a distant site cuts into a program’s instructional time, limiting the content that the instructor is able to cover. In some cases, a program is not offered because the cost of equipment and teachers exceeds the local school budget, and local school boards have control over what programs they are willing to fund. An assessment of how and where CTE is made available to New Hampshire high school students is needed so all eligible students have access to CTE as educational environment where they can apply and retain what they learn in school.

2. **Market CTE as the choice for high-performing, goal-oriented students.**

   Why do school boards, legislators, and community leaders shun CTE and refuse to improve and increase these programs? One reason is the overall misconception by the general public, educators, parents and students, of what career and technical education is today. By 1994, enrollments in secondary vocational education decreased for several reasons. To summarize, these programs were not seen as meeting the needs of students, were seen as “dumbing down” the curriculum, and were offered to those students that were disadvantaged or not aspiring to a four-year college. More than a name change has occurred since 1994.

   The general perception persists today that vocational education, now known as career and technical education, will inhibit rather than enhance future career and educational choices (Lynch, 2000). These misconceptions illustrate the need for a better
understanding of what CTE is in the 21st century. Refining the image of CTE will come about by first expanding access to these programs, so a truly heterogeneous student population can be served. To attract high achieving students to these courses, educators, parents, students, and the community must begin to view CTE as an educational system that benefits all students.

Next, CTE curricula are not widely understood as rich and rigorous contextual learning experiences where students apply the academic knowledge they learn in their other courses. Breaking down a culture of separateness that exists in some schools will be necessary to encourage teachers to share what they do in their classrooms. One way of doing this is to structure a team-teaching environment, where academic instruction works side-by-side with CTE. A team approach would allow teachers to teach and assess embedded academic content and, in some circumstances, give students the opportunity to earn credit for their efforts. *No Child Left Behind* legislation requires highly qualified teachers for academic teaching. Professional development opportunities that explore methods of team-teaching should be encouraged.

The annual document put out by schools generally referred to as “Program of Studies” sometimes compounds the culture of separateness that divides students as much as faculty. This document usually opens with the school’s mission statement and then describes the course offerings. Often the language of these course descriptions will perpetuate the notion that academic courses for CTE students are somehow substandard to those designed as college preparatory. This is a subtle form of tracking and is no longer a recommended practice in education. Furthermore, most CTE programs continue at two-year and four-year postsecondary institutions. CTE students attending college will be required to take college level math and English courses as part of their degree programs. *Language in program of studies documents that suggests CTE courses do not require the academic rigor of college prep courses is misleading and must be eliminated.*

CTE academic coursework should not be less challenging than other academic high school curricula. More academic courses for CTE should be eligible for college credit. *Further consideration should be given to increasing dual credit opportunities in academic courses for students enrolled in CTE.* Currently, *Project Running Start* offers college courses to high school students at reduced tuition rates. There are many CTE dual credit course options, but more could be offered in academic subjects taught at CTE centers. There are academic courses currently being offered by the community college system in English, math and science that could serve as models for academic courses taught at CTE centers. This would, again, require teachers working together on a common goal—to ensure that course content satisfies both the high school and the postsecondary requirements.

When students, parents, and educators see the value of a unified teaching effort, transferable college credits earned in high school, and the practical and efficient
education that will result, career and technical education will be recognized as a valuable educational opportunity for highly motivated, high-performing students.

3. CTE programs should be tied to high school reform and other state initiatives.

The high school reform movement has come about for several reasons; the most obvious reason is the realization that high school education in this country is failing to meet the demands of a new post-agricultural, post-industrial economy. Today’s workers must be prepared for a culture that values knowledge-as-product, team problem solving, flexibility, and an ability to continue learning. There are few jobs today that require the mastery of a single skill. Career and technical education addresses all of these new worker skills, by preparing students to enter the workplace either immediately after high school or when they complete their CTE studies in college. Even when students decide to follow a different career path, it is clear that the student’s CTE experience in high school enhances their employability. Relationships, rigor and relevance, the new three R’s of education, are all present in the small classrooms and laboratories of a career and technical education program.

Everyone wants a better public high school. Student dropout rates continue to climb, with students stating the lack of relevance in what is being taught as the number one reason for falling behind and eventually giving up on their education. In the article “The Silent Epidemic: Perspectives of High School Dropouts”, the authors state, “Nearly half (47 percent) said a major reason for dropping out was that classes were not interesting” (Bridgeland, DiJulio & Morison, 2006, p. 1). Many of these students were not suffering from poor grades or external pressures that prevented them from graduating. School just didn’t have enough meaning or relevance for them.

Career and technical education is not a dropout prevention strategy in itself. Already, CTE suffers from image problems; some believe that it is an unhealthy avenue for a subculture of students. This image of CTE needs revision. Career and technical education today is, however, a model of what is succeeding with students who are finding the relevance of contextual application for academic subject knowledge. Unfortunately, those educators closest to the success are the only ones acknowledging the value of these programs for students. Funding continues to be in jeopardy, and publications that address high school reform denigrate the value of career and technical education, confusing it with vocational programs as they existed in the past. Those involved in high school reform and redesign should consider career and technical education for its successes in preparing students to meet the demands of a new and competitive world economy.

4. Academic coursework should be consistent in quality and content in all New Hampshire schools.
Currently, there is no uniformity in the quality or content of academic subjects from one school to the next. This serious flaw in our educational system becomes evident when students with varied levels of academic proficiency arrive at their CTE center from their sending schools. This problem may be remedied to some degree when academic competencies are a state requirement in 2008.

In addition to competency-based courses, planning periods that allow teachers to share their course content could be achieved with web-based technology. These virtual teaching and learning communities eliminate the communication barriers of time and distance. Encouraging teachers to improve their relationships with each other and share their knowledge and expertise may result in the discovery of some fertile common ground where collaborative ideas can grow. Innovative solutions from teachers that address the problems of teaching in isolation should be further explored. Teachers should be supported in efforts that allow them to share their experiences and standardize their course content.

5. Measure academic performance of students early in CTE, as a student enters a program, and again, when the program of studies is completed at the secondary level.

There are several reasons for developing a method of assessing the academic performance of CTE students. First, academic performance is one of seven performance indicators tied to program approval and federal funding. Currently, no formal assessment of academic achievement is given in the last two years of high school when most students are engaged in their CTE programs. After tenth grade it is a difficult task to determine how well or poor a student is doing academically.

Second, a formal assessment of CTE students as they enter their high school CTE program of studies will allow them to seek remedial support in academic subjects that they may need in order to succeed in their career and educational endeavors. Remediation should be offered before students leave high school. Also, giving students the ability to know their strengths and weaknesses will help them direct their education toward success in high school and in postsecondary education and careers. Discovering a deficit in academic foundation courses when entering college requires remediation that will often delay entrance into postsecondary programs, frequently resulting in frustration or failure for a student.

Finally, at the end of their high school programs, CTE students should be tested again. This will confirm the quality of their education and give them a solid understanding of their successes and their challenges. In addition, it may help affirm the quality of programs being offered. A standardized measurement of academic achievement is needed for CTE students when they enter and when they complete their programs at the secondary level.

6. Encourage students to begin planning for their career goals as early as middle school.
Connecting students to their career goals and making these goals the motivating force behind their own education will instill the relevance of their learning. Some may argue that middle school is too early for children to think about their postsecondary plans. However, the academic rigor necessary for most jobs today cannot wait until a student reaches high school. When the student has a clear goal in mind and the guidance to help choose the appropriate courses, this early planning and preparation can lead to success. Parents and teachers must encourage students to think beyond their educational years and consider what field or career would fit their interests. Waiting until the last two years of high school to begin thinking about a career is too late. Some attention is paid to career exploration in the middle grades, but there needs to be a more focused approach.

Even when college is in the plans, some students may find that they are not adequately prepared academically to go into the major of their choice without remediation in math and English. Too many students arrive for their first year of high school below grade level in math and reading. Remediation should take place in middle school so that all students are performing at their grade level in reading and math before they become high school freshmen.

7. Young women must be encouraged to pursue training in family-supporting careers.

Sadly, gender inequity is alive and well in New Hampshire. Even armed with a college degree, women often are paid less than men because the roles they fill in society do not pay as well as careers traditionally filled by men. When young women are seeking guidance for their career choices, these inequalities should be made clear so they can make an informed decision. Changing society is a gradual process.

The next generation of women must be prepared to support themselves and their families. Everyone today must plan on working outside the home, and finding a career that will support a family is part of that reality. This survey showed that many young women in career and technical courses are not being directed toward careers that will help them compete for high-paying jobs. Directors need to be aware of the problems of low-wage careers and help young women see their potential beyond traditional roles in order to help them overcome the barriers to equality that still exist.


Career cluster outlines are a powerful planning tool for students, parents, guidance counselors, and teachers to use when charting a student’s courses and educational choices required for a chosen career. (See example, appendix B). These outlines will encourage students to examine their career interests, while helping them recognize the courses they need to take to be adequately prepared for the academic rigor in the CTE field of their choice. Students should not be surprised by the amount of math, science and reading involved in CTE courses. Knowing that these courses are
required, and having guidance and support to direct their choices, allows students to fully prepare for success in their chosen field. Career Cluster Outlines should be used by all students, effectively tying education to the desired outcome of a meaningful career.

9. Guidance counselors, parents and teachers need to understand the value of CTE and encourage all students to enroll in career studies while they are still in high school.

Why are students still being told that they are too smart for vocational education? Well-intended perhaps, but nonetheless misguided, this kind of advice robs students of opportunities. All forms of education are meant to prepare students for careers, including some requiring postsecondary education, such as law, business, biotechnology and engineering. These are career and technical education programs offered in high schools and continued in college. When students wait until college to begin thinking about a major, or a career direction that will satisfy their interests, they have already lost valuable educational time. Guidance counselors need to inform middle and high school students of all the opportunities available to them. They need to advise their students to take the correct courses that are required for their career goals. By taking the wrong science courses in high school, for example, a student may be prevented from enrolling in the career program she planned to pursue in college. Career cluster outlines for the sixteen career clusters should be used consistently. Guidance counselors and teachers need to help students see the value of every year of education, so all students are able to pursue their education with active and informed guidance from the trusted adults in their lives.

Conclusion

Education is experiencing a renaissance in the 21st century and with it career and technical education will blossom as an educational platform for success. This study reveals some positive change already in process. For New Hampshire, improvements in articulation agreements between secondary and postsecondary institutions continue to develop. Awareness of the value of CTE as a vehicle for contextual learning and educational growth is increasing among educators. Career academies are proving successful and showcase their ability to provide students with relationships, rigor and relevance, the new three R’s of educational reform.

Though many successes were measured in this study, work continues. Parents, teachers, and guidance counselors, all adults in a child’s world, must improve their methods of working together and sharing what they know to offer each student opportunities that will enrich their lives. Guiding and supporting every child through the countless opportunities that await them is vital. Efforts will continue, encouraging students to take a serious and active role in the direction of their education early in their
school years. Developing a system to monitor quality and content of educational programs will help educators and learners know what they need to improve in CTE systems and curricula.

The directors of New Hampshire’s CTE centers demonstrate the leadership qualities and understanding of the challenges that educational reform requires. The researcher gratefully acknowledges their contribution to this project.
References


Appendices

Appendix A. Assessment Tool Directors’ Survey

Appendix B. Sample Career Planning Outline

Appendix C. New Hampshire Wages by County. Josiah Bartlett Center for Public Policy
Appendix A. Assessment Tool Directors’ Survey

2005-2006 Workforce Investment Act – Incentive Grant Project
Needs Assessment Survey- Career and Technical Education Centers

Please respond to the following questions concerning the three goals identified as the focus for this study.

5 digit CTE Center ID#
Answer

Goal I. To Promote High Academic Achievement

1.1 From your experience, please estimate overall student academic performance as demonstrated in the CTE programs.

* Not Measured  Bottom Quarter  Mid Range  Top Quarter  Top 10%

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<thead>
<tr>
<th></th>
<th>Math</th>
<th>Science</th>
<th>English</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td>Math</td>
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<tr>
<td>English</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>Overall</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
</tbody>
</table>

1.2 Describe assessment methods your CTE instructors use to measure student proficiency in core academic subjects?

If different methods are used in different programs, indicate which method was used in which program.

<table>
<thead>
<tr>
<th>Math</th>
<th>Science</th>
<th>English</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

1.3 How useful do your CTE instructors find the statewide technical core competencies when planning their courses?

- Very Useful
- Somewhat Useful
- No Opinion
- Not Very Useful
- Of No Use
1.4 Are guidance counselors and students using Career Planning Outlines for each of the 16 career clusters when deciding which courses to take? (These outlines can be reviewed at the DOE website: www.ed.state.nh.us/techprep)

☐ Yes ☐ No

1.5 Of your CTE students who are not attaining high academic achievement, what system changes can you recommend to support them in reaching this goal?
Goal II: To Provide Training for Careers with Family Supporting Wages

The following chart shows the hourly wages necessary (in 1999) for family supporting employment in New Hampshire.

### Estimated NH Livable Wage by County by Household Type, 1999

<table>
<thead>
<tr>
<th>Family Unit</th>
<th>Belknap</th>
<th>Carroll</th>
<th>Cheshire</th>
<th>Coos</th>
<th>Grafton</th>
<th>Hillsboro</th>
<th>Merrimack</th>
<th>Rockingham</th>
<th>Strafford</th>
<th>Sullivan</th>
<th>NH Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two parents &amp; two children (both parents working)</td>
<td>$11.15</td>
<td>$11.12</td>
<td>$11.27</td>
<td>$10.29</td>
<td>$10.86</td>
<td>$11.71</td>
<td>$11.40</td>
<td>$11.78</td>
<td>$10.05</td>
<td>$10.96</td>
<td>$11.42</td>
</tr>
<tr>
<td>Two parents &amp; two children (one parent working)</td>
<td>$16.19</td>
<td>$16.14</td>
<td>$16.43</td>
<td>$14.47</td>
<td>$15.61</td>
<td>$17.32</td>
<td>$16.69</td>
<td>$17.31</td>
<td>$15.00</td>
<td>$15.82</td>
<td>$16.74</td>
</tr>
<tr>
<td>Two parents &amp; one child (one parent working)</td>
<td>$14.74</td>
<td>$14.73</td>
<td>$15.11</td>
<td>$13.11</td>
<td>$14.28</td>
<td>$16.02</td>
<td>$15.45</td>
<td>$16.07</td>
<td>$14.80</td>
<td>$14.51</td>
<td>$15.45</td>
</tr>
<tr>
<td>Single person &amp; two children</td>
<td>$18.17</td>
<td>$18.16</td>
<td>$18.56</td>
<td>$16.57</td>
<td>$17.73</td>
<td>$19.49</td>
<td>$18.93</td>
<td>$19.56</td>
<td>$18.30</td>
<td>$17.97</td>
<td>$18.92</td>
</tr>
<tr>
<td>Single person</td>
<td>$8.49</td>
<td>$8.42</td>
<td>$8.88</td>
<td>$7.63</td>
<td>$8.24</td>
<td>$9.50</td>
<td>$8.60</td>
<td>$9.29</td>
<td>$8.94</td>
<td>$8.30</td>
<td>$8.91</td>
</tr>
</tbody>
</table>

Notes: When both parents are working, the hourly wage is the wage for each adult. Children are assumed to be young (a single child is assumed to be 4 years; two children are assumed to be 4 and 6 years) and requiring child care if there is not a non-working parent at home.

You may view additional information from this study at the following website:

http://www.jbartlett.org/nh_basicneeds.html#fos_2

2.1 Based on the 1999 livable wage study, how many of your program concentrators (not including students who will eventually own a business) will graduate with the skills necessary for family supporting employment from career training they received at your center?

- [ ] All will be prepared to find careers with family supporting income
- [ ] Most will be prepared to find careers with family supporting income
- [ ] Less than half will be prepared to find careers with family supporting income
- [ ] None. This goal is not a priority for most students of this center.
2.2 How do students choose their career paths? Rate the degree of influence for each of these factors (5, greatest to 1, weakest)

<table>
<thead>
<tr>
<th>Factor</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>teachers</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>counselors</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>peers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other (TV etc)</td>
<td></td>
<td></td>
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</tbody>
</table>

2.3 How much consideration is given to the following factors when deciding what programs to offer at your CTE Center? Check all that apply.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Most important</th>
<th>Some Importance</th>
<th>Minor Concern</th>
<th>Not a Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earning Potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Employment Opportunity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Need</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
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</tbody>
</table>

2.3 (a) Explain Other or Perceived need
2.4 If local employment opportunity is a deciding factor when choosing programs to offer, how many of your graduates find local employment that can support a family?

☐ All ☐ Most ☐ Less than half ☐ None ☐ Don't Know ☐ N/A not applicable

2.5 When students are guided toward career choices, rate the level of importance advisors (teachers and counselors) place on family supporting income?

2.5.1 MALE students (5, highest to 1 lowest)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

2.5.2 FEMALE students (5, highest to 1 lowest)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

Goal III: To Strengthen Links Between Secondary and Postsecondary Education

3.1 Overall, how well informed are your instructors about postsecondary educational opportunities for their students? (5 is well-informed and 1 is not informed at all):

Knowledge of Postsecondary:

3.1.1 course work (5, highest to 1 lowest)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

3.1.2 prerequisites (5, highest to 1 lowest)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

3.2 Rate how well guidance counselors help CTE students choose the academic courses they should take to support their CTE program and their college/employment plans:

☐ Excellent ☐ Good ☐ Average ☐ Below Average ☐ Poor
3.3 In your opinion, are most CTE students adequately informed about postsecondary education and financial aid opportunities?

☐ Yes ☐ No

Comment:

3.4 Approximately how many of your graduates continue education in their CTE field of study after high school?

☐ All ☐ Most ☐ Less than half ☐ None ☐ Don't Know ☐ N/A not applicable

3.5 What are some of the reasons your students choose NOT to attend postsecondary programs?

Answer

3.6 What system changes can you recommend to assure all students graduate ready for postsecondary education even if they choose not to attend at this time?

Answer

Questions concerning all three goals:
4.1 Describe obstacles your center encounters in meeting these three goals?

4.1.1 To Promote High Academic Achievement

4.1.2 To Provide Training for Careers with Family Supporting Wages

4.1.3 To Strengthen Links Between Secondary and Postsecondary Education

4.2 What else would you like to share concerning your programs, your instructors, and your students relative to the three goals we have outlined here?

Answer

4.3 Are you interested in working with the Department of Education on an action plan for your center that will address the challenges your programs face in these three areas?

☐ Yes, I’d like to hear your recommendations

☐ No thanks.

Once this data has been collected and analyzed, we will share the information with you. Thank you for taking the time to respond to these questions.
# Appendix B. Sample Career Planning Outline

## Biotechnology

**Career Planning Outline**

**Career Pathways in:** Biotechnology

**Career Focus:** Discovery Research

**What is it?** Focuses on research, development or production in biotechnology companies

**Salary Range:**
- Technical Staff: $30k - $60k
- Technical Middle Management: $50k - $80k
- Executive, R&D: $70k - $100+k

---

## College and Career Planning

<table>
<thead>
<tr>
<th>Job Titles</th>
<th>Certificate Programs</th>
<th>Associate Degrees</th>
<th>Bachelor Degrees</th>
<th>Post Graduate Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Process Technician</td>
<td>NH Community Technical College Pease</td>
<td>NH Community Technical College Pease</td>
<td>University of New Hampshire</td>
<td>University of New Hampshire</td>
</tr>
<tr>
<td>2. Laboratory Technician/Analyst</td>
<td>Biotechnology</td>
<td>Biotechnology</td>
<td>Animal Science (Bioscience &amp; Technology Option), Biochemistry, Molecular, Cellular and Developmental Biology, Medical Laboratory Science (Research Track), Microbiology</td>
<td>Biotechnology</td>
</tr>
<tr>
<td>3. Quality Control Technician/Analyst</td>
<td>Bioprocessing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Metrologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Research Assistant/Associate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Quality Assurance</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Validation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Genomics/Bioinformatics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Research Scientist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. University Professor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### College and Career Planning Outline

- **NH Community Technical College Pease**: Biotechnology/Bioprocessing
- **University of New Hampshire**: Biotechnology, Animal Science (Bioscience & Technology Option), Biochemistry, Molecular, Cellular and Developmental Biology, Medical Laboratory Science (Research Track), Microbiology
- **Plymouth State University**: Biotechnology
- **Rochester Institute of Technology**: Biotechnology

**NOTE:** The level to which an advanced degree is required will vary from one employer to the next and one position to the next.

---

## High School Course Planning

<table>
<thead>
<tr>
<th><strong>9th Grade</strong></th>
<th><strong>10th Grade</strong></th>
<th><strong>11th Grade</strong></th>
<th><strong>12th Grade</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English 9</td>
<td>English 10</td>
<td>English 11</td>
<td>English 12 and or College Composition I*</td>
</tr>
<tr>
<td>Technical English</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Math</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algebra I</td>
<td>Geometry</td>
<td>Algebra II</td>
<td>Pre-Calculus or Calculus</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td>Biology</td>
<td>Chemistry</td>
<td>Microbiology*</td>
</tr>
<tr>
<td></td>
<td>Biotechnology I (Microbiology*)</td>
<td>Biotechnology II (General Biology*)</td>
<td>AP or General Biology I* AP or General Chemistry I* Biotechnology Internship*</td>
</tr>
<tr>
<td><strong>Social Studies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World History</td>
<td>Government and or Ethics</td>
<td>United States History</td>
<td>Economics</td>
</tr>
<tr>
<td><strong>World Language</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Language I</td>
<td>WorldLanguage II</td>
<td>World Language III</td>
<td>World Language IV</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT &amp; ME</td>
<td>Computer Applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Business</td>
<td>Ethics &amp; Society</td>
<td>Communication for the Workplace</td>
<td>Human Relations &amp; the Organization</td>
</tr>
</tbody>
</table>

*College Credit Courses through NH Community Technical College Project Running Start Program.

**Note:** Check with your guidance counselor to identify the comparable courses offered at your high school or technical center.

For more information, please contact Kathleen Totten, 603-433-1964
## Appendix C. New Hampshire Wages by County

**Estimated NH Livable Wage by County by Household Type, 1999**

<table>
<thead>
<tr>
<th>Family Unit</th>
<th>Belknap</th>
<th>Carroll</th>
<th>Cheshire</th>
<th>Coos</th>
<th>Grafton</th>
<th>Hillsboro</th>
<th>Merrimack</th>
<th>Rockingham</th>
<th>Strafford</th>
<th>Sullivan</th>
<th>NH Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two parents &amp; two children (both parents working)</td>
<td>$11.15</td>
<td>$11.12</td>
<td>$11.27</td>
<td>$10.29</td>
<td>$10.86</td>
<td>$11.71</td>
<td>$11.40</td>
<td>$11.70</td>
<td>$11.05</td>
<td>$10.96</td>
<td>$11.42</td>
</tr>
<tr>
<td>Two parents &amp; two children (one parent working)</td>
<td>$16.19</td>
<td>$16.14</td>
<td>$16.43</td>
<td>$14.47</td>
<td>$15.61</td>
<td>$17.32</td>
<td>$16.69</td>
<td>$17.31</td>
<td>$16.00</td>
<td>$15.82</td>
<td>$16.74</td>
</tr>
<tr>
<td>Two parents &amp; one child (one parent working)</td>
<td>$14.74</td>
<td>$14.73</td>
<td>$15.11</td>
<td>$13.11</td>
<td>$14.28</td>
<td>$16.02</td>
<td>$15.45</td>
<td>$16.07</td>
<td>$14.80</td>
<td>$14.51</td>
<td>$15.45</td>
</tr>
<tr>
<td>Single person &amp; two children</td>
<td>$18.17</td>
<td>$18.16</td>
<td>$18.56</td>
<td>$16.57</td>
<td>$17.73</td>
<td>$19.49</td>
<td>$18.93</td>
<td>$19.56</td>
<td>$18.30</td>
<td>$17.97</td>
<td>$18.92</td>
</tr>
<tr>
<td>Single person</td>
<td>$8.49</td>
<td>$8.42</td>
<td>$8.88</td>
<td>$7.63</td>
<td>$8.24</td>
<td>$9.50</td>
<td>$8.60</td>
<td>$9.29</td>
<td>$8.94</td>
<td>$8.30</td>
<td>$9.01</td>
</tr>
</tbody>
</table>

Notes: When both parents are working, the hourly wage is the wage for each adult. Children are assumed to be young (a single child is assumed to be 4 years; two children are assumed to be 4 and 6 years) and requiring child care if there is not a non-working parent at home.

You may view additional information from this study at this website: [http://www.jbartlett.org/nh_basicneeds.html#fos_2](http://www.jbartlett.org/nh_basicneeds.html#fos_2)