SMALL MANUFACTURERS' INSTITUTE

2020/2021 State of California Career and Technical Education

A Niche Focus on Trades and Industry (Shop) Programs

INTRODUCTION

History shows us that thriving manufacturing sectors (aerospace, construction, technology) bring economic stability and innovative opportunities to our communities and are critical to not only our American Covid recovery but our national security. This economic achievement is largely brought about through the availability of skilled labor and the investment in technology.

A good example is California that has benefitted over the past 50/60 years from an infrastructure built around manufacturing entrepreneurs, workers, schools, and customer supply chains that helped grow it into the world's fifth largest economy. However, over the last forty years, there is growing evidence of systemic problems within the school system that is having a negative impact on career and technical opportunities for students and the companies that ultimately hire them. Reports from California State University Chico in 1972, and State Superintendent Delaine Eastin's 1999 Task Force on Industrial and Technical Education, predicted the vocational teacher crisis and this 2021 SMI Report validates past findings.

There are two common findings throughout the various studies that require attention:

1. The lack of a pipeline for new teachers and the growing retirement of existing CTE teachers
2. School counselors that lack the necessary familiarity with CTE career opportunities and sufficient motivation to encourage students and parents to consider the opportunities and benefits that CTE careers can bring

These gaps have hurt companies and leave the future of manufacturing in California in jeopardy. Not only because of a needed transition to technology and automation but because of a lack of a trained workforce. In addition to traditional shop skills, employers in California need students to have hands-on exposure with skills in Electronics, Robotics, as well as Motors and Controls.

According to an article by Boston Consulting Group entitled *Made in America: The Future of US Manufacturing*, the resource manufacturing companies need to succeed is, "...a bigger, more highly skilled workforce...(with) digital skills but also adaptive skills like critical thinking and complex problem solving in order to install, operate, maintain, and optimize the new technologies."

Unfortunately, there is a shortage of this type of worker, largely due to a diminishing number of teachers necessary to train them.

STATE OF CTE SURVEY - BACKGROUND

For that reason, roughly 300 California Career Technical Educators were invited to participate in an online survey between April 18, 2020 and May 14, 2020. Respondents were instructors from the Trades and Industry[1] sectors of Career Technical Education (CTE) subject areas, as well as administrators and coordinators facilitating programs at middle schools, high schools, and community colleges. Responses were segregated to only report on the 276 teacher responses. The Small Manufacturers Institute (SMI) and the California Industrial and Technology Education Association (CITEA) created the survey in conjunction with University of Southern California Center for Economic Development. The survey questions covered four topics:

- Respondent Snapshot,
- Age and Retirement,
- Teacher Experience and Education, and
- Program Support

WHAT WE FOUND and the difference it makes

Yes, there is a shortage of career technical educators. But why?

The first hard truth learned through the survey was an alarming statistic - the majority of high school and college teacher who participated in the study are nearing retirement. To make matters worse, participants reported difficulty in finding replacement teachers when someone does retire, which is a direct threat to the sustainability and longevity of CTE programs. In fact, many participants said it was unlikely their programs would survive five to ten years into the future.

Secondly, as more experienced teachers with graduate degrees retire, newer teachers who replace them with less education and less experience may not be able to teach students to the same standard. This further puts the industry at risk because graduating students could potentially fail to meet industry expectations.

Participating teachers also pointed to the lack of a pipeline. In other words, there isn't an adequate number of CTE teacher training programs funneling teachers into local community colleges and trade schools. Today, there are no California State Universities offering traditional degrees in multi-discipline Industrial Technical Education. Instead, CSU offers single subject credentialling programs and the California Community Colleges are attempting to bridge the teacher gap with Teach California. The question over the next three to five years will be if these efforts will be enough to fill the pending gaps. Clearly, without a specialized workforce pipeline, recruitment from only private industry cannot fill the need for new CTE teachers. In fact, more than one participant implied recruitment from industries would not work under current circumstances.

[1] Also, known as Industrial & Technology Education - Career Technical Education (CA Dept of Education) Building and Construction, Energy, Environmental and Utilities, Engineering and Architecture, Manufacturing and Product Development and Transportation Trades.

The reason for this is economics. While stable paychecks may be appealing, salaries are much higher for industry tradespeople, eliminating the incentive to leave the workforce and join the classroom. The pay is even lower if these individuals don't have a 4-year degree, which many don't. Additionally, tradespeople are trained for 'hands-on' work and may find it difficult to obtain a teaching credential partly because they may not have the temperament nor the management skills for a classroom.

All of this points to the need for *dedicated pathways* that will encourage college students and facilitate trades people to move into teaching. After all, teaching would require not only the expertise in CTE subject areas, but special skills in education (verbal presentation skills, test development and review, mentoring) as well as the right temperament (patience, compassion, and a passion for teaching). In addition, participants told us that school career counselors are not adequately informed on CTE job opportunities and therefore tend not to encourage students to follow that path.

WHERE WE GO FROM HERE

Now more than ever, the long-term successes of CTE programs and the economic boom they could provide will rely on an investment from the state, local school districts, and the manufacturing industries to build pipelines for students and trades people to,

- become CTE teachers,
- train counselors appropriately to support CTE programs and encourage students enrollment,
- and raise awareness of the economic and community benefits of having robust CTE programs.

Policy Recommendations:

1. Rebuild Industrial and Technology Education credentialing programs at major California State University campuses strategically located statewide.
    a. Persuade the California Commission for Teacher Credentialing (CTC) to declare the CTE teacher shortage in critical sectors such as ITE a crisis, requiring immediate action. Initiate an immediate review and revision of State credential standards for CTE.
    b. Initiate an immediate state-wide appeal for CTE teacher candidates.
    c. Legislate the revitalization of CTE Educator Preparation programs.
    d. Implement hard to hire incentives (including tuition reimbursement for teaching degrees) for new ITE teachers.
2. Provide resources and Inservice preparations for CTE teachers
    a. Call for a complete review of all current CTE teachers by credential, name. age, and school location.
    b. Integrate performance standards to be used as the basis for establishing policies for preparing, hiring. evaluating. and promoting technology teachers.
3. Partner with industry to develop a set of programs which enhance and extend the soundness of CTE, provide real world experiences for teachers and students, and provide guidance for technical programs in terms of content, equipment, and delivery.

a. Create a tax-credit for businesses to provide externships for teachers and counselors to do short term work in industry
b. Create a professional development program for teachers and counselors to understand the continuum of apprenticeship opportunities and the tools to increase participation
c. Establish an internet website or computer-accessible central clearinghouse for information on CTE vacancies and guidance for job seekers
d. Offer tax incentives and/or credits to industry for placing employees in positions to support CTE educators in their classrooms

ACKNOWLEGEMENTS:

SMI would like to thank University of Southern California's School of Economic Development for their enormous efforts especially Vera Hung, Matthew Schwartz, Haley Feng and Satyandra Kumar Gupta to collect, interpret and write the following report. Additionally, our relationship with Dion Jackson from the Advanced Manufacturing Program Southern California (Amp SoCal) for her work to managing the student team and editing the report. Finally, thank you to our partners at the California Industrial and Technology Education Association (CITEA) who have been our long-term partners in seeking program equity for CTE instruction within California's academic system.

INDUSTRY ENDORSEMENTS (as of 6/2/21)**:**

The findings and proposed recommendations have been reviewed, improved, and endorsed by the following organizations seeking to overcome skills shortages with the Trades and Industry business sectors:

Aerospace and Defense Forum
California Metals Coalition
California Industrial and Technology Education Association
Coalition for Manufacturing Careers'
Grow Manufacturing Initiative
Institute for Electrical and Electronics Engineers - Southern California Council
National Industrial Base Workforce Coalition
National Tooling and Machining Association –

- Los Angeles Chapter
- San Francisco Chapter
- San Fernando Valley Chapter

Society of Plastics Industry – Southern California Section
Printing Industry Association of California
Uniquely Abled Project
West Coast Spring Manufacturers Association

SMI 2020/2021 State of California Career and Technical Education
Report Detail

INTRODUCTION
California Career Technical Educators were invited to participate in an online survey between April 18, 2020 and May 14, 2020. The data gathered from roughly 300 participants is analyzed in this report. Respondents include instructors teaching all Career Technical Education (CTE) subject areas, as well as administrators and coordinators facilitating programs at middle schools, high schools, and community colleges. While the survey is not a true representative sample, the participants who responded provided the following insights: respondents are well educated and experienced in their fields of instruction; the vast majority are over the age of 50 and most reported a moderate-to-high level of job satisfaction. Notably, a higher percentage of High School instructors indicated plans to retire or leave the field within the next 24 to 36 months, as illustrated in the table below.

Exhibit 1: Plans for Retirement or to Leave the CTE Field by Instruction Level

Timelines/Institutions	Middle School	**High School**	Community College
*Extremely likely to leave CTE in **12-24 months***	15%	**19%**	15%
*Plan to leave CTE in **3 years***	26%	**34%**	26%

PURPOSE
The main objective and purpose of conducting this survey is to gain a more robust understanding of the current and future need for new CTE educators with a focus on Trades and Industry Sectors (Shop Classes)

METHODOLOGY
A survey of 16 questions was created by the Small Manufacturers Institute (SMI) and administered using Google Forms. Respondents accessed the survey anonymously by clicking a link sent to them via email. Four organizations sent out the survey: the California Industrial and Technology and Education Association (CITEA), Small Manufacturers Association of California (merged with California Metals Coalition 2021), Skills USA and the Small Manufacturers Institute (SMI).

The survey questions covered four topics: **Respondent Snapshot, Age and Retirement, Teacher Experience and Education,** and **Program Support,** as shown in Appendix A. The last, optional question provided an opportunity for teachers to leave their contact information for follow up interviews. A copy of the survey is provided in Appendix B.

To provide background information needed to interpret survey results, four contextual interviews were conducted via Zoom. The interviewees are CTE teachers who currently teach at the high school level, although most also taught at community colleges or adult schools at some point in their careers. They are from Los Angeles, Tulare, Sacramento, and El Dorado Counties.

Each interview lasted about 30 minutes and was recorded with each participant's written and verbal consent. There were seven questions concerning 1) the trend in the number of CTE programs, 2) their experience filling vacant CTE positions, 3) recruiting teachers from industry,

4) attributes of a good CTE teacher, 5) improvements on CTE programs they'd like to see, and 6) their relationships with industry, 7) their relationship with industry and links to jobs. A copy of the post survey questions are provided in Appendix C.

ANALYSIS

Upon the conclusion of the survey administration phase, responses were first sorted by the teachers' primary level of teaching, Middle School, High School, and Community College. For each group, the following information was analyzed.

- **Respondent Snapshot**
  - Number of respondents
  - Subject area taught sorted into four categories:
    - Automotive
    - Construction/Woodshop
    - Advanced Manufacturing (includes Drafting/Engineering/Design, Electronics/Robotics, Metal/Machinist, and Welding)
    - Other (includes Print/Graphic Arts and others)
  - Location by County
- **Age and Retirement**
  - Age
  - Likelihood of leaving the field within 2 years
  - Number of years expecting to continue teaching
  - Possible reasons for leaving CTE
- **Teacher Experience and Education**
  - Years of teaching experience
  - Highest education level completed
- **Program Support**
  - Job support from stakeholder groups
  - Job satisfaction
  - Areas in which their program is doing well
  - Areas in which their program needs improvement

Additional Analysis on High School CTE Programs

For select questions, survey results were further analyzed by subject area to identify differences.

Additional Analysis on Community College CTE Programs

Community college level CTE programs become much more sophisticated and specialized than their Middle and High School counterparts. Therefore, the same analyses were performed for each subject area and the results were compared between subject areas and the "Overall" group to gauge the varying states of wellbeing amongst different community college CTE programs. It should be noted that because some instructors teach in multiple subject areas, some responses were included in more than one subject area section, but only once in the overall analysis.

RESULTS & DISCUSSION

Contextual Interviews

Participants observed that while CTE programs have diversified substantially, the number of CTE programs has been decreasing. Although CTE's decline has its roots in the "College for All" mentality, the most urgent and immediate threat to CTE programs today is the lack of CTE teachers. Participants were aware of the older workforce in their profession, and all were deeply concerned about finding replacement teachers.

Why such a shortage? Participating teachers pointed to the lack of adequate numbers of CTE teacher training programs. Without a specialized workforce pipeline, recruitment from industries cannot fill the need for new CTE teachers. In fact, more than one participant implied recruitment from industries would not work under current circumstances. While stable paychecks are appealing, industry tradespeople make much more than teachers; the pay is even lower if they do not have a 4-year degree. Additionally, tradespeople may find classroom management a hard subject to tackle and have difficulties obtaining a teaching credential. All observations point to the necessity of offering a dedicated career pathway for CTE teachers, for it requires, in addition to expertise in CTE subject areas, special skills in education, the right temperaments (i.e. patience, a passion for teaching).

Envisioning the future of CTE programs, participating teachers expressed desires to better prepare students to be responsible individuals for the workforce through CTE as well as other subject areas. Some teachers called for school districts to require a series of CTE courses to graduate, provide more funding, and for career counselors to take CTE as a serious department. Most importantly, they urge stakeholders to invest in efforts recruiting and training CTE teachers to ensure the longevity of CTE programs. All teachers interviewed enjoy great relationships with industries, and they believe partnering with industries can help secure CTE programs' future.

Middle School Results

Respondent Snapshot. A total of 39 middle school CTE educators responded to the survey. Most middle school CTE teachers instruct more than one subject, resulting in 94 reported subjects. 56% of the respondents teach Advanced Manufacturing, 27% teach Construction/Woodshop, and 2% teach Automotive. About half of the respondents provided their teaching location, four are from Los Angeles County, three are from Ventura County, and two are from Santa Barbara and Alameda Counties each. The remaining eight are from Butte, El Dorado, Fresno, Kern, Sacramento, Solano, Sonoma, and Tulare Counties providing a good cross section of the state.

Age and Retirement. 74% of respondents are 50 years old or older. Asked if they plan on retiring in the next 24 months, 15% said it was extremely likely and 18% said it was somewhat likely. When asked what reasons would make them leave their career in CTE, most said they would only depart upon retirement. Of those who had another reason, it was either finances, career change, or a change initiated by their school district.

Two respondents selected less than a year for how much longer they expect to teach. One respondent teaching Construction/ Woodshop, and Advanced Manufacturing said they were retiring in June and that there is no replacement. Eight respondents said they expected to work 1-3 more years; six teach Construction/Woodworking and two teach Advanced Manufacturing.

Teacher Experience and Education. 74% of respondents have been teaching for 15 years or more. All but one respondent holds a bachelor's degree; 59% hold a post-graduate degree. The lone respondent without a 4-year college degree received their education via Trade/ Technical/ Vocational Training and has been teaching more than 15 years.

Program Support. Respondents were asked to rate the level of support their program receives from their school district administrators, senior school administrators, career counselors, fellow teachers, parents, and industry. Table 2 shows the average rating each group received from highest to lowest using a rating from 1 to 5, with 1 = none, 2 = limited, 3 = some, 4 = sufficient, 5 = great. Support from school district administrators and industry ranked the highest and parents and career counselors ranked the lowest.

Exhibit 2: Program Support Experienced by Middle School Respondents

Group	Average
School District Administrators	3.28
Industry	3.15
Senior School Administrators	3.08
Fellow Teachers	3.01
Parents	2.97
Career Counselors	2.72

92% of respondents reported job satisfaction of moderate to highly satisfied. However, six people reported it extremely unlikely and another five reported it somewhat unlikely that their institution will continue to offer their CTE program in the next 5 to 10 years. Issues cited contributing to concerns about the sustainability of their programs are district finances, replacement teachers when the respondent retires, lack of understanding of the value of the program to local businesses.

When asked what aspects of the program they felt were doing well or needed improvement, respondents were asked to choose all that apply. The top three cited items cited as doing well are student engagement, teaching materials and supplies, and facilities and equipment. The top three items cited as needing improvement are recruitment of students for CTE classes, career counselors understand my industry, and continuing education resources. The full list of responses is shown in Exhibit 3.

Exhibit 3: Aspects of the Program Identified as Doing Well or to Improve Middle School Results

Areas	Areas Doing Well	Areas to Improve
Student Engagement	25	12
Teaching Materials & Supplies	25	13
Facilities & Equipment	21	12
Faculty Pay and Benefits	18	9
Recruitment of Students for CTE Classes	12	26
Funding to Expand Program	9	17
Continuing Education Resources	7	18
Career Counselors Understand My Industry	4	25
Sufficient Number of Teachers/ Classroom Aides	4	14
None	4	0
Total	129	146

Discussion. Over a third of respondents said they were extremely or somewhat likely to retire in the next two years. One respondent already retired in June and specifically said there was no replacement for them this fall. With nearly three-fourths of middle school teacher respondents over the age of 50, the need for replacement teachers will only grow. Having pioneered or lead their respective CTE programs for over 15 years in some cases, many teachers are ready to pass the leadership to a younger generation of teachers. This data highlights the necessity for new, younger teachers to come in and take their place but also poses a potential issue in finding replacements: the current teachers' vast knowledge, accumulated through years of experience, is unlikely to be found in new, inexperienced teachers. Navigating this transition without negatively impacting industry will be a challenge. It also creates an opportunity to engage local industry to inform the design of the program a new instructor would teach and to aid in the recruitment of replacement faculty.

Middle school CTE programs are hindered by below average support from parents and career counselors, who were regarded as lacking understanding about the industry. That combination likely contributes to the most cited area for improvement, recruitment of students for CTE classes. Other top areas for improvement are a lack of continuing education resources and funding to expand programs. A centralized effort to address information targeting students and their parents about career paths available through CTE courses aimed at 4th through 7th graders could help address the lower demand, especially in light of the demand from industry for workers.

Despite these issues, teachers expressed satisfaction with their positions. Moreover, a majority of responses seem to reference success within the middle school program's fundamentals (teaching materials and supplies, student engagement, facilities and equipment, and faculty pay and

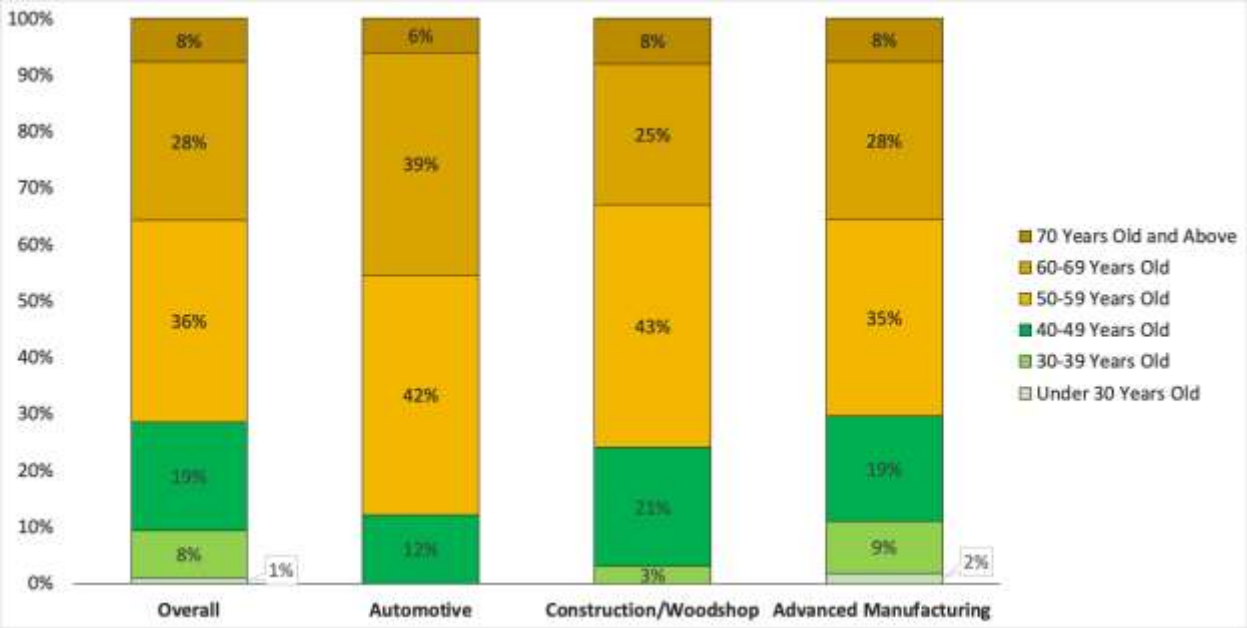
benefits). The success of the aforementioned areas is crucial for the effective education and continuation of programs.

High School Results

Respondent Snapshot. A total of 193 high school CTE teachers responded to the survey. Most High School CTE teachers instruct more than one subject resulting in 371 reported responses. 61% of the respondents teach Advanced Manufacturing, 36% teach Construction/Woodshop, and 17% teach Automotive.

109 respondents provided their teaching location, 47 were from six counties in Southern California, 20 were from nine counties in Northern California, 19 were from seven counties in Central California, 17 were from seven counties in the Bay Area and six were from four counties in Central Coast.

Exhibit 4: Age Distribution, High School Results



Age and Retirement. 72% indicated they are 50 years old or above. 19% of the respondents indicated that they are extremely likely to leave CTE within 12-24 months as shown in Exhibit 5. That translates to a need for 37 teachers. Because some teachers teach more than one subject, the need is for nine teachers of Automotive (27% of the respondents teaching this subject), 15 teachers of Construction/ Woodworking (22%), and 28 teachers of Advanced Manufacturing (24%) in the next 12-24 months. Exhibit 5 illustrates the distribution of ratings for all respondents, and separately for each subject area. When asked what reasons would make them leave their career in CTE, most said they would only depart upon retirement. Of those who had another reason, it was either finances, career change, or a change initiated by their school district such as a closing program, laid off, etc.

The age distribution of all respondents, and for respondents teaching Automotive, Construction/ Woodshop, and Advanced Manufacturing is shown in Exhibit 4. Overall, only 9% of respondents are under age 39 and 36% are over 60 years old, near retirement age or older. In other words, 69 respondents in this category represent a high risk to the continuation of these programs in the coming years without a coordinated effort to train replacement teachers. Breaking down this data by subject area, respondents teaching Automotive are all over 40 years old and have the largest concentration of teachers over 60. Respondents teaching Manufacturing most closely resemble the overall distribution and those teaching Construction/Woodworking are all over 30 years old, making them older on average than Manufacturing.

Exhibit 5: High School CTE Teachers Likelihood to Leave in 12-24 Months

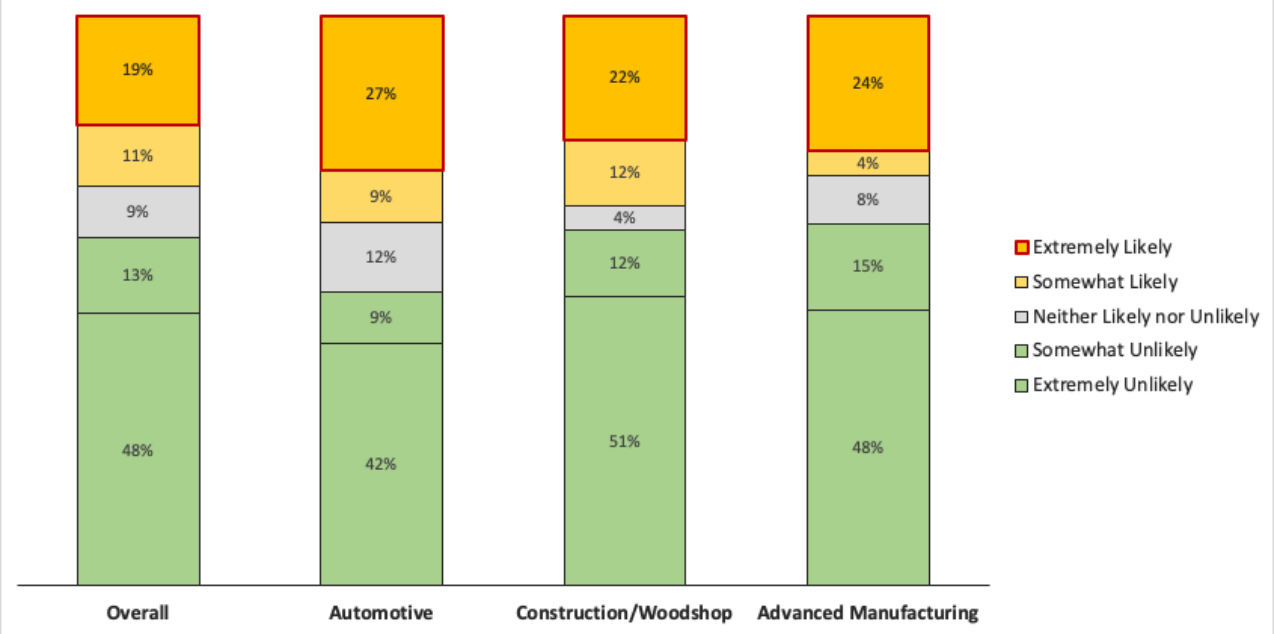
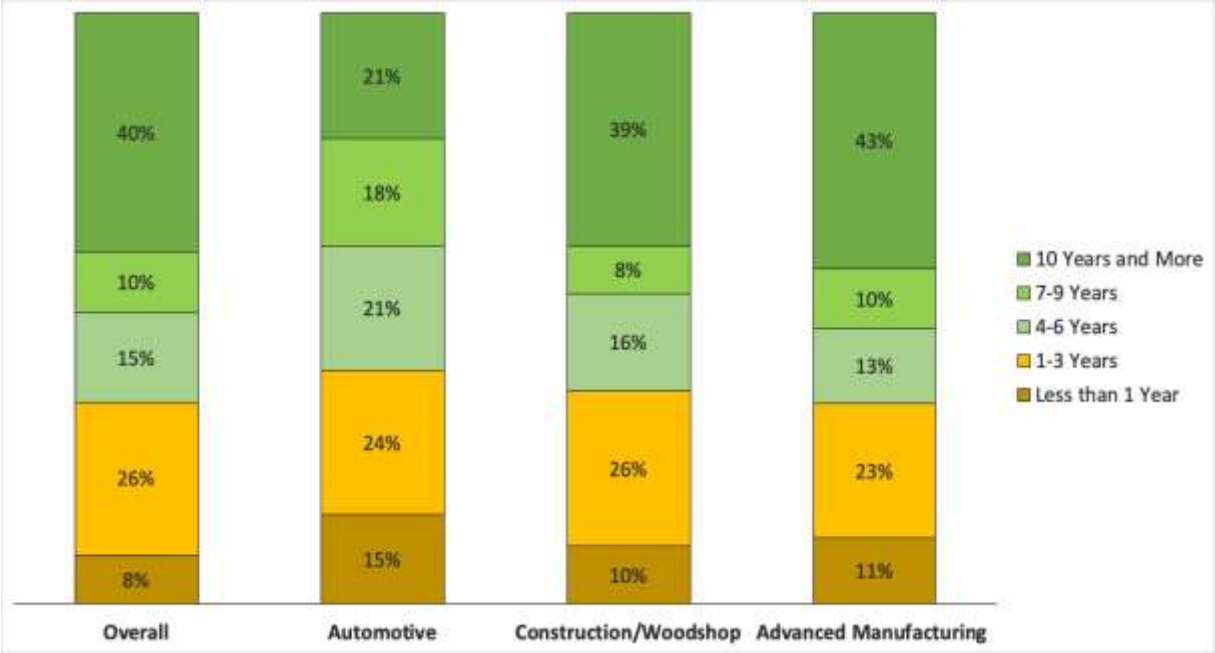


Exhibit 6: How many more years do you plan to teach? High School Results



Asked how many more years they will continue to teach, 40% of overall said ten years or more while 34%, or 66 respondents, said less than three years. The distribution of answers is shown in Exhibit 6. Responses from those who teach Construction/Woodshop and Advanced Manufacturing closely align with the overall distribution. For Automotive, only 21% of the respondents plan on teaching for ten years or more, while 39% said they will continue to teach no longer than three years.

Teacher Experience and Education. 72% have been teaching for 15 years or more. Many respondents explained that they pioneered, or even designed and operated, their whole program. All but 13% have earned a bachelor's degree or higher, and 55% possess graduate degrees. However, respondents who indicated 0-4 years of teaching experience reported lower education attainment levels than those with 5+ years of experience, so it appears respondents may have obtained additional degrees on-the-job.

Program Support. Asked to rate the support their CTE programs received from six groups of stakeholders, respondents gave career counselors and parents the lowest scores. The low ratings are likely indicative of counselors' and parents' lack of understanding and appreciation of CTE programs. The full list of ratings are summarized in Exhibit 7. As additional comments, many respondents said they received support from local businesses, private foundations, nonprofits, government grant programs, professional organizations, and the CTE programs' own advisory boards.

Exhibit 7: Program Support Experienced by High School Respondents

Group	Average
School District Administrators	3.68
Senior School Administrators	3.61
Fellow Teachers	3.54
Industry	3.51
Career Counselors	3.19
Parents	3.04

92% of the respondents reported moderate to high job satisfaction. 40% said it was extremely likely their CTE programs will continue in five to ten years. Representing 18% of the respondents, 16 people said it was extremely unlikely for their CTE programs to continue in five to ten years while 19 more said it was somewhat unlikely. Exhibit 8 breaks down the responses by subject area. 30% of the respondents teaching Automotive believed it was somewhat or extremely unlikely their program will continue in five to ten years. Responses from Advanced Manufacturing adhere to the overall pattern, while Construction/Woodshop respondents felt more secure about their programs' future. As additional comments, respondents gave a number of reasons for their concerns over sustainability, including a lack of funding and support from the school district and low-enrollment due lack of student awareness. However, substantially more comments point to the lack of CTE teachers, which is indicative of a larger pattern.

Respondents identified aspects of the program they felt were doing well or needed improvement. The top three areas voted as doing well are facilities and equipment, student engagement, and teaching materials and supplies. The top three items cited as needing improvement are career counselors understand my industry, recruitment of students for CTE classes, and funding to expand program. Exhibit 9 contains the full list of responses.

Exhibit 8: What is the likelihood your institution will continue to offer your CTE program in the next 5 to 10 years? High School Results

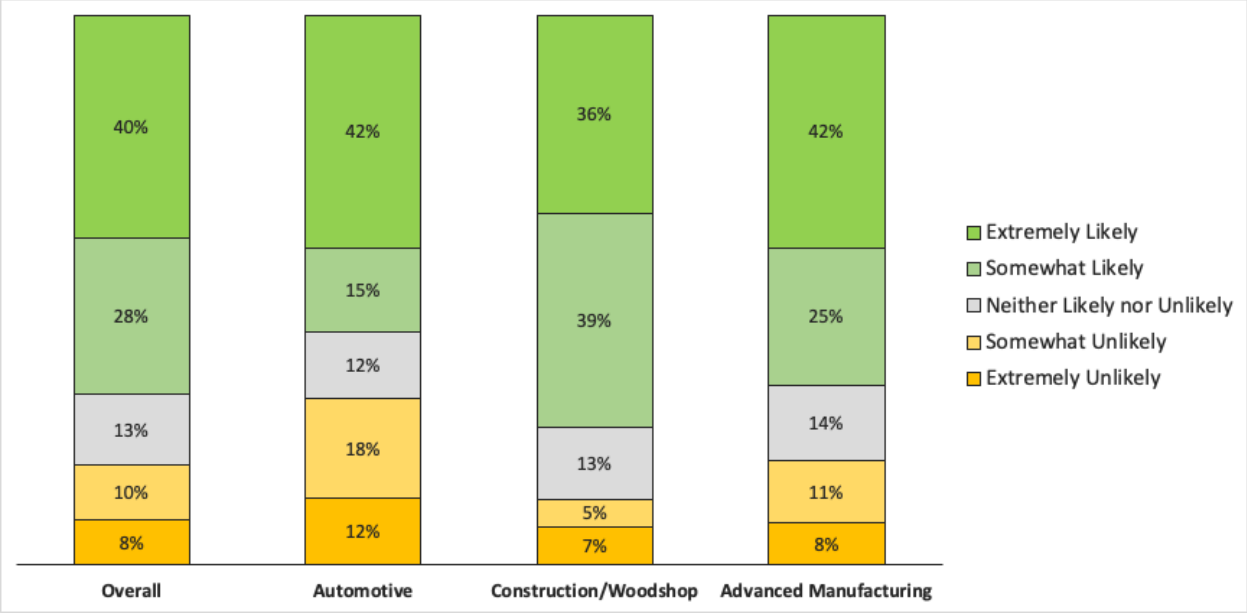


Exhibit 9: Aspects of the Program Identified as Doing Well or to Improve High School Results

Areas	Areas Doing Well	Areas to Improve
Facilities & Equipment	123	71
Student Engagement	119	51
Teaching Materials & Supplies	109	74
Faculty Pay and Benefits	91	61
Funding to Expand Program	67	85
Recruitment of Students for CTE Classes	65	107
Continuing Education Resources	53	63
Career Counselors Understand My Industry	33	132
Sufficient Number of Teachers/ Classroom Aides	29	75
None	6	3
Total Selections	695	722

Discussion. About one third of the respondents said they were somewhat or extremely likely to leave the CTE field within two years. Nearly three-fourths of the respondents are over the age of 50. As retirement was consistently cited by respondents as the main reason for their departure from work, the overrepresentation of elderly ages in respondents is alarming. Furthermore, respondents reported difficulties in finding replacement teachers for retired ones, a direct threat to the sustainability and longevity of CTE programs. In fact, 18% said it was unlikely for their programs to continue in five to ten years.

Automotive programs appear to be more vulnerable, as respondents teaching this subject area are considerably older and 36% said they were somewhat or extremely likely to leave their jobs in 12-24 months. 30% believed their programs would not survive in five to ten years.

Having pioneered or lead their respective CTE programs for over 15 years in some cases, many teachers are ready to pass the leadership to a younger generation of teachers. This data highlights the necessity for new, younger teachers to come in and take their place and poses the potential issue in finding replacements. As reiterated by respondents on multiple occasions, the lack of replacement teacher is an immediate and direct threat to the continuation of their CTE programs. Furthermore, as elder, more experienced teachers with graduate degrees or above retire, newer teachers with less education and less experience may not be able to teach students to the same standard, potentially failing to meet the industries' demand.

A number of deficient areas hinder the sustainability of high school CTE programs. Similar to results from middle school respondents, the most documented areas of improvement are career counselors' understanding of CTE industries, recruitment of students for CTE classes, and lastly, funding to expand programs. Career counselors' lack of understanding in CTE programs and their respective industries is well documented by the survey results. Not surprisingly, they received the second-lowest rating for their support to the CTE programs. Without key knowledge in the field of CTE, career counselors cannot properly inform students on the career they are entering, which could be a reason why there is trouble recruiting students. Additionally, poor recruitment and funding issues may also reflect poor management in the administration of outreach efforts that promote awareness of high school CTE programs.

CTE programs are valuable assets to communities, creating good teaching jobs and training the next generation of workforce. Despite the aforementioned lacking areas, respondents are invested in their students and expressed satisfaction with their positions and job experience. Now more than ever, the long-term successes of these programs rely on investment from school districts as well as the industries to build pipelines for CTE teachers, train counselors to properly support CTE programs, and raise awareness of CTE programs.

Community College Results

Respondent Snapshot. A total of 73 community college CTE instructors and staff across California responded to the survey. They teach a total of 25 unique subject areas, in addition to working in administrative positions. 15 respondents, or 21%, teach Automotive; 12 respondents, or 16%, teach Construction/Woodshop; 36 respondents, or 49%, teach Advanced Manufacturing. A sizeable portion (33%) of the respondents do not teach any of the three defined subject areas (many teach Agriculture, Aircraft Maintenance, or work in administration); their response was included in the overall analysis but excluded for subject area analyses.

33 respondents provided their teaching location. 18 respondents were from Southern California (Counties of San Diego, Orange, Los Angeles, San Bernardino, and Ventura); 11 respondents were from the Bay area (Counties of Alameda, Santa Clara, San Mateo, Solano, Napa, and Contra Costa); 2 respondents were from Central California (specifically, Kern County and Santa Barbara County); 2 respondents were from Northern California/Sacramento area (specifically, Mendocino County and Yolo County).

Age and Retirement. The vast majority of respondents are above 50 years old; 36 respondents (about half) are above 60 years old. This represents a need for 36 replacement teachers and staff in the foreseeable future, including 9 for Automotive, 6 for Construction/Woodshop, and 14 for Advanced Manufacturing.

Exhibit 10: Community College CTE Faculty Age Distribution

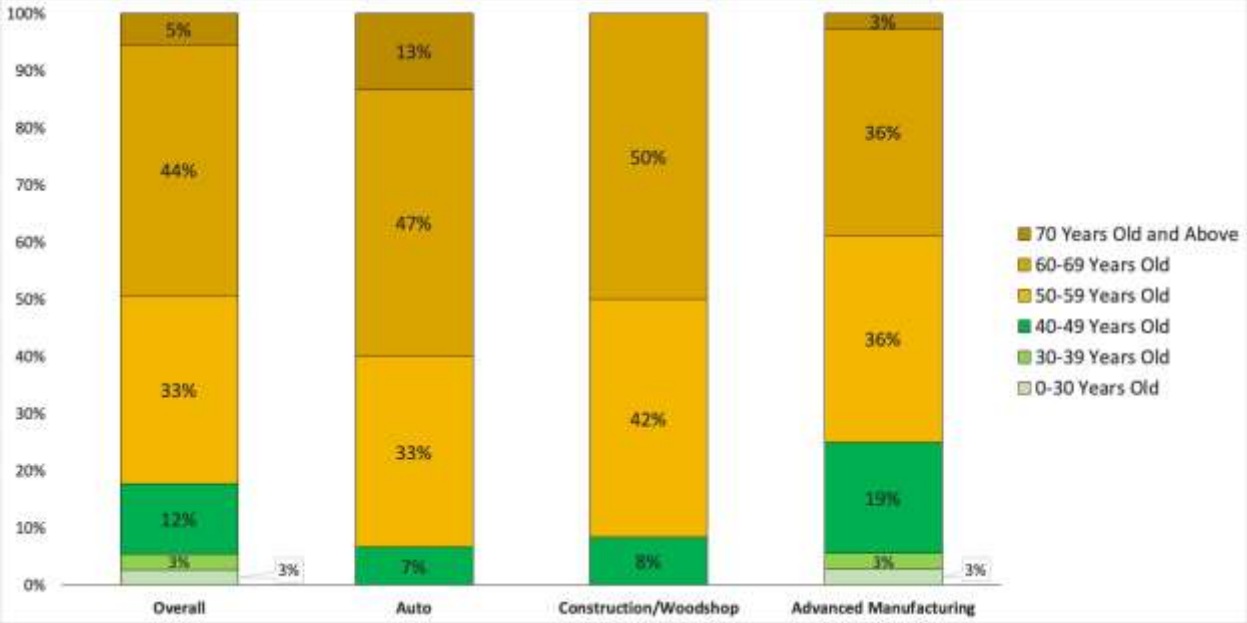


Exhibit 10 illustrates the age distribution of all respondents, and for three sub-groups of respondents teaching Automotive, Construction/Woodshop, and Advanced Manufacturing. Age distribution within each subject area varies. Comparatively, Automotive respondents are an older

cohort with no one below 40 years old and 13% 70 years of age and above. Construction/Woodshop respondents are concentrated in the age ranges near or at retirement age of 50 - 69. Respondents teaching Advanced Manufacturing are younger — 19% are between 40-49 years old, the largest share amongst all subject areas; 6% are less than 30 years old or between 30 to 39 years old, making it the only subject area with respondents less than 40 years old.

15% of the respondents said they were extremely likely to leave CTE within 12-24 months. This translates to an urgent need for 11 community college CTE faculty; because some respondents work in non-teaching positions, the need is for five Advanced Manufacturing instructors (14% of the respondents teaching this subject), three Automotive instructors (20%), and one Construction/Woodshop instructors (8%). Exhibit 11 lists all responses received.

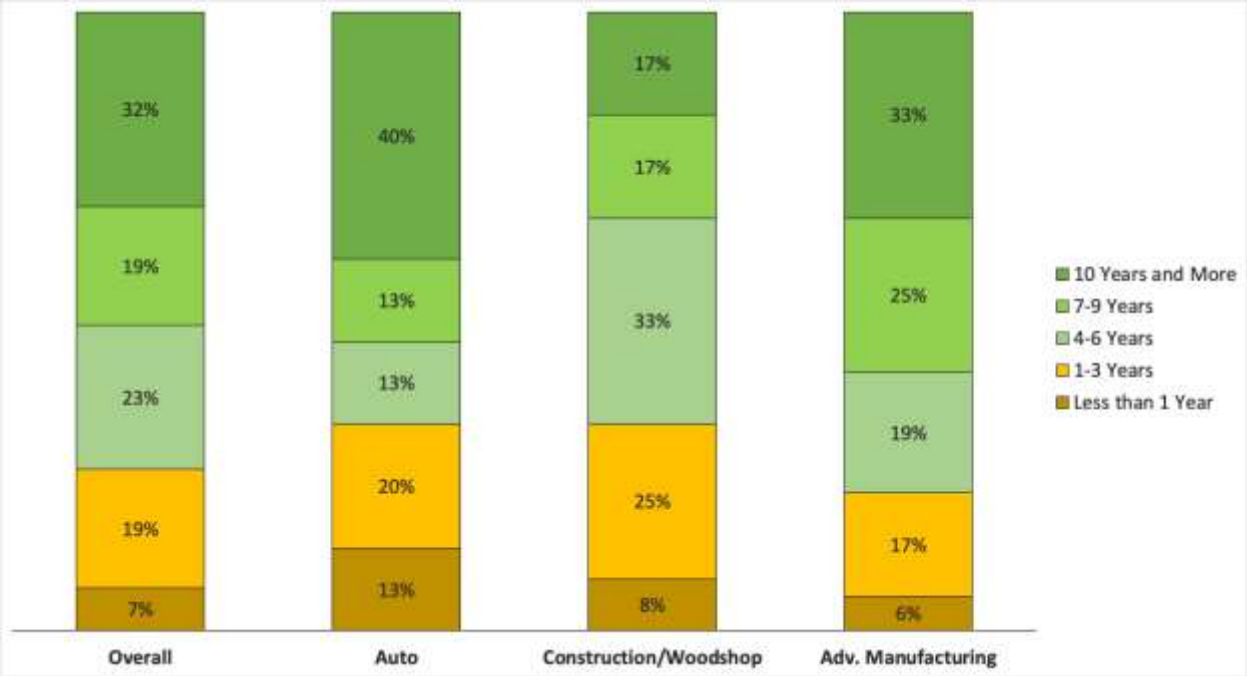
Exhibit 11: Community College CTE Instructors Likelihood to Leave in 12-24 Months

Ratings	Overall	Automotive	Construction/ Woodshop	Advanced Manufacturing
Extremely Unlikely	30	5	6	17
Somewhat Unlikely	9	5	1	4
Neither Likely nor Unlikely	12	1	2	5
Somewhat Likely	11	1	2	5
Extremely Likely	11	3	1	5

Asked how many more years they plan to teach, 19 respondents (26%) said they plan to continue teaching for no more than three years; of which 5 teach Automotive, 4 teach Construction/Woodshop, 8 teach Advanced Manufacturing. 32% of the respondents plan to teach for 10 years or more. As shown in Exhibit 12, larger shares of Automotive and Construction/Woodshop respondents (33% each) plan to teach for no more than 3 years, compared to Advanced Manufacturing respondents, 23% of whom said they expect to continue teaching CTE for no more than 3 years. At the same time, 40% of the Automotive respondents plan to teach for 10 years or more, a substantially larger share than Construction/Woodshop (13%) and Advanced Manufacturing (33%).

Respondents collectively gave 100 reasons for departing from their jobs, of which 56 were retirement. Other reasons documented include a change of career, finances, termination of program, and being laid-off; notably, two respondents said they were compelled to leave because of poor support from administration. Retirement remains the main reason for leaving CTE amongst Automotive and Construction/Woodshop respondents. For Advanced Manufacturing, retirement was involved in less than half of the total number of reasons reported by respondents.

Exhibit 12: How many more years do you plan to teach? Community College Results



Teacher Experience and Education. 71% of the respondents have taught for over 15 years. Comparing each subject area, Automotive respondents are the most experienced, with 80% having taught for 15 years or more; for Advanced Manufacturing, the share of respondents with 15+ years of experience is 67%; Construction/Woodshop respondents' teaching experience lies somewhere in between with 75% having taught for more than 15 years.

Overall, 77% of the respondents have earned a bachelor's degree or above, 18% earned associate degrees, and no respondent possesses only a High School Diploma. With 54% possessing a bachelor's degree or higher, Automotive respondents completed less college education comparatively, but they are the only group that received Trade/Technical/Vocational training. Advanced Manufacturing respondents all earned college degrees; 25% possess associate degrees and the rest have earned bachelor's degrees or higher. Construction/Woodshop respondents have significantly more higher education experience compared to other subject areas, with all but 8% possessing at least a 4-year degree, and 58% earned a graduate degree or above.

Program Support. Respondents rated the support from six stakeholder groups. Career Counselors and Parents consistently received lower ratings compared to other groups, reflecting a lack of appreciation for CTE programs. Stakeholder groups and their scores are listed in Exhibit 13. As additional comments, respondents said they received support from government grant programs, private foundations, professional and industry organizations, and the community.

Exhibit 13: Program Support Experienced by Community College Respondents

Group	Average
School District Administrators	3.73
Fellow Teachers	3.70
Industry	3.70
Senior School Administrators	3.66
Career Counselors	3.21
Parents	2.51

More than 90% of the respondents said they are moderately to very satisfied with their job experience with an average rating of 3.88 out of 5. Asked to identify all areas where they believe their CTE programs are doing well, respondents collectively made 256 selections, the top three of which are facilities and equipment, student engagement, and teaching materials & supplies; all three areas were selected by the majority of respondents. Breaking down the selections by subject areas, these three areas are consistently the top three most selected, although not every most-selected area received the majority of the vote. While Automotive's top-selected areas all earned votes from the majority of its respondents, Construction/Wood Shop respondents made the least selections for areas of success and no area emerged as a clear example of success (i.e., selected by majority of the respondents). Only facilities and equipment and teaching materials and supplies received votes from the majority of Advanced Manufacturing respondents.

Respondents were also asked to identify all areas in need of improvement. For each subject area, except for Automotive, respondents collectively selected more areas for improvement than success. Based on 299 selections made, respondents identified career counselors understand my industry, sufficient number of teachers/classroom aides, and recruitment of students as the top three areas in need of improvement. All three areas received votes from the majority of respondents; additionally, 37 respondents (out of 73 total) said a fourth area, funding to expand program, is in need of improvement as well. The results are fairly consistent across the three subject areas, both in terms of the distribution of votes and whether an area was selected by the majority of respondents. Exceptions include less than half of the Automotive respondents selected career counselors understand my industry as an area of improvement, and an additional area, student engagement, selected by the majority of Construction/Woodshop respondents as an area of improvement. Exhibit 14 shows the full list of responses.

Exhibit 14: Aspects of the Program Identified as Doing Well or to Improve Community College Results

Areas	Areas Doing Well	Areas to Improve
Facilities and Equipment	46	30
Student Engagement	40	19
Teaching Materials & Supplies	39	29
Faculty Pay and Benefits	34	26
Funding to Expand Program	25	37
Career Counselors Understand My Industry	20	45
Recruitment of Students	18	42
Continuing Education Resources	17	25
Sufficient Number of Teachers/ Classroom Aides	8	44
1-None	6	0
Other areas	3	2
Total Selections	256	299

Asked to rate the likelihood of their institutions offering CTE programs in the next 5-10 years, just below 50% said it was extremely likely while three (or 4%) said extremely unlikely – including one response each from Automotive and Construction/Woodshop. Exhibit 15 shows the full list of responses. As additional comments, respondents said they are concerned about decreased funding (especially as we enter an economic downturn), depressed enrollment numbers in recent years, and a lack of teachers to fill vacancies.

Exhibit 15: What is the likelihood your institution will continue to offer your CTE program in the next 5 to 10 years? Community College Results

Ratings	Overall	Automotive	Construction/ Woodshop	Advanced Manufacturing
Extremely Unlikely	3	1	1	0
Somewhat Unlikely	3	3	1	0
Neither Likely nor Unlikely	11	2	2	5
Somewhat Likely	22	2	2	14
Extremely Likely	34	7	6	17

Follow up Discussions with Respondents.

Overall. With retirement being the main reason cited for departure from CTE, it is alarming that about half of the respondents are above 60. In fact, 15% said they were extremely likely to leave CTE within two years and 26% plan to teach for no more than three years. Community College CTE respondents' high academic achievements will likely make finding replacement teachers with equivalent knowledge and experience difficult. While teachers mostly have positive experiences with their jobs, several areas are notably lacking. These lacking areas include: a lack of inadequate knowledge on CTE subject areas amongst counselors and subsequently their inability to properly support CTE teachers; the need for more faculty; poor/a lack of outreach and engagement resulting in concerns about student recruitment. Notable findings concerning each subject area category are discussed below.

Automotive. Automotive respondents are older and more experienced. Correspondingly, a higher percentage (20%) of Automotive instructors are extremely likely to leave CTE within two years. Consistent with the larger picture, retirement is the main reason why Automotive respondents leave their jobs. Automotive respondents completed less college-level education but had more training from trade/technical schools. While appearing to receive the least support from stakeholders' groups, respondents said their programs received good funding. Along with difficulties in finding replacement teachers, the lack of sufficient number of teachers and issues with student recruitment may obstruct the continuation of automotive CTE programs. Out of 15, four respondents said it was somewhat to extremely unlikely their programs will continue in five to ten years.

Construction/Woodshop. Respondents are mostly in their 50s and 60s. Only one respondent said they were extremely likely to leave CTE within two years, although 83% are planning to leave CTE within 10 years. Retirement is the main reason why Construction/Woodshop respondents leave their jobs. Construction/Woodshop respondents are highly educated. Almost 60% possess a graduate degree or above, and all respondents received college education. Construction/Woodshop respondents appear to receive better support from stakeholder groups; however, consistent with the overall results, respondents were concerned with a number of deficient areas constraining the success of their programs. Of 12 respondents, two said it was somewhat to extremely unlikely that their programs will exist in 5 to 10 years.

Advanced Manufacturing. Advanced Manufacturing respondents are younger. They were also less inclined to cite retirement as a reason for their departure from CTE. 33% plan to teach only three more years, and 67% will leave CTE within 10 years. Advanced Manufacturing respondents have less teaching experience, but all possess college degrees, with a significant share of instructors holding Associate Degrees. Of 36 respondents, most believed it was somewhat or extremely likely their programs would continue in five to ten years.

APPENDIX A: SURVEY DESIGN

Subject	Intent	Question	Type
Current Position	Allows for parsing data based on teaching level and subject areas	Q4 – Subject Areas	Checklist
		Q5 – Teaching Level	Multiple Choice
Career Timeline	Understanding the anticipated need for new CTE teachers	Q1 - Age	Multiple Choice
		Q11 – Likelihood of Leaving CTE in 1-2 Years	Rating on a Scale of 1-5
		Q12 – How Many More Years Will You Teach?	Multiple Choice
		Q13 – Reasons for Leaving CTE	Checklist
Teacher Knowledge	Understanding the knowledge and skills of CTE teachers	Q2 – Years of Teaching Experience	Multiple Choice
		Q3 – Highest Education Level Completed	Multiple Choice
Job Experience	Understanding CTE teachers' experience on their jobs	Q6 – Job support from Stakeholder Groups	Rating on a Scale of 1-5
		Q7 – Job Satisfaction	Rating on a Scale of 1-5
		Q8 – Areas Doing Well	Checklist
		Q9 – Areas Needing Improvement	Checklist
		Q10 – Additional Comments about Your Program	Short Answer
		Q14 – Likelihood of Having the Program in 5-10 Years	Rating on a Scale of 1-5
		Q15 – Concerns for Program Sustainability	Short Answer
Additional Information	Gather contact and location information for follow-up interviews	Optional	Fill in the blank

Whenever rating was required, the scales provided are summarized below:

Types of Rating	**Scale**
Support	1 - None 2 - Some/Limited 3 - Some/Moderate 4 - Sufficient 5 - Great
Likelihood	1 - Extremely Unlikely 2 - Somewhat Unlikely 3 - Neither Likely nor Unlikely 4 - Somewhat Likely 5 - Extremely Likely
Satisfaction	1 - Unsatisfied 2 - Somewhat Satisfied 3 - Moderately Satisfied 4 - Satisfied 5 - Very Satisfied

APPENDIX B: SURVEY GOOGLE FORM

CTE Survey

This survey will take less than 10 minutes unless you have additional comments to help our research. Some questions provide space for you to provide additional information or descriptive responses. We encourage you to include as much information as you feel comfortable sharing so we can understand the urgent need to retain existing CTE educators, as well as, hire new ones. Please answer the questions honestly and to the best of your knowledge.

If you include your contact information at the end of the survey, we will contact you for an interview to gain additional insight. Your answers will not be shared with anyone outside of those conducting the survey (SMA/SMI). All information collected will be aggregated before publishing in a report. Only those comments elicited via interview may be quoted if permission is given, however, no names will be used.

Thank you for your time!
* Required

1. What is your age? *

Mark only one oval.

- ◯ Under 30 Years Old
- ◯ 30-39 Years Old
- ◯ 40-49 Years Old
- ◯ 50-59 Years Old
- ◯ 60-69 Years Old
- ◯ 70 Years Old and Above

2. How many years have you been teaching? *

Mark only one oval.

- ◯ 0-4 Years
- ◯ 5-9 Years
- ◯ 10-14 Years
- ◯ 15 Years and Above

3. What is the highest level of education/ qualification that you have completed? *

Mark only one oval.

- ◯ High School Graduate, Diploma or the equivalent
- ◯ Some College Credit, No Degree
- ◯ Trade/ Technical/ Vocational Training
- ◯ Associate Degree
- ◯ Bachelor's Degree
- ◯ Graduate Degree and Above

4. Which subject area(s) of CTE do you currently teach? Select all that apply. *

Check all that apply.

- ☐ Automotive
- ☐ Construction/ Woodshop
- ☐ Drafting/ Engineering/ Design
- ☐ Electronics/ Robotics
- ☐ Metal/ Machinist
- ☐ Print/ Graphic Arts
- ☐ Welding

Other: ☐ _____

5. What level of education/ qualification do you teach? Select all that apply. *

Check all that apply.

- ☐ Middle School
- ☐ High School
- ☐ Adult School
- ☐ Community College
- ☐ Trade School
- ☐ University

6. How much support does your CTE program receive from each of the following groups? Please rate from 1 to 5. (1=None, 2=Limited, 3=Some, 4=Sufficient, 5=Great) *

Mark only one oval per row.

	1 - None	2 - Limited	3 - Some	4 - Sufficient	5 - Great
District School/ College Administrator(s)	◯	◯	◯	◯	◯
Senior School Administrator(s)	◯	◯	◯	◯	◯
Career Counselor(s)	◯	◯	◯	◯	◯
Fellow Teacher(s)	◯	◯	◯	◯	◯
Parents	◯	◯	◯	◯	◯
Industry	◯	◯	◯	◯	◯

7. If there is any other source of support that your program receives, please list it here and rate it from 1 to 5.

_____

8. How satisfied are you as a teacher with the overall experience with your CTE program? Please rate from 1 to 5. *

Mark only one oval.

- ◯ 1 - Unsatisfied
- ◯ 2 - Somewhat Satisfied
- ◯ 3 - Moderately Satisfied
- ◯ 4 - Satisfied
- ◯ 5 - Very Satisfied

9. In what areas do you believe your program is doing well? Please select all that apply. *

Check all that apply.

- [ ] Career Counselors Understand My Industry
- [ ] Continuing Education Resources
- [ ] Facilities & Equipment
- [ ] Faculty Pay and Benefits
- [ ] Funding to Expand Program
- [ ] Recruitment of Students for CTE Classes
- [ ] Student Engagement
- [ ] Sufficient Number of Teachers/ Classroom Aides
- [ ] Teaching Materials & Supplies
- [ ] None
- [ ] Other: _____

10. If you would like to elaborate on any of the options you selected, please use the space below.

_____

_____

_____

_____

_____

11. In what areas do you believe your program should improve? Please select all that apply. *

Check all that apply.

- [ ] Career Counselors Understand My Industry
- [ ] Continuing Education Resources
- [ ] Facilities & Equipment
- [ ] Faculty Pay and Benefits
- [ ] Funding to Expand Program
- [ ] Recruitment of Students for CTE Classes
- [ ] Student Engagement
- [ ] Sufficient Number of Teachers/ Classroom Aides
- [ ] Teaching Materials & Supplies
- [ ] None
- [ ] Other: _____

12. If you would like to elaborate on any of the options you selected, please use the space below.

13. Do you have any additional comments regarding your program?

14. How likely will you leave the field within 12-24 months? Please rate from 1 to 5. *

Mark only one oval.

- 1 - Extremely Unlikely
- 2 - Somewhat Unlikely
- 3 - Neither Likely nor Unlikely
- 4 - Somewhat Likely
- 5 - Extremely Likely

15. How many more years do you plan to teach? *

Mark only one oval.

- Less than 1 Years
- 1-3 Years
- 4-6 Years
- 7-9 Years
- 10 Years and More

16. If you were to stop teaching CTE, what would be your main reason(s)? Please select all that apply. *

Check all that apply.

- [ ] Retirement
- [ ] Pursuing Other Careers in Manufacturing
- [ ] Career Change
- [ ] Work Relocation
- [ ] Finances (i.e. salary, benefits, etc.)
- [ ] Other: _____

17. What is the likelihood your institution will continue to offer your CTE program in the next 5 to 10 years? Please rate from 1 to 5. *

Mark only one oval.

- ◯ 1 - Extremely Unlikely
- ◯ 2 - Somewhat Unlikely
- ◯ 3 - Neither Likely nor Unlikely
- ◯ 4 - Somewhat Likely
- ◯ 5 - Extremely Likely

18. Do you have any concerns about the sustainability of your CTE program? If so, please describe them.

_____

_____

_____

_____

_____

If you would like to be contacted to share more about your CTE teaching experience, please provide your information below. The information you provide will only be used for the purpose of this survey.

19. Name

_____

20. Phone

_____

21. Email

_____

22. City Where You Teach

_____

Skip to section 16 (Thank you for taking the time to complete this survey!)

Thank you for taking the time to complete this survey!

If you have additional time, please take a look at the website of the California Industrial Technology Educators Association (CITEA) (https://www.citea.org/index.html). CITEA is a long-term partner of SMI and SMA. They are the key advocate and skills development organization for Industrial Technology Education. I hope you will review their website for information on the organization and consider the small membership fee to help support our common mission.

Additionally, we would like to thank the USC Center for Economic Development and AMP SoCal for their support in recognizing the importance of CTE. Their assistance was invaluable in administering the study and follow-ups.

Thank you again!

APPENDIX C: Post Survey Respondent Interview Script

Before Interview Preliminary Background Information - *5-7 minutes*

The following questions will focus on your experience with CTE programs. If there are questions you do not feel comfortable answering, please let us know by saying "skip", and we will move on to the next question.

We will be recording this interview for research purposes only. Do you consent to be recorded? Please answer yes or no.

Answer: _____

We would like to quote CTE educators in the final report, however we will not be using names. Do you consent to be quoted? Please answer yes or no.

Answer: _____

Before we begin, please share a little bit about your background.

(If they ask background in relation to what, say: such as how you entered the CTE industry, your educational background, your current position-if they have one, what industry they are focused on)

Questions:

1. Are the number of CTE programs in California increasing, decreasing, or staying the same?
    a. Why is this occurring?
    b. Is the quota system influencing this trend? (number of students needed to continue a program)

2. Are there challenges filling open CTE positions?
    a. If yes: Has there been a drop off in CTE programs due to this difficulty in hiring people?
    b. If no: move on

3. Do you anticipate challenges filling positions in the future?
    a. If yes: What are they?
    b. If no: move on

4. Have you personally ever recruited teachers from industry?
    a. If yes: What have been their motivations to leave the industry to become a teacher?
    b. If no, move on.

5. What attributes make someone from industry a good teacher?

6. What improvements would like to see in CTE programs across the state?

7. Do you have a good relationship with your industry sector to help students get hired after graduation?

Closing Segment - *3 minutes*

We have now concluded the interview. Thank you for your time. Do you have any questions?

[PAUSE FOR RESPONSE]

If you have any further insight you would like to share, please forward it to David Goodreau (**dg@smaofca.com**), who will relay the information to us. Thank you again and we will keep in touch with any additional updates.

End