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Summary Report: Essential Programs and Services Career and Technical Education Component Review

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**Summary Report: Essential Programs and Services
Career and Technical Education Component Review**

Report to the Maine Department of Education

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May 2022

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Essential Programs and Services Report of Findings: Career and Technical Education Component Review

Background

The Career and Technical Education (CTE) funding model was implemented in FY2019 after a lengthy period of development. The component was scheduled for a review in FY2020 and FY2021 as part of the ongoing cycle of analysis of all major components of Maine's Essential Programs and Services (EPS) education cost model. Due to the breadth and complexity of the CTE funding model, and the fact that this is the first time it has been reviewed to see how it is being implemented in actual practice, the findings have been broken into several sections. Appendix A provides the overall plan of analyses, which were divided into two separate reports.

The Part I report issued in summer 2021 included analyses related to student enrollment trends, including the impact of the Covid-19 pandemic on program enrollments, as well as analyses related to facilities and maintenance spending. The Part II report issued in March 2022 described the remainder of the analyses, which are divided into three distinct sections based on the source data used in each task. Section I presented findings that were derived from staffing data. Section 2 described patterns from expenditure data from the most recent pre-pandemic program year. Section 3 summarized results of a questionnaire that was administered to all CTEs to gather data that are not routinely collected. The data from the questionnaire responses were needed to address a series of questions posed by the "Maine CTE Subsidy Workgroup," which was formed by Maine Administrators of Career & Technical Education (MACTE) and the Maine School Superintendent Association (MSSA). The Maine Department of Education (MDOE) agreed to include the questions in the research plan for the EPS component review contract with MEPRI.

The research topics and questions came from the Maine Department of Education, prior reports by MEPRI and MDOE, and the MACTE/MSSA CTE Subsidy Workgroup as mentioned above. Some of the information was needed for decisions to be made by MDOE during the continuing implementation of the EPS CTE model. The adequacy of sub-components was evaluated. And in some cases updated model parameters were computed. Miscellaneous topics

and questions presented by the MACTE/MSSA Workgroup were also addressed. Additionally, relevant findings were presented to the LD 313 work group, which was established after the MEPRI research project was well underway. The materials prepared by MEPRI for the LD 313 work group are included as Appendix D.

The current summary report is a compilation of the findings of the Part I and Part II reports together with a summary of the main findings and elaboration on data and analysis methods. It begins with an overall summary of our most pertinent findings in order to aid the reader in navigating the various sections of the report. A methods section describes the data and the analysis techniques used in the review. Finally, detailed findings are presented in two parts corresponding to the Part I and Part II reports previously submitted.

Summary of Main Conclusions

Enrollment

Before the pandemic, programs and enrollments increased for both standard programs and programs with fewer hours. Grade 9 and 10 enrollments increased. MEPRI recommends continuing toward full EPS implementation, continuing immediate EPS funding for new programs, and considering adding a mechanism to provide immediate EPS funding for program expansions. (See findings Part I)

Direct Instruction

- a. Teachers.* With expanding enrollments, using a three-year average enrollment to determine teacher allocations increases the lag for EPS funding to catch up to actual enrollments. Consider using most-recent-year enrollment or the greater of the most-recent-year or the three-year average. (See Findings Part I & Personnel sections)
- b. Teacher Salary Matrix.* CTE teacher salaries are correlated to years of experience. Sufficient data exists to make a CTE-specific teacher salary matrix to adjust allocations to actual education and school experience levels of teachers. Data on industry experience, which also affects CTE teacher salaries, is not routinely collected. If such data were accurately and routinely collected, a more precise matrix might be possible. (See Regional Adjustment & Salary Matrix sections)
- c. Regional Adjustment.* CTE teacher salaries are correlated to regional differences. It would be possible to adjust CTE personnel cost allocations using the EPS Regional Adjustment. The result would be higher allocations in higher-cost areas, lower allocations in lower-cost areas, and little effect on the statewide total of the EPS CTE allocations. (See Regional Adjustment & Salary Matrix sections)
- d. Education Technicians.* While the number of education technicians in CTE schools has increased in recent years, the EPS allocation for CTE education technicians remains at nearly double the number of actual education technicians. MEPRI recommends continuing to monitor the number of actual education technicians as full implementation of the EPS CTE model proceeds. (See Questionnaire section)
- e. Special Education and ELL.* Costs for special education and ELL programs are funded in their respective EPS components. Additional CTE costs for students with special education or ELL needs are not tracked or reported separately within the CTE program. Thus it is not feasible to create a separate, empirically-based weighted pupil count within the CTE cost model. Adequacy for such needs is provided within the existing sub-components of the EPS CTE model, especially

the education technician and student and staff support personnel sub-components, both of which have EPS allocations well beyond actual spending in those areas. (See Questionnaire section)

Administrative and Support Costs

- a. *Administrative and Student & Staff Support Personnel.* EPS FTE personnel allocations are greater than actual FTE personnel in all areas of administration and support, especially in student & staff support. (See Personnel section)
- b. Other administrative and student & staff support costs. EPS allocations are greater than actual expenditure in both administration and support. In student & staff support, allocations in each of the four per-pupil amounts are well beyond expenditures in those particular areas. The funding models for administration and support could be aligned by using similar models for each, for example, a per-pupil amount or a percentage of personnel cost. (See Expenditure section)

Supplies

Per-program allocations for supplies were recalculated based on recent expenditure data, including newly available programs such as cosmetology. (See Expenditure section)

Maintenance & Operation of Plant

The cost-per-square-foot model currently used in the EPS CTE model continues to be a good fit to actual OMP expenditure, as is a cost-per-pupil model similar to the one used in the general EPS OMP component. Models utilizing area-by-usage were considered. The empirical model fit was not as good as the models based on enrollment and total building area. An independent verification of the data is pending. (See Findings Part I)

Equipment

CTE equipment is currently funded outside the EPS model primarily through state and federal grants, which may provide a better fit given the irregular intervals of CTE equipment needs. Current equipment inventories would not provide sufficient data to develop a program-specific EPS model of annualized equipment costs. State funding programs such as grants and revolving funds may be evaluated for adequacy in supporting the amount and irregular intervals of CTE equipment needs. (See Questionnaire section)

Methods

Several methodological approaches were adopted as appropriate in setting the original parameters for the various EPS CTE model subcomponents, updating the parameters for implementation, and verifying the equity and adequacy of subcomponents. The bulk of the model was originally developed using a *professional judgment approach*, which was used in the models for teachers, education technicians, student services personnel, and administration personnel. These components were developed by the Maine Department of Education with research assistance from MEPRI consistent with the consensus of the CTE Funding Formula Committee, also known as the “Stakeholder Group,” acting as the professional judgment panel. The CTE Funding Formula Committee was a group of administrators including CTE directors, superintendents, and business managers convened by the Maine Department of Education to guide the development of the EPS CTE component. Actual human resource and expenditure data was compared to the recommended model as a reality check. In some cases, the model was designed to allocate staffing levels well beyond current actuals based on the judgment of the panel. This is particularly evident in the education technician and student services sub-components, where the levels were set much higher than current levels based on the perception that increases in actual staffing in these categories would improve safety and CTE education for students with special needs.

Other subcomponents, particularly resource areas considered less central to the instruction process, were modeled appropriately using statewide actual expenditure data. These areas included operation and maintenance of plant (OMP) and non-personnel costs for administration. The model for supplies was also developed using such a method to provide specific allocation parameters for each kind of program. These methods are a type of what is called a *cost-function approach*. The cost functions vary from a dollar amount per-square foot for OMP to a percentage of administration personnel costs for administration non-personnel costs to an allocation formula based on a regression analysis for supplies. (The supplies allocation equals a per-student amount plus a program-specific per-program amount). Costs for other support services such as instructional technology and professional development were modeled as a percentage of the corresponding component in the EPS model for regular secondary education.

Similar appropriate methods were used in this review for verifying the adequacy of sub-components, computing new model parameters, comparing alternative model specifications, and performing miscellaneous analyses. For the components originally set using the professional judgment method—teachers, education technicians, student services personnel, and administration personnel—adequacy verification involved a comparison of actual and allocated resources. In the case of education technicians and student services personnel, which were originally allocated far beyond actual resources, the comparison was intended to show progress toward adequacy of actual resources employed as much as showing funding adequacy of the EPS model sub-components. Although a new committee or professional judgment panel was not convened as part of this review, MEPRI considered suggestions and feedback about the model provided by the MACTE/MSSA CTE Subsidy Workgroup, and relied on their professional knowledge and expertise for information about CTE operations and practices.

For sub-components originally using a cost function approach—OMP, non-personnel administrative costs, other support services, and supplies—updated model parameters were computed. For OMP, several alternative models were examined using per-square-foot or per-pupil amounts. Non-personnel administrative costs as a percentage of administrative personnel costs were recomputed, as well as an alternative per-pupil model. Other support services allocations were computed on the bases of the most recent regular education EPS model parameters in addition to an alternative per-pupil model. The supplies cost model was recalculated using regression analysis and includes new programs, such as cosmetology, that became available to Maine students after the original model was developed.

A. Data

Enrollment data. Enrollment data by program was provided by MDOE. Most of the analysis centered on the three school years 2017-18, 2018-19, and 2019-20, which were the most recent years of October enrollment data not impacted by the COVID-19 pandemic. School year 2020-21 enrollments were also examined as the first year of enrollments impacted by the pandemic.

Human resources data. Human resource data was provided by MDOE. Most analysis centered on school year 2019-20, which was the most recent year of December staffing data before enrollments and operations were impacted by the COVID-19 pandemic. Among

others, the human resource data included teacher salary, education, and experience as educators. Another primary determinant of CTE teacher salaries is the industry experience a CTE teacher had before becoming a teacher. Often CTE teachers are given credit for such experience on the teacher salary scale at a rate one year for every two years of industry experience. This data is not regularly collected by the state. However, MDOE did collect and analyze industry experience data recently on a one-off basis and provided it to MEPRI.

Expenditure data. Detailed expenditure data was provided by MDOE. Most analysis centered on fiscal year 2018-19, which was the most recent full year of expenditure data not impacted by the COVID-19 pandemic. The data was categorized by MEPRI to correspond to the EPS CTE sub-components according to program, function, and object codes.

Square footage data. Two sets of area data were provided by MDOE. First was the building data on file with MDOE that had been used in determining EPS allocations for OMP after corrections and clarifications had been provided to MDOE by CTE regions and centers. The second set of data was from a survey administered by MDOE of CTE regions and centers about indoor and outdoor areas by usage, such as instructional space, common areas, storage, and administrative offices. While this data was by all accounts carefully and conscientiously collected, it was not certified or independently verified, and there were questions about whether the same standards and criteria were used by the individual regions and centers in collecting and categorizing their data.

Questionnaire data. MEPRI administered a questionnaire to Maine CTE directors covering information not regularly collected by MDOE. The response rate was 100%.

Part I: Enrollment and Facilities

A. Enrollment

Number of Programs

Table 1. Enrolled Programs FY19 to FY21

	FY18	FY19	FY20	FY21	Change
All	340	339	343	355	15
Federal CIP	314	310	313	320	6
Maine CIP	26	29	30	35	9

- *Supporting a goal to increase CTE opportunities for Maine students*, there were 15 net new enrolled programs in FY 2019 through FY 2021 compared to FY 2018. This is the combined result of new programs, splits, splinters, and unsuspended programs net of discontinued and suspended programs. It represents the net change in programs available to Maine CTE students.
- Net increases occurred in programs with federal CIP codes and in programs with Maine CIP codes. Programs with federal CIP codes tend to be the familiar traditional half-time two-year CTE programs with 350 hours or more per year. Programs with Maine CIP codes may involve fewer hours of instruction, often 175 hours a year, and may be academic or exploratory rather than specific career training. The net increase in programs was greater for Maine CIP programs than federal CIP programs.

Change in Enrollment

Table 2. Enrollment FY18 to FY20 and FY21 (pandemic year)

Type	FY18	FY19	FY20	Change FY18 to FY20	FY21	1-year change
All	7884	8275	8595	711	8451	-144
Federal CIP	6848	7154	7418	570	6920	-498
Maine CIP	1036	1121	1177	141	1531	354

- *Supporting a goal to increase access to CTE for Maine students*, CTE program enrollment increased in the two years from FY2018 to FY 2020, which was the last year before enrollments were affected by the pandemic. The increases occurred in both federal CIP programs and Maine CIP programs, mostly federal CIP programs.

- In FY 2021, the pandemic year, there was an overall decrease in enrollments. Because FY 2021 is an anomaly, it needs to be analyzed and understood separately rather than as part of a continuing trend.
- In the pandemic year, Maine CIP programs increased at a greater rate than before the pandemic year, while federal CIP program enrollments decreased.

Enrollment by Grade

Table 3. Enrollment by Grade FY18 to FY21

All Programs	FY18	FY19	FY20	change	FY21	change
Grade 9	284	238	322	38	587	265
Grade 10	682	661	920	238	965	45
Grade 11	3252	3573	3591	339	3505	-86
Grade 12	3666	3803	3762	96	3394	-368
Grades 9-12	7884	8275	8595	711	8451	-144

- *Supporting dual goals of new and expanded programming for 11th and 12th graders and increased participation of 9th and 10th graders*, enrollments increased in all grades 9 through 12 in the two years from FY 2018 to FY 2020, the last year before enrollments were affected by the pandemic.
- In FY 2021, the pandemic year, there were decreases in CTE enrollments for 11th and especially 12th grade students. There were also increases in enrollments for 9th and 10th grade students. Notably, the proportional increase in participation of 9th grade students was very large during the pandemic year.

Table 4. Enrollment by Grade FY18 to FY21 Federal CIP and Maine CIP Programs

Federal CIP	FY18	FY19	FY20	change	FY21	change
Grade 9	88	90	125	37	139	14
Grade 10	486	486	617	131	567	-50
Grade 11	3013	3305	3324	311	3209	-115
Grade 12	3261	3273	3352	91	3005	-347
Grades 9-12	6848	7154	7418	570	6920	-498

Maine CIP	FY18	FY19	FY20	change	FY21	change
Grade 9	196	148	197	1	448	251
Grade 10	196	175	303	107	398	95
Grade 11	239	268	267	28	296	29
Grade 12	405	530	410	5	389	-21
Grades 9-12	1036	1121	1177	141	1531	354

- Grade 11 and 12 enrollment increases through FY 2020 were largely in federal CIP programs.
- Grade 9 and 10 enrollment increases through FY 2020 were in both federal CIP and Maine CIP programs.
- In FY 2021, the pandemic year, grade 11 and 12 enrollment decreases were largely in Federal CIP programs.
- Grade 9 enrollment increases in FY 2021 were mostly in Maine CIP programs. Grade 10 enrollments that year increased in Maine CIP programs and decreased in federal.

B. Defining Program Enrollment of Continuing and New Programs

CTE model alternative definitions for program enrollment:

1. Continuing programs:
 - a. Three-year average (current statute)
 - b. Most recent year
 - c. Greater of most recent year and three-year average.
2. New programs in their first three years:
 - a. Planned enrollments from new program application (current statute)
 - b. Adjust plan as actuals enrollments become available. (Note: only one year for FY20 analysis, two years available for FY21 analysis including the pandemic year.)

Table 5. Enrollment Measures: Most Recent Year as FY21

	Programs	FY21	3-year Average	Greater of	FY22 Plan	3-year Actual or Plan
Continuing (3yr)	310	7058	7258	7630	N/A	N/A
CIP change	8	103	127	127	N/A	N/A
Splits & Splinters	17	391	422	459	422	N/A
New in 2020*	20	352	364	384	454	394
New in 2021*	22	488	488	488	508	501
New in 2022*	15	N/A	N/A	N/A	405	405

*Including unsuspended programs (4 in FY20: 3 in FY21: 3 in FY22)

Splits and splinters: 6 programs split or splintered into 17 programs

Green shading indicates enrollments according to current statute.

Yellow shading indicates a single year or two-year average as available.

- Table 5 shows three alternative enrollments that may be used for determining recommended teacher counts for existing programs in the EPS CTE model: the most recent year (FY21), a three-year average, and the greater of the most recent year or a three-year average. For new programs in their first three years, Table 5 shows two more alternatives: the planned enrollment from the application for new programs and a three-year average using actual enrollments for available years and plan amounts for unavailable years
- As may be seen in Table 5, for the three years ending in FY 2021, the pandemic year, the 3-year average enrollment was greater than most-recent-year enrollment. This is due to the pandemic-related enrollment decrease in FY2021.

- For programs that were new in FY20 and FY21, actual enrollments were lower than planned enrollments from the CTE new program applications. As a result, the planned enrollment is greater than the three-year average of actual or plan.

Enrollments for alternative FTE Teacher models (FY 2020: most recent typical year)

Table 6. Enrollment Measures: Most Recent Year as FY20

	FY20	3-year Average	Greater of	FY22 Plan	3-year Actual or Plan
Continuing (3yr)	7544	7378	7916	N/A	N/A
CIP change	132	150	156	N/A	N/A
Splits & Splinters	474	430	474	422	N/A
New in 2020	375	376	377	454	427
New in 2021	N/A	N/A	N/A	508	508
New in 2022	N/A	N/A	N/A	405	405

Green shading indicates enrollments according to current statute.

Yellow shading indicates a single year available only.

- Because FY 2021 was extraordinary, the analysis was repeated treating FY 2020 as the most recent year. The results are shown in Table 6. This more typical year was used in further analysis to estimate the relative cost of the different model alternatives.
- As may be seen in Table 6, for the three years ending in FY 2020, the most-recent-year enrollment was greater than the 3-year average enrollment. This raises the question whether the current statute requiring the use of a three-year average may result in less-than-adequate allocations.
- For new programs in FY 2020, actual enrollments were below planned enrollments from approved new program applications. An accurate CTE cost model requires accurate planned enrollments. Two possible ways to improve cost model accuracy are:
 - 1) Improve the accuracy of the planned enrollments in approved program applications.
 - 2) Adjust planned program enrollments in the first three years as actual enrollment data becomes available.

Table 7. Accuracy of Planned Enrollments for
New Programs: Selected Examples

CIP Code	Certified FY20	Certified FY21	Estimate FY22
New in FY20:			
99.6000	36	27	64
11.1003	19	26	50
51.0904	13	16	32
51.0801	35	47	30
New in FY21:			
99.6000	-	27	48
99.6000	-	16	32
19.0709	-	5	24
49.0202	-	7	24
46.0302	-	9	24
48.0508	-	10	20
47.0605	-	11	20
19.0709	-	11	20
43.0203	-	5	18
52.0901	-	7	16
46.0503	-	6	14
1.0303	-	2	10
49.0205	-	3	7
99.6000	-	99	70
99.6000	-	147	20

- Table 7 is a list of selected new programs whose planned enrollments are substantially different from actual. A programs was selected if either its planned enrollment was more than 75% higher than actual (unshaded) or if its planned enrollments was lower than actual by any amount (shaded green).
- More accurate planned enrollments would improve the cost model accuracy.
- Fewer programs, shaded green, had actual enrollments above plan. Using actual enrollments for such programs may improve the cost model accuracy and adequacy.

FTE teacher allocation for alternative enrollment models

Table 8. Teacher FTE Allocation Models: Most Recent Year as FY20

	FY20	3-year Average	Greater of	FY22 Plan	3-year Actual or Plan
Continuing (3yr)	323	316.5	329.5	N/A	N/A
CIP change	6.5	7	7	N/A	N/A
Splits & Splinters	15	15	15	19	N/A
New in 2020	18	18	18	20	19.5
New in 2021	N/A	N/A	N/A	23.5	23.5
New in 2022	N/A	N/A	N/A	18.5	18.5

Green shading indicates enrollments according to current statute.

Yellow shading indicates a single year available only.

- The next step in costing out the model alternatives was to apply the Recommended Teacher FTE table. A lookup was made for each CTE program. The results were added up to determine the total number of FTE teachers allocated under each EPS cost model alternative. The results are in Table 8.
- For continuing programs, the statutory three-year average model results in a lower FTE teacher allocation than the most recent year model, calling into question the adequacy of the teacher allocation under current statute.
- Although program splits and splinters do not result in higher total enrollments, they do result in higher FTE teacher allocations. This is a result of having two separate teacher FTE determinations. Some economies of scale are lost when a larger program is split or splintered into two smaller ones. The cost model reflects this loss in economies of scale.
- Only one year of actual enrollment data is available for new programs started under the new CTE cost model. The effect of using higher planned enrollments without adjusting for actual enrollments as they become available is smaller than may be expected when more years of data become available.

Teacher salary cost allocation estimates for alternative enrollment models

Table 9. Teacher Salary Cost Allocation Estimate (Most Recent Year as FY20)

	FY20	3-year Average	Greater of	FY22 Plan	3-year Actual or Plan
Continuing (3yr)	\$17,091,632	\$16,747,683	\$17,435,581	N/A	N/A
CIP change	\$343,949	\$370,407	\$370,407	N/A	N/A
Splits & Splinters	\$793,729	\$793,729	\$793,729	\$1,005,390	N/A
New in 2020	\$952,475	\$952,475	\$952,475	\$1,058,305	\$1,031,848
New in 2021	N/A	N/A	N/A	\$1,243,509	\$1,243,509
New in 2022	N/A	N/A	N/A	\$978,932	\$978,932

Green shading indicates enrollments according to current statute.

Yellow shading indicates a single year or a two-year average as available.

- The total teacher salary allocation associated with the different model alternatives was estimated. The estimates are in Table 9, with estimated allocations according to current statute in the green shaded areas.

Table 10. Teacher Salary Cost Estimate Compared to Current Statute
(Most Recent Year as FY20)

	FY20	3-year Average	Greater of	FY22 Plan	3-year Actual or Plan
Continuing (3yr)	\$343,949	\$0	\$687,899	N/A	N/A
CIP change	(\$26,458)	\$0	\$0	N/A	N/A
Splits & Splinters	(\$211,661)	(\$211,661)	(\$211,661)	\$0	N/A
New in 2020	(\$105,831)	(\$105,831)	(\$105,831)	\$0	(\$26,458)
New in 2021	N/A	N/A	N/A	\$0	\$0
New in 2022	N/A	N/A	N/A	\$0	\$0

Green shading indicates enrollments according to current statute.

Yellow shading indicates a single year available only.

- Table 10 shows the estimated cost of each alternative relative to the current statute. As a result, the green shaded areas are zero.
- Continuing Programs Enrollment model:
 - Basing teacher salary allocations on the most recent year of data would result in higher allocations by approximately \$344 thousand. This is the approximate

amount by which current teacher allocations may be inadequate for current enrollment.

- Teacher salary allocations would be approximately \$688 thousand higher if model enrollments were equal to the greater of the most recent year or the three-year average.
- Splitting and splintering of programs resulted in more recommended teachers and higher allocations by approximately \$211 thousand. This loss of scale economies is a cost of providing students with the benefit of more specialized CTE programming.
- The current model for new programs where planned enrollments are used for the first three years would result in approximately \$26 thousand higher teacher salary allocations than adjusting plans for programs in their second year with one year of actual data. In the future, data will be available to also adjust plans for programs in their third year using two years of actual data. Adopting such a model is one way of addressing the varying accuracy of planned enrollments.

C. Operation and Maintenance of Plant (OMP)

Table 1. Operation and Maintenance of Plant (OMP) Expenditure FY19

Operation and Maintenance of Plant (OMP)	\$9,023,601
Capital Improvement and Renovation	\$791,899
OMP excluding Capital Improvement and Renovation	\$8,231,703

- Capital improvement and renovation is not an annual operating cost and is funded outside EPS. The \$8.2 million amount is used in this component review.

Table 2. Facilities Area

	Square Feet	Cumulative
Program Areas	1,202,939	1,202,939
Offices and Commons	357,425	1,560,364
Miscellaneous	155,746	1,716,111
Total	1,716,111	

Miscellaneous includes outdoor program areas, play areas, greenhouses, a fire house, sheds, storage, and bus garages.

- Square footage data was collected the Maine Department of Education in a 2019 CTE facilities survey. The areas were classified by their usage as program areas, offices and commons, and miscellaneous categories.
- The types of areas may be analyzed separately or cumulatively, starting with the program areas as primary cost drivers.

Table 3. OPM Expenditure Per Unit FY19

Basis	Units	OMP per unit	Correlation to Expenditure
Expenditure	\$8,231,703	1	1.000
Schools	27	\$304,878	N/A
Programs FY19	327	\$25,173	0.697
Student Program Enrollment FY19	8,026	\$1,026	0.764
Square Feet:			
Building Area (2018 Data)	1,666,915	\$4.94	0.772
<i>2019 Facilities Survey Data:</i>			
Program Areas	1,202,939	\$6.84	0.760
Program areas, offices, and commons	1,560,364	\$5.28	0.724
Programs areas, offices, commons, and miscellaneous	1,716,111	\$4.80	0.689

Miscellaneous includes outdoor program areas, play areas, greenhouses, a fire house, sheds, storage, and bus garages.

- Several unit cost measures are presented in Table 3, including expenditure per student and expenditure per square foot, using several different square footage options.
- The correlation provides an indication of how strongly related each of the measures listed is to OMP expenditures. The highest possible correlation would be 1.00.
- Three strong cost model options are suggested by strong correlations:
 - 1) Total Building Area (2018 Data): \$4.94 per square foot (current model)
 - 2) Program Enrollment: \$1,026 per student
 - 3) Program Areas (instructional space): \$6.84 per square foot
- Other model options
 - *Simple regression.* A simple regression model could be used to determine a model allocating a flat amount to each CTE school *plus* an amount per square foot or per pupil.
 - *Multiple regression.* Statistically robust models depend on having a large number of data points. With only 27 CTE organizations to analyze, a complex statistical model is impractical.
 - *Multiple categories.* Theoretically, different amounts per square foot could be used for areas of different usage, which is an approach suggested by the CTE Funding Workgroup. The areas may include indoor program areas, outdoor program areas, offices, and commons. Such a model would be possible if a method for consistently allocating OMP expenditures to each type of area is developed and implemented.
- The measuring, categorizing, and reporting of square footage data is yet to be reviewed by an independent facilities consultant. One might expect that the data quality and consistency of the currently available square footage data is lower than the quality and consistency of enrollment data, which is standardized and certified. Because of the similarity in the correlations between the square-footage and enrollment models, it may be warranted to change to a per-pupil OMP allocation until square-footage data collection is standardized and verified.

Part II, Section 1: CTE Personnel Findings

The EPS CTE model provides an FTE allocation for some major categories of CTE school staff. These categories account for 524.5 FTE actual personnel. There are an additional 71.3 FTE personnel with a total annual salary of \$2.3 million in other staff categories, primarily in Operation & Maintenance of Plant, and also technology and co-curricular, which are allocated within sub-subcomponents relying on per-square-foot or per-pupil dollar amounts rather than specified FTE personnel.

Table 1. Actual Personnel Corresponding to EPS FTE Personnel Allocations

EPS Position	FTE	Percent	Salary	Percent	EPS CTE Sub-Component
Teacher	361.6	69%	20,129,777	73%	Direct Instruction
Education Technician	72.1	14%	1,849,772	7%	Direct Instruction
Director	24.8	5%	2,294,606	8%	Central Administration
Assistant Director	10.5	2%	822,079	3%	Central Administration
Business Manager	4.8	1%	288,640	1%	Central Administration
Clerical	34.1	7%	1,236,248	4%	Central Administration
Guidance/Student Services	16.6	3%	1,008,115	4%	Student and Staff Support
Total	524.5	100%	27,629,236	100%	

Comparisons of Actual to EPS Model

Table 2. EPS vs. Actual FTE by Position

EPS Position	EPS FTE	Actual FTE	Difference	Percent
Teacher	353.0	361.6	-8.6	-2%
Education Technician	146.4	72.1	74.3	103%
Director	27.0	24.8	2.2	9%
Assistant Director	10.5	10.5	0.0	0%
Business Manager	8.0	4.8	3.2	67%
Clerical	34.7	34.1	0.6	2%
Guidance/Student Services	58.5	16.6	41.9	252%
Total	638.1	524.5	113.6	22%

Teachers. The number of EPS allocated teachers is slightly below the actual number of teachers. In MEPRI's *EPS Component Report of Findings: Career and Technical Education, Part I*, August 2021, three policy options were presented for which enrollment measure to use in determining teacher allocations:

Three-year average:	356.5	FTE
Most recent year:	362.5	FTE
Greater of the two:	369.5	FTE

The current EPS model implementation uses three-year average enrollments, which is the lowest of the three and the only one below actual.

Education technicians. More detailed information is available in the section of the current report analyzing Questionnaire responses. The EPS allocates funding for around double the number of education technicians in CTE schools.

Administration personnel. In each position category within central administration—director, assistant director, business manager, and clerical—EPS provides allocations for at least as many FTE personnel as are actually employed.

Guidance/student services. The EPS model as implemented allocates more than double the number of FTE guidance/student services personnel as are actually employed. The recommended model from the 2017 MEPRI report recommended an FTE allocation ranging from 0.5 FTE to 1.5 FTE, depending on enrollment at the school. The model as implemented allocated between 2.0 and 2.5 FTE. Either allocation would be well beyond actual current practice.

Regional Adjustment & Salary Matrix

Prior studies have established that CTE classroom teachers have salary patterns that are materially different from non-CTE teachers. Namely, CTE teachers are paid more than non-CTE teachers with similar levels of education and experience. This has led to the use of a state average CTE teacher salary rather than using the salary matrix and regional adjustment method that is used in the non-CTE EPS formula. To investigate whether it may be advantageous to include more information in allocating CTE teacher salaries, MEPRI analyzed the relationship between CTE salaries and other variables of interest.

First we studied the relationship of educational attainment to CTE teacher salary. There was no significant difference between the salaries of individuals with a high school diploma, bachelor's degree, or bachelor's degree plus up to 30 credits. There was also no significant difference between those with a master's degree and those with a master's plus 30 credits or a doctorate. However, there was difference between the first category (high school diploma through bachelor's degree plus 30 credits) and the second (master's degree or higher). This suggests that if a separate salary matrix were to be created for CTE teachers, it would have two educational categories.

Next we calculated the correlations between the average salary of all full-time ($FTE = 1.0$) classroom teachers at each CTE to their average years of teacher experience, and the regional salary index of the geographic location of the CTE (Table 3).

Table 3. Correlation of CTE Average Teacher Salary to Other Variables of Interest

	Avg years of experience	Regional Index
Average salary	0.58	.71
Avg years of experience	1.00	.22

Table 3 shows that there is indeed a regional pattern to a CTE's average salary, and that the years of experience also influence CTE teacher pay. This suggests that if it is desired to implement an adjustment to more closely model the pay of a given CTE teacher, the system should include both a salary matrix and a regional adjustment.

Table 4 (next page) describes the pattern of these variables of interest for each CTE.

- CTE average salary as a percentage of the state average for CTE classroom teachers
- Average years of experience for CTE teaching staff
- EPS Regional cost adjustment, based on the geographic location of the CTE

Table 4. Average Full-time CTE Classroom Teacher Salaries, Based on FY20 Staff Data

	# of FTE=1 Tchrs	Avg Yrs Exp	Average salary	% of State CTE Average	Geographic Regional Index
CTE Centers					
Bath Regional Career & Technical	10	17	\$65,566	118%	102%
Biddeford Regional Ctr of Tech	15	14	\$68,757	124%	109%
Capital Area Technical Center	17	8	\$50,076	90%	95%
Caribou Regional Technology Ctr	9	10	\$52,814	95%	90%
Coastal Wash Cty Inst of Tech (Machias)	<5	*	*	*	84%
Foster Regional Applied Tech Ctr	16	17	\$46,659	84%	96%
Hancock County Technical Center	10	10	\$46,421	83%	93%
Lake Region Vocational Center	11	19	\$64,381	116%	94%
Lewiston Regional Technology Ctr	23	19	\$62,941	113%	98%
Mid-Maine Technical Center (Waterville)	13	10	\$54,851	99%	97%
Portland Arts & Technology H S	20	16	\$68,667	123%	108%
Presque Isle Reg Career & Tech Ctr	7	19	\$50,889	91%	90%
Sanford Regional Technical Center	22	12	\$61,460	111%	103%
Somerset Career & Technical Center	10	12	\$54,124	97%	103%
St Croix Regional Technical Center	6	7	\$42,971	77%	96%
St John Valley Technology Center	6	9	\$49,522	89%	99%
Tri-County Technical Center (Dexter)	14	18	\$58,651	105%	94%
Van Buren Regional Technology Ctr	<5	*	*	*	99%
Westbrook Regional Technology Ctr	15	13	\$65,326	117%	108%
CTE Regions					
Maine Region 10 Technical High Sch	11	12	\$61,995	111%	102%
Mid-Coast Sch of Tech-Region 8	19	9	\$58,435	105%	100%
No Penobscot Tech-Region 3 (Lincoln)	13	10	\$41,550	75%	86%
Oxford Hills Tech - Region 11 (Norway)	20	15	\$54,670	98%	94%
Region 9 Sch of Applied Technology	13	14	\$49,008	88%	93%
Region 2 Sch of Applied Tech (Houlton)	11	7	\$41,822	75%	88%
United Technologies Ctr-Region 4	19	15	\$46,309	83%	102%
Waldo County Tech Ctr-Region 7	10	6	\$45,469	82%	101%
Statewide	343	13	\$55,617	100%	100%

* Fewer than 5 full-time teachers; averages not considered sufficiently representative to include

The number of CTE teachers is not adequate to develop a robust salary matrix with all of the education and experience categories in the non-CTE matrix. However, if the education levels were reduced to just two and the experience levels are combined at the high and low ends, then the number of teachers is adequate (though not robust).

Table 5. Number of CTE Teachers and Average Salaries by Experience and Education Levels

Years of Experience	Number of Full-time CTE Classroom teachers		Average Salary (\$)
	High school Diploma to Bachelor's +30	Master's to Doctorate	
<i>Total N</i>	<i>261</i>	<i>81</i>	<i>342</i>
0 to 5 years	95	14	47,285
6 to 10 years	34	18	51,647
11 to 15 years	43	13	55,660
16 to 20 years	29	11	62,676
21 to 25 years	29	11	63,888
26 years or more	31	14	65,922
Average Salary	\$54,014	\$60,345	\$55,513

Table 5 shows that actual average salaries observed in the staff data do increase as education and experience increase. However, the increase due to years of experience is not smooth; one can observe a jump in the average salary between the 11-15 and the 16-20 bands, and a much smaller increase for 21-15 years. Additional analysis would be necessary to discern if this is attributable to the education levels, the geographic location, or neither. The comparatively small number of teachers in each education and experience category means that averages can be influenced by just a few atypical cases.

Additional study of the regional adjustment is also needed to discern its potential impact. CTEs would need to receive the EPS regional adjustment for their location in order to have an adequate number of cases to represent the impact of geographic region on salary patterns.

Concluding Statement for Regional Adjustment and Salary Matrix. There appears to be evidence that the personnel cost for CTE is correlated to teacher experience and to regional cost differences, as is the case in regular education. A CTE teacher salary matrix similar to the matrix used in the EPS model for regular education teacher salary cost allocations (although simpler) could be developed. Further, although there is insufficient data to generate a CTE-specific

regional adjustment, the EPS regional adjustment could be applied to CTE personnel cost. Neither of these changes would be expected to change to CTE allocation statewide, but it would increase or decrease the allocations to individual CTE regions and centers depending on their geographic location within the state and the level of experience and education of their CTE teachers.

Part II, Section 2: CTE Expenditure Findings

Summary

Table 6. Expenditures Corresponding to EPS CTE Model Components

Expenditure Category	Amount	Percent	Component(s)
Direct Instruction	\$ 27,406,332	55%	Teacher and Ed Tech
Central Administration	6,348,050	13%	Admin Personnel and Other Admin
Supplies	3,273,395	7%	Supplies
Operation and Maintenance	8,666,470	17%	OMP
Other Student and Staff Support	3,279,714	7%	Student Support Staff
Technology	636,468	1%	Technology
Co-Curricular	96,370	0%	Co-Curricular
Professional Development	52,612	0%	Professional Development
Total	\$49,759,410	100%	EPS CTE Model

Note: Safety is an EPS CTE component not limited to one corresponding expenditure category.

Table 7. CTE Expenditure Not Corresponding to EPS CTE Model Components

Expenditure Category	Amount	Percent	Funding Source
Equipment (General Fund)	429,088	1%	
Student Transportation	274,228	1%	EPS Transportation
Debt Service	2,875,776	10%	School Construction/Local
Staff Travel	79,994	0%	
Field Trip Transportation	14,769	0%	
Not General Fund	21,430,262	73%	Federal & Other State Funding
Not Center/Region	3,820,081	13%	
unassigned	240,161	1%	
Total	29,164,359	100%	

Administration Expenditure

Table 8. Administration Expenditure by Category

Category	Amount	Percent
Salary	4,283,118	67%
Benefits	1,136,085	18%
Purchased Professional Services	219,802	3%
Purchased Property Services	112,965	2%
Other Purchased Services	295,049	5%
Supplies	165,843	3%
Property & Equipment	9,980	<1%
Other	125,207	2%
Total	6,348,050	100%

Table 9. Administration Expenditure: Personnel v. Other

Category	Amount	Percent
Personnel Expenditure	\$5,419,203	85%
Other Expenditure	\$928,846	15%
Total	\$6,348,050	100%

Calculated Amounts:

Other Administration as % of Personnel	17%
Other Administration Expenditure Per Pupil	\$112
Other Administration Expenditure Per Program	\$2,740
Pupils	8,275
Programs	339

Comparison to EPS. The EPS model provides an Other Administration Allocation equal to 16% of the Administration Personnel Allocation. Allocations for personnel and non-personnel costs are greater than actual expenditure.

Table 10. Total Administration Cost Model v. Actual

	Model	Actual
Personnel	6,146,373	5,419,203
Other (16%)	983,420	928,846
Total	7,129,793	6,348,050

Support Expenditures**Table 11. Support Expenditure by Category**

Category	Amount	Percent
Salary	2,657,166	65%
Benefits	790,999	19%
Purchased Professional Services	186,420	5%
Purchased Property Services	101,279	2%
Other Purchased Services	15,608	0%
Supplies	132,225	3%
Property & Equipment	70,669	2%
Other	110,798	3%
Total	4,065,164	100%

Table 12. Support Expenditure: Personnel v. Other

Category	Amount	Percent
Support Personnel Expenditure	3,448,165	85%
Other Support Expenditure	616,999	15%
Total	4,065,164	100%

Calculated Amounts:

Other Support as % of Personnel	18%
Other Support Expenditure Per Pupil	\$75
Other Support Expenditure Per Program	\$1,820

Pupils	8,275
Programs	339

Comparison to EPS. According to the stakeholder group, the distinction between administration and support is less important, because in CTE they all work together as a central office. This suggests that the funding for administration and support could be aligned. For example, the non-personnel costs could be determined by similar models rather than treating student and staff support non-personnel allocations as a percentage of the EPS model for regular secondary education.

In the current EPS CTE model, per-pupil amounts in three of the four specific categories are allocated at 35% of the EPS amount in the same category. Safety is a flat \$40 per pupil. The EPS CTE Model provides a funding allocation for these areas equal to 231% of Actual expenditure, \$1.8 million EPS vs. \$0.8 million actual.

Table 13. EPS Model Amounts vs. Expenditures in Support Areas

	2019 EPS Amount per Pupil	Updated CTE Model Amount per pupil (35% EPS)	Model Total	Actual Total 2019	Actual Per pupil Expenditure
Technology	322	113	932,593	636,468	77
Co-Curricular	125	44	362,031	96,370	12
Professional Development	65	23	188,256	52,612	6
Safety	n.a.	40	331,000	n.a.	n.a.
Total		219	1,813,880	785,450	95

Supplies

Table 14. Supplies Expenditure by Program Group FY 2019

CTE Program Group	Programs	Enrollment	Amount	Per program	Per Student
Agriculture/Horticulture	6	98	\$50,348	\$8,391	\$514
Auto Technology	23	622	\$304,161	\$13,224	\$489
Autobody	12	253	\$142,164	\$11,847	\$562
Building Trades	32	564	\$350,480	\$10,953	\$621
Business Studies	9	276	\$59,211	\$6,579	\$215
Child Care	17	399	\$78,484	\$4,617	\$197
Co-Op	9	336	\$36,622	\$4,069	\$109
Computer Repair/Install	14	327	\$150,798	\$10,771	\$461
Cosmetology/Cosmetologist, General	2	44	\$24,129	\$12,065	\$548
CTE Academics	7	463	\$13,848	\$1,978	\$30
CTE Employability Skills	9	408	\$64,274	\$7,142	\$158
Culinary Arts / Hospitality	24	572	\$431,253	\$17,969	\$754
Drafting/Engineering Tech	11	255	\$58,269	\$5,297	\$229
Electrical	10	226	\$106,316	\$10,632	\$470
Graphic Arts	12	314	\$90,014	\$7,501	\$287
Health Services	24	790	\$145,117	\$6,047	\$184
Machine Tool	10	172	\$81,250	\$8,125	\$472
Marketing/Sales	3	62	\$12,165	\$4,055	\$196
Multimedia	9	238	\$56,292	\$6,255	\$237
Pre-Engineering	1	11	\$14,826	\$14,826	\$1,348
Public Safety	24	489	\$194,688	\$8,112	\$398
Small Engine Repair	5	98	\$18,468	\$3,694	\$188
unlisted	1	10	\$7,083	\$7,083	\$708
Welding	15	362	\$288,373	\$19,225	\$797
Wood Harvesting/Heavy Equip Repair & Oper/Comm Truck Driving	13	189	\$186,802	\$14,369	\$988
Sub-Total	302	7,578	\$2,965,433	\$9,819	\$391
Lowest	1	10	\$7,083	\$1,978	\$30
highest	32	790	\$431,253	\$19,225	\$1,348

Note: Co-Op, CTE Academics, and CET Employability Skills are primarily Maine CIP codes and may not have similar required instruction hours to standard CTE programs.

Updated EPS Model. A regression analysis was run to update the per-program and per-pupil EPS CTE allocations for supplies. The new program area of Cosmetology is included.

Table 15. Updated Model Coefficients

CTE Program Group	Per-Program Amount
Agriculture/Horticulture	\$7,579
Auto Technology	\$11,879
Autobody	\$10,798
Building Trades	\$10,076
Business Studies	\$5,053
Child Care	\$3,449
Co-Op	\$2,211
Computer Repair/Install	\$9,609
Cosmetology/Cosmetologist, General	\$10,970
CTE Academics	\$0
CTE Employability Skills	\$4,886
Culinary Arts / Hospitality	\$16,783
Drafting/Engineering Tech	\$4,144
Electrical	\$9,507
Graphic Arts	\$6,199
Health Services	\$4,409
Machine Tool	\$7,269
Marketing/Sales	\$3,027
Multimedia	\$4,939
Pre-Engineering	\$14,278
Public Safety	\$7,098
Small Engine Repair	\$2,718
Welding	\$18,024
Wood Harvesting/Heavy Equip Repair & Oper/Comm Truck Driving	\$13,646
All Other Programs	\$6,586
Per pupil Amount (all programs)	\$50

Equipment

CTE equipment spending is mostly outside the General Fund. General Fund accounts for 20% of equipment expenditure. More information is available in the current report section on Questionnaire responses.

Table 16. CTE Equipment Expenditure by Funding Source

Fund	Amount	Percent
General Fund	434,314.40	20%
Local/private	4,862.00	0%
State Grants	1,045,536.73	49%
Perkins	435,412.05	20%
Enterprise Funds	3,352.45	0%
Agency Funds	227,581.38	11%
Total	2,151,059.01	100%

Part II, Section 3: CTE Questionnaire Findings

Question 1: Grade 9 & 10 Unapproved Exploratory Programs

“1. Participation Level and Enrollment for:

a. Exploratory Programs for Grades 9 and 10:

Did your CTE school run unapproved exploratory or pre-CTE programs for 9th and 10th graders in the 2019-20 school year?

b. How many 9th and 10th graders participated?

c. How many annual hours of instruction were provided to each student?”

The number of schools offering exploratory or pre-CTE programs at the 9th and 10th grade levels and number of students participating in them is shown in Table 17 and Table 18. One-third of the CTE schools (9 schools, 33%) reported they were running exploratory programs for Grades 9 and 10. Seventeen CTE schools reported not offering exploratory programs. One response was left blank.

Table 17. Schools Running Unapproved Exploratory or Pre-CTE Programs for 9th and 10th Graders in 2019-20 School Year.

Response	CTE schools	Percentage
Yes	9	33%
No	17	63%
Blank	1	4%
Total Responses	27	100%

The number of 9th graders attending exploratory programs was 410, an average of 46 students per CTE school. The number of 10th grade students was 408, an average of 45 students per CTE school. A total of 818 students attended exploratory CTE programs, as shown in Table 18.

Table 18. Participation in Exploratory or Pre-CTE Programs 2019-20 School Year

Grade	CTE Schools	Total Students	Average
9 th	9	410	46
10 th	9	408	45
All	9	818	91

Table 19 shows hours of instruction per student in exploratory programs offered to 9th and 10th graders. The median hours of instruction were 140, the weighted average hours of instruction were 78 and the range was between 12 and 430 hours.

Table 19. Hours of Instruction Per Student

Median hours of instruction	140
Weighted average	78
Range	12 – 430

Policy Considerations

With a weighted average of 78 hours of instruction per student, exploratory programs for Grades 9 and 10 are on average approximately one-fourth of a full CTE program of 350 hours per year or one-eighth time compared to a full-time high school student.

Unapproved exploratory programs do not currently receive a funding allocation in EPS. If an approval process for such programs is developed at MDOE, an EPS funding allocation method may be developed as well. The Full-Time Equivalent (FTE) teacher allocation of such programs should be based on the lower number of required hours of student instruction rather than the existing table, which was designed for standard 350 hour-per-year CTE programs.

Question 2: Drop-ins

“2. Drop ins or students who sign up for only part of a CTE program

a. Did your CTE school have drop-ins or students who signed up for only part of a CTE program in the 2019-20 school year?

b. If yes, use the table to list the programs with drop-ins or students who signed up for only part of a CTE program in the 2019-20 school year, the number of such students and the average annual hours of instruction for each student.

c. Were any programs expanded to accommodate such students? If so, which ones?

d. Describe any additional costs associated with drop-in students in the 2019-20 school year?”

Tables 20 through Table 23 reflect responses to the questions of whether programs were expanded to accommodate drop-in students and, if so, whether there were additional costs associated with them. Answers to open-ended questions appear after the corresponding tables. Table 20 shows that 33% of CTE schools allowed drop-in students or students who signed up for only part of a CTE program in the 2019-20 school year. CTE schools reporting they had no drop-ins totaled 17, and 1 response was left blank.

Table 20. Schools with Drop-in Students

Response	CTE schools	Percentage
Yes	9	33%
No	17	63%
Blank	1	4%
Total	27	100%

The number of drop-in students or those participating in part of a CTE program, number of programs, and hours of instruction are presented in Table 21. Nine CTE schools reported a total of 241 students as drop-ins in 22 programs. This is an average of 11 students per program. Average annual hours of instruction were 137. The weighted average hours of instruction was 123 and the range was 86-245 hours.

Table 21. Students, Hours of Instruction, and Drop-In Programs in the 2019-20 School Year.

Number of Schools	9
Drop-in students	241
Programs with drop-ins	22
Average of drop-in students per program	11
Average hours Instruction	137
Median hours of instruction	134
Weighted average hours of instruction	123
Range hours of instruction	86 - 245

Table 22 reports one CTE school reported “Yes” to the question of whether programs were expanded to accommodate drop-ins. The open-ended response indicates students needing to make up time were expected to attend a class held in a different period. The researchers determined this not to be a program expansion. Therefore, none of the 27 CTE schools expanded their programs to accommodate drop-in students. CTE school responses of “No” equaled 8, “N/A” totaled 4 and 12 responses were left blank. Two other responses did not indicate a program expansion to accommodate drop-ins.

Table 22: Programs Expanded to Accommodate Drop-In Students

Response	CTE schools	Percentage
Yes	1	4%
No, none	8	30%
Other no expansion	2	7%
N/A	4	15%
Blank	12	44%
Total	27	100%

Note: “Yes” response determined not to represent a program expansion.

Response indicating program expansion to accommodate drop-in students:

- *Yes. Students were expected to make up lost time during an alternative period.*

Other responses addressing program expansion:

- *We did run a grant-funded 9/10th grade CTE Exploration program in 19-20 & 20-21. This program have received State DOE approval for 21-22.*
- *Our digital Graphics instructor worked directly with the Special Ed Director to give students an opportunity to have a CTE experience. This happened during the instructor's prep time. He spent time in each of the SCTC's programs learning some basics.*

Responses indicating no program expansion to accommodate drop-in students:

- *In past years we have not count "drop in" students in our state counts. This year we stopped allowing "drop in" students and ONLY allow full time students to enroll in the program to avoid confusion.*
- *No, these students took the program the next year. They were not counted in 19/20 but we counted them in 20/21.*

There were few reported additional costs associated with drop-in students as shown in Table 23. There were 3 "Yes" responses (11%), 6 (22%) "No" responses, 4 "N/A" (15%), and 14 answers (52%) were left blank. Costs listed include supplies and educational technician time.

Table 23: Additional Costs Associated with Drop-In Students

Response	CTE schools	Percentage
Yes	3	11%
No	6	22%
N/A	4	15%
Blank	14	52%
Total	27	100%

Responses indicating additional expenses associated with drop-in students:

- *The drop-in students still use consumables such as materials for the 3D printer and any other material for prototypes. The students also make use of all equipment we have purchased for the program.*
- *[CTE School] shops are open all day every day, however, Educational Technician time is need[ed] to assist in recovering student lost time.*
- *Books, paper, and general office supplies for business students estimate \$675*

Responses indicating no additional expenses associated with drop-in students:

- *We have had some drop in students in the past. The costs would be very similar to a full-time student depending on the student, the situation, the time of year, etc.*
- *[CTE School] didn't acquire and significant expenses during this pilot.*

Policy Considerations

With one-third of CTE schools reporting allowing drop-in students in their programs, CTE schools on the whole do not appear to be treating allowing drop-ins as an essential service. Supplies and education technician costs were cited by two and one schools, respectively. Both supplies and education technicians are included in the EPS CTE model. All supplies expenditures, whether they are used by program enrollees or drop-in students are included in the supplies cost estimates. Education technicians are funded well beyond current actual staffing level. Thus, the adequacy of the overall EPS funding amount is not at issue. Further, drop-ins do not appear to be a major differentiating cost factor considering the small amount of additional costs reported. That is, one would not expect a *substantial* difference in necessary expenditures in schools that allow drop-ins versus those who do not.

No change is needed to the EPS CTE cost model on account of drop-ins for three reasons: (1) allowing drop-ins is not considered an essential service in practice; (2) the additional overall cost of allowing drop-ins is already included in the EPS cost model allocations for supplies and education technicians; and (3) allowing drop-ins does not appear to be a major differentiating cost factor.

Question 3: Maine Classification of Instructional Programs (CIP) 99.x Programs

3. CIP 99.X programs

“For each of your CIP 99.xxxx programs, use the table below to report the annual number of hours of instruction provided to each student and the number of Full-time equivalent (FTE) teachers that were assigned to the program in the 2019-20 school year. If you do not have a program, leave that row blank. If you have more than one 9.4000 program, enter the information for each on a separate line.”

Maine CIP codes programs

The National Center for Education statistics at the US Department of Education created the Classification of Instructional Programs (CIP) codes to categorize federally approved instructional programs. For example, Agriculture, Construction Trades, and Health Professions, etc. For CTE programs, federal CIP codes by and large apply to standard two-year, half-day equivalent programs requiring at least 350 hours of instruction per year. The MDOE recognizes additional CIP 99.x programs that, because of the number of hours and level of instruction, may or may not meet the federal requirements. These codes are for the following instructional programs:

99.1000 – Cooperative Education
99.3000 – Academic Skills
99.3001 – Tech Lab
99.4000 – Multi/Interdisciplinary Skills/Tech Prep
99.6000 – Pre-Technical Career Clusters Exploration
99.7000 – Program PR Project Describe – Other
99.8000 – Employability Skills

Table 24 and Table 25 break down CIP 99.x programs in Maine by student attendance, hours of instruction, programs offered, and number of FTE teachers. Twenty Maine CTE schools (74%) operated a total of 37 state-approved programs in areas that are not recognized by the federal government for CTE programs, as shown in Table 24. The average annual hours of instruction totaled 294.8, and weighted average annual hours of instruction of 296.8. The number of FTE teachers dedicated to those programs totaled 50.125, an average of 1.4 FTE teachers per program.

Table 24: CIP 99.x Programs Offered

CTE Schools	20
% CTEs	74%
Number of CIP 99 Programs offered	37
Average Annual Hours of Instruction	294.8
Weighted Annual Hours of Instruction	296.8
Total FTE Teachers	50.125
Average FTE teachers per program	1.4

As may be seen in Table 25, the number of hours of student instruction for 14 of these programs (38%) are below 350, which is the number required for federally recognized CTE programs. Nine programs (24%) were around half of a typical CTE program, and four (17%) below half. Total FTE teachers for the 37 programs were 48.125.

Table 25: CIP 99.x by Annual Hours of Instruction

Annual Hours of instruction	Compared to Full CTE program	Programs	FTE Teachers
70-149	Less than Half	4	6.5
150-225	Around Half	9	17.625
226-349	In between	1	2.0
> 350	Full	20	22.0
Total	All Programs-	37	48.125

Note: Annual hours of instruction not listed for 3 programs, 2 varied by student need.

Policy Considerations:

According to a separate analysis of program enrollments, there has been an increasing number of CIP 99.x programs and an increasing number of students enrolled in them. Programs with fewer hours than 350 may need fewer FTE teachers than typical CTE programs for a given enrollment count. It may be appropriate to consider using a different table or a lower-weighted student count for programs with fewer than 350 hours of instruction.

Question 4: Oversubscribed Programs and Waitlisted Students

“4. Program capacity, oversubscribed, undersubscribed, waitlists.

List any programs that were oversubscribed or had a waitlist in the 2019-20 school year and the number of students who could not enroll in the program due to being on the waitlist.”

A total of 85 programs at 19 CTE schools were reported as oversubscribed or had a waitlist as shown in Table 26. The number of students reported to be unable to enroll in a program due to being waitlisted was 605. This represents an average of 7.3 students per

program being waitlisted. In follow-up discussions, CTE directors stated that some of the waitlisted students were able to enroll in a different CTE program.

Table 26: Waitlists and Oversubscribed Programs

Number of CTE schools	19
Programs oversubscribed or with a waitlist	85
Waitlisted Students who could not enroll	605
Average per-program waitlisted students who could not enroll	7.3

Policy Considerations

Barriers to program expansion may include limited space, equipment, or staffing. The EPS CTE model is intended to provide adequate funds for annual operating expenditures, including staffing, but not construction or major equipment purchases. The current system uses historical enrollments for program funding which creates a lag in state funding if a program expands by adding more sections. Eliminating the lag by allowing expanded funding in the first year of program expansion may remove a barrier to program expansion. Funding for expanded space needs and major capital equipment should be addressed outside the EPS annual operating cost allocation.

Question 5: Programs Requiring Different Teacher Ratios

“5. Programs requiring different ratios due to regulations or accreditation requirements or other factors.

5a. Does your CTE school operate programs that require different ratios than typical CTE programs due to regulations or accreditation requirements or other factors?

5b. If your CTE school operates programs that require different ratios than typical CTE programs due to regulations or accreditation requirements or other factors, use the table below to list all such programs and their required ratio. Also, list the reason for the requirement (regulation, accreditation, etc.) and whether education technicians count toward the ratio.

5.b (continued), Do education technicians count toward the ratio?”

Background. The original CTE stakeholder group that was tasked with developing a CTE cost model for EPS established a single threshold of 12:1 based on the understanding that the actual requirements for some programs may be greater or lesser than that. The consensus of the group, functioning as a professional judgment panel, was that the 12:1 ratio threshold would be adequate overall if it were applied to all CTE programs. Their recommendation was adopted and remains in the EPS model for CTE teacher allocations.

Table 27 and Table 28 show two-thirds of Maine CTE schools (18) reported 32 programs requiring differing ratios, which is 9% of Maine’s total 355 enrolled CTE programs. Nine CTE schools reported they did not have programs requiring differing ratios due to regulations or accreditation.

Table 27: Programs Requiring Different Ratios Due to Regulations or Accreditation

Response	CTE schools	Percentage
Yes	18	67%
No	9	33%
Total Responses	27	100%

Of the 18 CTE schools affirming that they had programs requiring differing ratios, 17 CTE schools listed programs. Table 28 shows 32 programs were reported. Student-teacher ratios averaged 9.25:1. The median student-teacher ratio was 10:1 and the range of ratios was 1:1 – 20:1.

Table 28: Programs Requiring Different Student/Teacher Ratios

CTE schools listing programs	17
Programs listed	32
Average of ratios	9.25:1
Median	10:1
Range of ratios	1:1 - 20:1

Table 29 through Table 32 show frequencies of student-teacher ratios by program and by reason for differing ratios. Of the 32 programs, 25 had required ratios listed below the current EPS CTE threshold of 12 students, and three programs had ratios above the model amount of 12:1.

Table 29: Frequency of Student-Teacher Ratios

Ratio	Programs	Percentage
1:1	1	3%
6:1	4	13%
8:1	6	19%
9:1	2	6%
10:1	12	38%
12:1	4	13%
14:1	2	6%
20:1	1	3%
Total	32	

Table 30 lists programs, number of programs reported, and how many programs have ratios below the 12:1 student-teacher threshold. CNA programs made up 32% of the 25 programs below the 12:1 threshold.

Table 30: Frequency of Programs with Required Ratios and Programs Below a 12:1 Threshold

Program	Programs	Programs below 12:1
Automotive	2	1
C N A	9	8
Commercial Truck Driving	3	3
Culinary Arts	1	-
Diverse Occupations	1	1
Early Childhood Education	1	1
Electrical Technology	2	1
Emergency Medical Services	1	-
Employability Skills	1	1
Forestry	1	1
Health Occupations	1	1
Heavy Equipment	3	2
Hospitality and Management	1	1
Introduction to Medical	1	-
Outdoor Leadership	1	1
Welding	2	2
Woodworking	1	1
Grand Total	32	25

As may be seen in Table 31 and Table 32, of the 32 programs reported as requiring different ratios, 15 were due to regulations or safety. The EPS model provides funding for educational technicians in programs that are known to need lower ratios for safety and compliance. There was some discrepancy among the responses as to whether education technicians count toward required ratios for safety and compliance.

Table 31: Frequency of Reasons for Required Ratios

Reasons for required ratios	Programs
Regulations	9
Clinical Hours	7
Lab Space	6
Safety	6
Driving Hours	1
Electrical Code	1
Preschool requirement	1
Special Needs of Students	1
	32

Clinical supervision affected ratios in seven programs. Clinical supervisors at required ratios are funded as an EPS allocation separate from classroom.

Insufficient lab space was reported as requiring different ratios in 6 programs. EPS does not provide construction funding. State funding is available for major construction projects including new school construction and major renovation projects. The Revolving Renovation Fund may be used to fund upgrades to existing spaces.

The remaining four programs had various reasons for requiring different ratios, including driving hours, electrical code, preschool requirement, and special needs of students. Of these programs, education technicians were reported as counting toward the ratios for electrical code and preschool requirement.

Table 32: Frequency Reasons Required by Program

Programs	Clinical Hours	Driving Hours	Electrical Code	Lab Space	Preschool requirement	Regulations	Safety	Special Needs of students
Automotive				2				
C N A	5					4		
Commercial Truck Driving		1				2		
Culinary Arts				1				
99.7000 Diverse Occupations								1
Early Childhood Education					1			
Electrical Technology			1			1		
Emergency Medical Services	1							
Employability Skills				1				
Forestry							1	
Health Occupations						1		
Heavy Equipment							3	
Hospitality and Management						1		
Introduction to Medical	1							
Outdoor Leadership							1	
Welding				2				
Woodworking							1	
Grand Total	7	1	1	6	1	9	6	1

Table 32a. Responses: “Do education technicians count toward the ratio?”

Response	Programs
Yes	4
No	25
Unknown	2
<blank>	1
Total	32

It was reported that education technicians count toward the ratios for 4 of the 32 programs as shown in Table 32a. The programs listed were CNA, Heavy Equipment, Early

Childhood Education, and Electrical Technology. There was some discrepancy in the responses about whether education technicians do or do not count toward the ratio for these programs.

Policy Considerations

The CTE Funding Formula Committee (also known as the Stakeholder Group) that was tasked with developing the CTE cost model for EPS established a single threshold of 12:1 based on the understanding that the actual requirements for some programs may be greater or lesser than that. The consensus of the group, functioning as a professional judgment panel, was that the 12:1 ratio threshold would be adequate overall if it were applied to all CTE programs. Their recommendation was adopted and remains in the EPS model for CTE teacher allocations.

Given that fewer than 10% of Maine CTE programs were reported to have lower ratio requirements, the single EPS ratio threshold of 12:1 applied to all programs appears to be more than adequate. MEPRI did not analyze programs that have actual ratio thresholds above 12:1. Such an analysis could be done to determine which programs require ratios above 12:1 or below 12:1. On the basis of such an analysis, multiple thresholds could be adopted for different programs as an alternative to the current policy of a single threshold for all programs.

Question 6: Education Technicians

“6. Which programs have education technicians assigned to them (actual)

6.a. List programs that had an education technician assigned to them in the 2019-20 school year and how many Full-Time Equivalent (FTE) education technicians were assigned to each. (1.0 FTE is full-time; 0.5 FTE is half-time)

6.b. How many Full-Time Equivalent (FTE) unassigned or floating education technicians did you have in the 2019-20 school year? (The total of “a” and “b” should match your total number of education technicians.)”

The number of CTEs with education technicians assigned to programs was 17 (63%) as shown in Table 33. A total of 60 programs were listed, with 55.5 FTE education technicians, which equals an average of 1.0 (.93) education technician per program. Five CTE schools reported they had no education technicians assigned to specific programs (as opposed to floating). There were two responses of “N/A”, and three answers were left blank.

Table 33: Programs with Assigned Education Technicians

CTE Schools listing programs	17
Programs listed	60
Number of FTE Education Technicians	55.5
CTEs schools reporting no assigned education technicians	5
N/A	2
Blank	3

Table 34 shows programs and number of education technicians assigned to them in the 2019-20 school year. Several education technicians were reported as assigned to multiple programs, but with no specification of the amount of time spent in each program. Those are included in the bottom section of the table.

Table 34: Programs and Assigned Education Technicians 2019-2020

Programs	Programs	Total FTE Education technicians
Agriculture	3	2.5
Autobody/Collision and Repair Technology/Technician	3	2.25
Automobile/Automotive Mechanics Technology/Technician	8	6.25
Carpentry/Carpenter	5	5.0
Construction Trades	2	2.5
CNA	1	1.0
Construction Technology/Cabinetmaking (Woodworking 48.0703 Precision Production)	1	1.0
Culinary Arts/Chef Training	8	8.0
Digital Arts	1	1.0
Diversified Occupations	2	8.0
Early Childhood Occupations Education	5	4.5
ESP	1	1.0
Electrician	1	0.5
Forest Technology/Technician	2	2.0
Machine Tool with Welding	1	1.0

Programs	Programs	Total FTE Education technicians
Marketing Management	1	2.0
STRIVE	1	1.0
Welding Technology/Welder	1	1.0
Education Technicians Assigned to Multiple Programs		
Automotive Technology, Construction Technology, Electrical Technology,	3	1.0
Precision Machining, Mass Media Communications, Information Technology	3	1.0
Early Childhood Education, Outdoor Leadership	2	1.0
Culinary Arts, Pre-nursing	2	1.0
CTE Academy, Emergency Services, Criminal Justice	3	1.0
Grand Total	60	55.5

Seventeen CTE schools also reported a total of 21.5 FTE floating or unassigned education technicians. Adding this amount to the 55.5 program-assigned education technicians gives a total of 77.0 FTE education technicians

EPS model.

Table 35 shows the EPS model of program-assigned education technician allocations from the 2017 report. The EPS model recommended 148.6 education technicians assigned to a total of 154 programs. The EPS model does not provide a separate allocation for floating education technicians but rather provides a minimum allocation of 1.0 FTE education technicians at each CTE school.

Table 35: Recommended Model for Education Technicians (from 2017 report)

Program Area	Programs	Students	Education technicians
Agriculture	1	36	1.0
Agricultural Mechanics	1	15	1.0
Autobody/Collision and Repair Technology/Technician	11	248	11.0
Automobile/Automotive Mechanics Technology/Technician	24	651	24.0
Carpentry/Carpenter	23	443	20.5
Child Care Provider/Assistant	18	427	17.0
Construction Trades	2	44	2.0
Crop Production	1	13	1.0
Culinary Arts/Chef Training	21	591	21.0
Electrician	10	228	9.5
Forest Technology/Technician	4	84	4.0
Machine Tool Technology/Machinist	9	174	8.5
Mason/Masonry	1	18	1.0
Plumbing Technology/Plumber	3	54	2.5
Sheet Metal Technology/Sheetworking	1	26	1.0
Welding Technology/Welder	16	391	14.5
Subtotal	146	3,443	139.5
Diversified Occupations	8	247	9.1
Total Model Education technicians	154	3,690	148.6

Policy Considerations and Comparison of Actual Education Technicians versus EPS

Compared with the total of 77.0 reported for the 2019-20 school year in, there were nearly twice as many education technicians allocated in the EPS model in the 2017 report. Put in another way, the actual number of education technicians employed and assigned to specific CTE programs was 52% of the number of education technicians allocated in the EPS model, as reported in Table 34. This suggests a more-than-adequate allocation for education technicians.

Table 36 through Table 38 shows a comparison of the EPS allocations from the 2017 with the actual number of education technicians reported in those program areas during the 2019-20 school year. Table 36 contains program areas that have actual education technicians assigned as well as allocations in the EPS model. As may be seen in the table, 142.1 education technicians were allocated to 147 programs in the EPS model as compared to the actual reported 44.5 education technicians assigned specifically to 42 programs. This means that schools were

employing 31% as many education technicians as the EPS model allocated to them in these program areas. Put another way, the EPS model allocated 320% more education technicians as were employed in these program areas. For example, some programs such as Welding Technology have at least one actual education technician but far fewer than there are programs. EPS allocated 14.5 FTE education technicians for Welding technology compared to 1.0 FTE actual education technicians reported in one program.

Table 36: Program Areas with EPS Allocated Education Technicians and Reported Actual Education Technicians

Program Area	From 2017 Model		From 2020 Questionnaire	
	Programs	Education Technicians Allocated	Programs	Education Technicians
Agriculture	1	1.0	3	2.5
Autobody/Collision and Repair Technology/Technician	11	11.0	3	2.25
Automobile/Automotive Mechanics Technology/Technician	24	24.0	8	6.25
Carpentry/Carpenter	23	20.5	6	6.0
Child Care Provider/Assistant	18	17.0	5	4.5
Construction Trades	2	2.0	2	2.5
Culinary Arts/Chef Training	21	21.0	8	8.0
Electrician	10	9.5	1	.5
Forest Technology/Technician	4	4.0	2	2.0
Machine Tool Technology/Machinist	9	8.5	1	1.0
Welding Technology/Welder	16	14.5	1	1.0
Subtotal	139	133	40	36.5
Diversified Occupations	8	9.1	2	8.0
Total	147	142.1	42	44.5

Table 37 shows program areas with education technicians allocated by the EPS model but with no actual education technicians assigned to them in the CTE school. There were seven such programs with 6.5 FTE education technicians allocated within EPS.

Table 37: Programs Allocated Education Technicians in EPS but no Reported Education Technicians in Staff Data

Program	From 2017 Model	
	Number of Programs	Education technicians
Agricultural Mechanics	1	1.0
Crop Production	1	1.0
Mason/Masonry	1	1.0
Plumbing Technology/Plumber	3	2.5
Sheet Metal Technology/Sheetworking	1	1.0
Total Model Education Technicians/ Total 2020 Education Technicians	7	6.5

Several programs in 2019-20 had education technicians assigned to them, but none allocated in the EPS model. These appear in Table 38. A total of six education technicians were assigned to these five programs.

Table 38: Programs with Reported Actual Education Technicians but Education Technicians not Allocated in EPS

Program	FTE Education technicians	
CNA	1	1.0
Digital Arts	1	1.0
ESP	1	1.0
Marketing Management	1	2.0
STRIVE	1	1.0
Total Programs and Education technicians not allocated in EPS	5	6.0

Policy Considerations

In 2019-2020 there were a total of 77.0 FTE education technicians in CTE schools. This is an increase from the 68.1 FTE reported in 2015-16, but still far below the EPS recommended FTE of 148.6. The EPS allocation for CTE education technicians is nearly double the number of actual education technicians. MEPRI recommends continuing to monitor the number of actual education technicians as full implementation of the EPS CTE model proceeds.

Question 7. Clinical Supervision

“7. Clinical supervision (contractor) pay rate and hours (actual).”

“List any of your programs that have a clinical supervisor requirement along with the number of required hours of clinical supervision and actual clinical supervisor hourly pay rate.”

Table 39 summarizes the responses on required hours of clinical supervision and pay rates for all programs and for CNA only. Twenty-one CTEs reported having programs with clinical supervisor requirements. CNA programs made up half of the 24 programs reported. The average hours of supervision was 148 for all programs and 84 for CNA programs. The Ranges were 20 to 600 hours and 70 to 150 hours respectively.

Not all CTE schools reported hourly pay rates. One reported that payment was included in the teacher’s salary, one was paid per diem, and two were paid stipends. Average hourly pay rate for all programs was \$31.57 and slightly less for CNA (\$22.08). Ranges were the same, \$25 to \$40 in both categories.

Table 39: Clinical Supervision Pay Rates and Hours

	All Programs	CNA Only
CTEs	21	12
Programs	24	12
<i>Required Supervision Hours</i>		
Average	148	84
Median	80	70
Range	20-600	70-150
<i>Clinical Supervisor Hourly Pay Rate</i> <i>(Average of 19 responses)</i>		
Average	\$31.57	\$22.08
Median	\$30.00	\$30.00
Range	\$25-40	\$25-\$40

Table 40 is a breakdown of reported programs requiring clinical supervision, clinical hours and hourly pay rates. All but one program reported was in the health-care field. One early

childhood education program offering 480 hours of clinical instruction was reported. This program had one clinical supervisor who was paid \$30.00 per hour. Early childhood programs are not included in EPS. The model includes clinical supervisors for healthcare programs only.

Table 40: Programs, Required Hours of Clinical Instruction, and Hourly Pay Rates

Program	Number of Programs	Required hours of clinical instruction			Hourly Pay Rates		
		Average	Median	Range	Average	Median	Range
CNA	12	84	70	70-150	\$29.44	\$30.00	*\$ 25.00-\$40.00
CNA/Health Assistant	1	110	110	110	\$40.00	\$40.00	\$40.00
CNA\Health Science	1	80	80	80	\$40.00	\$40.00	\$40.00
Registered Medical Assistant	1	160	160	160	**	**	**
Biomedical Health Science	1	70	70	70	\$43.00	\$43.00	\$43.00
Health/Medical Occupations	4	107.5	110	70-140	***\$29.17	\$30.00	\$26.52-\$32.00
EMT	1	20	20	20	\$25.00	\$25.00	\$25.00
Allied Health	1	400	400	400	\$37.50	\$37.50	\$37.50
Pre-nursing	1	600	600	600	\$31.83	\$31.83	\$31.83
Early Childhood Education	1	480	480	480	\$30.00	\$30.00	\$30.00

Note: 3 CTEs “required # of hours” left blank, two supervisors received stipends and one was paid on a per-diem basis.

*1 paid per diem, one not answered correctly.

**Stipend- no hourly rate listed

*** One stipend no hourly rate. Not included in average.

Policy Considerations

The programs allocated clinical supervisors are Health Professions and Related Clinical Sciences, Nurse/Nursing Assistant/Aide and Patient Care Assistant, and Emergency Medical Technology. Clinical supervisors do not have their own unique position code in the staff data, nor are clinical supervisor costs specifically identified in the accounting codes of the financial data. Early childhood programs are not included in EPS.

The current EPS model allocates funding for 90 clinical supervisor hours at a pay rate of \$30 per hour for every 8 students or fraction thereof. Compared to the median reported values of \$30 per hour for 80 hours in all programs and 70 hours for CNA programs, the current EPS model appears adequate.

Question 8. Supporting Students with Special Education Needs

“8. Additional costs of supporting students with special education needs and ELL (costs and enrollments)

8.a. Describe any expenses incurred by your CTE school that were required to support students who have special education needs. (This will give us a rough sense of where these types of costs might be reflected in the expenditure data). Where possible, provide approximate dollar amounts for those additional costs from the 2019-20 school year.

8.b. Do special education students at your CTE school have unmet special education needs due to insufficient funding? If so, describe them and, if possible, provide the approximate dollar amounts that would be needed to address those unmet needs.

8.c. Does your CTE school incur additional costs due to the language needs of ELL students? If so, describe them and, if possible, provide a dollar amount for those additional costs from the 2019-20 school year.”

In the overall EPS there is an additional pupil weight for students with special education needs and for English language learners. These services are provided within separately identified programs with their own designated teachers and other staff and resources. Although separate programs for special education and English language learners do not exist within CTE, MEPRI was asked to explore the feasibility of using weighted pupil counts for students with special education needs and for English language learners.

MEPRI administered a questionnaire to CTE directors, whose response rate was 100%. Responses to the questions on costs of supporting students with special education needs and English Language learners were as follows:

Table 41. Additional Expenses Incurred in Supporting Students with Special Education Needs

Survey Response	CTE schools
Reported incurred expenses	13
Reported no incurred expenses	14

Table 42. Estimate of Special Education Expenses Provided

CTE Schools Providing Estimates	4
Estimated expense reported	\$71,250

The \$71,250 in estimated expenses included \$30,000 toward a student services coordinator and \$30,000 for an education technician. The remaining \$11,250 was supplies and equipment. Naturally, as in regular education, CTE classroom teachers also implement accommodations specified in student IEPs. The EPS CTE model currently provides allocations for student support staff, education technicians, classroom teachers, and supplies. Equipment costs and are generally funded outside the EPS model for annual operating costs.

Several responses claiming no additional expenses incurred in supporting students with special education needs cited the responsibility of sending districts and district special education programs to provide special education services.

Descriptions and estimates of expenses incurred in supporting students with special education needs:

- *Currently, our Student Services Coordinator has to gather and deliver IEPs and 504 plans to our teachers. The work is extremely time consuming and frustrating. We would estimate the costs to be roughly \$30,000.*
- *Ed Tech in PLATO lab - \$30,000.*

- *...Typically, special student needs often require adaptive equipment or supplies. For example, this has recently included a specialized desktop computer for a visually impaired student (\$4,000) and specialized stethoscopes for hearing impaired students. In 19-20 I would estimate such costs around \$9,000-\$11,000.*
- *[CTE school] purchased special stands and switches so the students could take pictures and use Photoshop. (cost \$250) The District Special Education Department paid for hardware and software to the student could use their eyes to use a computer. (Eye Gaze) as well as a motorized wheelchair with the same kind of controls.*

Other selected responses describing costs:

- *Student services Coordinator- IEPs! , Tutoring*
- *Our Student Services Coordinator acquires all IEP/504 plans from sending schools and coordinates their copying and distribution to CTE instructors. We use in house staff to provide accommodations that go above and beyond in instructional practice accommodations. Sending school districts provide the one on one ed tech support when that accommodation is specifically listed in the IEP as needed or the team believes it is needed*
- *Although difficult to quantify as a dollar amount, our Student Services Counselor spends a great deal of time collaborating with partner school case managers to understand student needs, work with instructors to understand accommodations and modifications, and assist in the implementation of modifications such as having tests read aloud.*
- *[CTE School] follows each students IEP and meets the accommodations that It can. We are not able to provide 1 to 1 Ed Tech support for students, some schools can provide an Ed Tech other cannot. We purchase tools and make modifications to equipment as is reasonable to maintain the students and equipment's safety. We purchase audio textbooks for students when it is an accommodation in an IEP.*
- *One shared Ed Tech with Electricity and Building Trades*
- *...Because we have a floating Ed Tech we have been able to cover some of the need for Special Ed services, Support is additionally supplied through the Student Services Staff and Program Staff. Because our percentages have increased additional sped needs support my/is warranted.*
- *Facility updates and modifications have been addressed to meet student needs such as lowering sink heights and providing non-gender specific bathroom facilities.*

Selected responses that no additional expenses incurred to support students with special education needs:

- *N/A - The sending high school is responsible for special education costs (1-on-1 support, other accommodations/modifications).*
- *None, our sending schools provide the required funds or special education support*
- *We pushed costs back onto sending schools. When students needed a 1 on 1, we required the sending school to provide one.*
- *We have no education technicians or other special education personnel. Any special education programming or accommodations are made through connecting with the sending schools.*
- *We have not had direct costs for the 2019-20 year. However, the students require more time from our instructor to explain and demonstrate the needed skills this is taking away from other students that could continue to make progress.*
- *A fair number of our students have IEP's and require modifications of accommodations what we have been able to accommodate at present without added cost. However, it is not to say that we may encounter added costs above and beyond our current practice.*
- *Diversified Occupations program is aimed entirely to support students with special needs. In 19-20 there were no additional costs. However, as the need arises, expenses are incurred for adaptive equipment.*

Table 43 shows responses to the question of whether CTE schools had special education students with unmet needs due to funding. A little over half of CTE schools, (14) reported students with unmet needs. Eleven schools reported they had no special education students with unmet needs, and two answered “N/A.”

Table 43. Students with Unmet Needs Due to Funding

Response	CTE schools	Percentage
Yes	14	52%
No	11	41%
N/A	2	7%
Total Responses	27	100%

CTE schools reported the following additional funding required for special education student learning needs:

- CTEs providing estimated expenses: 6
- Total of estimated expenses: \$653,556

Responses from CTE schools who reported having special education students with unmet needs due to insufficient funding:

- *I fully believe that all CTE schools should have a special ed teacher on staff. This teacher could have a caseload of students to verify that the student needs are being met, and also help teachers understand how to meet accommodations in hands-on classrooms. One main challenge is that many students have unmet needs, as they require education technicians or some sort of support in the classroom. Schools many times are unable to send education technicians because of the high need back in the academic classrooms, so the students come to our school without their support they are used to. We currently have one floating Ed Tech for non special ed purposes. With the high special ed student population, we are in need of special ed funding for these positions.*
- *The special education students have unmet academic needs primarily. They often need extra help from their instructor to understand and apply math/literacy concepts as well as comprehend industry literature and directions. An additional ed tech that could work with these students would be beneficial. The cost for a full-time ed tech III including salaries and benefits is \$43556.27 approximately based on collective bargaining unit.*
- *Somewhat. I don't believe that students with special education received the full scope of their modifications as compared with what they receive at their sending school. For example, while we can provide space for students to take assessments, we don't have a resource room that is staffed to support that student in taking the assessment in the same way it would happen at the sending school. Also, it appears to be uncommon to review and revise IEPs to adjust for the change in placement at the CTE school. There may be unmet needs without this review/revise process given the differences between the sending school, a CTE school, and how that impacts a students need for services.*
- *Yes, there are times when students need more supervision than we have available. They don't rise to the level of a 1 on 1 but hey need more support than an instructor with a full class can give.*

- *Yes. Some students would benefit from having additional educational support during their tenor at [CTE School]. This may require a full time Educational Technician III and or a full time Academic Support Teacher. Educational Tech III. \$30,000. Academic Support Teacher \$65,000*
- *We do not have special education staffing employed by [CTE School]. Instead, the sending school district must provide one to one ed tech support if in the student's IEP. However, sometimes general ed tech support is listed in the IEP and that is NOT covered at CTE unless pushed in the IEP meeting by a parent and/or staff member. As a result, CTE instructors carry the burden of providing the support. When a student requires, a test read to them, our guidance counselor/Student Services Coordinator provides that or we pull one of the program education technicians to provide the service.*
- *Often times students IEP's call for specialized staffing or equipment which the sending district does not provide and [CTE School] does not have in its operating budget. The budget impact would vary year to year but may run in excess of \$50,000 where there are unmet staffing needs.*
- *Without a question, some special education students needs are not being met. Students arrive at [CTE School] with many barriers to learning. [CTE School] understands the legal requirements of an IEP, and strives to meet IEP accommodations that are within its ability to meet. [CTE School] instructors will modify curriculum and classroom procedures to support special education students. However, modification does not mean lowering or altering program standards. The basic objective of [CTE School] programming and the standards established for its completion remain constant. School year 20-21 [CTE School] percentage of students with an IEP is 49%.*
- *Lack of enough space to accommodate our all academic learners of TOPS/Hybrid Alternative Learning in one setting. Additional square footage would be required to provide needed staffing needs and all students needing this service to be housed at CTE. Building cost to accommodate all students/staff would be approximately \$320k.*
- *It is challenging to get to all students who need a specific accommodation, such as tests read aloud. One person typically handles this and she is also our Student Services Counselor. If there were a staff member specifically for Special Education services, we suspect that students would opt to have tests read more often, whereas now they just try without the assistance. Sometimes IEPs read that adult support is needed in the mainstream for students. That rarely means that the student comes to the CTE with an Ed.Tech, although sometimes that would be a huge benefit for the student. At least having an Ed. Tech who could be available for Special Education purposes would be an enormous help.*

- *Education technicians- need floaters, specialized learning materials*
- *The majority of our students have accommodations and modifications that we cannot meet with our current teaching staff. For instance, most of our students have the option to test in a special education setting. Unfortunately, we do not have a special education teacher on staff, so we cannot meet this need. Our school needs a special education teacher. The teacher would have a support classroom to provide the accommodations that we are not able to at this time. Estimated Cost = \$75,000 (Salary and Benefits)*
- *We strive to meet the needs of all of our students - if there was a need I would say in the academic support area - If we were able to hire an academic support teacher the salary and benefits could be up to \$70,000.00*
- *We had no full-time special education coordinator to review student programs, meet with students and parents, attend IEP meetings and consult with staff on students in their classes. Our percentage of special education students was 52% in 2019-20. This year we have a special education instructional strategist at a cost of approximately \$90,000 for salary and benefits.*

Responses of CTE schools who do not have students with unmet special education needs due to insufficient funding:

- *Students receive support to be successful*
- *No. Our needs are met through a cooperative effort with the sending schools.*
- *No (9)*
- *N/A (2)*

Incurred Expenses due to ELL student needs

Table 44 and Table 45 show responses to whether CTE schools had incurred expenses due to ELL student needs, and if so, what those expenses were. Three CTE schools (11%) reported they had incurred expenses due to ELL student needs and twenty four schools reported no expenses.

Table 44: Expenses Incurred Due to ELL Student Needs

Response	CTE schools
Yes	3
No, N/A, <blank>	24

The CTE schools describing expenses incurred due to ELL student needs listed translation and interpreter services, an education technician, books and an online program, as well as collaboration between CTE teachers and a district ELL program teacher.

Table 45: CTE schools reported expenses due to ELL student needs

CTE schools providing estimated expenses	2
Estimated expenses reported	\$9,500

Responses of CTE schools reporting additional expenses due to the language needs of ELL students:

- *[CTE School] incurs the cost for translation and interpreter services to serve ELL students. These costs vary year to year but might cost \$5-7,000 per year depending on frequency of use.*
- *We incur indirect costs providing academic support to these students through our Ed Tech III. We have purchased industry related translation books and the approximate cost is \$500. And an online industry translation program for the approximate cost of \$2,000.*
- *We have had a couple of ELL students the last couple of years and our CTE teachers have had to provide accommodations in collaboration with the ELL [CTE School] Department ELL teacher.*

Responses of CTE schools not incurring additional expenses due to the language needs of ELL students:

- *No (14)*
- *No, we have few if any ESL students*

- *No, however I do not think this question addresses the facts and challenges pertaining to supporting EL students in CTE. Despite our efforts to attract EL students to [CTE School], we have not seen significant growth, because we do not have the necessary resources to support these students. The larger urban school districts in Maine have seen significant growth in their EL student population yet there has not been a corresponding growth in EL student attending CTE schools. I attribute this to the lack of resources available to CTE schools to support these students. to expand access to EL students CTE schools need the resources to support these students, special the funding so CTE school can add trained and certified EL teachers to their staff.*
- *No, despite geographic are predominately French speaking in households, we have yet to identify a significant need for ELL services in the CTE environment.*
- *We have few ELL students, so no.*
- *No additional costs were incurred related to the needs of ELL students in the 2019-2020 school year.*
- *N/A (2)*
- *Blank (2)*
- *No, all ELL Costs are covered through our district*

Policy Considerations.

It is not feasible to identify the additional cost of providing for the special education needs of students necessary to make a separate, empirically-based weighted pupil count within the CTE cost model. The better option is (1) to continue to recognize all costs within the existing sub-components such as student support personnel and education technicians, (2) to assure adequacy of those allocations, and (3) to verify the opportunity for all students to participate fully in CTE programming. Both the education technician and student and staff support personnel sub-components have EPS allocations well beyond actual spending in those areas. Similarly, the cost data collected for the ELL needs of students do not justify a new, separate sub-component.

Question 9: Third-Party Industry Standard Assessments and Credentials

“9. Industry standard assessments (availability, cost, usage by program).”

9. a. In the table below, list all programs where your CTE school is making third-party industry standard assessments or credentials available to students, along with the number of students taking the assessment or gaining the credential in the 2019-20 school year and the costs of the assessment of credential for each student.

9.b. Are there industry standard assessments or credentials that you are not providing to students due to cost? If so, please list them in the table below.”

Industry standard assessments are not included as a separate allocation in EPS. These costs are included in supplies and/or other student and staff support. In 2017, the stakeholder group suggested the development of a separate component or subcomponent for assessments due to increased use and cost. This trend was expected to continue with the implementation of a proficiency-based high school diploma system because it encouraged the use of industry standard

All 27 CTE schools reported third-party assessments and/or credentials. The number of assessments reported was 472 and the total number of assessments taken was 8,696. The sum total of assessment cost was \$453,487. Several CTE schools reported per semester and per classroom costs, site licenses and flat fees. One CTE school reported two costs as “lifetime” totaling \$32,000, which are not included on the total line.

There was variation in the assessments and credentials reported in similar programs. A listing of all program with assessments or credentials offered is provided in an appendix along with a separate listing of the assessments reported under each program name.

Table 46: Schools Offering Industry Standard Assessments or Credentials

CTE Schools	27
Program-Assessments Reported	472
Program Names	103
Total Number of assessments taken	8,696
Total cost	\$453,487*
Weighted average cost	\$52

*Annual cost, does not include two assessments, each reported as “\$16,000 lifetime”

Three CTE schools (11%) listed four standard assessments or credentials they were not providing to students due to cost. The average cost per student was \$217, and the range of assessment costs was between \$75 and \$350. One CTE school reported a flat fee of \$1,610 for a classroom license. The detail of responses is shown in Table 47.

Table 47: Assessments or Credentials Not Provided Due to Cost

Program	Name of Assessment or Credential	Cost Per student
Early Childhood Education	National Child Development Assessment	\$350
Graphic Design	Adobe Certified Associate-	Flat fee \$1,610 for classroom license
Forest Resource Management	PLC Certifications	\$75
Electrical Construction	NABCEP PV 101 & 102	\$225

Policy Considerations:

Given the total cost of assessments and credentials (under \$0.5 million) and the administrative cost that would be incurred by the CTE schools and the state in maintaining a reporting system third party assessments and credentials, MEPRI does not recommend a separate sub-component for third party assessment and certification costs. They may remain in the CTE supplies sub-component at this time.

Question 10: Equipment

10. "Equipment"

10.a. Do you maintain an inventory of the equipment used in your CTE programs?

10. b. Is the equipment in your inventory identified by program?

10. c. What information about the equipment do you keep in the inventory?"

MEPRI was asked to explore the feasibility of providing a program-specific model for CTE equipment cost in the EPS annual operating cost model. CTE schools were asked about

their equipment inventories. All 27 CTE schools maintain an inventory of equipment. They were also asked what information was contained in the inventory. The following is a summary of the responses:

Every CTE reported keeping an inventory of equipment by program. The type of information in the equipment inventories varied, as indicated in Table 50.

Table 48: Schools Maintaining Inventory of Equipment

Response	CTE schools	Percentage
Yes	27	100%
No	-	-
Total Responses	27	100%

Table 49: Schools Maintaining Equipment Inventories by Program

Response	CTE schools	Percentage
Yes	27	100%
No	-	-
Total Responses	27	100%

Table 50: Types of Information Inventoried

Inventory information kept	CTEs
purchase date	20
program/location	13
funding source	11
cost	10
make and/or model number	9
serial number	9
Item description	7
maintenance history	5
supplier	4
depreciation	3
quantity	3
VIN	2
year	2
all Perkins Required Information	1

Inventory information kept	CTEs
brand	1
condition	1
designated name	1
disposal records	1
equipment Type	1
insurance	1
maintain inventory of Perkins Grant equipment	1
manufacturer	1
mileage	1
name of the CWCIT	1
purchasing information	1
usage	1

Policy Considerations

Background. CTE equipment costs are funded mostly outside the EPS annual operating cost allocation. Some lower-cost equipment items are designated as supplies for accounting purposes. Such equipment is funded within the supplies sub-component of the EPS CTE component. Most equipment costs are paid from outside the General Fund. The General Fund represented 20% of equipment expenditures in FY 2019.

Table 51. CTE Equipment Expenditure by Funding Source

Fund	Amount	Percent
General Fund	434,314	20%
Local/private	4,862	0%
State Grants	1,045,537	49%
Perkins	435,412	20%
Enterprise Funds	3,352	0%
Agency Funds	227,581	11%
Total	2,151,059	100%

Concluding Statement on Equipment Cost. CTE equipment is currently funded outside the EPS model of annual operating cost. There appears to be insufficient available data on current equipment assets to develop a program-specific model for annualized equipment costs. State funding programs such as grants and revolving funds may be evaluated for adequacy in supporting the amount and the irregular intervals of CTE equipment needs.

Appendix A. CTE Component Review Plan

Description: The CTE cost component of the Essential Programs and Services (EPS) funding model is intended to provide funding for the necessary operating costs of providing career technical education. It provides allocation amounts for costs in the following areas: direct instruction, central administration, student & staff support, supplies, and operation & maintenance of plant. Transportation to and from the CTE centers and regions is included in the transportation component of EPS rather than the CTE component. Major capital expenditures on equipment and construction are funded separately from the EPS cost model, which focuses on covering annual operating costs.

Before the 2018-19 school year, the allocations used in determining state subsidy for CTE were based on the actual prior expenditures reported by each individual CTE center or region. Because actual-expenditure funding models were seen as inherently inequitable in favor of communities with a greater ability to raise money locally, a cost-based model for CTE was implemented in beginning in Fiscal Year 2019. The cost model was developed by MEPRI in consultation with MDOE, the CTE Funding Formula Committee, and other stakeholders. Its development was described in reports in 2007, 2009, 2010, and 2017 by MEPRI and in 2019 by MDOE.

Career Technical Education Component Review – PART I (Summer 2021)

Study Question/Topic (Prior review reference) [CTE workgroup reference]		Data sources, Methods, Questions and/or Comments
A. Programs and Enrollment		
1	Student enrollment and programs: Are there new and expanded programs? (p3, T1) [#8i]	Data: 2019-20 Enrollment data by program from MDOE
3	Participation level and enrollment for Grade 9 and 10, middle school, non-concentrators/dropins, and CIP 99.x programs (p5) [#8d,e,i]	Data Question: Enrollment data from MDOE and/or CTE questionnaire to fill in data gaps
B. Direct Instruction		
7	Effect of using greater of prior year enrollment or three year average (p15) [#2]	Data: Three years of enrollment data by program from MDOE
E. Operation and Maintenance of Plant		
19	Cost per square foot (p.25) Explore feasibility of cost by area type.	Data: FY19 expenditure data; square footage data by area type previously collected by MDOE

Note: References refer to page (p) and table (T) numbers from the 2017 MEPRI report, and item numbers [#] from the 2019 CTE-EPS Funding Workgroup Recommendations

Career Technical Education Component Review – PART II (December 2021)

Study Question/Topic (Prior review reference) [CTE workgroup reference]		Data sources, Methods, Questions and/or Comments
A. Programs and Enrollment		
2	Participation in CTE by sending school districts	MDOE enrollment by sending SAU
4	Capacity. How many programs are oversubscribed (or wait list), at capacity, under capacity? (p10); Has this changed since the 2017 report?	Data collection: program capacity and waitlist data from CTE questionnaire
B. Direct Instruction		
5	Teachers Recommended Teacher FTE (p14, T5)	Data: 2019-20 Human Resources data and Enrollment data by program from MDOE
6	Which programs may require different ratios due to regulations or accreditation requirements or equipment limitations? Do ed techs count toward the lower ratios? (p15) [#8h]	Data Collection: Teacher, ed tech, and lower required ratio data by program from CTE questionnaire
8	Teacher Salary Matrix Compare CTE salaries to general EPS matrix with improved industry experience data (p15 and Appendix C) Explore feasibility of CTE-specific teacher salary matrix [#3]	Data: 2019-20 Human Resources data from MDOE;
9	Regional Adjustment Estimate effect of applying regional adjustment on CTE cost allocations and on fit of teacher salary matrix [#8g]	Data: 2019-20 Human Resources data from MDOE or salary cost allocation data from model?; CTE School location from public sources
10	Ed Techs Has the total number of FTE ed techs increased as intended, and how does it compare to the total allocated FTE? (p17, T6)	Data: 2019-20 Human Resources data from MDOE;
11	To which types of programs are ed techs assigned? Compare to model.	Data collection: Ed techs by program from CTE school survey
12	Cost of clinical supervisors for healthcare programs (p18)	Data: Clinical supervision (contractor) pay rate and hours from CTE school survey; compare staff and financial data

13	Special Education Examine additional cost of services provided to students with special education needs? (#6) Explore possibility of using differential student weights in the model. Examine additional cost of ELL students.	Data Collection: Additional costs of supporting students with special education needs and ELL from CTE questionnaire
C. Administrative and Support Costs (examined together)		
14	Actual vs. allocated administrative and support staff (p19, T8; p21, T11)	Data: 2019-20 Human Resources data from MDOE;
15	Other administrative costs (p21, T10)	Data: FY19 expenditure data
16	Other Support Costs by category: (p23, T12) Is there a better way to model these costs, such as a per-pupil amount?	Data: FY19 expenditure data
17	Industry standard assessment costs (p26)	Data Collection: Availability, usage, and cost of industry standard assessments from CTE questionnaire
D. Supplies		
18	Compare actual Per-pupil and per-program spending to model allocations (p24, T13)	Data: FY19 expenditure data, 2018-19 enrollment data by program
F. Other		
20	Equipment costs (Outside EPS cost model) Exploratory analysis of existing data	Data previously submitted to MDOE for the proposed bond issue on funding needs for equipment.

Data Needed from CTE Questionnaire or other data collection:

1. Participation level and enrollment for Grade 9 and 10, middle school, non-concentrators/drop ins, and CIP 99.x programs (q3) [#8i]
2. Program capacity, oversubscribed, undersubscribed, and waitlist data (q4)
3. Programs requiring different ratios due to regulations or accreditation requirements or other factors: Teacher, ed tech, student, and required ratio data by program (q6) [#8h]
4. Ed techs by program (q11)
5. Clinical supervision (contractor) pay rate and hours (q12)
6. Itemized additional costs of supporting students with special education needs and ELL (q13)[#6]
7. Count of students with special education needs and ELL (q13) [#6]
8. Cost and usage of industry standard assessments (q17)

Appendix B. Programs with Assessments

Agriculture	Culinary Arts/early childhood	Law Enforcement
All programs	Cybersecurity	Machine Tool Technology/Machinist
Allied Health	Data Processing	Marine Technology
ANDRE MTA Exploratory	Design Technology	Marketing Management
Auto Collision Repair	Diesel Technology	Masonry
Auto Technology	Digital Design	Mass Media
Automotive and Diesel	Digital Media	Mechanical Systems
Automotive Engineering	Diversified Occupations	Medical Assisting
Biomedical & Health Science	Drafting	Medical Occupations
Biomedical Science	Early Childhood Education	Metal Fab
Biotechnology	Early childhood occupations	Metal Trades
Building Construction	EDOC	Metals Manufacturing
Building Trades	Electrician	Most Programs
Business	Emergency Medical Services	Multi-Media
Business Academy	Emergency Medical Technology	Multimedia Productions
Business Leadership	Employability Skills	New Media
C N A/Health assistant	Engineering	Outdoor Leadership
CADD	Engineering and Architectural Design	Plumbing Technology
Carpentry	Engineering Applications with Robotics	Pre-Engineering
Carpentry, electrical, early childhood, engineering,	Farm Mach.	Precision Machining
CDL	Fire Fighting/Fire Science	Precision Manufacturing
Child Care Provider asst.	Food Service	Registered Medical Assistant
CNA	Forest Management	Residential construction
Co-op	Forestry	Small Engines
Commercial Arts	Graphic Design	Technical Foundations
Commercial Truck Driving	Graphic Design & Communications	Truck Driving
Composites	Health Occupations	Video & Audio Production
Computer Careers	Health Science	Welding and metal Fabrication
Computer/Electronics	Health Science / early Childhood	Welding Technology
Computer Installation and Repair /Technology/Technician	Health Science & intro to Medical & EMT	
Const. Heavy Equipment Ops	Heavy Equipment Operations	
Construction Technology	Horticulture	
Construction Trades, General	Horticulture & Outdoor Recreation	
Cosmetology	Hospitality	
Criminal Justice	Industrial Electronics	
CTE Academy	Information Technology	
Culinary Arts	Landscapes and Gardens	

Appendix C. Program Assessments

Program Assessment	Responses
Agriculture	
pesticide applicator	1
All programs	
OSHA 10	1
Allied Health	
C N A	1
NOCTI Pre test	1
YouScience Precision Exams pre and post test	1
ANDRE MTA Exploratory	
(blank)	1
Auto Collision Repair	
ASE	3
ASE pre and post testing	1
ASE Student Certification	1
Automotive Education Foundation ASE, I-CAR	1
i-Car Exams	1
ICAR Welding Certification	1
NATEF	1
NOCTI	1
OSHA-10	1
SP2 Safety Certification	1
Auto Technology	
Air Conditioning EPA Section 609	1
ASE	8
ASE pre and post testing	1
ASE Student Certification	2
ASE, S2, State Inspection	1
ASE, State	1
Automotive Education Foundations ASE, Ford Service Teach, Maine State Inspection License, Safety & Pollution, Valvoline Oil Certification	1
Automotive Lift Safety Certification	1
Battery, Starting & Charging Systems, Multiple Certifications Possible	1
Electudes, Auto Upkeep	1

Lift Institute	1
Program Assessment	Responses
Auto Technology Cont'd	
Maine Oxy OxyAcetylene Safety	2
Maine State Inspection	4
Maintenance and Light Repair	1
ME Oxy Torch Cert, Aut 100 Intro to Auto CMCC, Lift it right, ASE Eng Rep, ASE Auto Trans, ASE Man Drive, ASE Ster/Susp. ASE Brakes, ASE Elect, ASE HVAC, ASE Eng Perf., ASE MLR, SP/2 Safety, SP/2 Pollution, MET 123, Auto 110 (2c) Aut 120 (2c), Auto 20(2c), MET (112) 1, MET (114) electrical, MET 116)	1
Multimeter, 1 Multiple Certification Possible	1
NATEF	2
NATEF Entry Level	1
NOCTI	1
NOCTI, Maine State Inspection	1
OSHA 10	2
SP2 Pollution, Prevention, Safety	1
SP2 Safety Certification	1
SP2- Automotive	1
SP2s	2
State Inspection App/SBI Check	1
State Inspection Manual	1
Tire Industry Association	1
Automotive and Diesel	
Maine Oxy Gas Cylinders Safety and Handling, torch and welding safety.	1
Automotive Engineering	
Abrasives Safety	1
Automatic Transmission	1
Automotive Lift Safety	1
Automotive service	1
Brakes (BR) (AS)	1
Engine Repair (ER) (A1)	1
FCA/EMCC Factory Tech training (ACE) - level 0	1

Fire Extinguisher - Level 2	1
Program Assessment	Responses
Automotive Engineering Cont'd	
Fluids & Chemicals	1
Fuel Safety	1
Maintenance/Repair (MR)(G1)	1
Manual Transmission & Drive Train (MD)(A3)	1
OSHA 10	1
Plasma & Cutting Safety	1
Safety Training	1
Snap On Meter	1
Steering Suspension (SS)(A4)	1
Biomedical Science	
CPR/First Aid	1
Jackson Lab Chemical Safety Certification	1
OSHA 10	1
Precision Exam Biotechnology	1
Project lead the way- Human body systems	1
Project lead the way- Medical interventions	1
Project lead the way- Principles of biomed science exam	1
Biomedical & Health Science	
Certified Nursing Assistant, Certified Residential Medication Aid, Dental X-Ray & Infection Control, First Aid & CPR	1
Biotechnology	
Articulation 4credits UMF, 3 credits SMCC	1
Building Construction	
CPR, First Aid, OSHA-10, Maine School of Masonry, "no dual"	1
NOCTI	3
Building Trades	
NOCTI	1
NOCTI 4215 Carpentry post test	1
NOCTI 4215 Carpentry pre test	1
NOCTI OSHA 10	1

NOCTI pre and post test	1
OSHA 10	1
Business	
MOS, Test Out, Quickbooks, NOCTI	1
NOCTI	2
Business Academy	
Precision Certification Exam Accounting, Accounting AC 111 3 credits, Computer app. CS115 3 credits, principals of marketing, MK116 3 credits, Microsoft specialist certification.	1
Precision Exams	1
Business Leadership	
Accounting 1 - 210 precision exams	1
Business Concepts - 200 precision exams	1
Business Law - 240 precision exams	1
Entrepreneurship - 451 precision exams	1
Marketing 1 - 401 precision exams	1
C N A/Health Assistant	
Background Checks	1
CPR/First Aid	1
National Health Assessment	1
State Exam	1
CADD	
ACP Certification: AutoCAD Certified Professional	1
ACU Certification: AutoCAD Certified User	1
NOCTI 4983 Post-test	1
NOCTI 4983 Pre-test	1
Carpentry	
HBI/NAHB-NOCTI	1
NCCER Carpentry Certification National Center for Construction Education and Research. OSHA 10 Hour safety card	1
NOCTI - Carpentry Test	1
OSHA 10	2
Carpentry, electrical, early childhood, engineering,	
NOCTI	1

CDL	
Class B License	1
Child Care Provider asst.	
NOCTI	1
CNA	
C N A	7
Maine State Certification Test	2
NOCTI	1
NOCTI/ C N A ME State Board	1
State Certification, CPR-Healthcare Provider, medical terminology 3 college credits	1
Co-op	
Everfi	1
NOCTI	3
NOCTI - Workplace Readiness	1
OSHA 10	2
Welcome ME Cus Svc	1
Commercial Arts	
Adobe	1
SMMC Photoshop	1
Commercial Truck Driving	
Maine CDI permit test	1
Maine Oxy OxyAcetylene Safety	1
Maine State License	1
Composites	
ACMA CCT-VIP Certification, 3 cr. Enrollment SMCC, OSHA 10	1
Computer Careers	
NOCTI	1
Computer/Electronics	
Precision Exams	1
Computer Installation and Repair /Technology/Technician	
A++	1
ABE	1
AP Computer Science	1
AP tests	1
Comp TIA, A+	1
CompTIA	1
CompTIA and TestOut	1
NOCTI	1
NOCTI pre and post test	1
Skills USA	1

Const. Heavy Equipment Ops	
SP2s	1
Construction Technology	
NOCTI	1
OSHA 10	2
SP2-Gen Industry	1
Werner Ladder Safety	1
Construction Trades, General	
NOCTI	1
SP2s	1
Cosmetology	
OSHA 10	1
Criminal Justice	
CPR/First Aid	1
CTECS Maine Law Enforcement Assessment Post test	1
CTECS Maine Law Enforcement Assessment Pre-test	1
NOCTI	1
CTE Academy	
CPR/First Aid	1
OSHA 10	1
Culinary Arts	
30 Hr. Serv Safe food handler test	1
CTEC, SCC Concurrent, Articulated, Serve Safe-Mgr.	1
Culinary Arts	1
NOCTI	5
NOCTI ACF Secondary graduate - post	1
NOCTI Culinary Arts Prep Cook Pre test	1
NOCTI Culinary Arts Exam, ServeSafe	1
NOCTI pre and post tests	1
NOCTI Retail commercial baking	1
NOCTI- Culinary Arts Prep Cook	1
NOCTI/ACF	1
OSHA 10	1
Pro Start	1
ServeSafe	9
ServeSafe (4 courses)	1
ServeSafe 1 year food handler	1
ServeSafe 5 year management	1

Culinary Arts Cont'd	
ServeSafe Manager	1
ServeSafe Test	1
ServSafe, ACF	1
Wilderness First Aid, CPR, AED	1
Culinary Arts/early childhood	
ServeSafe	1
Cybersecurity	
CompTIA IT fundamentals, CompTIA Security Plus, Palo Alto PCCSA	1
Data Processing	
Certiport Testing	1
NOCTI	1
Design Technology	
SkillsUSA Design Test	1
Diesel Technology	
NOCTI	1
OSHA 10	1
Digital Design	
PrintEd/Skills USA	1
Digital Media	
CTEC, SMCC 3 credits CNMS 160	1
Diversified Occupations	
NOCTI	1
NOCTI pre and post-tests	1
Drafting	
OSHA 10	1
Early Childhood Education	
and NOCTI (for CECA)	1
BpHP Training - free	1
Childhood Development Association Certification	1
CPR/First Aid	3
Ed Tech application fee	1
Ed Tech Certification fingerprinting	1
Maine Registry for CECA Credential	1
Nat. Restaurant Assoc. Food Handler Assessment	1
NOCTI	3
NOCTI Early childhood education and care basics	1
NOCTI early childhood test post test	1
NOCTI early childhood test pre test	1
NOCTI pre and post test	1
ServeSafe (1 course)	1
USM CECA Certificate	1

Wilderness First Aid, CPR, AED	1
Early Childhood Occupations	
CECA	1
CPR/First Aid	2
NAEYC-NOCTI	1
NOCTI	4
NOCTI, CMMC 3 credits, CPR/First Aid	1
EDOC	
CECA	1
Electrician	
Electrical NCCER Level 1 Module 1	1
Electrical NCCER Level 1 Module 2	1
Electrical NCCER Level 1 Module 3	1
Electrical NCCER Level 1 Module 4	1
Electrical NCCER Level 1 Module 5	1
Electrical NCCER Level 1 Module 6	1
Electrical NCCER Level 1 Module 7	1
Electrical NCCER Level 1 Module 8	1
Engineering Business Course	1
NCCER Modular Tests	1
NOCTI	8
NOCTI OSHA 10	1
OSHA 10	2
Skills USA	1
Solar System Installation	1
SP2s	1
State Exam	1
Emergency Medical Services	
EMT Basic Exam	1
Emergency Medical Technology	
BLS First Aid/AES/CPR for healthcare workers	1
BLS-CPR	1
CPR/First Aid	2
EMS Basic	1
EMT- Basic practical Exam	1
FEMA Incident Command 100	1
FEMA Incident Command 700	1
Mandated Reporter	1
MREMT	1

Emergency Medical Technology Cont'd	
National Basic Exam	1
National EMT Basic Certification	1
National Registry [written] vouchers	1
NOCTI	2
NOCTI - Emergency Medical Service	1
NOCTI Emergency Medical Services Post-test	1
NOCTI Emergency Medical Services Pre-test	1
NREMT EMT Basic Certification	1
Practical Exam	1
Psychomotor (hands on) exam	1
Stop the Bleed	1
United	1
Employability Skills	
CTEC -Job skills	1
NOCTI	1
ServeSafe	1
Engineering	
NOCTI	2
Engineering and Architectural Design	
CSWA.100	1
NOCTI pre and post test	1
SME. 100	1
Engineering Applications with Robotics	
NOCTI	1
Farm Mach.	
OSHA 10	1
Fire Fighting/Fire Science	
CPR	1
FF1 Provisional, Haz Mat Ops, ICS-700, 100	1
Maine Fire Sci I and II	1
NOCTI - Fire Service	1
Practical Exam	1
State of Maine FF 1 & 2	1
Food Service	
ServeSafe	1
Forest Management	
OSHA 10	1
SP2s	1
Forestry	
Articulation dual credits, CLP/NESLP, First Aid, CPR, CDL, NOCTI	1
Maine CLP	1

Forestry Cont'd	
NOCTI pre and post-tests	1
NOCTI, CLP	1
OSHA 10	1
Wilderness First Aid, CPR, AED	1
Graphic Design	
NOCTI	1
Skills USA	1
Skills USA	1
Graphic Design & Communications	
Adobe Indesign	1
Graphic Design and illustration using Adobe illustrator CC	1
Visual Design Using Adobe Photoshop CC	1
Health Occupations	
BLS First Aid/AES/CPR for healthcare workers	1
BLS-CPR	1
C N A	3
Certified Nursing Assistant Exam	1
CPR	1
CPR/First Aid	2
CRMA	1
Maine State C N A exam	1
Mandated Reporter	1
NOCTI 4258 Nursing Assisting post-test	1
NOCTI 4258 Nursing Assisting pre-test	1
Precision Exam Medical Terminology Exam	1
State Assessment	1
Stop the Bleed	1
Health Science	
C N A	1
C N A Maine Certification	1
Health Science/early Childhood	
CPR/First Aid	1
Health Science/intro to Medical/EMT	
C N A	1
EMT	1
NOCTI	1
Heavy Equipment Operations	
NOCTI, OSHA 10	1
Horticulture	
CTEC - Horticulture	1
Horticulture & Outdoor Recreation	
Pesticide Application Cert.	1

Hospitality	
National Restaurant Association test	1
NOCTI - Culinary Arts	1
ServeSafe	1
Industrial Electronics	
Not specified	1
Information Technology	
Apple voucher	1
Comp TIA A+	1
Comp TIA Network+	1
COMP-TIA	1
CompTIA and TestOut	1
TestOut site license	1
Landscapes and Gardens	
Master Gardener	1
Law Enforcement	
CPR/AED/First Aid	1
CPR/First Aid	1
CTECS Exam	3
FEMA NIMS 100, 200, 700	1
First Aid	1
Health Care Provider	1
NR Patrol Rifle Shooting	1
NRA Basic Pistol Shooting	1
NRA Personal protection	1
OSHA 10	1
Wilderness First Aid, CPR, AED	1
Machine Tool Technology/Machinist	
NIMS Level 1	1
NOCTI	1
NOCTI-Precision Machining	1
Marine Technology	
American Boat & Yacht Council Certification, Yamaha Tech Cert	1
NOCTI - Marine Service	1
OSHA 10	1
Yamaha Tech Cert	1
Marketing Management	
National Retail Federation Exam	1
NOCTI pre and post-tests	1
Masonry	
NOCTI Brick & Block, forklift Certification	1
OSHA 10	1
Mass Media	
Adobe Site License	1
CTECS Exam	1

Mechanical Systems	
NOCTI	1
Medical Assisting	
BLS-CPR	1
CPR/First Aid	1
NOCTI	1
Medical Occupations	
Certified Residential Medication Aid	1
First Aid Cards	1
Food handlers	1
Maine certified Nursing Assistant	1
NOCTI, ME. CNA Exam	1
Metal Fab	
SP2, AWS D1.1, Oxy-fuel, SMCC 3 credits, Maine oxy abrasives	1
Metal Trades	
American Welding Society	1
NOCTI	1
Metals Manufacturing	
Maine Oxy OxyAcetylene Safety	1
NOCTI 4152 Precision Machining post-test	1
NOCTI 4152 Precision Machining pre-test	1
Most Programs	
CPR	1
Multi-Media	
Maine AB course completion	1
Multimedia Productions	
Adobe After Effects	1
Adobe Indesign	1
Adobe Premier Pro	1
CTECS Maine Video Production Technology post-test	1
CTECS Maine Video Production Technology pre-test	1
New Media	
NOCTI	1
Outdoor Leadership	
ACA Basic canoeing folder/packet/shipping	1
CPR/First Aid	1
Fingerprinting Maine Guide	1

Outdoor Leadership Cont'd	
Magic Falls Whitewater Guide	1
Maine Guide Exam	1
Whitewater License State	1
Whitewater Testing Site	1
Wilderness First Aid	1
Plumbing Technology	
Aerial Lift	1
EPA 608	1
NOCTI	3
OSHA 10	1
OSHA 10 HVAC & Plumbing	1
Phy100 3 credits, CPR, first aid, OSHA 10, PHY 103	1
Pre-Engineering	
4 credits UMF Physics, OSHA 10	1
NOCTI - Pre-Engineering	1
NOCTI pre and post-tests	1
Precision Machining	
NIMS Level 1 Registration	1
NIMS Measurement-Materials- Safety	1
Tooling U	1
Precision Manufacturing	
NOCTI	1
OSHA 10	1
Registered Medical Assistant	
Registered Medical Assistant	1
Registered Phlebotomy Technician	1
Residential construction	
NOCTI	1
OSHA 10	1
Small Engines	
EETC Exam	1
Technical Foundations	
CTECT- post-test Workplace Readiness Skills	1
CTECT- pre-test Workplace Readiness Skills	1
Maine Oxy OxyAcetylene Safety	1
Truck Driving	
CDL	1
Video & Audio Production	
Maine Video Production Technician	1

Welding and metal Fabrication	
American Welding Society	1
NOCTI	1
OSHA 10	1
Welding Technology	
American Welding Society	5
American Welding Society Certification	1
AWS FCAW	1
Maine Oxy OxyAcetylene Safety	1
materials for testing	1
NOCTI	2
NOCTI - Welding	1
OSHA 10	2
SP2s	1
Total Program-Assessments	472

Appendix D. Memorandum Prepared for LD 313

LD 313 Resolve, To Advance Career and Technical Education Opportunities in Maine

“8. Use the data provided by the **Maine Education Policy Research Institute** draft report available in the summer of 2021 to consider the following options:” (LD 313, emphasis added)

“A. Fully funding the essential programs and services career and technical education funding formula as proposed by the Maine Education Policy Research Institute to support the State Board of Education goal of **increasing statewide career and technical education enrollment**, including an **additional per-pupil weight for students with special needs and English language learners**,” (LD 313, emphasis added)

A1. Increase in Statewide CTE Enrollment

The following is an excerpt from MEPRI, “EPS Component Report of Findings: Career and Technical Education, Part I,” presented to the Maine Department of Education, August 2021 (p.1):

A. Enrollment

Number of Programs

Table 1. Enrolled Programs FY19 to FY21

	FY18	FY19	FY20	FY21	Change
All	340	339	343	355	15
Federal CIP	314	310	313	320	6
Maine CIP	26	29	30	35	9

- *Supporting a goal to increase CTE opportunities for Maine students*, there were 15 net new enrolled programs in FY 2019 through FY 2021 compared to FY 2018. This is the combined result of new programs, splits, splinters, and unsuspended programs net of discontinued and suspended programs. It represents the net change in programs available to Maine CTE students.
- Net increases occurred in programs with federal CIP codes and in programs with Maine CIP codes. Programs with federal CIP codes tend to be the familiar traditional half-time two-year CTE programs with 350 hours or more per year. Programs with Maine CIP codes may involve fewer hours of instruction, often 175 hours a year, and may be academic or exploratory rather than specific career training. The net increase in programs was greater for Maine CIP programs than federal CIP programs.

[August 2021 Excerpt, Cont.]

Change in Enrollment

Table 2. Enrollment FY18 to FY20 and FY21 (pandemic year)

Type	FY18	FY19	FY20	Change FY18 to FY20	FY21	1-year change
All	7884	8275	8595	711	8451	-144
Federal CIP	6848	7154	7418	570	6920	-498
Maine CIP	1036	1121	1177	141	1531	354

- *Supporting a goal to increase access to CTE for Maine students*, CTE program enrollment increased in the two years from FY2018 to FY 2020, which was the last year before enrollments were affected by the pandemic. The increases occurred in both federal CIP programs and Maine CIP programs, mostly federal CIP programs.
- In FY 2021, the pandemic year, there was an overall decrease in enrollments. Because FY 2021 is an anomaly, it needs to be analyzed and understood separately rather than as part of a continuing trend.
- In the pandemic year, Maine CIP programs increased at a greater rate than before the pandemic year, while federal CIP program enrollments decreased.

(End of excerpt)

Concluding Statement on Section A.1. The goals of increasing programs and increasing participation appear to have been supported. While it is impossible to be sure that the implementation of the EPS CTE cost model and its on-time new-program funding are partly responsible for the increases, the evidence supports continuing toward full implementation of the model. Applying a similar but not identical approach to funding program **expansions** may also have promise, as suggested in previous MEPRI reports.

A.2. Special Education and English Language Learner Weighted Pupil Counts

Background. In the overall EPS there is an additional pupil weight for students with special education needs and for English language learners. These services are provided within separately identified programs with their own designated teachers and other staff and resources. Although separate programs for special education and English language learners do not exist within CTE, MEPRI was asked to explore the feasibility of using weighted pupil counts for students with special education needs and for English language learners.

MEPRI administered a questionnaire to CTE directors, whose response rate was 100%. Responses to the questions on costs of supporting students with special education needs and English Language learners were as follows:

Table 2. Additional Expenses Incurred in Supporting Students with Special Education Needs

Survey Response	CTE schools
Reported incurred expenses	13
Reported no incurred expenses	14

Table 3. Estimate of Special Education Expenses Provided

CTE schools	4
Estimated expense reported	\$71,250

The \$71,250 in estimated expenses included \$30,000 toward a student services coordinator and \$30,000 for an education technician. The remaining \$11,250 was supplies and equipment. Naturally, as in regular education, CTE classroom teachers also implement accommodations specified in student IEPs. The EPS CTE model currently provides allocations for student support staff, education technicians, classroom teachers, and supplies. Equipment costs and are generally funded outside the EPS model for annual operating costs.

Several responses claiming no additional expenses incurred in supporting students with special education needs cited the responsibility of sending districts and district special education programs to provide special education services.

Descriptions and estimates of expenses incurred in supporting students with special education needs:

- *Currently, our Student Services Coordinator has to gather and deliver IEPs and 504 plans to our teachers. The work is extremely time consuming and frustrating. We would estimate the costs to be roughly \$30,000.*

- *Ed Tech in PLATO lab - \$30,000.*
- *...Typically, special student needs often require adaptive equipment or supplies. For example, this has recently included a specialized desktop computer for a visually impaired student (\$4,000) and specialized stethoscopes for hearing impaired students. In 19-20 I would estimate such costs around \$9,000-\$11,000.*
- *[CTE school] purchased special stands and switches so the students could take pictures and use Photoshop. (cost \$250) The District Special Education Department paid for hardware and software to the student could use their eyes to use a computer. (Eye Gaze) as well as a motorized wheelchair with the same kind of controls.*

Other selected responses describing costs:

- *Student services Coordinator- IEPs! , Tutoring*
- *Our Student Services Coordinator acquires all IEP/504 plans from sending schools and coordinates their copying and distribution to CTE instructors. We use in house staff to provide accommodations that go above and beyond instructional practice accommodations. Sending school districts provide the one on one ed tech support when that accommodation is specifically listed in the IEP as needed or the team believes it is needed*
- *Although difficult to quantify as a dollar amount, our Student Services Counselor spends a great deal of time collaborating with partner school case managers to understand student needs, work with instructors to understand accommodations and modifications, and assist in the implementation of modifications such as having tests read aloud.*
- *[CTE school] follows each students IEP and meets the accommodations that It can. We are not able to provide 1 to 1 Ed Tech support for students, some schools can provide an Ed Tech other cannot. We purchase tools and make modifications to equipment as is reasonable to maintain the students and equipment's safety. We purchase audio textbooks for students when it is an accommodation in an IEP.*
- *One shared Ed Tech with Electricity and Building Trades*
- *...Because we have a floating Ed Tech we have been able to cover some of the need for Special Ed services, Support is additionally supplied through the Student Services Staff and Program Staff. Because our percentages have increased additional sped needs support is warranted.*
- *Facility updates and modifications have been addressed to meet student needs such as lowering sink heights and providing non-gender specific bathroom facilities.*

Selected responses that no additional expenses incurred to support students with special education needs:

- *N/A - The sending high school is responsible for special education costs (1-on-1 support, other accommodations/modifications).*
- *None, our sending schools provide the required funds or special education support*
- *We pushed costs back onto sending schools. When students needed a 1 on 1, we required the sending school to provide one.*
- *We have no education technicians or other special education personnel. Any special education programming or accommodations are made through connecting with the sending schools.*
- *We have not had direct costs for the 2019-20 year. However, the students require more time from our instructor to explain and demonstrate the needed skills this is taking away from other students that could continue to make progress.*
- *A fair number of our students have IEP's and require modifications of accommodations what we have been able to accommodate at present without added cost. However, it is not to say that we may encounter added costs above and beyond our current practice.*
- *Diversified Occupations program is aimed entirely to support students with special needs. In 19-20 there were no additional costs. However, as the need arises, expenses are incurred for adaptive equipment.*

The CTE schools describing expenses incurred due to ELL student needs listed translation and interpreter services, an education technician, books and an online program, as well as collaboration between CTE teachers and a district ELL program teacher.

Table 4. Expenses Incurred Due to EL Student Needs

Response	CTE schools
Yes	3
No, N/A, <blank>	24

Table 5. Estimate of Expenses for EL Services

CTE schools	2
Estimated expense reported	\$9,500

Responses of CTE schools reporting additional expenses due to ELL student needs:

- *[CTE school] incurs the cost for translation and interpreter services to serve ELL students. These costs vary year to year but might cost \$5-7,000 per year depending on frequency of use.*
- *We incur indirect costs providing academic support to these students through our Ed Tech III. We have purchased industry related translation books and the approximate cost is \$500. And an online industry translation program for the approximate cost of \$2,000.*
- *We have had a couple of ELL students the last couple of years and our CTE teachers have had to provide accommodations in collaboration with the ELL [SAU] Department ELL teacher.*

Concluding Statement on Section A.2. It is not feasible to identify the additional cost of providing for the special education needs of students necessary to make a separate, empirically-based weighted pupil count within the CTE cost model. The better option is (1) to continue to recognize all costs within the existing sub-components such as student support personnel and education technicians, (2) to assure adequacy of those allocations, and (3) to verify the opportunity for all students to participate fully in CTE programming. Similarly, the cost data collected for the ELL needs of students do not justify a new, separate sub-component.

“B. Creating a formula approach to include an allowance for **yearly building maintenance, capital improvements and equipment costs;**” (LD 313, emphasis added)

(Note: major capital improvements are not within the scope of EPS, which funds annual operating cost. Minor capital costs are funded through the EPS CTE operation and maintenance sub-component.)

Operation and Maintenance of Plant (OMP)

The following is an excerpt from MEPRI, “EPS Component Report of Findings: Career and Technical Education, Part I,” presented to the Maine Department of Education, August 2021 (p. 11):

C. CTE Model Alternatives for Operation and Maintenance of Plant

Table 1. Operation and Maintenance of Plant (OMP) Expenditure FY19

Operation and Maintenance of Plant (OMP)	\$9,023,601
Capital Improvement and Renovation	\$791,899
OMP excluding Capital Improvement and Renovation	\$8,231,703

- Capital improvement and renovation is not an annual operating cost and is funded outside EPS. The \$8.2 million amount is used in this component review.

Table 2. Facilities Area

	Square Feet	Cumulative
Program Areas	1,202,939	1,202,939
Offices and Commons	357,425	1,560,364
Miscellaneous	155,746	1,716,111
Total	1,716,111	

Miscellaneous includes outdoor program areas, play areas, greenhouses, a fire house, sheds, storage, and bus garages.

- Square footage data was collected the Maine Department of Education in a 2019 CTE facilities survey. The areas were classified by their usage as program areas, offices and commons, and miscellaneous categories.
- The types of areas may be analyzed separately or cumulatively, starting with the program areas as primary cost drivers.

Table 3. OPM Expenditure Per Unit FY19

Basis	Units	OMP per unit	Correlation to Expenditure
Expenditure	\$8,231,703	1	1.000
Schools	27	\$304,878	N/A
Programs FY19	327	\$25,173	0.697
Student Program Enrollment FY19	8,026	\$1,026	0.764
Square Feet:			
Building Area (2018 Data)	1,666,915	\$4.94	0.772
<i>2019 Facilities Survey Data:</i>			
Program Areas	1,202,939	\$6.84	0.760
Program areas, offices, and commons	1,560,364	\$5.28	0.724
Programs areas, offices, commons, and miscellaneous	1,716,111	\$4.80	0.689
Miscellaneous includes outdoor program areas, play areas, greenhouses, a fire house, sheds, storage, and bus garages.			

- Several unit cost measures are presented in Table 3, including expenditure per student and expenditure per square foot, using several different square footage options.
- The correlation provides an indication of how strongly related each of the measures listed is to OMP expenditures. The highest possible correlation would be 1.00.
- Three strong cost model options are suggested by strong correlations:
 - 1) Total Building Area (2018 Data): \$4.94 per square foot (current model)
 - 2) Program Enrollment: \$1,026 per student
 - 3) Program Areas (instructional space): \$6.84 per square foot
- Other model options
 - *Simple regression.* A simple regression model could be used to determine a model allocating a flat amount to each CTE school *plus* an amount per square foot or per pupil.
 - *Multiple regression.* Statistically robust models depend on having a large number of data points. With only 27 CTE organizations to analyze, a complex statistical model is impractical.
 - *Multiple categories.* Theoretically, different amounts per square foot could be used for areas of different usage, which is an approach suggested by the CTE Funding Workgroup. The areas may include indoor program areas, outdoor program areas, offices, and commons. Such a model would be possible if a

method for consistently allocating OMP expenditures to each type of area is developed and implemented.

- The measuring, categorizing, and reporting of square footage data is yet to be reviewed by an independent facilities consultant. One might expect that the data quality and consistency of the currently available square footage data is lower than the quality and consistency of enrollment data, which is standardized and certified. Because of the similarity in the correlations between the square-footage and enrollment models, it may be warranted to change to a per-pupil OMP allocation until square-footage data collection is standardized and verified.

(End of excerpt)

Equipment Cost

Background. CTE equipment costs are funded mostly outside the EPS annual operating cost allocation. Some lower-cost equipment items are designated as supplies for accounting purposes. Such equipment is funded within the supplies sub-component of the EPS CTE component. Most equipment costs are paid from outside the General Fund. The General Fund represented 20% of equipment expenditures in FY 2019.

Table 6. CTE Equipment Expenditure by Funding Source

Fund	Amount	Percent
General Fund	434,314	20%
Local/private	4,862	0%
State Grants	1,045,537	49%
Perkins	435,412	20%
Enterprise Funds	3,352	0%
Agency Funds	227,581	11%
Total	2,151,059	100%

MEPRI was asked to explore the feasibility of providing a program-specific model for CTE equipment cost in the EPS annual operating cost model. CTE schools were asked about their equipment inventories. All 27 CTE school maintain an inventory of equipment. They were also asked what information was contained in the inventory. The following is a summary of the responses:

Table 7. Information in Equipment Inventories

Inventory information	CTEs
purchase date	20
program/location	13
funding source	11
cost	10
make and/or model number	9
serial number	9
Item description	7
maintenance history	5

Fewer than 5 CTEs reported tracking each of the following: supplier, depreciation, quantity, VIN, year, all Perkins Required Information, brand, condition, designated name, disposal records, equipment Type, insurance, Perkins funding, manufacturer, mileage, name of the CWCIT, purchasing information, and usage.

Concluding Statement on OMP Cost. From a data quality standpoint, the best model for the OMP sub-component would be a cost per-pupil model, which is the same as the general EPS model. The CTE model currently uses a cost per-square-foot model, which is also empirically a good fit. Models utilizing area-by-usage were considered. However, the data for the models is pending independent verification, and the empirical model fit was not as good as the models based on enrollment and total building area.

Concluding Statement on Equipment Cost. CTE equipment is currently funded outside the EPS model of annual operating cost. There appears to be insufficient available data on current equipment assets to develop a program-specific model for annualized equipment costs. Other state funding programs such as grants and revolving funds may be evaluated for adequacy in supporting the amount and the irregular intervals of CTE equipment needs.

“C. Funding middle school career and technical education separately from high school career and technical education based on the data provided at the completion of the current pilot projects for middle school career and technical education exploration pursuant to the Maine Revised Statutes, Title 20-A, section 15688-A, subsection 8;” (LD 313, emphasis added)

The middle school CTE pilot project data analysis was not included in the research plan for the MEPRI component review report due the timing of the completion of the pilot program.

“D. Developing a **regional index** for salary adjustments across the State with a specific career and technical education teacher and administrator **salary matrix**; and” (LD 313, emphasis added)

Prior studies have established that CTE classroom teachers have salary patterns that are materially different from non-CTE teachers. Namely, CTE teachers are paid more than non-CTE teachers with similar levels of education and experience. This has led to the use of a state average CTE teacher salary rather than using the salary matrix and regional adjustment method that is used in the non-CTE EPS formula. To investigate whether it may be advantageous to include more information in allocating CTE teacher salaries, MEPRI analyzed the relationship between CTE salaries and other variables of interest.

First we studied the relationship of educational attainment to CTE teacher salary. There was no significant difference between the salaries of individuals with a high school diploma, bachelors degree, or bachelor’s degree plus up to 30 credits. There was also no significant difference between those with a master’s degree and those with a master’s plus 30 credits or a doctorate. However, there was difference between the first category (high school diploma through bachelor’s degree plus 30 credits) and the second (master’s degree or higher). This suggests that if a separate salary matrix were to be created for CTE teachers, it would have two educational categories.

Next we calculated the correlations between the average salary of all full-time (FTE = 1.0) classroom teachers at each CTE to their average years of teacher experience, and the regional salary index of the geographic location of the CTE (Table 8).

Table 8. Correlation of CTE Average Teacher Salary to Other Variables of Interest

	Avg years of experience	Regional Index
Average salary	0.58	.71
Avg years of experience	1.00	.22

Table 8 shows that there is indeed a regional pattern to a CTE's average salary, and that the years of experience also influence CTE teacher pay. This suggests that if it is desired to implement an adjustment to more closely model the pay of a given CTE teacher, the system should include both a salary matrix and a regional adjustment.

Table 9 (next page) describes the pattern of these variables of interest for each CTE.

- CTE average salary as a percentage of the state average for CTE classroom teachers
- Average years of experience for CTE teaching staff
- EPS Regional cost adjustment, based on the geographic location of the CTE

Table 9. Average Full-time CTE Classroom Teacher Salaries, Based on FY20 Staff Data

	# of FTE=1 Tchrs	Avg Yrs Exp	Average salary	% of State CTE Average	Geographic Regional Index
CTE Centers					
Bath Regional Career & Technical	10	17	\$65,566	118%	102%
Biddeford Regional Ctr of Tech	15	14	\$68,757	124%	109%
Capital Area Technical Center	17	8	\$50,076	90%	95%
Caribou Regional Technology Ctr	9	10	\$52,814	95%	90%
Coastal Wash Cty Inst of Tech (Machias)	<5	*	*	*	84%
Foster Regional Applied Tech Ctr	16	17	\$46,659	84%	96%
Hancock County Technical Center	10	10	\$46,421	83%	93%
Lake Region Vocational Center	11	19	\$64,381	116%	94%
Lewiston Regional Technology Ctr	23	19	\$62,941	113%	98%
Mid-Maine Technical Center (Waterville)	13	10	\$54,851	99%	97%
Portland Arts & Technology H S	20	16	\$68,667	123%	108%
Presque Isle Reg Career & Tech Ctr	7	19	\$50,889	91%	90%
Sanford Regional Technical Center	22	12	\$61,460	111%	103%
Somerset Career & Technical Center	10	12	\$54,124	97%	103%
St Croix Regional Technical Center	6	7	\$42,971	77%	96%
St John Valley Technology Center	6	9	\$49,522	89%	99%
Tri-County Technical Center (Dexter)	14	18	\$58,651	105%	94%
Van Buren Regional Technology Ctr	<5	*	*	*	99%
Westbrook Regional Technology Ctr	15	13	\$65,326	117%	108%
CTE Regions					
Maine Region 10 Technical High Sch	11	12	\$61,995	111%	102%
Mid-Coast Sch of Tech-Region 8	19	9	\$58,435	105%	100%
No Penobscot Tech-Region 3 (Lincoln)	13	10	\$41,550	75%	86%
Oxford Hills Tech - Region 11 (Norway)	20	15	\$54,670	98%	94%
Region 9 Sch of Applied Technology	13	14	\$49,008	88%	93%
Region 2 Sch of Applied Tech (Houlton)	11	7	\$41,822	75%	88%
United Technologies Ctr-Region 4	19	15	\$46,309	83%	102%
Waldo County Tech Ctr-Region 7	10	6	\$45,469	82%	101%
Statewide	343	13	\$55,617	100%	100%

* Fewer than 5 full-time teachers; averages not considered sufficiently representative to include

The number of CTE teachers is not adequate to develop a robust salary matrix with all of the education and experience categories in the non-CTE matrix. However, if the education levels were reduced to just two and the experience levels are combined at the high and low ends, then the number of teachers is adequate (though not robust).

Table 10. Number of CTE Teachers and Average Salaries by Experience and Education Levels

Years of Experience	Number of Full-time CTE Classroom teachers		Average Salary (\$)
	High school Diploma to Bachelor's +30	Master's to Doctorate	
<i>Total N</i>	<i>261</i>	<i>81</i>	<i>342</i>
0 to 5 years	95	14	47,285
6 to 10 years	34	18	51,647
11 to 15 years	43	13	55,660
16 to 20 years	29	11	62,676
21 to 25 years	29	11	63,888
26 years or more	31	14	65,922
Average Salary	\$54,014	\$60,345	\$55,513

Table 10 shows that actual average salaries observed in the staff data do increase as education and experience increase. However, the increase due to years of experience is not smooth; one can observe a jump in the average salary between the 11-15 and the 16-20 bands, and a much smaller increase for 21-25 years. Additional analysis would be necessary to discern if this is attributable to the education levels, the geographic location, or neither. The comparatively small number of teachers in each education and experience category means that averages can be influenced by just a few atypical cases.

Additional study of the regional adjustment is also needed to discern its potential impact. CTEs would need to receive the EPS regional adjustment for their location in order to have an adequate number of cases to represent the impact of geographic region on salary patterns.

Concluding Statement for Section D. There appears to be evidence that the personnel cost for CTE is correlated to teacher experience and to regional cost differences, as is the case in regular education. A CTE teacher salary matrix similar to the matrix used in the EPS model for regular education teacher salary cost allocations (although simpler) could be developed. Further, although there is insufficient data to generate a CTE-specific regional adjustment, the EPS regional adjustment could be applied to CTE personnel cost. Neither of these changes would be expected to change to CTE allocation statewide, but it would increase or decrease the allocations to individual CTE regions and centers depending on their geographic location within the state and the level of experience and education of their CTE teachers.

“E. Examining an adjustment to the **student-to-teacher ratio** for those career and technical education programs that have legal requirements or industry restrictions determining the student-to-teacher ratio.” (LD 313, emphasis added)

Background. The original CTE stakeholder group that was tasked with developing a CTE cost model for EPS established a single threshold of 12:1 based on the understanding that the actual requirements for some programs may be greater or lesser than that. The consensus of the group, functioning as a professional judgment panel, was that the 12:1 ratio threshold would be adequate overall if it were applied to all CTE programs. Their recommendation was adopted and remains in the EPS model for CTE teacher allocations.

MEPRI was asked to explore programs that need lower (or higher) student-to-teacher ratios than typical CTE programs (i.e. 12:1). CTE directors were asked about such programs on a questionnaire, and they identified 28 programs as requiring different ratios; this represents fewer than 10% of the 355 CTE programs statewide. Of the 28 programs, 25 had required ratios listed below the current EPS CTE threshold of 12 students, and three programs had ratios above the model amount of 12:1.

Table 11. Programs Requiring Student-to-Teacher Ratios below 12:1

CTE schools listing programs requiring different ratios	17
Programs listed	25
Median	9:1
Range of ratios	1:1 - 10:1

Table 12. Student-Teacher Ratios Required

Ratio	Programs
1:1	1
6:1	4
8:1	6
9:1	2
10:1	12
Total	25

Concluding Statement for Section E. A number of programs, fewer than 10%, were reported to have lower ratio requirements than that provided by the 12:1 ratio threshold that is currently applied to all programs. MEPRI did not analyze programs that have actual ratio thresholds above 12:1. While such an analysis could be done and multiple thresholds could be adopted for different programs, keeping a single ratio of 12:1 applied to all programs appears to be more than adequate.

CTE Funding Model Report Addendum

September 2022

CTE Program Waitlists

Based on information provided by the CTEs in their questionnaires there are significant numbers of Maine high school students waitlisted for CTE programs. A total of 605 students were waitlisted in 2021-22 across 83 program areas in 26 CTE centers. Only the Van Buren CTE in MSAD 24 did not report waitlisted students. Sanford's CTE had the greatest total number of waitlisted students at 135 students across 10 program areas.

A summary of the number of students waitlisted in each CTE program is included below. Waitlists for individual programs ranged from 1 to 56 students, with a median of 9. Welding and Welding/Metal Fabrication programs had the largest combined waitlists (104 across 9 sites), followed by Automotive Technology and Auto Collision Repair with 58 total waitlisted students across 10 CTEs. There were also 60 students waiting to join one or more of Medical Assistant, CNA, Pre-Nursing, Health Occupations, Health Science, or Allied Health programs (duplicates may exist). CNA programs had the most of these waitlisted students at 27, with the majority (20) at Somerset's CTE. Given the state's interest in expanding childcare options, it is also noteworthy that Early Childhood Education programs had 34 waitlisted students across 4 sites, mostly at Sanford (24 students). Lewiston also had a waitlist of 13 students for their Education program.

The questionnaire did not collect additional demographic information about the waitlisted students. However, it is of potential future interest to analyze whether the students who are on waitlists would help Maine to further its goals of increasing gender, racial and ethnic diversity in its workforce.

Addendum Table 1. CTE Program Waitlists

	Sum of students	Count of Programs
<i>Grand Total</i>	605	83
Welding/Metal Fabrication	56	4
Automotive technology	54	10
Welding	48	5
Electrical technology	47	5
Digital Media	42	5
Culinary Arts	37	6
Early Childhood Education	34	4
CNA	27	4
Criminal Justice	21	2
Business Leadership	20	1

<i>Table 1, Cont.</i>	<i>Students</i>	<i>Programs</i>
Carpentry	14	2
Cosmetology	14	1
Education	13	1
Engineering and Architectural Design	13	1
Medical Assistant	12	1
Audio & Video	10	1
Design /Technology	10	1
Food Service	10	1
Information Technology	10	2
Business Management	9	1
Entrepreneurship	9	1
Law	9	1
Pre-Nursing	9	1
Video Production	9	1
Building Trades	8	2
CTE Academy	8	1
Health Occupations	8	1
Outdoor Power	7	1
Construction Technology	5	1
Technical Foundations	5	1
Auto Collision Repair	4	1
Computer Technology	4	1
Allied Health	3	1
Employability Skills	3	1
Marketing	3	1
Business Academy	2	1
EMT	2	1
Plumbing and Heating	2	1
Advanced Communications	1	1
Graphic Design	1	1
Health Science	1	1
Hospitality	1	1

Data compiled from a February 2022 MEPRI survey of CTEs.