Funding For Career and Technical Education

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This report presents the results of the work the Maine Education Policy Research Institute (MEPRI) completed in developing a funding model for Career and Technical Education (CTE) within Essential Programs and Services (EPS). The first section of this report describes the results of the analyses conducted and recommendations made related to all components except equipment. The primary goal of MEPRI's CTE work throughout 2008 – 2009 was to analyze the equipment expenditures, needs, and inventories in the CTE schools. The results of these analyses are presented in the second section of this report.

Section I.

The Overall Recommended Funding Model for Career and Technical Education

Background

Career and Technical Education (CTE) is one of the last educational components to be brought under Essential Programs and Services (EPS), Maine's model for funding public education. In 2005 MEPRI was charged with developing a model to bring CTE within EPS. To answer this charge MEPRI conducted the following steps:

1. Review of cost-studies and funding models in other states
2. Preliminary analysis of expenditures
3. Collaboration with an advisory committee to understand cost factors, develop a funding model, and make recommendations

The proposed model is the result of the work of the advisory committee and MEPRI from 2005 through 2008. The model will be comprised of six components: direct instruction, operation and maintenance, supplies, equipment, central administration, and other student and staff expenditures. Within each component a combination of quantitative analyses and professional judgment was used to develop the recommended parameters.

Analysis of Expenditures

A previous report (MEPRI, 2007) described the review of cost-studies, analysis of expenditures, and preliminary work conducted with the advisory committee. Some key findings from that report were:

Direct Instruction

- 86% of CTE programs operate with 32 or fewer students per teacher

- Ed techs are regularly used in special education and forestry programs
- Forty-three percent of CTE instructors had less than bachelor's degrees, 43% had bachelor's degrees, and 14% had master's degrees
- The majority of schools consider work experience in determining salary. Typically they offer 1 step for 2 years of work experience.

Central Administration
- There is a relationship between school size and per-pupil amount spent on administration; smaller schools spend more per-pupil than larger schools.
- All schools employ a CTE director and larger schools (more than 350) also employ an assistant director

Supplies
- The two programs with the highest supply costs are welding and culinary arts.
- Supply expenditures are a function of both program type and the number of students in the program`

Operation and Maintenance
- There is a relationship between expenditures and both square feet and the number of students. The stronger relationship, however, was between square feet and total expenditures.

Other Student and Staff Support
- Eight schools employ certified guidance counselors but discussions with the advisory committee indicated that the guidance function is being fulfilled by a staff member who may not necessarily be a certified guidance counselor.
- The reported expenditures showed tremendous variance in the per-pupil amounts spent on professional development and co-curricular activities.

Equipment
- There is little relationship between the number of students and program-level equipment expenditures
- The average equipment expenditure per-program varies significantly across years. The programs that showed high expenditures across years are communications, computer repair, and drafting.

Development of Funding Model

For each component, the typical method used by MEPRI was to first generate the research questions and discuss the analytical methods with the committee. The results of the analyses would then be presented to the committee for feedback, discussion, and recommendations for follow-up analyses. This then resulted in a recommended set of parameters for each component. These parameters are described in the next section.

Recommended CTE Funding Model

Direct Instruction

The direct instruction portion of the model will represent salaries and benefits for teachers and ed techs for approved CTE programs. The parameters are as follows:

- Approved coop and multi-disciplinary programs will receive funding for one instructor per program. The number of instructors for the other programs will be determined based on program enrollment ranges. Table 1 displays the enrollment ranges to be used in the model.

Table 1. Enrollment Ranges for Determination of Instructor Allocation

Enrollment Range	Number of Instructor FTEs	Number of Programs	% of Programs
32 or fewer students	1 teacher	261	79%
33 – 39 students	1.5 teachers	28	9%
40 – 64 students	2 teachers	27	8%
65 – 79 students	2.5 teachers	4	1%
80 or more	3 teachers	8	2%

- A CTE-specific salary matrix will be developed to account for the variation in instructor experience and educational attainment across schools. At this time work experience has not been incorporated into the matrix as we only have this information for about half of the teachers. Table 2 displays the teaching experience/educational attainment matrix based on 2008 – 2009 data. A new matrix will be calculated with 2009 – 2010 prior to running the model for the 2010 – 2011 funding year.

Table 2. CTE Teaching Experience/Educational Attainment Salary Matrix

	Less than Bachelors	Bachelors Plus	Masters
0 - 5 years*	1.00	1.03	1.16
6 - 10 years	1.06	1.08	1.22
11 - 15 years	1.13	1.15	1.29
16 - 20 years	1.20	1.23	1.36
21 - 25 years	1.27	1.29	1.42
More than 25 years**	1.27	1.29	1.42
*The base salary is $39,286.			
**There was no signifcant difference seen between the 21-25 and more than 25 year experience categories in the 2008 - 2009 data.			

- The allocation will reflect funds for one ed tech for all forestry, child care, and electrician programs; a clinical supervisor for health care programs; ed techs for special education programs at a ratio of 27:1; and a school-wide floating ed tech at a ratio of 122:1.

Supplies

The supply portion of the model represents the cost of supplies for approved CTE programs.

- The allocation will reflect both per-program and per-pupil amounts for supplies. The amounts appear in Table 3.

Table 3. Determination of Supply Allocation*

Program Category	Amount
Culinary	$8,606
Auto-Tech	$5,515
Welding	$8,956
Building Trades	$5,447
Communications	$5,484
Computer	$4,496
All Other	$2,717
Per-Pupil	$49

* These amounts are based on a three-year average (2005 – 2007) and will be updated and inflated prior to implementation.

Central Administration
This portion represents the costs of salaries and benefits for directors, assistant directors, business managers, clerical staff, and other central office costs.

- The allocation will reflect one director per school, one director per school with more than 350 students, and one business manager in regions.
- The allocation will reflect a 245:1 ratio for clerical staff.
- An additional 16% will be added for other central administration costs.

Operation and Maintenance
This portion represents the costs of such things as custodial staff, heating, building/grounds maintenance.

- The allocation will reflect $5.49 (inflated to year of implementation) per square foot.

Other student and Staff Support
This portion represents the costs of guidance counselors, technology, safety, co-curricular activities, and professional development.

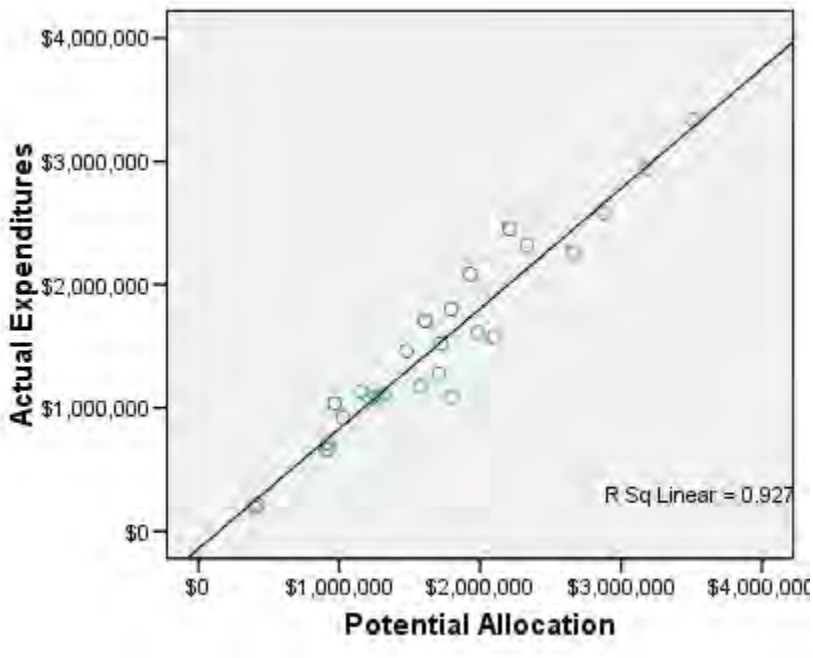
- The allocation reflects one guidance counselor per 250 students
- The allocation reflects the following per-pupil amounts (inflated to the year of implementation):
    - $35 for technology
    - $40 for safety
    - $37 for co-curricular activities
    - $19 for professional development

The amounts for technology, co-curricular activities, and professional development are a portion of the amounts used in the regular education secondary portion of the EPS model. To determine the per-pupil amount, .35 was multiplied by the amount included in the regular EPS model. This .35, calculated by dividing the number of CTE hours per year (350) by the number of regular ed instructional hours per year, represents the approximate proportion of time a CTE student is in the CTE class.

Comparison of Model to Actual Expenditures

To identify how well the model compared to actual expenditures in the five categories mentioned above, the allocation estimate was compared to actual 2007 – 2008 expenditures. We did not have 2007 – 2008 expenditure data for two schools so we used an inflated amount based on the 2006 – 2007 expenditures. With the exception of five schools (indicated in blue) the formula allocation is above what is currently being spent. Approximately 93% of the variance in expenditures was explained by the formula. Figure 1 displays this comparison.

Figure 1. Relationship Between Actual Expenditures and Allocation Estimate



SECTION II

CTE Equipment
Expenditures, Needs, Inventory

Historical Expenditures

Historically overall state/local equipment expenditures for instructional purposes have been consistent from year to year. An additional source of funding for equipment purchases are Perkins federal grants. Table 4 displays the overall CTE expenditures attributed to equipment over the last four years from state/local and Perkins funds. There was a significant drop between 2006-2007 and 2007-2008 in state/local expenditures. It is unclear whether the change is due to an overall decrease in equipment amounts in schools' budgets, the change in the reporting mechanism, or both.

Table 4. Total Equipment Expenditures
2005 - 2008

	State/Local	Perkins*	Total
2004 - 2005	$987,215	$393,178	$1,380,393
2005 - 2006	$1,176,700	$411,614	$1,588,314
2006 - 2007	$1,300,813	$498,955	$1,799,768
2007 - 2008	$521,522	$367,789	$889,311

*The source of the Perkins data was the budgets submitted in the application process.

An analysis of historical spending on equipment in CTE showed that the expenditures vary tremendously across and within programs as well as across and within schools. There is tremendous year to year variation even at the school-level. This is something that was not seen with the other components where school-level expenditures remained consistent from year to year. To highlight this phenomenon, Table 5 displays the amount spent for equipment by school for the last four years.

Table 5. Total Equipment Expenditures by School

School	2004 - 2005	2005 - 2006	2006 - 2007	2007 - 2008
1	$100,868	$120,194	$138,667	$88,714
2*	$55,841	$76,883	$73,332	
3	$41,715	$18,573	$16,046	$0
4	$30,410	$35,119	$20,440	$0
5**	$32,705	$42,287		$16,580
6	$16,872	$19,222	$31,126	$24,951
7	$26,777	$7,041	$13,052	$30,523
8	$61,514	$30,400	$64,021	$31,076
9	$75,415	$70,830	$42,127	$61,242
10	$29,565	$35,985	$34,851	$8,695
11	$8,274	$0	$870	$0
12***	$35,131	$95,371	$18,369	
13	$40,561	$43,242	$466,840	$48,590
14	$19,356	$34,591	$34,356	$0
15	$15,301	$4,245	$14,717	$3,315
16	$21,408	$47,451	$38,542	$46,972
17	$42,276	$21,681	$42,413	$800
18	$56,108	$45,548	$44,546	$18,830
19	$92,309	$118,560	$66,932	$12,597
20	$58,361	$233,567	$83,064	$16,562
21	$30,564	$60,298	$130,562	$75,861
22	$198,806	$181,928	$212,093	$51,871
23	$38,650	$30,868	$37,914	$29,383
24	$11,026	$6,665	$5,900	$9,959
25	$38,313	$28,782	$24,195	$13,100
26	$60,389	$59,890	$22,757	$85,952
27	$141,878	$119,093	$120,737	$213,737

* 2007 - 2008 data were not available for this school.

** 2006 - 2007 data were not available.

*** 2006-2007 and 2007-2008 data were not available.

CTE schools provide programs across 72 different Classification of Instructional Program (CIP) codes. CIP codes, developed by the U.S. Department of Education's National Center for Education Statistics, represent fields of study within the educational system and are used in CTE to classify the many programs of study. A complete list of the CIP codes in Maine's CTE schools is included in Table A1 of Appendix A. For analysis purposes throughout this report we have aggregated these 72 CIP codes into 18 broad program categories. Please see Table A2 in Appendix A for descriptions of the categories. Table 6 displays the average per-program expenditure within each of seventeen broad program categories. It is evident that there is tremendous variation in the average per-program amount spent on equipment from year to year. *Caution should be taken when interpreting these averages because an infusion of money into one program in one year could drastically increase the mean.* The Drafting and Welding categories appear to be the categories with the highest equipment expenses while health occupations and forestry appear to be the lower categories.

Table 6. Mean Expenditures per Program by Category

Program Category	Number of Programs	2004 - 2005	2005 - 2006	2006 - 2007	2007 - 2008
Agriculture	13	$3,645	$29,601	$10,116	$5,452
Forestry	5	$1,774	$3,321	$2,513	$1,150
Communications	26	$6,860	$10,956	$12,799	$4,562
Culinary	20	$5,255	$2,842	$3,256	$2,561
Computer Installer	18	$6,890	$6,630	$7,225	$7,946
Drafting	16	$3,391	$9,449	$10,374	$5,968
Child Care	19	$2,515	$2,514	$1,110	$2,960
Building Trades	43	$3,020	$3,239	$3,338	$1,798
Auto Trades	51	$4,601	$6,372	$6,717	$6,304
Welding	14	$3,841	$11,340	$15,055	$1,675
Health Occupations	31	$1,578	$2,136	$2,515	$2,612
Business	36	$5,160	$6,787	$11,039	$10,246
Protective Servies	11	$5,361	$4,655	$2,611	$7,111
Machinist	12	$8,844	$2,516	$17,964	$1,698
Commercial Driving	5	$3,301	$2,365	$5,275	$1,800
Special Needs	11	$2,324	$1,711	$4,110	$1,062
Coop	28	$2,673	$1,989	$695	$63
Other	29	$1,496	$2,395	$2,775	$2,224

The average equipment expenditures per program category excluding the outliers appear in Table 7. For the purpose of these calculations we reported single-year program expenditures of less than $1,000 or more than $50,000 were excluded. For example, one school invested over $100,000 in one program during one year; this instance would be excluded from these calculations. Although there is still year-to-year variation, it is not as extreme as what is seen in Table 6.

Table 7. Mean Expenditures per Program by Category Excluding Outliers

Program Category	2004 - 2005	2005 - 2006	2006 - 2007	2007 - 2008	Four-Year Average
Business	$7,443	$7,508	$12,107	$12,592	$9,912
Drafting	$8,257	$10,168	$10,968	$7,823	$9,304
Communications	$7,224	$11,981	$8,439	$4,111	$7,939
Agriculture	$7,923	$15,707	$1,565	$5,360	$7,639
Computer Installer	$7,421	$6,630	$7,961	$7,735	$7,437
Auto Trades	$5,916	$7,987	$4,509	$6,451	$6,216
Protective Servies	$7,841	$6,069	$3,783	$7,104	$6,199
Welding	$6,571	$7,405	$6,991	$2,357	$5,831
Other	$7,618	$4,042	$4,774	$2,989	$4,856
Machinist	$5,960	$4,911	$6,077	$2,320	$4,817
Commercial Driving	$4,312	$4,069	$5,275	$4,500	$4,539
Culinary	$6,486	$4,565	$3,769	$2,541	$4,340
Building Trades	$4,288	$4,033	$4,459	$3,594	$4,093
Child Care	$2,724	$5,335	$2,875	$5,431	$4,091
Special Needs	$3,745	$2,392	$7,022	$1,914	$3,768
Health Occupations	$2,563	$3,475	$3,849	$3,793	$3,420
Forestry	$2,527	$4,774	$2,513	$1,919	$2,933
Coop	$3,463	$2,633	$0	$0	$1,524

Within these program categories there is significant variation from school to school. When we examined the amounts schools spent per program across years we found spending varied tremendously and that the majority of schools do not spend equipment money in each program every year. To demonstrate this, Table 8 displays the amount spent for Auto Tech programs across the schools.

Table 8. Equipment Expenditures on Auto Tech Programs by School and Year

School	2004 - 2005	2005 - 2006	2006 - 2007	2007 - 2008
1	$4,857	$5,909	$2,930	$0
2	$2,310	$5,014	$3,029	$0
3	$0	$7,544	$7,544	$0
4	$5,007	$2,461	$0	$0
5	$0	$24,318	$0	$5,483
7	$0	$0	$5,000	$11,836
8	$1,502	$0	$0	$0
9	$16,186	$7,978	$1,217	$3,466
11	$2,218	$0	$0	$0
12	$0	$10,473	$0	$0
13	$0	$0	$0	$8,908
14	$0	$5,369	$3,183	$2,367
17	$5,285	$10,027	$0	$0
18	$2,157	$1,954	$0	$0
19	$13,441	$35,909	$0	$0
20	$7,103	$9,177	$3,237	$0
21	$4,407	$1,649	$4,147	$2,377
22	$8,585	$10,800	$7,400	$4,750
23	$3,200	$2,717	$2,410	$6,423
25	$1,250	$0	$0	$0
26	$0	$15,992	$4,953	$16,440
27	$28,621	$31,651	$16,976	$18,208

The tremendous fluctuation in expenses at the program- and school-levels led to lengthy discussions among the members of the advisory committee. Some reasons suggested for these fluctuations were:

- Differences among schools in the definition of equipment. Prior to 2007 – 2008 schools were using different dollar thresholds for determining an item as equipment. Some were using lower thresholds of $500 while others were using $1,000. Schools are now being advised to report items that cost at least $1,000 as equipment.
- Varying replacement schedules in schools may require large amounts to be spent in particular programs one year and not the next.
- Fixed items that need immediate replacement may cause a one-time increase in equipment expenses.
- New programs may have higher equipment costs to get them up and running.
- Changes in certification requirements often require schools to have high cost equipment.

- Some schools may just not be able to fit the equipment purchases in their budgets.

For these reasons it was determined that a simple analysis of historical expenditures would not accurately reflect equipment costs and needs. The advisory committee came to the consensus that MEPRI should collect the reported needs of CTE schools to allow for an examination of the needs across programs and schools. At the beginning of 2008 MEPRI sent an "equipment need" form to all CTE directors asking for a description, justification, and estimate of their capital equipment needs from 2009 – 2011. For the purpose of this form, equipment was defined as items costing at least $1,000. This survey (please see the Appendix B) asked for the description of the item, the reason for the need (as an open-ended question), and an estimate of the cost within the year of the expected purchase. The expectation was that these data would be part of the implementation of the CTE model in EPS for the 2009 – 2010 school year.

Due to budget issues, however, it was decided that CTE would not be incorporated into EPS until the 2010 – 2011 school year. Due to this delay the Ed Committee of the legislature asked MEPRI to update the equipment need data, collect additional information about the reported needs, and to collect equipment inventories from each CTE director. Please see Appendix B for the 2009 equipment need data request. Table 9 displays the number of schools that responded to these requests for data. Requests for data were sent to directors via multiple emails that were sent throughout March and April. Phone calls were also made to directors who had not responded by mid-May.

Table 9. Response to Data Requests

Data Request	**n**	**%**
Equipment Need Survey 2009	15	55.56%
Equpment Need Survey 2008 Only	8	29.63%
Total Schools Represented in Equipment Need Data	23	85.19%
Inventory Request	12	44.44%

Reported Equipment Needs

MEPRI combined the data from the first and second rounds to create a database that includes the needs for 23 of the 27 schools. The data from the previous year's survey were included for those schools that did respond this year (schools that did not this year were informed that the data for the previous year would be used in these analyses). For the purpose of these analyses we combined the three years to show a three-year total. Many schools were unsure of which year to put certain items as the purchase of some items was directly related to the availability of funds. A summary of the needs by school is displayed in Table 10. The actual equipment expenditures by school for the previous three years are included for comparative purposes.

Table 10. Historical and Estimated Equipment Costs by School

School	Number of Programs	Number of Students	Three-Year Actual Expenses (2006 - 2008)*	Total Three-Year Estimated Cost (2010 - 2012)	Program With Greatest Need
12	8	306	$88,826	$1,637,110	Forestry
14	16	283	$68,948	$1,558,425	Forestry
26	14	352	$168,599	$1,160,445	Machinist
2	19	514	$100,401	$876,158	Film Production
10	16	457	$79,531	$779,500	Forestry
8	9	211	$125,497	$457,611	Truck Driving
9	8	123	$174,199	$436,455	Heavy Equipment Repair
13	20	685	$558,672	$432,873	Drafting
22	12	417	$445,893	$419,795	Machinist
21	21	378	$266,721	$359,837	Machinist
18	19	590	$108,923	$344,313	Desktop Publishing
20	6	282	$333,193	$323,050	Agriculture
7	14	317	$50,616	$244,723	Construction Equipment Operator
25	18	335	$66,077	$195,994	Auto Body
15	9	253	$22,277	$60,725	Entrepreneurial Studies
16	9	138	$132,964	$143,100	Forestry
23	9	247	$98,165	$135,037	Digital Graphic Arts
6	8	170	$75,299	$131,880	Truck Driving
19	22	626	$198,089	$117,500	Welding
5	15	312	$60,167	$106,050	Auto Tech
11	7	135	$870	$103,620	Welding

*MEPRI did not have all three years of data for these schools so the most recent three-year total was used.

**Two responding schools indicated no equipment needs and do not appear in the table.

Replacement vs. New Expenditures

Directors were asked to indicate whether the items were replacement items or new items and to give a reason for the replacement or new item purchase. Table 11 displays the proportion of items and cost that were indicated as replacement or new. This information was not provided for all items; the items for which the director did not indicate replacement or new are included under unknown in the table. The data show that the equipment needs over the next three years are almost evenly split between replacement and new equipment.

Table 11. Estimates for Replacement and New Equipment

	Items	Estimated Cost	% of Items	% of Cost
Replacement	560	$4,620,160	47%	46%
New	497	$4,749,228	42%	47%
Unknown	128	$664,813	11%	7%
Total	1,185	$10,034,201		

Reason for Replacement or New Items

Directors were asked to indicate the reason for either the replacement or new item. This was an open-ended question in the 2008 survey but respondents were given the following choices in the 2009 survey. We recoded the open-ended responses for those schools that responded to just the 2008 survey into these categories where possible.

Replacement Reasons

1. Equipment is past its life expectancy
2. Technology is outdated and replacement is necessary to comply with national certification requirements
3. Technology is outdated (replacement is not necessary to comply with any national certification requirements)
4. Current piece of equipment is broken
5. Other (please describe)

New Reasons

1. Increased demand for program
2. New technology for existing program and needed for national certification
3. New technology for existing program (not needed for national certification)
4. Needed to start a new program
5. Other (please describe)

Tables 12 and 13 show the proportion of the total three-year estimated equipment items and costs that are attributed to the various reasons given for the purchase. The majority of the estimated replacement costs are due to equipment being beyond life expectancy and the majority of the estimated new costs are due to equipment being outdated and needed for certification. In some cases the directors did not indicate the reason for the replacement or new item and are included under reason unknown in the tables.

Table 12. Estimated Costs for Replacement Items by Replacement Reason

			Including All		Excluding "Unknown"	
Replacement Reason	n	Estimated Cost	% of items	% of cost	% of items	% of cost
Equipment past life expectancy	246	$2,105,844	43.93%	45.58%	57.48%	54.16%
Technology outdated/necessary for certification	87	$1,062,765	15.54%	23.00%	20.33%	27.33%
Technology outdated/not necessary for certification	64	$594,679	11.43%	12.87%	14.95%	15.30%
Current piece of equipment is broken	24	$107,567	4.29%	2.33%	5.61%	2.77%
Other	7	$17,197	1.25%	0.37%	1.64%	0.44%
Reason Unknown	132	$732,108	23.57%	15.85%		
Total	560	$4,620,160				
Total (Excluding Unknown)	428	$3,888,052				

Table 13. Estimated Costs for New Equipment by Reason

			Including All		Excluding "Unknown"	
Reason for New Purchase	n	Estimated Cost	% of items	% of cost	% of items	% of cost
Increased demand for program	67	$594,357	13.48%	12.51%	17.14%	14.54%
New tech for existing program-needed for cert	158	$2,739,612	31.79%	57.69%	40.41%	67.01%
New tech for existing program-not needed for cert	128	$512,390	25.75%	10.79%	32.74%	12.53%
Needed to start new program	18	$91,250	3.62%	1.92%	4.60%	2.23%
Other	20	$150,470	4.02%	3.17%	5.12%	3.68%
Reason Unknown	106	$661,149	21.33%	13.92%		
Total	497	$4,749,228				
Total (Excluding Unknown)	391	$4,088,079				

Expected Equipment by Program Type

Programs were divided into the 18 broad categories. Figure 2 and Table 14 display the proportion of the three-year total expected costs distributed among the categories. A comparison of the proportion of the actual expenditures to the proportion of the estimated needs was conducted to identify whether there are programs where historical expenditures are clearly not indicative of future needs. The most obvious case of such a situation is Forestry where the proportion of the estimated needs is over 25% compared to only 3% of the actual expenditures. This is due to the fact that particular items needed to have a certified forestry program are substantial in cost and schools have been unable to afford the costs despite the need. One school has actually suspended its program for the time being until they can afford to purchase the items needed to ensure their program is adequate.

Figure 1. Comparison Between Proportion of Expenditures and Needs by Program

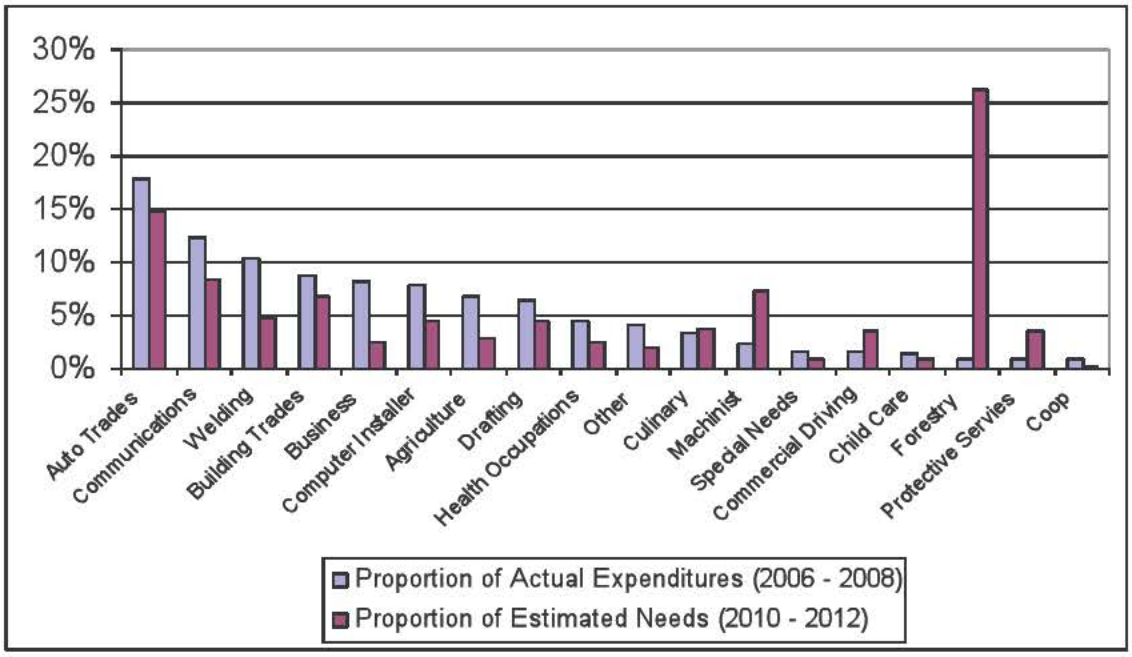


Table 14. Actual and Estimated Total Three-Year Costs by Program Category

Program Category	Programs		Students (2007 - 2008)		Actual Expenditures (2006 - 2008)		Reported Items Needed (2010 - 2012)		Expected Cost (2010 - 2012	
Auto Trades	35	17.07%	1024	13.86%	$370,231	17.80%	205	17.30%	$1,446,545	14.42%
Communications	17	8.29%	539	7.29%	$255,021	12.26%	130	10.97%	$843,495	8.41%
Welding	12	5.85%	294	3.98%	$215,801	10.38%	85	7.17%	$481,931	4.80%
Building Trades	24	11.71%	770	10.42%	$181,150	8.71%	124	10.46%	$681,291	6.79%
Business	10	4.88%	781	10.57%	$171,302	8.24%	39	3.29%	$258,499	2.58%
Computer Installer	14	6.83%	318	4.30%	$163,542	7.86%	81	6.84%	$447,353	4.46%
Agriculture	9	4.39%	262	3.55%	$142,144	6.84%	58	4.89%	$274,911	2.74%
Drafting	9	4.39%	238	3.22%	$132,266	6.36%	40	3.38%	$459,934	4.58%
Health Occupations	15	7.32%	538	7.28%	$91,757	4.41%	83	7.00%	$249,638	2.49%
Other	10	4.88%	579	7.83%	$86,518	4.16%	38	3.21%	$189,747	1.89%
Culinary	14	6.83%	502	6.79%	$71,250	3.43%	71	5.99%	$369,390	3.68%
Machinist	6	2.93%	149	2.02%	$48,338	2.32%	60	5.06%	$750,753	7.48%
Special Needs	6	2.93%	254	3.44%	$34,428	1.66%	26	2.19%	$97,400	0.97%
Commercial Driving	3	1.46%	32	0.43%	$31,690	1.52%	16	1.35%	$357,730	3.57%
Child Care	7	3.41%	299	4.05%	$27,924	1.34%	37	3.12%	$82,289	0.82%
Forestry	5	2.44%	90	1.22%	$19,803	0.95%	34	2.87%	$2,668,700	26.60%
Protective Servies	7	3.41%	244	3.30%	$19,278	0.93%	55	4.64%	$359,595	3.58%
Coop	2	0.98%	477	6.45%	$17,069	0.82%	3	0.25%	$15,000	0.15%

We examined the proportion of the anticipated costs that can be attributed to replacement or new items among the 18 categories. The majority of the Forestry and Auto Tech costs are for new items, predominantly due to certification requirements. Large proportions of the expected costs for Culinary, Protective Services, and Welding are for replacing items that are past their life expectancy. These data can be found in Tables 15 – 17.

Table 15. Expected Equipment by Replacement/New and Program Type

	Replacement				New				Unknown			
	Items	% of Items	Total Cost	% of Expected Cost	Items	% of Items	Total Cost	% of Expected Cost	Items	% of Items	Total Cost	% of Expected Cost
Agriculture	31	53%	$174,000	63%	24	41%	$91,453	33%	3	5%	$9,458	3%
Forestry	16	47%	$697,000	26%	11	32%	$1,889,000	71%	7	21%	$82,700	3%
Communications	47	36%	$370,129	44%	73	56%	$404,466	48%	10	8%	$68,900	8%
Culinary	54	76%	$317,540	86%	8	11%	$25,875	7%	9	13%	$25,975	7%
Computer Installer	16	20%	$130,450	29%	38	47%	$210,076	47%	27	33%	$106,827	24%
Drafting	20	50%	$256,225	56%	9	23%	$126,409	27%	11	28%	$77,300	17%
Child Care	18	49%	$36,589	44%	10	27%	$20,150	24%	9	24%	$25,550	31%
Building Trades	64	52%	$388,405	57%	46	37%	$237,686	35%	14	11%	$55,200	8%
Auto Trades	72	35%	$476,383	33%	123	60%	$931,662	64%	10	5%	$38,500	3%
Welding	60	71%	$317,744	66%	17	20%	$106,687	22%	8	9%	$57,500	12%
Health Occupations	34	41%	$105,225	42%	39	47%	$105,913	42%	10	12%	$38,500	15%
Business	23	59%	$167,500	65%	14	36%	$70,999	27%	2	5%	$20,000	8%
Protective Servies	29	53%	$258,200	72%	25	45%	$100,342	28%	1	2%	$1,053	0%
Machinist	38	63%	$462,443	62%	16	27%	$232,110	31%	6	10%	$56,200	7%
Commercial Driving	14	88%	$350,830	98%	2	13%	$6,900	2%	0	0%	$0	0%
Special Needs	13	50%	$53,900	55%	13	50%	$43,500	45%	0	0%	$0	0%
Coop	0	0%	$0	0%	3	100%	$15,000	100%	0	0%	$0	0%
Other	11	29%	$57,597	30%	26	68%	$131,000	69%	1	3%	$1,150	1%
Total	560		$4,620,160		497		$4,749,228		128		$664,813	

Table 16. Estimated Three Year Costs for Replacement Items by Replacement Reason by Program Type

	Equipment past life expectancy		Technology outdated/necessary for certification		Technology outdated/not necessary for certification		Current piece of equipment is broken		Other/Unknown	
Type	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%
Agriculture	$155,700	89.48%	$7,500	4.31%	$6,000	3.45%	$1,800	1.03%	$3,000	1.72%
Forestry	$95,000	13.63%	$432,500	62.05%	$152,000	21.81%	$0	0.00%	$17,500	2.51%
Communications	$131,827	35.62%	$58,700	15.86%	$98,135	26.51%	$3,967	1.07%	$77,500	20.94%
Culinary	$153,045	48.20%	$25,400	8.00%	$72,000	22.67%	$24,695	7.78%	$42,400	13.35%
Computer Installer	$4,500	3.45%	$55,200	42.32%	$44,950	34.46%	$0	0.00%	$25,800	19.78%
Drafting	$129,800	50.66%	$0	0.00%	$12,750	4.98%	$4,300	1.68%	$109,375	42.69%
Child Care	$14,112	38.57%	$3,500	9.57%	$0	0.00%	$1,280	3.50%	$17,697	48.37%
Building Trades	$254,945	65.64%	$58,241	14.99%	$31,219	8.04%	$20,000	5.15%	$24,000	6.18%
Auto Trades	$162,573	34.13%	$214,089	44.94%	$11,500	2.41%	$26,530	5.57%	$61,691	12.95%
Welding	$172,855	54.40%	$47,247	14.87%	$49,300	15.52%	$0	0.00%	$48,342	15.21%
Health Occupations	$13,900	13.21%	$11,500	10.93%	$18,925	17.99%	$21,500	20.43%	$39,400	37.44%
Business	$17,800	10.63%	$17,600	10.51%	$48,900	29.19%	$0	0.00%	$83,200	49.67%
Protective Servies	$189,100	73.24%	$2,000	0.77%	$0	0.00%	$0	0.00%	$67,100	25.99%
Machinist	$306,685	66.32%	$103,158	22.31%	$34,600	7.48%	$0	0.00%	$18,000	3.89%
Commercial Driving	$282,700	80.58%	$26,130	7.45%	$2,000	0.57%	$0	0.00%	$40,000	11.40%
Special Needs	$9,500	17.63%	$0	0.00%	$0	0.00%	$0	0.00%	$44,400	82.37%
Coop	$0	0.00%	$0	0.00%	$0	0.00%	$0	0.00%	$0	0.00%
Other	$11,802	20.49%	$0	0.00%	$12,400	21.53%	$3,495	6.07%	$29,900	51.91%
Total	$2,105,844	45.58%	$1,062,765	23.00%	$594,679	12.87%	$107,567	2.33%	$749,305	16.22%

Table 17. Estimated Three Year Costs for New Items by New Reason by Program Type

	Increased demand for program		New tech for existing program-needed for cert		New tech for existing program-not needed for cert		Needed to start new program		Other	
	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%	Three Year Estimated Cost	%
Agriculture	$6,800	7.44%	0	0.00%	$11,500	12.57%	$0	0.00%	$73,153	79.99%
Forestry	$160,000	8.47%	$1,689,000	89.41%	$25,000	1.32%	$0	0.00%	$15,000	0.79%
Commun	$68,134	16.85%	$138,799	34.32%	$61,094	15.10%	$4,800	1.19%	$131,639	32.55%
Culinary	$8,800	34.01%	$4,100	15.85%	$7,200	27.83%	$0	0.00%	$5,775	22.32%
Computer Installer	$26,300	12.52%	$62,276	29.64%	$6,200	2.95%	$61,800	29.42%	$53,500	25.47%
Drafting	$30,309	23.98%	$34,100	26.98%	$55,000	43.51%	$0	0.00%	$7,000	5.54%
Child Care	$0	0.00%	$1,250	6.20%	$18,900	93.80%	$0	0.00%	$0	0.00%
Building Trades	$29,092	12.24%	$69,459	29.22%	$82,285	34.62%	$2,000	0.84%	$54,850	23.08%
Auto Trades	$105,438	11.32%	$506,008	54.31%	$76,478	8.21%	$0	0.00%	$243,738	26.16%
Welding	$52,523	49.23%	$19,000	17.81%	$14,000	13.12%	$0	0.00%	$21,164	19.84%
Health Occupations	$21,161	19.98%	$29,335	27.70%	$39,434	37.23%	$0	0.00%	$15,983	15.09%
Business	$20,800	29.30%	$30,000	42.25%	$17,199	24.22%	$0	0.00%	$3,000	4.23%
Protective Servies	$0	0.00%	$62,175	61.96%	$7,600	7.57%	$0	0.00%	$30,567	30.46%
Machinist	$36,000	15.51%	$94,110	40.55%	$12,000	5.17%	$0	0.00%	$90,000	38.77%
Commercial Driving	$4,500	65.22%	$0	0.00%	$2,400	34.78%	$0	0.00%	$0	0.00%
Special Needs	$4,500	10.34%	$0	0.00%	$37,000	85.06%	$0	0.00%	$2,000	4.60%
Coop	$0	0.00%	$0	0.00%	$15,000	100.00%	$0	0.00%	$0	0.00%
Other	$20,000	15.27%	$0	0.00%	$24,100	18.40%	$22,650	17.29%	$64,250	49.05%
Total	$594,357	12.51%	$2,739,612	57.69%	$512,390	10.79%	$91,250	1.92%	$811,619	17.09%

Estimated Needs by Cost Category

An examination of the needed items by cost category was conducted to separate the smaller-scale items from the high-cost purchases. Overall, items that cost between $1,000 and $5,000 make up 66% of the items in the database but only 20% of the total cost. Items that cost over $10,000, however, make up only 17% of the items but 65% of the cost. The distribution of items and needed expenditures across three cost categories can be found in Table 18.

Table 18. Items and Estimated Cost by Cost Categories

Year		Items $1,000 - $5,000	Items $5,000 - $10,000	Items Over $10,000	Total*
2010	Items	376	95	71	542
	% of Items	69%	18%	13%	
	Estimated Cost	$939,215	$715,607	$2,500,072	$4,154,894
	% of Cost	23%	17%	60%	
2011	Items	244	63	73	380
	% of Items	64%	17%	19%	
	Estimated Cost	$642,326	$469,319	$2,762,667	$3,874,312
	% of Cost	17%	12%	71%	
2012	Items	163	42	58	263
	% of Items	62%	16%	22%	
	Estimated Cost	$417,905	$303,364	$1,283,726	$2,004,995
	% of Cost	21%	15%	64%	
Total	Items	783	200	202	1,185
	% of Items	66%	17%	17%	
	Estimated Cost	$1,999,446	$1,488,290	$6,546,465	$10,034,201
	% of Cost	20%	15%	65%	

These categories were used to examine the differences among the 18 program categories in the distribution among high- and lower-cost items. Table 19 displays these distributions. A large proportion of the estimated costs for Forestry, Drafting, Machinist, and Commercial Driving programs are in the More than $10,000 category while the majority of the estimated costs for Health Occupations and Child Care are in the $1,000 - $5,000 range.

Table 19. Proportion of Estimated Costs by Cost Category and Program

	$1,000 - $5,000		$5,001 - $10,000		More than $10,000	
Program Category	% of Items	% of Costs	% of Items	% of Costs	% of Items	% of Costs
Agriculture	82.76%	41.62%	5.17%	9.28%	12.07%	49.11%
Forestry	32.35%	1.04%	2.94%	0.34%	64.71%	98.62%
Commun	63.85%	28.59%	19.23%	22.45%	16.92%	48.96%
Culinary	71.83%	36.08%	16.90%	25.88%	11.27%	38.04%
Comp	66.67%	28.51%	20.99%	29.20%	12.35%	42.29%
Drafting	50.00%	11.55%	17.50%	9.85%	32.50%	78.60%
Child Care	91.89%	75.94%	8.11%	24.06%	0.00%	0.00%
Building Trades	74.19%	33.34%	14.52%	18.38%	11.29%	48.28%
Auto Trades	60.83%	24.16%	23.04%	23.54%	16.13%	52.30%
Welding	63.53%	29.58%	21.18%	28.88%	15.29%	41.54%
Health Occupations	89.53%	73.65%	9.30%	20.48%	1.16%	5.87%
Business	69.23%	30.17%	10.26%	15.47%	20.51%	54.35%
Protective Servies	74.55%	23.82%	10.91%	15.57%	14.55%	60.61%
Machinist	28.33%	5.35%	20.00%	12.26%	51.67%	82.40%
Commercial Driving	50.00%	7.14%	6.25%	1.45%	43.75%	91.41%
Special Needs	73.08%	52.77%	26.92%	47.23%	0.00%	0.00%
Coop	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Other	63.16%	30.36%	28.95%	44.45%	7.89%	25.19%

We examined the mean estimated need per program category across the three years for each cost category to identify whether the yearly fluctuations in average costs per program category are lower in the low-cost categories than the higher-cost categories. Table 20 displays the averages within each of the cost categories across the three years. It is quite apparent that the greatest fluctuation occurs within in the items that cost above $5,000, particularly in the purchase of those items above $10,000.

Table 20. Mean Estimated Program Equipment Costs by Cost Category

	$1,000 - $5,000				$5,001 - $10,000			Over $10,000		
Program	2010	2011	2012	Three-Year Average*	2010	2011	2012	2010	2011	2012
Agriculture	$11,300	$5,043	$5,652	$7,332	$9,000	$7,500	$9,000	$66,000	$32,000	$37,000
Forestry	$4,925	$3,250	$1,500	$3,225	$9,000	$0	$0	$1,205,000	$1,412,000	$15,000
Commun	$9,304	$8,944	$8,330	$8,859	$14,306	$8,200	$5,300	$76,800	$188,095	$148,095
Culinary	$5,860	$4,334	$5,658	$5,284	$10,000	$7,200	$7,800	$100,000	$12,000	$28,500
Comp	$5,572	$6,075	$4,540	$5,396	$9,710	$7,967	$9,683	$45,198	$21,000	$123,000
Drafting	$7,055	$3,621	$3,500	$4,725	$13,100	$6,700	$6,050	$145,500	$65,300	$150,695
Child Care	$4,842	$4,545	$2,543	$3,977	$6,600	$0	$0	$0	$0	$0
Building Trades	$7,075	$4,047	$4,470	$5,197	$10,633	$8,020	$7,994	$100,904	$153,811	$74,212
Auto Trades	$6,999	$8,179	$4,984	$6,721	$9,486	$10,681	$13,007	$269,215	$285,614	$224,485
Welding	$6,467	$6,784	$5,222	$6,157	$10,150	$12,451	$9,751	$98,612	$46,800	$54,800
Health Occupations	$8,911	$6,685	$3,664	$6,420	$7,125	$8,325	$6,000	$15,000	$0	$0
Business	$6,857	$2,583	$3,625	$4,355	$10,000	$10,000	.	$49,450	$73,450	$17,600
Protective Servies	$8,145	$9,800	$12,660	$10,202	$20,000	$13,000	$10,000	$175,950	$30,000	$12,000
Machinist	$2,950	$4,268	$3,500	$3,573	$8,607	$14,973	$7,462	$132,443	$251,597	$234,547
Commercial Driving	$11,265	$3,000	.	$7,133	$0	$5,200	$0	0	$174,000	$153,000
Special Needs	$13,500	$3,725	$4,750	$7,325	$12,250	$7,167	$0	$0	$0	$0
Coop	$5,000	$5,000	$5,000	$5,000	$0	$0	$0	$0	$0	$0
Other	$5,771	$4,938	$9,000	$6,570	$13,950	$17,750	$7,000	$20,000	$17,000	$10,792

* The three-year average is only displayed within this category due to the wide fluctuation in the high-cost categories.

Summary of CTE Equipment Inventory

MEPRI asked each CTE director in the state to provide an equipment inventory for each program in their school. For the purpose of this data collection, equipment was defined as items that cost at least $1,000. Directors were asked to list each item, the program associated with the item, the cost of the item, and the year in which it was purchased. We received responses from 10 of the 27 schools representing 804 items across 89 programs. We did not receive the year of purchase information for all items within all programs and schools, however, so the age analysis is limited to those items for which we have age data (628 items).

Inventory by Program

Table 21 displays a summary of the costs of the inventory by program. There is tremendous variance within and across the programs in the cost of the inventory per program. The cost of the inventory in Forestry programs, for example, ranges from $34,200 to $331,000. On average, however, Forestry, Machinist, and Agriculture are the top three programs in terms of inventory costs.

Table 21. Inventory Costs by Program Category

Program	Number of Programs	Cost Per Program			Equipment Items Per Program		
		Mean	Min	Max	Mean	Min	Max
Agriculture	4	$106,738	$19,300	$310,950	14	2	36
Forestry	2	$182,600	$34,200	$331,000	9	6	11
Communications	5	$39,152	$1,489	$95,825	12	1	20
Culinary	7	$25,034	$6,145	$77,850	8	3	23
Comp	3	$55,209	$9,415	$140,911	9	3	15
Drafting	2	$62,350	$33,800	$90,900	8	3	13
Child Care	6	$6,919	$1,520	$24,595	2	1	7
Building Trades	10	$39,384	$2,540	$116,800	7	1	12
Auto Trades	18	$83,214	$4,500	$197,700	12	1	34
Welding	7	$62,114	$11,286	$111,170	14	3	27
Health Occupations	9	$12,396	$1,299	$31,521	3	1	7
Business	6	$25,123	$1,900	$54,400	3	1	5
Protective Servies	3	$105,433	$5,799	$295,000	3	2	5
Machinist	4	$181,501	$33,905	$257,000	24	8	42
Commercial Driving	3	$68,048	$22,999	$143,744	6	3	11

* Only programs that were reported in more than one school are included in this table.

The age of items was examined by program. The programs with the oldest items are Building Trades and Welding while programs such as Protective Services, Computer Installer, Drafting, and Culinary Arts tend to have acquired items in recent years. Table 22 displays these data.

Table 22. Age of Inventory by Program

Program	Total Items With Age Information	Average Age of Items (Years)	Proportion of Items Over 10 Years Old
Agriculture	23	5	13.04%
Forestry	10	16	30.00%
Communications	50	5	6.00%
Culinary	48	10	25.00%
Comp	26	5	3.85%
Drafting	14	9	21.43%
Child Care	13	6	7.69%
Building Trades	61	17	59.02%
Auto Trades	162	12	50.00%
Welding	78	14	48.72%
Health Occupations	24	9	20.83%
Business	16	4	6.25%
Protective Servies	6	4	0.00%
Machinist	78	11	25.64%
Commercial Driving	19	8	31.58%

Distribution of Inventory Across Cost Categories

We examined the distribution of both the items and costs of the inventory across the three cost categories used in Tables 18 – 20 to examine the estimated needs. The inventory within the responding schools is distributed in a similar way to the estimated needs. The majority of the items fall into the $1,000 - $5,000 range (67%) but only make up 24% of the cost while only 14% of the items cost above $10,000 but make up over half of the cost (57%).

Table 23. Inventory by Cost Category

	Items $1,000 - $5,000	Items $5,000 - $10,000	Items Over $10,000	Total
Items	541	148	115	804
% of Items	67%	18%	14%	
Estimated Cost	$1,266,077	$1,045,918	$3,018,234	$5,330,229
% of Cost	24%	20%	57%	

Table 24 displays the distribution of items and costs among the cost categories by program category. The majority of the inventory costs was for the high-cost items in programs such as Forestry, Business, Protective Services, and Commercial Driving while the inventory for programs such as Culinary, and Child Care is predominantly consists of lower-cost items.

Table 24. Proportion of Inventory Items and Costs by Program and Cost Category

	$1,000 - $5,000		$5,001 - $10,000		More than $10,000	
Program Category	% of Items	% of Costs	% of Items	% of Costs	% of Items	% of Costs
Agriculture	50.00%	15.54%	25.93%	22.23%	24.07%	62.23%
Forestry	47.06%	5.53%	23.53%	7.67%	29.41%	86.80%
Communications	86.21%	43.84%	3.45%	6.50%	10.34%	49.66%
Culinary	87.93%	73.42%	12.07%	26.58%	0.00%	0.00%
Computer Installer	88.46%	29.00%	7.69%	10.62%	3.85%	60.38%
Drafting	43.75%	12.75%	31.25%	29.67%	25.00%	57.58%
Child Care	85.71%	65.07%	14.29%	34.93%	0.00%	0.00%
Building Trades	74.32%	29.84%	12.16%	17.47%	13.51%	52.69%
Auto Trades	63.80%	24.59%	21.72%	21.60%	14.48%	53.80%
Welding	73.96%	37.47%	18.75%	28.87%	7.29%	33.66%
Health Occupations	86.67%	48.82%	3.33%	8.25%	10.00%	42.94%
Business	56.25%	12.15%	6.25%	3.98%	37.50%	83.87%
Protective Servies	60.00%	4.20%	10.00%	2.53%	30.00%	93.27%
Machinist	47.37%	15.37%	33.68%	32.78%	18.95%	51.85%
Commercial Driving	52.63%	13.54%	10.53%	7.59%	36.84%	78.87%

Inventory and Need Relationships

The equipment need data was merged with the inventory data to identify whether there is a relationship between equipment needs and inventory within programs. For this analysis we examined the largest programs as defined by individual CIP codes. We examined the programs for which we had both inventory and need data in at least five different programs. These programs were: auto tech (47.0604), carpentry/building trades (46.0201/46.0000), welding (48.0508), health occupations/nursing (51.0000/51.1614), child care (19.0709), and culinary (12.0503). We examined the relationship between the estimated costs, inventory, and certification status where relevant.[1]We did not see any relationship between inventory, equipment needs, and certification status.

[1] MEPRI collected data pertaining to the certification of programs, instructors, and students from CTE directors in the Spring of 2007.

Equipment Need/Inventory Databases

MEPRI developed two databases that were used in these analyses. The expectation is that they will be updated as directors continue to complete their inventory lists and as needed in future years. These databases can be used for either future analyses or as a place to make decisions about future funding for equipment. Table 25 displays the information included in each database.

Table 25. Equipment Need and Inventory Database Elements

Equipment Needs (23 schools)	***Inventory (10 schools)***
School	School
Program	Program
Item Description	Item Description
Replacement/New Indicator	Cost of Item
Reason for Replacement/New	Year of Purchase
Estimated Cost for 2010, 2011, 2012	
Lifespan*	

*Only 11 schools reported the lifespan for the equipment.

Recommendations for Funding for Capital Equipment

The development of a funding model for equipment within CTE is complicated due to the lack of accurate historical data, the tremendous fluctuation within schools and programs in what is needed from year to year, and the differences among schools in equipment needs due to the nature of their programs. To address these issues some states have funded equipment in a different manner than other components of CTE costs. Such states as Missouri, Virginia, Pennsylvania use either a grant program or separate categorical percentage reimbursement method for funding equipment (Klein, 2001). The recommendation in this report is for the state to consider both the ongoing need to update and maintain equipment items that fall on the lower end of the scale and the need to invest significant dollars in some programs for high-cost items necessary to bring their programs up to standard. The two options MEPRI is presenting are:

Recommendations:

- Use a flat dollar amount per program for funding equipment on a year-to-year basis. These funds would be intended to cover the less-costly items ($1,000 - $5,000 range) but could be used in any way to cover equipment expenses. In other words, the funding would not be targeted to particular items or programs but would be targeted or equipment purchases.

- Develop a grant program, reimbursement method, or bond proposal for which schools can apply and receive funds to address the more extensive needs. This would be intended to help schools pay for the more costly items needed to encourage innovation in programs, bring their programs up to national standards, or develop new programs.

References

Klein, S. (2001). Financing Vocational Education: Sorting out the byzantine world of state funding formulas, district cost variations, and options for supporting the provision of equitable, quality vocational education in high schools. Berkeley, CA: MPR Associates Inc.

Maine Education Policy Research Institute (2007). Preliminary Report: Development of a funding model for Career and Technical Education. Orono, Maine: Author.

APPENDIX A

Table A1. CIP Codes and Programs in Maine CTE Schools

CIP Code	Program	Programs	Students (07-08)
99.1000	Coop	28	513
47.0604	Automotive Tech	27	682
46.0201	Carpentry	25	564
51.0000	Health Services	25	596
12.0503	Cullinary Arts	19	585
19.0709	Child Care	19	376
47.0104	Computer Installer	16	302
48.0508	Welding	14	294
47.0603	Auto Body Repair	12	274
48.0501	Machinist	12	167
46.0302	Electrician	11	174
99.4000	Multi/Interdisciplinary	11	61
99.7000	Voc Special Needs	11	325
15.1301	Drafting	10	186
52.0407	Data Processing/Office	9	289
1.0601	Horticulture	7	103
43.0107	Law Enforcement	7	210
50.0602	Film/Video Making	6	89
52.0401	Admin Assistant	6	104
3.0511	Forest Technology	5	90
10.0202	Radio Broadcasting	5	101
32.0105	Job Seeking	5	280
49.0205	Truck/Bus Driver	5	47
10.0301	Graphic Design	5	93
10.0305	Graphic/Printing Equipment Operator	4	161
43.0000	Protective Services	4	70
47.0302	Heavy Equipment Maintenance	4	74
47.0606	Small Engine Repair	4	89
47.0616	Marine Maintenance	4	78
52.0201	Business Admin	4	80
52.1803	General Retailing Operations	4	122
32.0107	Career Exploration	3	152
46.0503	Plumbing	3	49
51.1614	Nursing Assistant	3	39
52.0302	Accounting Tech	3	172
52.1803	General Retailing Operations	3	122
99.3001	Tech Lab	3	14
1.0000	Agriculture-Agribusiness	2	91
10.0303	Desktop Publishing	2	53
15.0000	Engineering Technology	2	59
41.0101	Biotech	2	27
50.0409	Digital Graphic Arts	2	49
52.0803	Banking & Financial	2	59
99.6000	CTE Academy Career Cluster Exploration*	2	0
1.0205	Agriculture Mechanization	1	21

1.0303	Aquaculture	1	4
1.0304	Crop Production	1	33
3.0201	Natural Resource Management	1	10
10.0301	Graphic Communications	1	29
10.9999	Telecommunications*	1	0
11.0103	Computer Information Sciences	1	56
11.0801	Data Processing Technology	1	18
12.0505	Food Prep	1	27
14.1801	Composite Manufacturing	1	11
15.0613	Manufacturing Tech	1	8
15.1302	CAD Drafting	1	25
15.1303	Architectural Drafting	1	18
31.0301	Parks and Recreation	1	24
46.0000	Construction Trades	1	57
46.0101	Mason & Tile Setter	1	15
47.0101	Electronal Equip Repair	1	48
48.0506	Sheet Metal Worker	1	31
49.0202	Construction Equipment Operator	1	12
50.0101	Visual & Performing Arts	1	34
51.0703	Health Unit	1	6
51.0710	Medical Office Assistant	1	9
51.2602	Elder Care Provider	1	10
52.0399	Accounting Other	1	14
52.0408	General office	1	8
52.0701	Entrepreneurship	1	6
52.1801	Sales	1	20
52.1910	Hospitality	1	0
Total		395	8,619

* New Programs in 08 - 09.

Table A-2. Program Category Definitions

Program Category	Programs
Agriculture	Agriculture-Agribusiness
	Agriculture Mechanization
	Aquaculture
	Crop Production
	Horticulture
	Natural Resource Management
Forestry	Forest Technology
Communications	Radio Broadcasting
	Graphic Communications
	Desktop Publishing
	Graphic/Printing Equipment Operator
	Telecommunications
	Graphic Design
	Digital Graphic Arts
	Film/Video Making
Culinary	Culinary Arts
	Food Prep
Computers	Computer Information Sciences
	Data Processing Technology
	Computer Installer
Drafting	Composite Manufacturing
	Engineering Technology
	Manufacturing Tech
	Drafting
	CAD Drafting
	Architectural Drafting
Child Care	Child Care
Building Trades	Construction Trades
	Mason & Tile Setter
	Carpentry
	Electrician
	Plumbing
	Electronic Equip Repair
	Construction Equipment Operator
Auto Trades	Heavy Equipment Maintenance
	Auto Body Repair
	Automotive Tech
	Small Engine Repair
	Marine Maintenance
Welding	Welding
Health Occupations	Health Services
	Health Unit
	Medical Office Assistant
	Nursing Assistant

	Elder Care Provider
Business	Business Admin
	Accounting Tech
	Accounting Other
	Admin Assistant
	Data Processing/Office
	General office
	Entrepreneurship
	Banking & Financial
	Retailing
	Sales
	General Retailing Operations
	Hospitality
Protective Servies	Protective Services
	Law Enforcement
Machinist	Machinist
Commercial Driving	Truck/Bus Driver
Special Needs	Voc Special Needs
Coop	Coop
Other	Parks and Recreation
	Job Seeking
	Career Exploration
	Biotech
	Sheet Metal Worker
	Visual & Performing Arts
	Tech Lab
	Multi/Interdisciplinary
	CTE Academy Career Cluster Exploration

APPENDIX B

Request for Inventory Needs (2008 and 2009)

Date: January 17, 2008

To: Career and Technical Education (CTE) Directors

From: Walt Harris, Director and Debra Allen, Research Associate
Maine Education Policy Research Institute (MEPRI)
University of Maine, Orono

Re: Request for Data

Dear CTE Director,

The development of a model for funding CTE within EPS is nearing completion. The one component that is left to determine is funding for equipment. The best way to understand the equipment needs for the CTE schools is to collect information on anticipated needs directly from you. Please use the attached form to provide us with your anticipated equipment costs for the next three years by program. Use the following guidelines when completing the form:

- Beginning in 2009 – 2010, equipment will be defined as items that cost over $1,000 and it will be divided into minor equipment ($1,000 - $2,999) and major equipment ($3,000 or more). Please use this definition when determining what items should be included on your list.
- Please include a brief but specific description of each equipment item.
- Please include each piece of equipment on a separate line.
- Please put a brief description of the need for the equipment. For example:
    - Necessary replacement
    - Needed for national certification of program
    - Needed to bring program up to date
    - Needed for the development of new skills taught in the program
    - Needed for new program
    - Needed for increased demand for program

Please return the form by Friday, February 15 as an attachment via email to: debra.allen@umit.maine.edu or through the mail to:

Debra Allen
Center for Research and Evaluation
College of Education and Human Development
5766 Shibles Hall
Orono, ME 04469-5766

Thanks for your assistance with this data collection effort. If you have any questions about this request for information, please contact Walter Harris at 581-2467 or Debra Allen at 581-2421.

Date: March 12, 2009

To: Career and Technical Education (CTE) Directors

From: Walt Harris, Director and Debra Allen, Research Associate
Maine Education Policy Research Institute (MEPRI)
University of Maine, Orono

Re: Request for Updated Data

Dear CTE Director,

A request for equipment needs was sent to CTE directors in 2008. Within this request directors were asked to estimate their equipment needs for 2009 – 2010, 2010 – 2011, and 2011 – 2012. MEPRI is requesting updated information pertaining to these needs. The specific additional information being requested is:

- Confirmation that the needs are still relevant for the school and program
- A clearer understanding of the reasons for the need using some pre-determined categories
- The lifespan of the piece of equipment

Your response to the original data request is attached to this email. Please confirm that these needs are still relevant and make any changes to the items or cost to the items that are necessary. We have added columns to the spreadsheet for the purpose of collecting information pertaining to the reason for the purchase and an estimate of the lifespan of the equipment. Below are the data we would like to collect in each column.

- Reasons for equipment purchase

  Replacement/New: Please indicate, by checking the appropriate box, whether this piece of equipment should be categorized as a replacement. Equipment should be categorized as replacement if your school/program already owns the piece of equipment and new if this is a piece of equipment that is new to the program.

  Reasons for Replacement: If you indicated the piece of equipment was **replacement** please indicate the reason for the replacement by using the codes below:

  6. Equipment is past its life expectancy
  7. Technology is outdated and replacement is necessary to comply with national certification requirements
  8. Technology is outdated (replacement is not necessary to comply with any national certification requirements)
  9. Current piece of equipment is broken
  10. Other (please describe)

Reasons for New: If you indicated the piece of equipment was **new** please indicate the reason for needing new equipment by using the codes below:

6. Increased demand for program
7. New technology for existing program and needed for national certification
8. New technology for existing program (not needed for national certification)
9. Needed to start a new program
10. Other (please describe)

- *Lifespan:* Please indicate, using the codes below, an estimated lifespan for the piece of equipment being purchased using the codes below
    1. 0 – 5 years
    2. 6 – 10 years
    3. 11 – 20 years
    4. More than 20 years

Please return the form by Wednesday, March 25 as an attachment via email to: debra.allen@umit.maine.edu or through the mail to:

Debra Allen
Center for Research and Evaluation
College of Education and Human Development
5766 Shibles Hall
Orono, ME 04469-5766

Thanks for your assistance with this data collection effort. If you have any questions about this request for information, please contact Walter Harris at 581-2467 or Debra Allen at 581-2421.

Date: April 3, 2009

To: Career and Technical Education (CTE) Directors

From: Walt Harris, Director and Debra Allen, Research Associate
Maine Education Policy Research Institute (MEPRI)
University of Maine, Orono

Re: Request for Updated Data

Dear CTE Director,

A request for equipment needs was sent to CTE directors in 2008. Within this request directors were asked to estimate their equipment needs for 2009 – 2010, 2010 – 2011, and 2011 – 2012. MEPRI is requesting updated information pertaining to these needs. The specific additional information being requested is:

- Confirmation that the needs are still relevant for the school and program
- A clearer understanding of the reasons for the need using some pre-determined categories
- The lifespan of the piece of equipment

Your response to the original data request is attached to this email. Please confirm that these needs are still relevant and make any changes to the items or cost to the items that are necessary. We have added columns to the spreadsheet for the purpose of collecting information pertaining to the reason for the purchase and an estimate of the lifespan of the equipment. Below are the data we would like to collect in each column.

- Reasons for equipment purchase

  Replacement/New: Please indicate, by checking the appropriate box, whether this piece of equipment should be categorized as a replacement. Equipment should be categorized as replacement if your school/program already owns the piece of equipment and new if this is a piece of equipment that is new to the program.

  Reasons for Replacement: If you indicated the piece of equipment was **replacement** please indicate the reason for the replacement by using the codes below:

  11. Equipment is past its life expectancy
  12. Technology is outdated and replacement is necessary to comply with national certification requirements
  13. Technology is outdated (replacement is not necessary to comply with any national certification requirements)
  14. Current piece of equipment is broken
  15. Other (please describe)

Reasons for New: If you indicated the piece of equipment was **new** please indicate the reason for needing new equipment by using the codes below:

11. Increased demand for program
12. New technology for existing program and needed for national certification
13. New technology for existing program (not needed for national certification)
14. Needed to start a new program
15. Other (please describe)

- *Lifespan:* Please indicate, using the codes below, an estimated lifespan for the piece of equipment being purchased using the codes below
    5. 0 – 5 years
    6. 6 – 10 years
    7. 11 – 20 years
    8. More than 20 years

Please return the form by April 15 as an attachment via email to: debra.allen@umit.maine.edu or through the mail to:

Debra Allen
Center for Research and Evaluation
College of Education and Human Development
5766 Shibles Hall
Orono, ME 04469-5766

Thanks for your assistance with this data collection effort. If you have any questions about this request for information, please contact Walter Harris at 581-2467 or Debra Allen at 581-2421.