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AUTHOR Lewis, James P.; Burrows, Robert T.
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ABSTRACT

This study was conducted to provide information on equipment needs, the extent of planning to upgrade equipment, and technological advancements necessary to continue providing quality training to entry-level students and incumbent workers. The results were based on a 98 percent return from 72 area vocational-technical school directors, 17 community college occupational deans, and 12 administrators of vocational programs at selected comprehensive high schools in Pennsylvania. Data were collected by mail from July 1982 to January 1983. Some of the results of the study were as follows: (1) in general, vocational education institutions do not use a formal or systematic process to replace and update tools and equipment; (2) federal, state, and private contributions account for about 50 percent of the funds used to purchase new equipment; (3) the current mean dollar value of tools and equipment used in vocational schools is $1.812 million; (4) 53 percent of the schools' tools and equipment are over 10 years old, and about one-fourth of them are no longer current with the technology used in industry; (5) $77 million would be needed for updating tools and equipment, but only about 14 percent of that amount is spent for this purpose annually; and (6) almost all vocational schools surveyed are involved at some level in implementing or planning for the 13 selected advanced technologies (e.g., microprocessing technology, word processing, energy-saving devices, robotics, etc.) Based on the study, implementation of a systematic long-range plan for keeping tools and equipment current was recommended and more long-term and private funds were suggested as sources for funding such a program. The survey instrument, a list of participating schools, and summary tables are appended. (KC)

Vocational Education Tool and Equipment Inventory

Prepared by:

James P. Lewis
Educational Research Associate
Bureau of Vocational Education

Robert T. Burrows
Educational Research Assistant
Bureau of Vocational Education
Pennsylvania Department of Education

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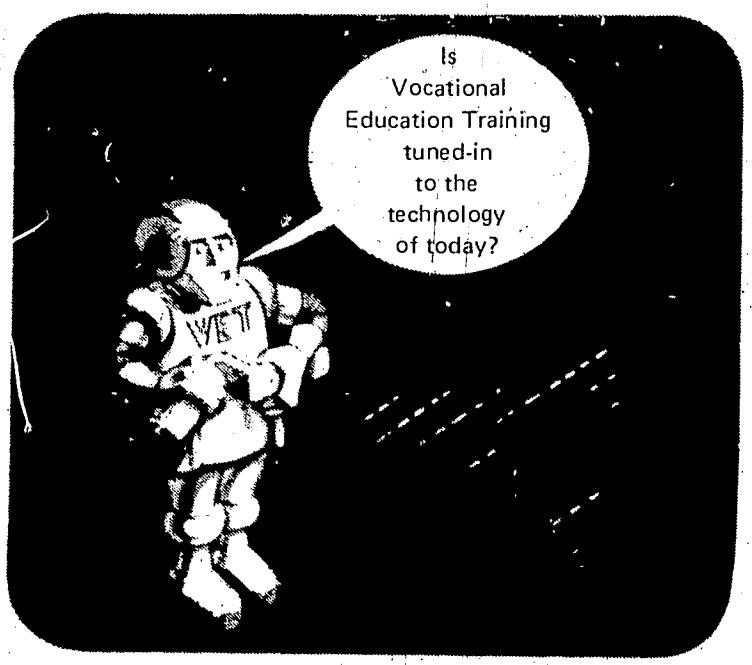

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Bureau of Vocational Education
Jerry C. Olson, *Director*

Division of VOED Administrative and Financial Operations
Lowery E. McHenry, *Chief*

Pennsylvania Department of Education
333 Market Street, P.O. Box 911
Harrisburg, PA 17108

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ABSTRACT

The purpose of this study was to provide information on equipment needs, the extent of planning and technological advancements necessary to continue providing quality training to entry-level students and incumbent workers.

The results were based on a 98 percent return from 72 area vocational-technical school directors, 17 community college occupational deans and 12 administrators of vocational programs at selected comprehensive high schools. The data was collected by mail from July 1982 to January 1983.

1. In general, local vocational education institutions do not use a formal or systematic process to replace and update tools and equipment.

2. Federal, state and private contributions account for about 50 percent of the funds used to purchase new equipment.

3. Vocational schools are skewed negatively in meeting the present cost of tools and equipment. Only about one in five is meeting 71 percent or more of the cost.

4. Almost all vocational schools' tool and equipment costs are paid by more than one source. The area vocational-technical school and comprehensive high school depend on the school district for most of its funding, while the community college campuses rely more on state and federal sources.

5. The current mean dollar value of tools and equipment used in vocational schools is $1.812 million. For the 101 vocational schools reporting, this equals about $185 million. The trade and industrial field in the area vocational-technical school accounts for over 50 percent of the current value of tools and equipment.

6. A total of 53 percent of the tools and equipment used in vocational education is over 10 years old.

7. Almost one-fourth of the tools and equipment is no longer current with the technology used in industry.

8. Overall, $77 million is needed for updating: $35 million to keep advanced technology tools and equipment already purchased current with the state-of-the-art; $21 million for updating worn-out or obsolete equipment; and $21 million for new, advanced technology planned for 1983-84.

9. A total of seven percent of the vocational schools listed the private sector as a source and method for obtaining new tools and equipment. The actual dollar amount from the private sector was less than one percent.

10. Three percent of the total current value, or $6 million, is spent annually for updating tools and equipment. The ratio for dollars spent ($6 million) to dollars needed ($77 million) is about 1 to 13.

11. Almost all vocational schools are involved at some level in implementing or planning for the 13 selected advanced technologies surveyed.

SUMMARY

Both the Governor's Office of Policy and Planning and the Pennsylvania Advisory Council on Vocational Education recommended that a thorough and objective study be conducted on equipment needs and the nature and extent of planning in vocational education needed to continue providing quality training programs for both entry-level students and incumbent workers. To accomplish this task, it was necessary to examine the goals and objectives of vocational education, search the literature to determine national objectives for updating tools and equipment, examine current and past evaluations, formulate research objectives and gain approval of the research design.

The Vocational Education Information Network, Educational Resource Information Center and National Center for Research in Vocational Education were asked to identify surveys used in other tool and equipment studies. Drafts of the inventory were reviewed by a joint committee from the Governor's Office and Bureau of Vocational Education. Also, two area vocational-technical school directors made some recommendations. The final version of the Vocational Education Tool and Equipment Inventory form was approved in June 1982.

In July 1982 a letter of instruction and the inventory form were sent to 72 area vocational-technical school directors, 17 community college occupational deans and 12 administrators of vocational programs at comprehensive high schools. The cutoff date for receiving inventories was November 1, 1982. In late November an addendum was sent to the vocational directors to collect more information on the dollar amount needed for advanced technology and regular updating needs. A total of 98 percent of the vocational directors returned the inventory.

Objective 1. To determine the nature and extent of comprehensive planning for obtaining the tools and equipment used in secondary and postsecondary vocational education programs.

The most popular system (47%) used to replace and update tools and equipment appears to be "As new equipment or major renovations are needed, a proposal is made to our governing board." Only 12 percent used a long-range or systematic process. It was found that most funding methods depend on outside sources. Federal and state funds account for about 50 percent. Vocational schools presently meeting the costs for tools and equipment from all sources were found to be very divergent. About one-third said 30 percent or less of the costs are presently being met compared to 22 percent that said 71 percent or more of the costs are being met. Almost all indicated that the tools and equipment costs are paid by more than one source. The mean percentage for the sources ranges from 66 from school districts to 7 percent from private sector. The actual dollar value from the private sector amounted to less than one percent. Finally, over two-thirds of the vocational directors said that the information base for the cost items on the inventory were from actual budget requests or depreciation schedules.

Objective 2. To determine the current dollar value, functional use, replacement rate, cost for updating and private sector contributions for the tools and equipment used in secondary and postsecondary vocational education programs.

The current mean dollar value of the tools and equipment used in vocational education is $1.812 million. The community college campuses and comprehensive high schools show means of $1.177 million and $788,000, respectively. Trade and industrial fields at the area vocational-technical school account for over 50 percent of the current value of all tools and equipment used in vocational education.

The mean value of all tools and equipment over 10 years old is $954,000, or 53 percent of the current value. A mean dollar value of $427,000 was reported for the obsolete tools and equipment. In comparison to the total current value, 24 percent of the tools and equipment used in vocational education are no longer current with technology.

It was reported that, overall, $77 million is needed for updating: $35 million to keep advanced technology tools and equipment already purchased current with the state-of-the-art; $21 million for updating worn-out or obsolete equipment; and $21 million for new, advanced technology planned for 1983-84. The ratio of dollars spent ($6 million) to dollars needed ($77 million -- $56 million updating and $21 million planned for 1983-84) is about 1 to 13. Private sector support for meeting the cost for new technology was only $22,000.

Objective 3. To determine the extent that specific technological advancements have been incorporated into secondary and postsecondary vocational education programs.

In examining the three types of vocational schools, all seem to be involved in planning or implementing each of the 13 advanced technologies surveyed. Extensive use of advanced technology in existing programs was found in the following: word processing (55%), electromechanical, microprocessors and energy-saving devices (49%). Some use was indicated with medical and scientific devices (41%), specialized materials (31%), agriculture (24%), telecommunications (22%) and computer-assisted design (17%). Even the lesser-known technologies like robotics (8%), fiber optics and lasers (1%) have been implemented in existing programs.

BACKGROUND

The impetus for this study came from the Governor's Office of Policy and Planning. A major component of the economic recovery plan shows vocational education expanding to meet more of the specific training needs of business and industry. The main question about this new role was "Can vocational education deliver cost-effective training needed by the industrial worker?"

The second reason for conducting a tool and equipment inventory for vocational education came from the 1982 PACVE Recommendation IV (Equipment) to the State Board of Education. PACVE concluded that "quality vocational education requires that students must have access to tools and equipment comparable to those used in business and industry." Specifically, they recommended:

A. A thorough and objective study to establish the adequacy and condition of equipment and tools in vocational education be conducted.

B. The Department of Education provide leadership in developing alternative methods for securing the equipment essential for the operation of quality vocational education programs.

The Governor's Office question, plus the PACVE recommendations, prompted the Bureau of Vocational Education to organize a special effort to support economic development. Part of the need for this effort was to learn about equipment needs and the nature and extent of planning in vocational education necessary to continue providing quality training programs for both entry-level students and incumbent workers.

Objectives

The objectives of the study were:

1. To determine the nature and extent of comprehensive planning for obtaining the tools and equipment used in secondary and postsecondary vocational education programs.

2. To determine the current dollar value, functional use, replacement rate, cost for updating and private sector contributions for the tools and equipment used in secondary and postsecondary vocational education programs.

3. To determine the extent that specific technological advancements have been incorporated into secondary and postsecondary vocational education programs.

Instrument Development

The first step in developing the form to collect data for the objectives was to conduct a search for forms that had been developed for other tool and equipment inventories. The search was conducted through the services of the Vocational Education Information Network, Educational Research Information Center and National Center for Research in Vocational Education. A 1980 North Carolina community college tool and equipment study and the recent American Vocational Association survey conducted by Nelson (1982) was found useful in establishing the scope of the investigation.

A number of rough drafts of the inventory were critically reviewed by a joint committee from the Governor's Office of Policy and Planning and the Bureau of Vocational Education. Also, two area vocational-technical school directors and a staff member of the State Advisory Council reviewed drafts and made some recommendations. The final version of the Vocational Education Tool and Equipment Inventory was approved by the joint committee in late June 1982 (see Appendix A).

Quality Control

The survey form was designed to facilitate coding, keypunching and data analyses. The completed form was reviewed by at least two staff members from the Bureau of Vocational Education. Follow-up telephone calls and on-site visits were used to clarify or complete survey items.

Instructions were prepared for handling the survey for keypunching. Independent verification of all keypunched information is standard practice of the Data Processing Center. After raw scores were stored in the computer, editing runs were conducted to determine the variations in the response for each item of the inventory, the extent of omissions and interrelationships with other survey items.

Sample

This study was to cover all public secondary and postsecondary vocational programs operating in Pennsylvania. The joint committee for the study decided to send the inventory form to vocational directors at 72 area vocational-technical schools, 17 community college campuses and 12 selected comprehensive high schools.

Field Procedures

In July 1982 instructions and the inventory form were sent out. The letter explained the reason for the study, gave due dates and named a contact person who could help in completing the inventory. Jerry C. Olson, state director of vocational education, also announced the upcoming tool and equipment study at the 1982 Pennsylvania Vocational Conference at The Pennsylvania State University. The cutoff date for receiving completed inventories was November 1, 1982.

An addendum to the tool and equipment inventory was sent to the vocational directors on December 3, 1982 (see Appendix A) to collect more information on the dollar amounts needed for advanced technology and regular updating needs. Additional information was also needed on advanced agriculture technology.

ANALYSIS

Table 1 shows that the number of vocational schools covered in the study was 101. This total was based on the list of vocational schools in the 1982-83 Pennsylvania Education Directory and the 1980-81 Directory of Industrial Education Programs in comprehensive high schools. In late July one area vocational-technical school reported that its status was officially changed from an area vocational-technical school to a comprehensive high school, thus reducing the number of area vocational-technical schools to 72 and increasing the number of comprehensive high schools to 16. Three comprehensive high schools reported that they no longer offer a substantial number of vocational programs and two others reported that a civil rights decision combined their school districts. Therefore, the final adjusted number of the comprehensive high school was reduced to 12. Returns show that 98 percent of the vocational schools returned an acceptable inventory.

The number responding to each item on the inventory varied, mainly because staff was not available to help or the director was not comfortable in giving "best estimates." Many directors indicated that missing data would be forthcoming when staff returned in the fall or when third-party audits were completed.

TABLE 1

INVENTORY RETURNS

Type of School	Mailed	Returned	Percent
AVTS	72	71	99
Community College Campus	17	16	94
Comprehensive High School	12	12	100
TOTAL	101	99	98

Objective 1: To determine the nature and extent of comprehensive planning for obtaining the tools and equipment used in secondary and postsecondary vocational education programs.

The Vocational Education Amendments of 1976 specify comprehensive planning for vocational programs. Inherent in this legislation are policies that the states establish comprehensive plans for providing job skills training based on current and future labor market needs. In a further development for vocational education in Pennsylvania, the State Board of Education is proposing Regulation 6.12, which mandates a long-range plan. This regulation requires needs assessments based on labor market trends; coordinated and articulated programs at all levels; action plans for delivery of the services; staff development and job placement services; and a plan for repair, replacement and addition of instructional equipment.

Items 1, 2, 3, 4 and 11 on the Vocational Education Tool and Equipment Inventory were designed to collect information on the nature and extent of planning for the instructional tools and equipment used in vocational education.

Tables 2, 3, 4, 5 and 6 present a descriptive analysis on the items for Objective 1. The Chi-Square analysis showed that there was no significant pattern for the multiple response for the most likely other(s) category for items 1, 2, 4 and 11. Item 3 was not a multiple response choice. It should be noted that the total frequency for the multiple response items is more than the number of vocational administrators who answered the item.

An important finding, reported in Table 2, shows that only 12 percent of the vocational schools use a long-range or systematic process to replace and update tools and equipment. Another 12 percent said a separate budget is available for equipment. The most popular system, 47 percent, appears to be "As new equipment or major renovations are needed, a proposal is made to our governing board." It should be noted that 21 percent indicated the practice of replacement or updating occurs when funds are available.

TABLE 2

SYSTEMS USED TO REPLACE AND UPDATE TOOLS AND EQUIPMENT BY VOCATIONAL SCHOOL

System	AVTS* N = 70 (%)	Comp. High School* N = 11 (%)	Community College Campus* N = 15 (%)	Combined* N = 96 (%)
Equipment is depreciated on an established schedule and funds are included in the regular budget for these costs.	11 (12)	3 (19)	1 (4)	15 (12)
As new equipment or major renovations are needed, a proposal is made to our governing board.	45 (50)	7 (44)	8 (35)	60 (47)
A separate budget is available for equipment.	8 (9)	4 (25)	4 (17)	16 (12)
Replacement/updating occurs when funds are available.	20 (22)	2 (13)	5 (22)	27 (21)
Other	6 (7)	-- --	5 (22)	11 (9)
TOTAL	90 (100)	16 (100)	23 (100)	129 (100)

*Multiple response by the vocational schools

Item 2 on the inventory was designed to collect information on the funding methods used to replace and update tools and equipment. Table 3 shows that 40 percent of the funds are systematically included in regular operating budgets. Most of the funding methods depend on outside sources. Federal and state contributions account for about 50 percent of the funds, the private sector for only 7 percent.

TABLE 3

FUNDING METHODS USED TO REPLACE AND UPDATE TOOLS AND EQUIPMENT BY VOCATIONAL SCHOOL

Funding Method	AVTS* N = 70 (%)	Comp. High School* N = 11 (%)	Community College Campus* N = 15 (%)	Combined* N = 96 (%)
Included in regular operating budget	62 (46)	9 (47)	3 (9)	74 (40)
Ongoing special fund for equipment	1 (1)	-- --	2 (6)	3 (2)
Equipment loan from Defense Dept. through National Equipment Industrial Reserve (NEIR) program	8 (6)	-- --	-- --	8 (4)
State funds	14 (10)	3 (16)	6 (19)	23 (12)
Federal funds	35 (26)	6 (32)	12 (38)	53 (29)
Private sector employers' financial and other contributions	7 (5)	1 (5)	5 (16)	13 (7)
Other	7 (5)	-- --	4 (12)	11 (6)
TOTAL	134 (100)	19 (100)	32 (100)	185 (100)

*Multiple response by the vocational schools

The costs for tools and equipment presently being met are reported in Table 4. A total of 38 percent of the vocational schools said that 30 percent or less of the costs are presently being met. The more fortunate vocational schools (22%) said that 71 percent or more of the costs are presently being met from all sources.

TABLE 4

COSTS FOR TOOLS AND EQUIPMENT THAT ARE PRESENTLY BEING MET BY VOCATIONAL SCHOOL

Percent of Cost	AVTS N = 70 (%)	Comp. High School N = 11 (%)	Community College Campus N = 15 (%)	Combined N = 96 (%)
0 - 10	19	-	27	18
11 - 30	24	8	7	20
31 - 50	20	17	47	24
51 - 70	13	42	13	17
71 - 90	17	25	7	17
91 - 100	6	8	-	5

Item 4 results are reported in Table 5. Almost all of the vocational schools indicated that tools and equipment costs are paid by more than one source. The mean percentage for the types of sources ranges from 66 from school districts to 7 percent from private sector. The most common amount (mode) paid by available sources was 100 percent for school districts and 10 percent for the other sources. The median (middle most percentage) was 71 for school districts to 6 for private sector. In summary, the area vocational-technical school and comprehensive high schools depend on the school district for most of their funding, while the community college campuses rely more on state and federal sources.

TABLE 5

PERCENTAGE OF TOOLS AND EQUIPMENT COSTS PAID BY AVAILABLE SOURCES BY VOCATIONAL SCHOOL

Source	AVTS* N = 70	Comp. High School* N = 11	Community College Campus* N = 15	Combined* N = 96
Local School District				
Mean	72	61	32	66
Mode	100	40	50	100
Median	75	60	23	71
State Funds				
Mean	18	18	42	25
Mode	10	10	50	10
Median	10	15	47	15
Federal Vocational Education Act				
Mean	33	38	40	35
Mode	10	25	50	10
Median	25	29	45	30
Private Sector				
Mean	6	10	7	7
Mode	10	10	10	10
Median	5	10	8	6

*Multiple response by the vocational schools

The last item for Objective 1 has a twofold purpose. One, it further explains the nature and extent of planning and collects information on the validity of the data presented for the actual costs questions about Objective 2. The results can be found in Table 6. It was indicated that 38 percent of the vocational directors used the annual budget request from each program area. Thirty-one percent used the "best estimate" method and 17 percent used different types of updated schedules. Combinations of the base choices were used by 14 percent. It should be noted that about half of the vocational directors indicated that they "qualified" their "best estimate" method by summarizing the responses by the individual instructor estimates for items 5 through 10.

TABLE 6

INFORMATION BASE FOR RESPONSES TO COST ITEMS

Information Base	AVTS* N = 70 (%)	Comp. High School* N = 11 (%)	Community College Campus* N = 15 (%)	Combined* N = 96 (%)
Regular depreciation and replacement schedule that is updated each year	5 (6)	-- --	1 (6)	6 (5)
Replacement schedule that is updated each year	7 (8)	1 (8)	-- --	8 (7)
Replacement schedule that is updated at least once every three years	6 (7)	-- --	-- --	6 (5)
Annual budget request based on requests from each area	31 (35)	6 (50)	7 (41)	44 (38)
General best estimate of what is needed	27 (31)	3 (25)	6 (35)	36 (31)
Other	11 (13)	2 (17)	3 (18)	16 (14)
TOTAL	87 (100)	12 (100)	17 (100)	116 (100)

*Multiple response by the vocational schools

Objective 2: To determine the current dollar value, functional use, replacement rate, cost for updating and private sector contributions for the tools and equipment used in secondary and postsecondary vocational education programs.

Most of the secondary and postsecondary vocational schools in Pennsylvania were built and equipped about 10 years ago. Through the years the schools purchased new equipment, expanded facilities and developed cooperative agreements with other schools for sharing facilities. In addition, special federal and state funds were awarded to schools that applied and met the guidelines. Some schools received equipment gifts from the private sector and had strong local support for expanding and updating their facilities. With all this growth, the Bureau of Vocational Education decided that a comprehensive inventory of the tools and equipment used in vocational education was needed for accurate planning and budget decisions in the future.

Items 5 through 10 were designed to collect information for Objective 2. The information base and validation for the responses were reported in Objective 1 analysis for Item 11. Although approximately 30 percent of the responses were reported as "best estimate," the figures for the most part were from the instructor. Therefore, almost all responses were qualified to some extent.

Table 7 shows that the current mean value of the tools and equipment used in vocational schools is $1.812 million. For the 101 vocational schools this should equal about $183 million. The community college campuses and comprehensive high schools show means of $1.177 million and $788,000, respectively. Table 7A in Appendix C gives additional information on how the 86 vocational directors reported the current mean dollar value by vocational field. It was found that the trade and industrial field at the area vocational-technical school accounts for over 50 percent of the current value. Further, the mean value of trade and industrial programs at the area vocational-technical school is almost 12 times greater than at the community college and three times greater than the comprehensive high school.

TABLE 7

SUMMARY OF MEAN PERCENTAGES AND RELATIONSHIP TO CURRENT VALUE

Tools and Equipment	AVTS		Comp. High School		Community College Campus		Combined	
	Mean	Percent of Current Value	Mean	Percent of Current Value	Mean	Percent of Current Value	Mean	Percent of Current Value
Current Value	2,046		788		1,177		1,812	
Over 10 Years Old	1,154	(56)	168	(21)	310	(26)	954	(53)
Obsolete	498	(24)	95	(12)	158	(13)	427	(24)
Replaced Each Year	66	(3)	47	(6)	56	(5)	63	(3)
Private Sector Contribution	25	(1)	12	(2)	13	(1)	22	(1)
Updating Cost	583	(28)	123	(16)	694	(59)	551	(30)
Advanced Technology* Already Purchased	358	(61)	66	(54)	480	(69)	346	(63)
New, Advanced Technology for 1983-84	213	(10)	39	(5)	347	(29)	212	(12)

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

*Based on Updating Cost located one line above.

Further, Table 7 shows the mean value of all tools and equipment over 10 years old is $954,000. A comparison of this finding to the total current value mean shows that 53 percent of the tools and equipment used in vocational education are over 10 years old. The community college and comprehensive high school have considerably fewer tools and equipment over 10 years old. Table 7B in Appendix C presents the status of tools and equipment over 10 years old by vocational field and school. For specific fields, there were ranges from 25 percent for agriculture to 65 percent for trade and industrial.

A mean dollar value of $427,000 was reported for obsolete tools and equipment. Again, comparing this finding to the total current value mean of $1.812 million shows that 24 percent of the tools and equipment used in vocational education are no longer current with technology used in industry and considered not functional for teaching the skills and knowledge required by industry. Table 7C (Appendix C) shows that agriculture has the highest amount of obsolete equipment (55%), followed by distributive education (45%). The health field has the lowest amount (22%), followed by trade and industrial (23%) and technical (25%). Overall, it was found, three percent of the tools and equipment were replaced each year. The community colleges reported 13 percent replacement each year, a figure that is considerably greater than the area vocational-technical school and comprehensive high school figures. Table 7D (Appendix C) shows home economics, at 30 percent replacement, far exceeds the other vocational fields.

Further, Table 7 shows a mean dollar value of $551,000 is needed for updating the tools and equipment. This amount is almost one-third of the total current value mean. Overall, this finding indicates that the 101 vocational schools need at least $56 million just to keep current with technology. Table 7E (Appendix C) presents the need for updating by field and school.

The addendum to the Vocational Education Tool and Equipment Inventory collected information on the last two entries on Table 7. It was found that 63 percent ($35 million) will be needed to keep advanced technology tools and equipment already purchased current with the state-of-the-art. An example would be replacing the controls of a 1975 computer-operated milling machine with a 1983 version of the system. The remaining 37 percent ($21 million) is needed for replacing worn-out and obsolete equipment; for example, replacing a 1970 tractor with a 1983 diesel tractor.

The amount needed for new advanced technology planned for the 1983-84 fiscal year shows a mean of $212,000. For all of the vocational schools this would amount to $21 million. As reported earlier, the replacement rate is three percent of the total current value, or about $6 million each year to keep tools and equipment current. The ratio for dollars spent ($6 million) to dollars needed ($77 million -- $54 million updating and $21 million planned for 1983-84) is about 1 to 13. Table 7EE (Appendix C) gives the amount needed for new, advanced technology by school.

A mean dollar value of $22,000 was reported for private sector support of vocational schools. The area vocational-technical school seems to have double the mean amount of private sector support that the comprehensive high schools and community colleges have. Table 7F (Appendix C) reports that agriculture programs at the area vocational-technical school enjoy a very high monetary support from the private sector. The five agriculture programs reported a mean dollar value of $346,000.

Objective 3: To determine the extent that specific technological advancements have been incorporated into secondary and postsecondary vocational education programs.

Our cover robot is asking, "Is vocational education training tuned in to the technology of today?" To get the answer, the inventory examined the extent of implementation of advanced technology in vocational programs. The technologies surveyed were the ones identified in a Governor's Office release concerning the Ben Franklin Partnership Consortium. Governor Thornburgh stated, "The Ben Franklin Partnership represents my belief that advance technology enterprise is our best hope for future growth in jobs and productivity. Advanced technology, which includes such fields as robotics, biotechnology, computers, telecommunications, and others are expected to generate one million jobs nationwide within the decade, and will require long range planning and consolidating and efforts of state agencies, private enterprises, academics and labor. In addition, advanced technology requires investing in human beings in training future generations, and in retraining today's workers for the jobs of tomorrow."

Item 12 on the Vocational Education Tool and Equipment Inventory was designed to collect information on the extent that advanced technology was used in the vocational programs. The data in Table 8 shows that the use in each technology varies from slight to extensive. It also shows that there is some activity in program development and new programs planned for the future. All three types of vocational schools seem to be involved at the planning or implementation level for each technology. For further analysis, the advanced technologies were placed into three levels of usage: The high group was the technologies that reported 40 percent and over on the "some" to "extensive use" categories. The moderate group ranged from 20 to 30 percent; and the low group was less than 20 percent.

Five technologies were in the high usage group. Word processing was the highest (55%), followed by electromechanical and microprocessors (49%). The four in the moderate usage group were specialized materials (31%), agriculture (24%), telecommunications (22%) and computer-assisted design (17%). Robotics, fiber optics and laser technology were in the low usage group.

In a further analysis, it was found that 31 advanced technology programs were under development and 44 were planned for fiscal year 1983-84. There seems to be planning and development for 12 of the 13 technologies listed in item 12. Specialized materials was the only exception. Most of the planning and development was with word processing, microprocessing and computer-assisted design. In the low usage technology area, robotics showed seven new planned and developed programs. Table 7 (page 14) gives the dollar value needed for the 44 new, advanced technology programs for 1983-84.

TABLE 8

EXTENT OF SPECIFIC TECHNOLOGIES IMPLEMENTED INTO VOCATIONAL PROGRAMS

	Energy-Saving Devices				Robotics				Microprocessors			
	AVTS N = 67 %	Comp. HS N = 12 %	Comm. College N = 15 %	School Totals N = 94 %	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %	AVTS N = 68 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 94 %
Not Using	16	50	13	20	79	82	53	75	30	25	7	25
Slight Use	25	-	33	23	8	9	20	10	15	-	13	13
Some Use	36	25	20	32	8	-	13	8	23	33	40	27
Extensive Use	13	17	20	15	-	-	-	-	18	25	40	22
New Program Developed	5	-	13	5	3	-	-	2	9	-	-	6
New Program Planned	5	8	-	4	3	9	13	5	6	17	-	6

	Word Processing				Laser Technology				Fiber Optics			
	AVTS N = 68 %	Comp. HS N = 12 %	Comm. College N = 15 %	School Totals N = 95 %	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %
Not Using	27	17	-	21	89	91	80	88	92	91	80	90
Slight Use	7	-	-	5	8	-	13	8	8	-	7	7
Some Use	27	17	40	27	-	-	7	1	-	-	7	1
Extensive Use	19	42	60	28	-	-	-	-	-	-	-	-
New Program Developed	6	25	-	7	3	-	-	2	-	-	-	-
New Program Planned	15	-	-	11	-	9	-	1	-	9	7	2

TABLE 8
(Continued)

EXTENT OF SPECIFIC TECHNOLOGIES IMPLEMENTED INTO VOCATIONAL PROGRAMS

	Computer-Assisted Design				Electromechanical				Specialized Materials			
	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %	AVTS N = 67 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 93 %
Not Using	49	36	33	45	26	36	13	25	45	27	47	43
Slight Use	21	46	33	26	24	9	27	23	31	9	7	25
Some Use	11	9	20	12	27	18	27	26	19	36	33	24
Extensive Use	6	-	7	5	18	36	33	23	5	27	13	9
New Program Developed	3	-	7	3	2	-	-	1	-	-	-	-
New Program Planned	11	9	-	9	3	-	-	2	-	-	-	-

	Telecommunications				Medical & Scientific Devices				Biotechnology			
	AVTS N = 68 %	Comp. HS N = 12 %	Comm. College N = 15 %	School Totals N = 95 %	AVTS N = 67 %	Comp. HS N = 10 %	Comm. College N = 15 %	School Totals N = 92 %	AVTS N = 66 %	Comp. HS N = 11 %	Comm. College N = 15 %	School Totals N = 92 %
Not Using	52	64	27	49	30	60	27	33	79	73	60	75
Slight Use	28	18	33	28	28	-	-	21	15	-	13	13
Some Use	19	9	33	20	22	20	33	24	3	-	13	4
Extensive Use	-	9	7	2	15	20	27	17	-	27	-	3
New Program Developed	-	-	-	-	2	-	7	2	2	-	13	3
New Program Planned	2	-	-	1	3	-	7	3	2	-	-	1

TABLE 8
(Continued)

EXTENT OF SPECIFIC TECHNOLOGIES IMPLEMENTED INTO VOCATIONAL PROGRAMS

	Agriculture Technology				Others			
	AVTS N = 50 %	Comp. HS N = 7 %	Comm. College N = 6 %	School Totals N = 63 %	AVTS N = 4 %	Comp. HS N = 6 %	Comm. College N = 2 %	School Totals N = 12 %
Not Using	56	71	83	60	-	-	-	-
Slight Use	18	-	-	14	1	1	-	2
Some Use	22	14	-	19	-	-	-	-
Extensive Use	4	14	-	5	-	-	-	-
New Program Developed	-	-	-	-	1	1	-	2
New Program Planned	-	-	17	2	2	4	2	8

IMPLICATIONS

The results of the inventory present a number of interesting implications for vocational education in Pennsylvania. They clearly point out in a number of ways that vocational education does not use a formal or systematic process to replace and update tools and equipment. Further, the data shows that most of the tools and equipment were purchased about 10 years ago, when many of the vocational schools were being built or remodeled. Over the years, it seems, there was little effort to keep the tools and equipment up to date, even though many vocational directors indicated they were operating with obsolete or worn-out equipment.

A look at the history of vocational education offers some answers to why this happened:

1. A number of VEMIS reports (PDE, 1982) and research studies (Herr, et al., 1981; Mertens, et al., 1981) show vocational graduates do better than their "academic" or "general" counterpart in finding jobs, earning higher salaries and being satisfied with their jobs and education. In addition, employer follow-up studies are usually very positive about vocational graduates' attitudes, job skills and value to the organization. With this type of feedback, it is easy to understand why many vocational directors felt safe about the adequacy of the tools and equipment. As the inventory shows, only about one-fourth of the equipment was considered obsolete or no longer current with technology used in industry and not functional to teach the skills or knowledge required by industry.

2. Another important influence on the vocational education budget is the federal, state and local mandates for the handicapped, equity, desegregation, quotas and so forth. Vocational education in Pennsylvania has been in the national forefront for training the disadvantaged learner and meeting mandated requirements. However, these activities are very costly and do not improve vocational education's capability for keeping equipment current with the state-of-the-art. Perhaps, if there were mandates to keep up with technology, the statistics would be quite different.

3. The ever-increasing overhead for vocational education is probably the main reason why there is such a slippage in keeping tools and equipment current with technology. A combination of increased staff salaries and energy and transportation costs has forced the use of local, state and federal funds for essential or mandated activities. The study shows that the dollar value of equipment which is replaced each year is only three percent of the current value. This means that annually only $6 million is spent to keep the tools and equipment up to date in over 100 vocational schools that serve almost one-half million in-school and adult learners.

Surely there are many other influences of equal importance on the vocational education budget. Since this is a status report, results will assuredly change. For example, the data shows that vocational education is spending one dollar for every 13 needed annually to keep current with the state-of-the-art. Given the present condition of tools and equipment, a lack of long-range planning, a low-funding priority and the rapid pace of technological advancement, the ratio of 1 to 13 will probably increase.

This leads to the reason why this study was conducted. The Governor's Office of Policy and Planning shows vocational education expanding to meet more of the specific training needs of business and industry. The question on this new role was "Can vocational education deliver cost-effective training needed by the industrial worker?"

The results of Objective 3 point out clearly that vocational education is capable of expanding into advanced technology. The data shows extensive implementation at both the secondary and postsecondary level in five key advanced technology areas. Even some of the lesser-known technologies like fiber optics show some planning and implementation.

In summary, it seems that vocational education in the past was able to train millions of students and incumbent workers for both entry- and advanced-level jobs. However, with rapid technological advancements, increased overhead and current economic conditions, there is some doubt about the continued effectiveness of vocational education.

This report can help serve as the basis for the revitalization of vocational education in Pennsylvania. Questions on planning, costs and advanced technology were based after the Governor's Office of Policy and Planning requested information on vocational education's capability to provide cost-effective, customized training services for business and industry.

RECOMMENDATIONS

1. Implement a systematic long-range plan for keeping tools and equipment current with the state-of-the-art.

   Already many vocational schools are in the second year of the Pennsylvania Department of Education's Long-Range Plan for School Improvement process, which requires extensive planning, needs assessments, labor market trend analysis, technological updating, staff development, etc. Within five years all secondary and postsecondary vocational schools will be actively involved with School Improvement. Base data in this report should help guide the direction of the Long-Range Plan for School Improvement. The results will show, hopefully, that vocational education is in a better position for meeting the needs of both the in-school student and the incumbent worker.

2. Implement exemplary cost-effective practices in utilizing tools and equipment for vocational training.

   Another initiative that was promoted by the Governor's Office and is a goal of the Bureau of Vocational Education is the cooperative delivery of customized training services to business and industry. This activity encourages joint communications, planning, curriculum development, delivery of services, sharing facilities, etc. The Pennsylvania Department of Education is planning workshops and providing seed money to help advance this effort in secondary and postsecondary vocational education. Hopefully, the results will show improvement in the delivery and cost of vocational education.

3. Request short-term federal and state funds for purchasing advanced technology tools and equipment needed for complementing the economic development plan for Pennsylvania.

   The Long-Range Plan for School Improvement and the joint delivery of training services should greatly improve the capacity of vocational education to provide cost-effective training, but they alone are not enough. Needed are more funds for vocational education from all sources. The analysis indicates that vocational education needs $77 million to replace worn-out equipment, to update advanced technology equipment already in place and to purchase new, advanced technology equipment for programs starting in fiscal year 1983-84. As noted in this report, only $6 million is spent annually on tools and equipment for vocational education.

   Some short-term funding must be made by both the federal and state governments to close this gap. Traditionally, governments seem to be the only source of remedies to problems of this nature. Further, the data in this report shows that vocational education depends on state and federal sources for about half of the support for tools and equipment. The proposed state budget for 1983-84 has a line item of $2 million for supporting the purchase of advanced technology tools and equipment and another $4 million over the next two fiscal years. In the long term, however, the local education agency and the private sector must continue to supply support to keep vocational education up to date and in a position to plan for growth in new, advanced technology.

4. Promote more long-term local education agency and private sector support for keeping vocational education tools and equipment current with the state-of-the-art.

   The local match required for the new state funds should help to improve the local education agency commitment for supporting the purchase of advanced technology tools and equipment for vocational education. At present, about half of the $6 million spent last year for updating tools and equipment came from the local education agencies. The local education agency support represents only about $30,000 per vocational school. Further, the implementation of the customized job training program and the Job Training Partnership Act should spur business and industry to recognize vocational schools with state-of-the-art tools and equipment as a valuable asset for their recovery efforts.

REFERENCES

1. AVTS Follow-Up Results Secondary Completers Classes of 1979-80-81. Vocational Education Management Information Report, Pennsylvania Department of Education, Harrisburg, PA, 1982.

2. Ben Franklin Partnership. Governor's Office of Policy and Planning, Commonwealth of Pennsylvania, Harrisburg, PA, August 1982.

3. Data-Based Locally Directed Evaluation of Vocational Education Programs, Component 4. Facilities and Equipment Evaluation. Florida State University, Tallahassee, FL, July 1977.

4. Herr, Edwin C., et al. Research on the Effects of Secondary School Curricular and Personal Characteristics Upon Post-Secondary Educational and Occupational Patterns. The Pennsylvania State University, University Park, PA, 1981.

5. Mertens, Donna M. and Gardner, John A. Vocational Education and the Younger Adult Worker. National Center for Research in Vocational Education, The Ohio State University, Columbus, OH, 1981.

6. Nelson, Orville. "Testimony to Congressman Perkins' Committee on Equipment Needs in Vocational Education." University of Wisconsin - Stout, Menomonie, WI, March 1982.

7. Outland, Vincent C. "Equipment Evaluation." Unpublished report, Department of Community Colleges, North Carolina State Board of Education, Raleigh, NC, 1980.

8. Pennsylvania Code, Title 22 Education, Chapter 6 (Proposed), Vocational Education. Pennsylvania Department of Education, Harrisburg, PA, November 1982.

APPENDIX A

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF EDUCATION
333 MARKET STREET
P.O. BOX 911
HARRISBURG, PA 17108

July 6, 1982

Dear Colleague:

I am aware of a growing problem you face keeping equipment current with the technology of business and industry. Most of the area vocational schools and community colleges in the Commonwealth were built and equipped many years ago. We believe it's an appropriate time to reflect on and identify the equipment needs of your institution that are necessary to continue providing quality vocational programs in Pennsylvania.

The attached form was developed to quantify by program area the means to and results of your equipment update efforts. Using 1981-82 as the base year, please complete the form as accurately as possible to allow us to aggregate the information for the state. I realize some "best estimates" will be necessary.

Please return the form as soon as possible to:

James P. Lewis
Research Coordinating Unit
Pennsylvania Department of Education
333 Market Street, 6th Floor
P.O. Box 911
Harrisburg, PA 17108

If you have any questions, you may call Jim at (717) 787-5293.

Sincerely,

Jerry C. Olson
State Director of Vocational Education

JCO/JPL/mh1861

Attachment

VOCATIONAL EDUCATION TOOLS AND EQUIPMENT INVENTORY

Institution _____ Vocational Director _____ Date _____

Card 1

1. What type of system or process is used to replace and update vocational education tools and equipment* in your AVTS/community college?

14

___ (1) Equipment is depreciated on an established schedule and funds are included in the regular budget for these costs.

___ (2) As new equipment or major renovations are needed, a proposal is made to our governing board.

___ (3) A separate budget is available for equipment.

___ (4) Replacement/updating occurs when funds are available (e.g., left over from other budget items and reallocated at the end of the year).

___ (5) Other _____

2. How does your institution fund the cost of replacing and updating tools and equipment in vocational education labs?

15

___ (1) Included in the regular operating budget.

___ (2) Funded through an ongoing special fund for equipment.

___ (3) Equipment loan from the defense department, through the National Equipment Industrial Reserve (NEIR) program.

___ (4) State funds are being used for equipment.

___ (5) Federal funds are being used for equipment (VOED, CETA, etc.).

___ (6) Private sector employers' financial and other contributions (e.g., equipment loans).

___ (7) Other (specify)_____

3. What percentage (based on cost) of your vocational education tools and equipment <u>needs</u> is presently being met? (From all sources of available funds)

16

___ (1) 0 - 10%
___ (2) 11 - 30%
___ (3) 31 - 50%
___ (4) 51 - 70%
___ (5) 71 - 90%
___ (6) 91 - 100%

4. What percentage of tools and equipment <u>costs</u> is paid by:

17-24

___ (1) Local school districts?
___ (2) State funds?
___ (3) Federal Vocational Education Act?
___ (4) Private sector?

*<u>Tools and equipment</u> - both fixed and movable, required to conduct vocational education programs.

Use your experience and the budget data available to you to answer the following questions. Use your best judgment in responding. If you do not have sufficient data available to answer a question, mark an X in the appropriate space. Round dollar amounts to nearest thousands (Ex. $165,523 to $166).

		Vocational Field							
		Agriculture	Business	Distributive Education	Health	Home Economics	Trade and Industrial	Technical	Totals
5. Card 2 14-46	What is the estimated total current value of the tools and equipment in each field? (The present value as carried on current inventory or replacement schedule.)	$	$	$	$	$	$	$	$
6. Card 3 14-60	Dollar value and percentage of tools and equipment which are over 10 years old? (Based on total value for Item 5.)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$
7. Card 4 14-60	Dollar value and percentage of your equipment which are obsolete? (No longer current with technology used in industry; not functional in order to teach the skill/knowledge required by industry.)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$
8. Card 5 14-60	Dollar value and percentage of your equipment which are replaced each year?	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$
9. Card 6 14-46	What would it cost to bring your equipment up-to-date with current technology in each field?	$	$	$	$	$	$	$	$
10. Card 7 14-60	Dollar value and percentage of private sector contributions and shared costs in meeting your new technology needs?	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$ (%)	$

NOTE: Any additional information you can provide to assist us in assessing equipment needs would be appreciated. (Shop-by-shop analysis if available.)

Card 8

14

11. What is the information base for the responses to items 5-10? (Check the most appropriate response.)

___ (1) Regular depreciation and replacement schedule that is updated each year.
___ (2) Replacement schedule that is updated each year.
___ (3) Replacement schedule that is updated at least once every three years.
___ (4) Annual budget request based on requests from each area.
___ (5) General best estimate of what is needed.
___ (6) Other _____

12. To what extent has the following technology been incorporated in your vocational programs? Use the following responses. Circle answer.

15-28

1 = None - Not used
2 = Slight use in ongoing/existing programs
3 = Some use in existing programs
4 = Extensive use in existing programs (up-to-date with business/industry use)
5 = New program developed in this area
6 = New program being planned or considered in this area

	Technology	In Existing Programs: Not Using (1)	Slight Use (2)	Some Use (3)	Extensive Use (4)	New Program Developed (5)	New Program Planned (6)
(1)	Energy Saving Devices and/or Alternative Forms of Energy	1	2	3	4	5	6
(2)	Robotics	1	2	3	4	5	6
(3)	Microprocessors	1	2	3	4	5	6
(4)	Word Processing (Computer Applications/Software, etc.)	1	2	3	4	5	6
(5)	Laser Technology	1	2	3	4	5	6
(6)	Fiber Optics	1	2	3	4	5	6
(7)	Computer-Assisted Design and/or Computer-Assisted Mfg.	1	2	3	4	5	6
(8)	Electro/mechanical	1	2	3	4	5	6
(9)	Biotechnology	1	2	3	4	5	6
(10)	Specialized Materials (steel, fibers, etc.)	1	2	3	4	5	6
(11)	Telecommunications	1	2	3	4	5	6
(12)	Medical & Scientific Devices	1	2	3	4	5	6
(13)	Other _____	1	2	3	4	5	6
(14)	Other _____	1	2	3	4	5	6

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF EDUCATION
333 MARKET STREET
P. O. BOX 911
HARRISBURG, PA 17108

September 13, 1982

Dear Vocational Director:

I am writing in regard to the Tool and Equipment Inventory that was sent to you in July. According to the Bureau of Vocational Education records, your inventory was not returned. I would appreciate an effort by you to complete the entire inventory and mail it to my attention as soon as possible.

The reason why we are so concerned about reaching 100 percent return is the fact that the Governor's Office for Economic Development requested that a tool and equipment inventory be conducted. Further, I am sure they will want to review the actual returns. It is important for vocational education to provide the Governor's Office with accurate information.

In case you have misplaced the inventory and cover letter, I have enclosed another copy. If you have any questions, please call me at (717) 787-8804.

Sincerely,

James P. Lewis
Research Associate
Bureau of Vocational Education

JPL/wg

Enclosure

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF EDUCATION
333 MARKET STREET
P. O. BOX 911
HARRISBURG, PA 17108

File No. VE74-82

November 22, 1982

Dear Vocational Director:

This is in regard to the Vocational Education Tools and Equipment Inventory that you recently submitted to me.

After you received the initial inventory, additional information was provided to us through the Governor's Office of Policy and Planning that requires some additional information on advanced technology. The focus of the request was Item 9 of the inventory. It seems that we must differentiate between dollar amounts needed for advanced technology and regular updating needs. In order to collect this information, I have enclosed a copy of your original inventory, a form to help you determine the specific dollar amounts for Item 9 and the status of advanced agriculture technology.

Please return the form in the enclosed postage-paid envelope by December 10, 1982. If you have any questions, call me at (717) 787-6675.

Sincerely,

James P. Lewis

James P. Lewis
Research Associate
Research Coordinating Unit
Bureau of Vocational Education

JPL/dlr

Enclosures

ADDENDUM - VOCATIONAL EDUCATION TOOLS AND EQUIPMENT INVENTORY

Institution _____

Vocational Director _____ Date _____

A. Record the dollar amount for Item 9 in the initial inventory to bring your equipment up to date with current technology. $ _____

B. What dollar amount recorded in Question A above did you estimate was needed for advanced technology* programs already incorporated in your program (if any)? $ _____

C. Record the amount needed to support new advanced technology* programs planned to begin in fiscal 1983-84. $ _____

D. To what extent has advanced agriculture technology been incorporated in your vocational programs? Use the following responses--circle number.

1 = None - Not used
2 = Slight use in ongoing/existing programs
3 = Some use in existing programs
4 = Extensive use in existing programs (up to date with business/industry use)
5 = New program developed in this area
6 = New program planned or considered in this area

*Please refer to the list of advanced technology on page 3 of the inventory and include agriculture technology in that list.

APPENDIX B

PARTICIPATING VOCATIONAL SCHOOLS

Admiral Peary AVTS
Altoona AVTS
Beaver County AVTS
Berks County AVTS
Bethlehem AVTS
Bradford County AVTS
Bucks County AVTS
Butler County AVTS
Carbon County AVTS
Central Chester County AVTS
Central Montgomery County AVTS
Central Westmoreland County AVTS
Centre County AVTS
Clarion County AVTS
Clearfield County AVTS
Columbia-Montour AVTS
Crawford County AVTS
Cumberland-Perry AVTS
Dauphin County AVTS
Delaware County AVTS
Eastern Montgomery County AVTS
Eastern Northampton County AVTS
Eastern Westmoreland County AVTS
Erie City AVTS
Erie County AVTS
Fayette County AVTS
Forbes Road East AVTS
Franklin County AVTS
Pottsville Senior High School
Greater Johnstown AVTS
Greene County AVTS
Harrisburg-Steelton-Highspire AVTS
Hazleton AVTS
Huntingdon County AVTS
Indiana County AVTS
Jefferson County-DuBois AVTS
Juniata-Mifflin County AVTS
Keystone Central AVTS
Lackawanna County AVTS
Lancaster County AVTS
Lawrence County AVTS
Lebanon County AVTS
Lehigh County AVTS
Lenape AVTS
McKeesport AVTS
Mercer County AVTS
Middle Bucks County AVTS
Monroe County AVTS
Mon Valley AVTS
North Fayette County AVTS
North Montco AVTS
Northern Chester County AVTS
Northern Westmoreland AVTS
Northumberland County AVTS
Parkway West AVTS
Philadelphia AVTS
Pittsburgh AVTS
Reading-Muhlenberg AVTS
Schuylkill County AVTS
Seneca Highlands AVTS
Somerset County AVTS
Steel Center AVTS
SUN AVTS
Upper Bucks County AVTS
Venango County AVTS
Warren County AVTS
West Side AVTS
Western Area AVTS
Western Montgomery County AVTS
Wilkes-Barre AVTS
Williamsport AVTS
York County AVTS
Bradford Area Senior High School
Carlisle Area School District
Chester-Upland School District
Delaware Valley School District
George Junior Republic School
Greater Johnstown School District
Milton Area Senior High School
Penn Hills School District
Pottstown Senior High School
Ridley Senior High School
Tyrone Area High School
Woodland Hills School District
Bucks County Community College
Butler County Community College
Community College of Allegheny County (Allegheny)
Community College of Allegheny County (Boyce)
Community College of Allegheny County (North)
Community College of Allegheny County (South)
Community College of Beaver County
Community College of Philadelphia
Delaware County Community College
Lehigh County Community College
Luzerne County Community College
Montgomery County Community College
Northampton County Area Community College
Reading Area Community College
Westmoreland County Community College
Williamsport Area Community College

TABLE 7A

CURRENT DOLLAR VALUE OF TOOLS AND EQUIPMENT
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	89	4 – 1,318	3,545	40	46	15 – 100	182	4	2	2 – 2	2	1	83	2 – 1,318	3,729	45
Business	170	15 – 2,015	5,428	32	211	30 – 1,000	1,895	9	376	125 – 697	3,384	9	214	15 – 2,015	10,707	50
Distributive Education	33	2 – 388	1,566	47	19	1 – 50	112	6	10	10 – 10	10	1	31	1 – 388	1,688	54
Health	43	4 – 233	2,593	61	21	10 – 33	63	3	163	40 – 400	1,303	8	55	4 – 400	3,959	72
Home Economics	126	8 – 1,163	5,816	46	154	6 – 1,000	1,384	9	111	111 – 111	111	1	131	6 – 1,163	7,311	56
Trade and Industrial	1,221	25 – 4,000	80,622	66	387	127 – 1,500	3,479	9	144	40 – 325	718	5	1,060	25 – 4,000	84,819	80
Technical	260	5 – 1,130	14,824	57	193	25 – 400	771	4	634	191 – 2,000	5,073	8	300	5 – 2,000	20,668	69
TOTAL	2,046	310 – 18,814	139,134	68	789	250 – 3,570	7,886	10	1,177	615 – 2,910	10,596	9	1,812	250 – 18,814	157,616	87

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7B

DOLLAR VALUE OF TOOLS AND EQUIPMENT OVER 10 YEARS OLD
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	49	1 – 791	1,659	34	8	5 – 10	15	2	25	25 – 25	25	1	46	1 – 791	1,699	37
Business	103	3 – 1,209	2,479	24	25	2 – 100	148	6	117	10 – 381	701	6	93	2 – 1,209	3,328	36
Distributive Education	20	1 – 233	664	34	4	1 – 5	11	3	10	10 – 10	10	1	18	1 – 233	685	38
Health	30	1 – 140	1,277	42	9	1 – 25	28	3	77	4 – 300	612	8	36	1 – 300	1,917	53
Home Economics	76	3 – 698	2,650	35	25	2 – 100	173	7	46	35 – 56	91	2	66	2 – 698	2,914	44
Trade and Industrial	789	15 – 3,920	47,328	60	147	60 – 275	1,027	7	73	39 – 134	218	3	694	15 – 3,920	48,573	70
Technical	164	2 – 918	8,534	52	38	1 – 100	115	3	81	19 – 175	485	6	150	1 – 918	9,134	61
TOTAL	1,155	23 – 8,770	70,428	61	168	3 – 430	1,515	9	310	70 – 848	2,482	8	954	3 – 8,770	74,425	78

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7C

DOLLAR VALUE OF TOOLS AND EQUIPMENT WHICH ARE OBSOLETE
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	54	1 – 921	1,029	19	6	2 – 10	17	3	1	1 – 1	1	1	46	1 – 921	1,047	23
Business	95	2 – 1,411	2,175	23	13	1 – 60	94	7	60	25 – 95	240	4	74	1 – 1,411	2,509	34
Distributive Education	16	1 – 272	404	26	6	1 – 20	24	4	5	5 – 5	5	1	14	1 – 272	433	31
Health	12	1 – 163	376	31	7	1 – 25	28	4	13	2 – 29	67	5	12	1 – 163	471	40
Home Economics	45	1 – 814	1,174	26	18	1 – 60	107	6	-	- – -	-	-	40	1 – 814	1,281	32
Trade and Industrial	277	3 – 2,000	14,142	51	71	2 – 200	498	7	36	6 – 58	109	3	242	2 – 2,000	14,749	61
Technical	78	1 – 400	3,920	50	19	3 – 35	38	2	75	8 – 186	377	5	76	1 – 400	4,335	57
TOTAL	498	1 – 5,432	28,368	57	95	4 – 260	759	8	158	10 – 293	791	5	427	1 – 5,432	29,918	70

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7D

DOLLAR VALUE OF EQUIPMENT REPLACED EACH YEAR
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	3	1 – 30	78	23	6	2 – 10	12	2	7	1 – 13	14	2	4	1 – 30	104	27
Business	18	1 – 129	310	17	16	2 – 55	124	8	26	10 – 50	102	4	18	1 – 129	536	29
Distributive Education	3	1 – 26	53	20	2	1 – 5	8	4	-	- – -	-	-	3	1 – 26	61	24
Health	3	1 – 16	79	27	1	1 – 2	5	4	11	2 – 25	34	3	3	1 – 25	118	34
Home Economics	46	1 – 1,117	1,330	29	13	1 – 68	102	8	40	40 – 40	40	1	39	1 – 1,117	1,472	38
Trade and Industrial	35	1 – 175	1,606	46	25	3 – 55	175	7	3	2 – 3	5	2	32	1 – 175	1,786	55
Technical	14	1 – 100	521	36	4	3 – 55	8	2	19	1 – 44	96	5	15	1 – 100	625	43
TOTAL	66	1 – 500	3,704	56	47	4 – 185	469	10	56	1 – 110	279	5	63	1 – 500	4,452	71

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7E

COST TO BRING EQUIPMENT UP-TO-DATE WITH CURRENT TECHNOLOGY
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	49	1 – 921	1,477	30	13	5 – 25	39	3	5	5 – 5	5	1	45	1 – 921	1,521	34
Business	103	2 – 1,411	3,185	31	47	1 – 100	375	8	196	1 – 800	2,158	11	114	1 – 1,411	5,718	50
Distributive Education	16	1 – 272	590	38	7	1 – 20	36	5	10	10 – 10	10	1	14	1 – 272	636	44
Health	16	1 – 163	702	44	5	2 – 8	16	3	102	10 – 300	715	7	27	1 – 300	1,433	54
Home Economics	38	1 – 814	1,377	36	12	2 – 30	85	7	53	28 – 100	213	4	36	1 – 814	1,675	47
Trade and Industrial	396	6 – 1,628	24,140	61	220	25 – 1,000	1,763	8	62	18 – 150	308	5	354	6 – 1,628	26,211	74
Technical	118	5 – 500	6,033	51	48	20 – 75	145	3	228	42 – 500	2,054	9	131	5 – 500	8,252	63
TOTAL	638	3 – 5,432	41,449	65	253	30 – 1,188	2,529	10	538	65 – 1,650	5,382	10	581	3 – 5,432	49,360	85

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7EE

SUMMARY OF COSTS FOR UPDATING OF EXISTING AND PLANNED ADVANCED TECHNOLOGY BY SCHOOL

		AVTS				Comp. High School				Community College				Combined			
		Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
A.	Cost to bring equipment up-to-date with current technology.	583	2 – 4,000	30,889	53	124	30 – 260	741	6	694	80 – 1,000	4,161	6	551	2 – 4,000	35,791	65
B.	Dollar amount based on A needed for advanced technology programs already incorporated.	358	10 – 2,140	13,262	37	66	6 – 139	265	4	480	250 – 731	2,401	5	346	6 – 2,140	15,928	46
C.	Dollar amount needed for new advanced technology programs planned for fiscal year 1983-84.	213	5 – 1,860	8,325	39	39	20 – 70	194	5	346	80 – 797	2,077	6	212	5 – 1,860	10,596	50

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).

TABLE 7F

DOLLAR VALUE OF PRIVATE SECTOR CONTRIBUTION
BY VOCATIONAL FIELD AND SCHOOL

Vocational Field	AVTS				Comp. High School				Community College				Combined			
	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N	Mean	Range	Sum	N
Agriculture	346	1 – 1,710	1,729	5	1	1 – 1	2	2	-	- – -	-	-	247	1 – 1,710	1,731	7
Business	5	1 – 16	28	6	2	1 – 2	3	2	-	- – -	-	-	4	1 – 16	31	8
Distributive Education	3	1 – 8	17	5	1	1 – 1	1	1	-	- – -	-	-	3	1 – 8	18	6
Health	2	1 – 8	15	7	1	1 – 1	1	1	-	- – -	-	-	2	1 – 8	16	8
Home Economics	1	1 – 4	7	4	2	1 – 3	5	3	-	- – -	-	-	2	1 – 4	12	7
Trade and Industrial	21	4 – 80	394	19	7	3 – 13	21	3	3	3 – 3	3	1	18	3 – 80	418	23
Technical	5	1 – 16	61	13	3	3 – 3	3	1	15	5 – 25	30	2	6	1 – 25	94	16
TOTAL	25	1 – 144	572	23	12	6 – 17	46	4	13	5 – 25	38	3	22	1 – 144	656	30

NOTE: Dollar amounts are rounded off to nearest thousands (Ex. $165,523 to 166).