DOCUMENT RESUME

ED 429 430 EF 005 325

TITLE	Modular Technology Education Planning Guide: 15 Key Steps To Creating a Successful Technology Education Program at Your School.
INSTITUTION	Hearlihy & Co., Springfield, OH.
PUB DATE	1994-00-00
NOTE	23p.
AVAILABLE FROM	Hearlihy and Company, 714 West Columbia St., Springfield, OH 45501; Tel: 800-622-1000 (Toll Free).
PUB TYPE	Guides - Non-Classroom (055)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Educational Facilities Design; *Educational Technology; Elementary Secondary Education; *Experiential Learning; *Instructional Innovation; *Learning Laboratories; *Multimedia Instruction; Program Development; Public Schools
IDENTIFIERS	*Modularization

ABSTRACT

Modular Technology Education (MTE) uses a combination of multi-media and hands-on activities to teach important concepts that increase the student's interest level as well as provide students with career choices that best fit their individual interests. This booklet provides 15 key planning steps for developing an MTE program and avoiding development pitfalls. Steps include researching the market and evaluating current resources, evaluating module suppliers, planning the curriculum, budgeting and financial planning, and allocating space and developing a MTE lab. (GR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Modular Technology Education Planning Guide

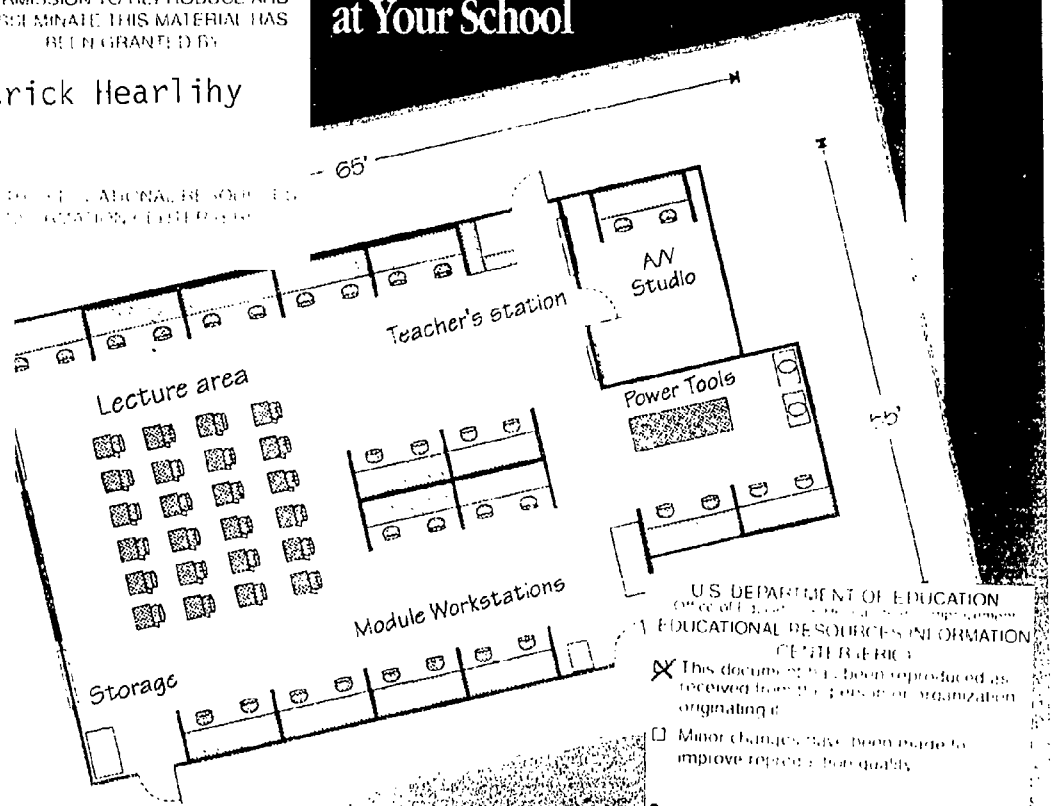
15 Key Steps to Creating a Successful Technology Education Program at Your School

ED 429 450

EF 005 325

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Patrick Hearlihy



U.S. DEPARTMENT OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Hearlihy & Company
714 West Columbia Street • Springfield, Ohio 45501
1-800-622-1000

BEST COPY AVAILABLE

Contents

Introduction 5
Getting Started 6
Planning Your New Program 7
Researching the Market 8
Evaluating Your Current Resources 9
Planning Your Curriculum 10
Evaluating Module Suppliers 11
Module (Curriculum) Characteristics 12
Setting a Realistic Budget 13
Funding Sources 14
How Long Will It Take? 15
Making Room for the Lab 16
Key Lab Considerations 17-18
Lab Equipment Needs 19
Lab Equipment Options 20
The Basic Lab Layout 21-22

©1994. Hearlihy & Company. Springfield, Ohio.

Introduction

Teachers and educators all over the United States & Canada are learning the many benefits of Modular Technology Education. Modular Tech Ed uses a combination of multi-media and hands-on activities to teach important concepts in ways that increase the student's interest level. And, as never before, Tech Ed learning helps guide students toward career choices that best fit their individual interests.

Students derive several important benefits from Modular Tech Ed learning, all critical to the acquisition of a well-rounded education. As a result of experience with quality Tech Ed programs, students:

- Develop self-discipline and initiative in handling projects without the direct leadership of a teacher
- Enjoy increased feelings of confidence and self-esteem through successful completion of hands-on activities
- Learn the productive value of working as a team member to accomplish important goals
- Gain exposure to concepts, theories and formulas that help them identify personal interests and match them with careers in the working world
- Reinforce important educational basics such as math, science, following directions and problem-solving
- Acquire technology literacy to prepare them for a world that will be very different from our world today

And, while Tech Ed learning uses technology as a teaching tool, teaching Tech Ed using the modular approach doesn't require that teachers be experts in technology. On the contrary, the best Tech Ed programs are developed so that teachers with little or no technical background can implement them successfully.

As a pioneer in developing Modular Technology Education programs for middle school, junior and senior high school students, Hearlihy & Company works closely with hundreds of teachers in implementing successful Tech Ed programs. If you're considering the establishment of a Modular Technology Education lab at your school, these pages highlight key points to consider — and pitfalls to avoid — in planning and building your program.

So if you're ready...let's get started!

1 Getting Started

First, look around your school or district for people, like you, who are interested in developing a Modular Tech Ed program. Form an Action Committee to create a talented brain trust...and help increase the potential impact of your campaign on administration or school board authorities. You'll also need the additional hands to perform research and development work that needs to be done.

While most of your committee members may be fellow teachers and administrators, don't forget to include interested parents and influential members of the local business community. Participants from outside the school can be very influential in helping your group move toward its objective.

It's important that your Action Committee meet regularly. This helps keep your project moving, and shows to everyone involved you're really committed to developing a successful program.

The key goals of your Action Committee: (1) To develop a detailed, written plan outlining the benefits, scope and estimated investment involved in implementing your program, (2) To assist in locating and/or raising funds, and (3) To gain administration or board approval for establishment of a Modular Technology Education lab at your school.

2 Planning Your New Program

Your Modular Tech Ed Plan will ultimately deal with dozens of important questions, the answers to which will lead your school to implementation of a program that works smoothly and cost effectively.

A few questions, however, stand out as pivotal...questions that must be dealt with if your program has any chance of becoming reality. These are:

- How many students in each class?
- How many classes per day?
- What space do we have for our Tech Ed Lab?
- How much can we invest in Tech Ed modules, equipment and furniture?
- How much can we invest to maintain and develop our Modular Tech Ed program?
- Does our school district/state have requirements concerning establishment of Modular Tech Ed programs? If so, what are they?

2 Researching the Market

Here are some important initial steps for you and your Action Committee members:

- Collect literature from companies who offer Modular Technology programs and accessories. Study the materials to learn what products are available and general price ranges.
- Contact schools who already have Modular Tech Ed programs. Talk with the teachers and administrators responsible for developing their programs. Take a tour of their labs if possible. You can learn a great deal from hearing what others have done right — and wrong — in building a Tech Ed lab. And, because they're proud of their new labs, teachers are almost always eager to talk with others about their programs.
- Arrange visits to schools to see Tech Ed labs in action. Hearlihy & Company offers several Model Sites across the U.S. If you're interested in learning about the experiences of these middle, junior and high schools in starting and running their Tech Labs, you and/or your Action Committee are welcome to call or visit these sites. (For Model Lab Site information, call Hearlihy & Company at 1-800-622-1000, Extension 88.)

Evaluating Your Current Resources

Now, you're ready to take a close look at the curriculum and equipment already in place at your school. To keep development costs down, make the most of materials and equipment your school already owns. And choose flexible curriculum you can customize to maximize use of your current equipment and supplies.

Also, carefully consider the role of your traditional Industrial Arts classes. Some of the best technology programs offer traditional subject matter such as drafting, woodworking, metal working, construction, manufacturing, etc. in addition to a Modular Lab.

Planning Your Curriculum

Here's where you may want to involve as many of your fellow teachers as you can. For example, many modules involve applied math and science concepts. It makes sense to involve teachers in these areas with the planning of your Modular Technology Education curriculum. Experience has proven to us that widespread involvement of school and community personnel in your program increases its strength, impact and reputation.

Be sure to consult the Tech Ed Curriculum Coordinator in your district or state. There may be requirements you'll need to follow in setting up your curriculum. Even if no firm standards exist in your district or state, Curriculum Coordinators can often provide you with valuable tips and suggestions regarding the modules you choose.

Here's an example of a comprehensive 2-semester, 36-week program in which students complete eight modules per semester.

Semester	Category	Module
I	Communications	Computer Aided Drafting (CAD)
		Electronic Publishing
		Audio/Video
		Electronic Control Systems
	Power & Energy	Pneumatic Systems
		Solar Energy
		Alternate Energy
		Hydraulic Systems
II	Manufacturing & Construction	Engineering (Bridge Building)
		Structures
		Robotics
		Computer Numerical Control (CNC)
	General Technology	Bio-Related Technology
		Research & Development
		Problem Solving
		Design Technology

BEST COPY AVAILABLE

Evaluating Module Suppliers

As a result of your earlier research, you've seen that product offerings of some companies better fit your needs (and budget) than others. This is where you begin to zero in on the Modular Technology Education company that can best supply the needs of your students and your school.

Analyze each potential supplier by answering the following questions:

- Does the company have a record of success in helping schools establish successful Tech Ed programs?
- Does the company offer modular programs that coincide with what you want to teach your students...and what your students want to learn?
- Are their modules reasonably priced?
- Can you purchase modules and equipment as you need (or can afford) them...or does the company impose restrictions such as minimum purchase requirements?
- Does the company make it easy — and affordable — to replenish consumable module supplies?
- Will modules run on computer equipment you already own? (For example, Hearlihy & Company offers most modules in Apple, Macintosh and IBM compatible versions. Others offer only IBM.)
- Are module Lesson Plans flexible so you can change them to meet specific time requirements (7- or 10-day duration)...and customize Lesson Plan content to suit your individual teaching preferences?
- Are module set-up instructions complete and easy to follow...or are you required to purchase high priced training or pay installation fees?
- Is the Teacher's Management System designed to be smoothly implemented by teachers without prior "technical" training or experience?
- Is competent technical assistance offered free of charge?
- Are purchases offered on a "Satisfaction Guaranteed" basis?

Once you've determined the vendor best qualified to meet your Modular Technology Education needs, ask them to help you put the finishing touches on your plan. You might be surprised how helpful they can be.

7 Module (Curriculum) Characteristics

To a large extent, the success of your Modular Technology Education program depends on the quality of the modules you use. Look for these features:

Concept-based Modules. This term simply means the module was created to fill Technology curriculum needs. Some suppliers create modules because they manufacture the hardware used in them...whether or not teachers feel a need exists for the activities performed. (All Hearlihy & Company modules are concept-based.)

Interdisciplinary Integration. Effective modules clearly identify the interdisciplinary skills students must employ to complete them. Among the most important are math, science and problem-solving skills. Some module suppliers carefully build into their programs a variety of key interdisciplinary skills. Others apparently give the issue little thought.

Varying Degree of Challenge. Select modules designed to provide multiple levels of challenge for students of varying abilities. This way, average students complete their modules successfully...while you maintain the interest of faster, brighter students with supplemental activities that match their skill level.

Flexibility. As you become active in Modular Technology Education, your ideas and approaches to subjects may change. You may need to shorten the duration of modules to fit your class schedule...extend them to accommodate students that work faster than others...or update them with new equipment as required.

You may even want to *customize* the lesson plans to emphasize the points you believe important...or even add material that amplifies certain aspects of the program. Choose modules that allow you the freedom to change and adapt in all of these areas. The price for not doing so is a significant degree of future frustration.

Proven Management System. A good Modular Technology Education management system is an important component in helping you run your program successfully. It's the system that simplifies and organizes: (1) Student organization, scheduling and record-keeping, (2) Testing and grading procedures, (3) Equipment scheduling...and much more.

Multiple Level Offering. Choose a Modular program that has more than one level of difficulty that can be utilized to challenge more talented students or those older or more experienced.

Setting a Realistic Budget

Accurate budgeting is extremely important to the success of your plan. Without serious attention to cost-gathering and number-crunching, the credibility of your plan will be in jeopardy when it comes under review with Administration or Board of Education officials.

Organize your budget plan into two basic categories:

Conversion Budget	Investment Items
Curriculum	Modules, accessories, etc.
Equipment	Computers, VCRs, furniture, etc.
Facility	Room conversion for lab use
Operating Budget	
Consumables	Supplies for hands-on activities, projects, etc.
Equipment Repair	Maintenance/repair of equipment, hardware, etc.
Curriculum/Equipment Expansion	Additional modules, accessories, equipment

BEST COPY AVAILABLE

Funding Sources

Funding Modular Technology projects is never a cinch, but having a solid, realistic plan on paper raises your chances of success considerably. If your Action Committee is raising the funds, a working budget tells you how much you need. If you're asking others to fund your program, the work you've put into developing a financial plan gives them confidence that you know what you're doing...and believe in your cause. This, of course, makes it much more likely they'll entrust you with the funding your project needs.

Most schools building Modular Technology labs call on a combination of the following funding sources:

Funding Sources	
Direct funding	**From the local school district or state budget. Meet with District Administrator for availability.**
Grants	**From State or Federal programs. Check with District or State Curriculum Coordinators for availability.**
Donations	**Local community and business donations; large employers in your area have funding available for community improvement.**
Fund-raising events	**Car washes, bake sales and other creative fund-raising methods. Be sure to get prior approval from your school administration.**

BEST COPY AVAILABLE

10 How Long Will It Take?

Complex projects almost always take more time to implement than a quick glance suggests. Make sure your plan is reasonable by creating a comprehensive schedule for project implementation.

Such a schedule helps organize the efforts of your Action Committee. It also helps spotlight missed deadlines so you can deal with them before they become serious problems.

Here's an example of a simple time-line that includes key project bench marks. (Your time-line requirements may be less or greater, depending upon your situation. For example, many schools develop their program a module or two at a time based on budget considerations.)

Task	Start	Finish
Gather curriculum information	Week 1	Week 5
Visit existing labs for ideas, tips, pitfalls etc.	Week 5	Week 9
Develop budgets	Week 9	Week 15
Investigate available funding sources	Week 14	Week 17
Complete project plan	Week 6	Week 17
Obtain Administration/School Board Approval	—	Week 20
Raise funds	Week 17	Week 25
Prepare facilities	Week 25	Week 33
Set up modules, equipment, etc.	Week 33	Week 36
Begin classes	Week 36	

BEST COPY AVAILABLE

11 Making Room for the Lab

Many schools establish their new Modular Technology lab in space formerly occupied by the Industrial Arts shop. Others choose a classroom for initial implementation.

One myth that's fairly common is that Modular Technology labs must be lush with carpet, fancy lighting and expensive new workstations. Nothing could be farther from the truth. Luxurious fittings are great if your budget has room for them...but certainly aren't necessary to establish a successful Tech Ed program.

Here are the three most common approaches schools take to creating new Modular Technology labs:

Rearrangement. If your budget is tight, you may choose to limit changes to rearrangement of furniture and equipment within a classroom. Use tables for workstations, adding inexpensive dividers to eliminate unnecessary distractions. While simple and utilitarian, many effective Modular Technology Education labs got their start just this way.

Conversion. Involves makeover of an existing shop or classroom. Conversion may entail the construction or purchase of workstations, and substantial lighting and electrical changes. While school district personnel or outside contractors often do this work, in many cases, teams of teachers or teachers/parents work on a volunteer basis to develop a new lab.

New. If you're building a new school or wing to house your Modular Technology lab, solicit the Action Committee and all involved administrators for ideas to be included in the new lab. Then, pass them on to the project architect to incorporate them into his plans.

12 Key Lab Considerations

Here are some important tips to consider as you develop your Modular Technology Education laboratory:

Modular Workstations. In selecting or building your workstations, be certain to provide sufficient room for two students to work side-by-side in relative comfort. Worksurfaces should be at least 8-10' wide and 24-36" deep. In considering work-surface size, remember that computers, VCRs and other equipment must share this space. You'll also need two chairs or stools per workstation.

Use partitions to separate the module stations. Locate panels in front of, and on both sides, of the workstation. And be sure they rise no higher than 4½' above the floor. You'll want to keep students in sight while they're working on their projects.

Each workstation should provide lockable storage to keep project materials and equipment safe. Provide at least two electrical outlets at each workstation position. Call lights, which students can activate when they need the teacher's help, are also handy workstation features.

Lecture Area. Even in a laboratory format, you'll need to address the students as a group occasionally. Examples: Roll calls, announcements, presentations and group testing. Good idea: Plan a classroom seating area in your laboratory for these purposes. If not possible, use a separate classroom located nearby.

Teacher's Station. Locate this so you can easily see the classroom and all the workstations. Potential designs range from a simple podium to elaborate workstations wired to control lab lighting and PA system.

Office. You'll also need a separate, lockable office for storage of scheduling and grading information, master copies of videos, software and other valuable equipment and supplies. A telephone, facsimile machine and modem are useful as well.

Storage. If a lockable office isn't available, closets or small side rooms can serve the purpose. As a last resort, you can use cabinets for storage of student projects and other materials and equipment. Be sure all storage is secured with strong locks.

Key Lab Considerations (cont'd)

Audio/Video Studio. An enclosed room, with one or more large windows, is ideal for audio/video modules. Be sure to provide enough electrical outlets for the extensive array of electronic equipment necessary to complete this module. To help control sound, cover the walls with sound absorbing materials such as cork, acoustical tile, etc.

Dust Control. It's not a good idea to put computers and sensitive electronic equipment in the same room with traditional Industrial Arts tools like power saws, lathes, etc. The dust created by power tools is deadly to your high-tech hardware. If your budget can't stand a steady stream of repairs and replacement purchases, plan to keep shop tools and computers separated.

Floors & Ceilings. If your budget allows, plan to carpet the Tech Ed work area. It helps deaden noise in your lab. A dropped ceiling with acoustical tile also helps control noise, and allows for the convenient running of the many electrical wires you'll accumulate as you expand with up-to-date technology.

12 Lab Equipment Needs

Apart from workstations and module equipment, Modular Technology Education students need access to the following:

Computers. Since many modules require a computer & peripherals to complete activities, you'll need some in your lab. The complete setup consists of a Central Processing Unit (CPU), Keyboard, Monitor, and a computer input tool called a "Mouse". One setup per workstation is ideal, but not essential. For the budget conscious, with some careful scheduling, you can run your program with one computer setup for every two modules. If you choose this route, store your computer equipment on portable carts so it can be easily moved from station to station.

Computer Printers. Many module activities require that work performed on the computer be printed out on paper, or "hard copy". Laser jet printers are best for this purpose, but less expensive inkjet and dot-matrix models can be used. Most modern printers are compatible with the software programs you'll use in your lab. Figure on having at least one printer for every five modules.

Video Cassette Recorders (VCR). Video tapes are another medium used often in Modular Technology Education modules. As with computers, we recommend at least one VCR for every two modules in your lab. They should be stored on portable carts for easy mobility.

Headphones. This valuable tool lets students listen to audio or videotapes privately...without distracting nearby classmates. Headphones plug into most television sets and VCRs. You'll need two sets of headphones for each VCR in your lab.

Notebooks. Each Modular Technology student needs a notebook for storage of worksheets, notes and grading information. These should be stored in a convenient place where students can access them easily. (Some teachers find using a different color notebook for each Tech Ed class, each with a unique student number, helps avoid confusion among students and classes.)

As instructor, you'll also have a notebook for storing master copies of Lesson Plans, test answer keys and program manuals. But, store yours in a locked office, drawer, cabinet or some other secured place.

14 Lab Equipment Options

While not absolutely essential, the following equipment options have proven useful and convenient to the operation of Modular Technology Education programs:

Public Address System. Controlled from the teacher's station, a small PA system can help you communicate effectively with students. Another possibility is a wireless microphone system. This new technological advance lets you make announcements to the class from anywhere in the lab.

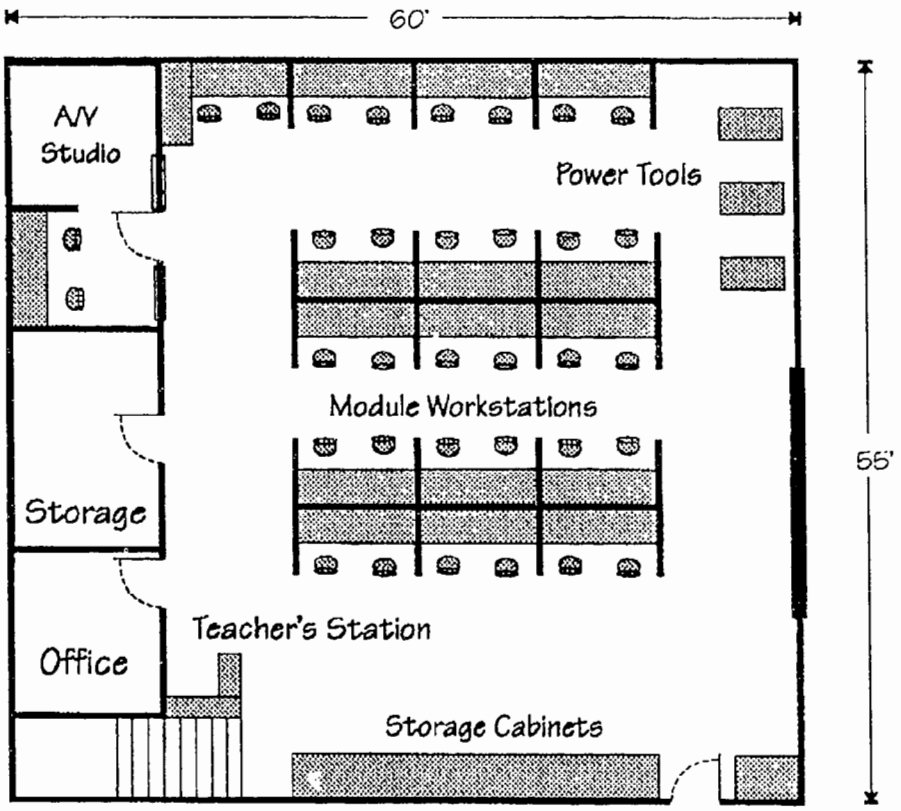
Direct Phone Line. We strongly recommend installation of a direct phone line in the laboratory. This allows you to receive technical support on any of your programs or equipment while working in the lab. You can also install a modem on this line to tap into many free electronic bulletin boards and download information.

Facsimile. Here's an example of modern technology in action. With a fax, you can send and receive written messages in seconds. With modems and software, you can also use your computers to send and receive fax documents.

15 The Basic Lab Layout

Using a pencil and paper, sketch a number of different room layouts. Don't be too critical at this point. Give yourself and your committee a number of options to consider. After the initial discussions, settle on the best of the designs and work at refining them.

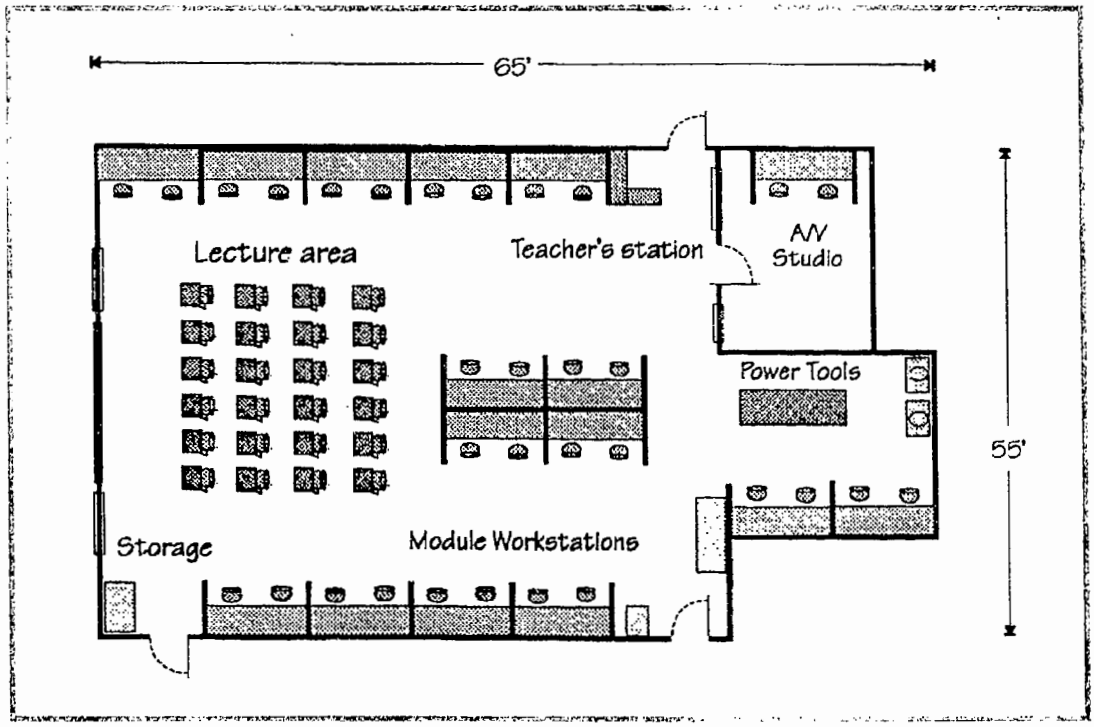
The effective floor plan diagram below represents an actual Modular Technology Education lab equipped with Hearlihy & Company modules. The pride of Bellbrook High School (Bellbrook, Ohio), this lab was converted during a summer break by the Tech Ed Instructor and an assistant. Power saws, lathes and other shop equipment were sold to raise funds to finance the conversion of the shop space to a new Modular Technology lab.



Bellbrook High School
Bellbrook, Ohio

Basic Lab Layout (cont'd)

This state-of-the-art lab graces Holmes Middle School (Livonia, Michigan). Maintenance personnel from the Livonia Public School District built the workstations and dividers. Carpeting and oak trim complete this beautiful, but fully functional, facility.



Holmes Middle School
Livonia, Michigan

BEST COPY AVAILABLE

A Sincere Invitation

Thank you for taking the time to review these 15 key steps in planning and implementing a successful Modular Technology Education program. We hope you've benefited from your brief time with this booklet ...and that what you've learned will encourage you to pursue the worthwhile goal of creating a successful Tech Ed program at your school.

As an early innovator of quality Tech Ed modules, Hearlihy & Company stands ready to help you. If you have questions about the suggestions presented in this booklet — or any aspect of creating or operating a Modular Technology Education program — please call us Toll-Free at 1-800-622-1000, Extension 88. We'll be happy to help in any way we can.

Hearlihy & Company
714 West Columbia Street • Springfield, Ohio 45501
1-800-622-1000

BEST COPY AVAILABLE