CURRICULUM ARCHITECTURE DESIGN

VIA A GROUP PROCESS

NSPI Conference
April 24, 1985

Guy W. Wallace

R. A. Svenson & Associates, Inc.
2100 Manchester Road, Suite 103
Wheaton, Illinois 60187
(312) 665-5765

<u>DEFINITION:</u>

Curriculum Architecture...

- Identifies the component modules of training

- Provides for flexible, sequenced paths through the curriculum

- Identifies estimated lengths, delivery methods, development priorities

... Required to support the performance requirements of an individual job or a function (multiple jobs)

CURRICULUM ARCHITECTURE USES

- Strategic Planning for Training
  - Development forecasting and planning
  - Delivery forecasting and planning
  - Facility planning

- Training Operations
  - Developing individual training plans
  - Setting course content parameters
  - Responding to change-driven maintenance requirements

CURRICULUM ARCHITECTURE BENEFITS

- Provides a visible link between training deliverables and performance requirements (by job)

- Allows for priority-driven, phased development/ implementation (via client input)

- Allows quick restructuring of training to respond to organizational change (task responsibilities)

- Provides data required for
  - development strategies and activities planning
  - delivery strategies and activities planning
  - administrative systems design
  - training organization design and resource planning

CURRICULUM ARCHITECTURE DESIGN PROCESS

1. Project Planning
   - Scope project
   - Establish Advisory Council
   - Develop plan

2. Performance Modeling
   - Model performance for each function/job in target audience

3. Knowledge and Skill Identification
   - Establish knowledge and skill categories
   - Identify knowledge and skill items

4. Curriculum Design Criteria Establishment
   - Identify Curriculum Architecture design criteria

5. Curriculum Architecture Design
   - Design curriculum structure
   - Sort knowledge and skills into structure

1. PROJECT PLANNING

Output: Project plan identifying
- Project scope (target audiences)
- Project participants and roles/responsibilities
- Process steps

Process:

1. Identify organizations/functions/jobs to be analyzed.

2. Identify target audience specifications.
   - experience levels
   - types/parameters of training needs to be addressed

3. Establish advisory councils (clients).

4. Develop project plan.

Goal: The goal of this step is to:
- Appropriately scope the project
- Create client buy-in/ownership
- Get client to identify individuals to give input and make decisions during the design project.

2. PERFORMANCE MODELING

Output: Performance model (organization/function/job/task)
- Mission statement
- Accomplishments/areas of responsibility
- Outputs
- Tasks
- Measures
- Standards
- Typical deficiencies
- Deficiency causes (dE/dK)

Process:

1. Orient group to project/process/outputs.

2. Complete the performance model.

Goal: The goal is to get the group to achieve a general concensus on what performance is desired/required prior to identifying knowledge and skills.

3. IDENTIFY KNOWLEDGE AND SKILLS

Output: Knowledge/skill matrix

Process:

1. Establish knowledge and skill categories (or review).

2. Complete knowledge/skill matrix, identify training topics (per category) via a systematic review of the performance model.

Goal: The goal is to break training content requirements into discreet components/topics, link each back to performance, and gather relevant data for each.

POTENTIAL KNOWLEDGE AND SKILL CATEGORIES

The following list of potential knowledge and skill categories can be used to identify the discreet components/topics of required training content.

- Organizational orientations
- Company policies/procedures/methods
- External regulations/codes/standards
- Records/reports
- Theories/concepts
- Equipment/tools
- Technical skills
- Computer systems
- Product knowledge
- Interpersonal skills
- Management skills
- Internal/external resources
- Etc.

Review/revise/select as appropriate. The purpose of these categories is to prompt the group's thinking process when identifying individual component pieces of training content.

4. ESTABLISH CURRICULUM DESIGN CRITERIA

Output: Curriculum Design Criteria

Process:

1. Review target audience data.
   - Function/jobs
   - Population sizes
   - Locations
   - Learning styles
   - Types of training required
   - Etc.

2. Identify constraints.
   - Delivery locations
   - Delivery methods
   - Target audience location
   - Minimum/maximum time off job for training
   - Cultural limitations

3. Establish and weigh curriculum design criteria.
   - Increased timing flexibility
   - Reduced redundant training
   - Minimize delivery cost
   - Increase flexibility of training planning/minimize unneccessary training
   - Increase ease of revisions/updating/maintenance
   - Increase ease of evaluation
   - Increase ease of administration (registration/scheduling)
   - Minimize development cost
   - Maximize use of existing curriculum
   - Etc.

5. DESIGN CURRICULUM ARCHITECTURE

Outputs: ● Curriculum Architecture
● Suggested training paths/development plans/
delivery forecasts/etc.

Process:

1. Design macro curriculum structure based on
   ● target audience data
   ● constraints identified
   ● design criteria established.

2. Sort training topics into curriculum structure.

3. Develop
   ● training paths
   ● development plans
   ● delivery forecasts
   ● etc.

Draft
XXXXXXXXX
FUNCTIONAL/JOB MODEL
XXXXXXX Sales

Meeting Date: XXXXXXXXXXXXXXXXXXXX

Mission: Sell profitable work.

Major Duties:

I.   Search and Qualify Potential Jobs/Adds/Service

II.   Influence Outcome

III. Estimate Project

IV.   Develop Bid Strategy

V.   Follow-Up and Close

VI.   Job Follow-Up

XXXXXXXXXXX
FUNCTIONAL/JOB MODEL
XXXXXXX Sales

I. SEARCH AND QUALIFY POTENTIAL JOBS/ADDS/SERVICE

Outputs

- Initial list of prospects
- Meeting/phone call notes
- Personal log/files
- Letter to potential customer

Tasks

- Review prospective jobs/leads
  - existing customers
  - Dodge reports
  - construction reports/construction papers
  - home office leads
  - local paper
  - consulting firm/contractors
  - service sales leads
- Qualify prospective jobs/leads
  - make personal judgement (gut feeling)
  - contact potential client (owner/consulting firm/contractor)
  - establish/identify customer/client's needs
  - determine whether you can meet those needs

I. SEARCH AND QUALIFY POTENTIAL JOBS/ADDS/SERVICE (Cont.)

Measures

- Appropriateness of client interaction
- Feedback from customers
- High potential jobs lost/gained
- Time to complete
- Appropriate use of resources
  - internal
  - external

Typical Deficiencies

- Wasted time/misdirected efforts
- Bad qualifying decisions

Causes

- Lack of experience
- Poor training
- Poor supervision
- Lack of capability
  - poor job assignments
  - poor development
- Lack of knowledge of:
  - control systems
  - market area
  - people (potential clients)

Draft
XXXXXXXXXX
XXXXXXX SALES
Knowledge/Skill Matrix
Meeting Date: XXXXXXXXXXX

Knowledge/Skill Category:	Job Model Linkages					Equipment Linkage			L.D.*	Est Hrs	Del* Pri
	I	II	III	IV	V	A	B	C			
POLICIES/PROCEDURES (Powers)											
1. Large Bid Review	X	X	X	X					M	4	H
2. Standard Office Practice									L	1	M
3. Estimate Bid Review (region/in-branch)		X	X	X					L	2	L
4. Contract Administration					X	X			L	4	H
5. Field Accounting						X			M	4	M
6. Office Services		X	X						L	1	L
7. Booking					X	X			H	8	H
8. Estimating		X	X	X	X	X			H	8	H

BASIC CURRICULUM FRAMEWORK

```
┌─────────────────────────────────┐
│          Orientation            │
└─────────────────────────────────┘
                 │
┌─────────────────────────────────┐
│          Task Overview          │
└─────────────────────────────────┘
                 │
┌─────────────────────────────────┐
│          Task Modules           │
└─────────────────────────────────┘
                 │
┌─────────────────────────────────┐
│     Skill/Knowledge Modules     │
└─────────────────────────────────┘
```

Design Curriculum Structure

Top diagram:

MENTORED OUT	—	WORK	—	CENTRALIZED GP	—	WORK

Middle diagram:

SP OUT	—	WORK	—	CENTRALIZED GP	—	WORK	—	CENTRALIZED GP

Bottom diagram:

OUT	—	GP	—	OUT	—	GP	—	OUT
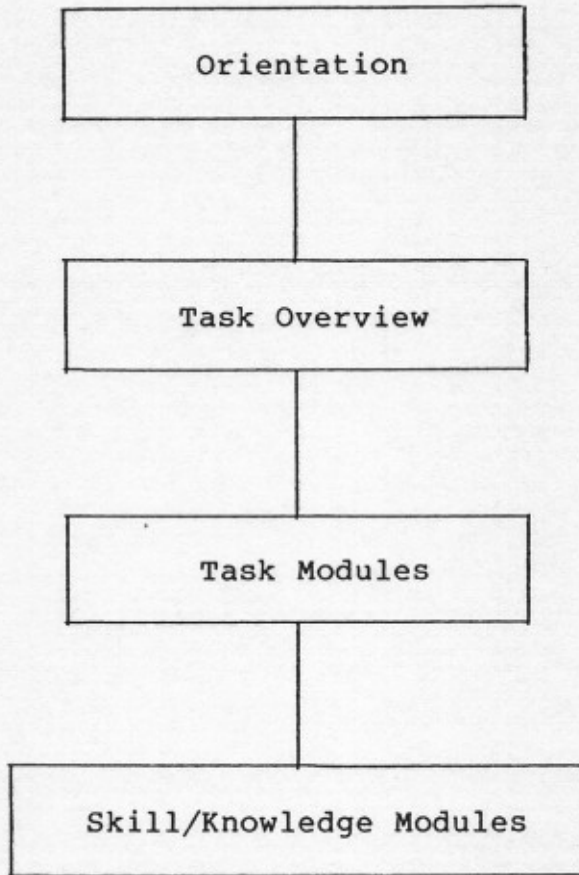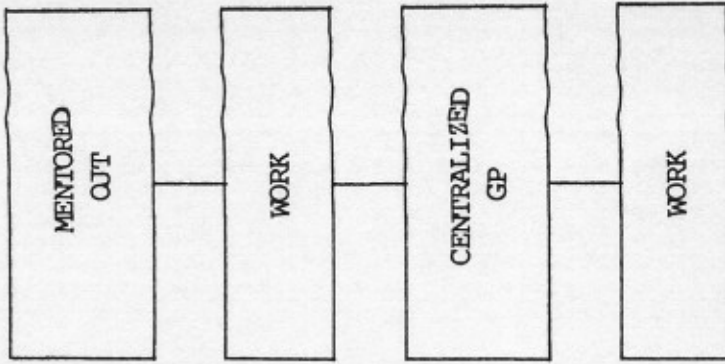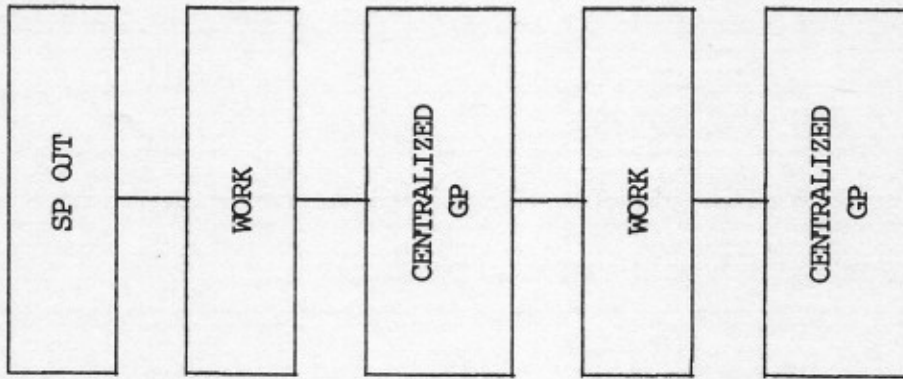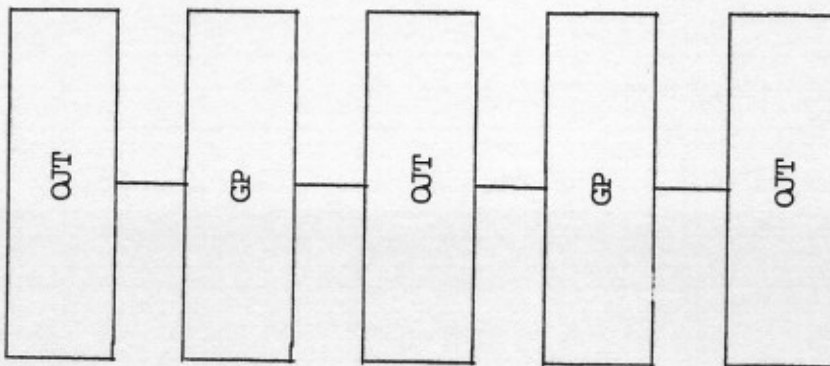
Curriculum Architecture
Design & Manufacturing
Engineering Functions

```
                         ┌──────────────────────┐
                         │     ORIENTATION      │
                         └──────────┬───────────┘
              ┌─────────────────────┴──────────────────────┐
     ┌────────┴─────────┐                        ┌──────────┴──────────┐
     │ Design Engineering│                        │    Manufacturing    │
     │   Job Overview    │                        │     Engineering     │
     │                   │                        │    Job Overview     │
     └────────┬─────────┘                        └──────────┬──────────┘
```

Task Modules
1	2	3	4	M	6	7	M	9	10	11

Task Modules
1	2	M	2.2	2.3	2.4	M	M	3	4	5
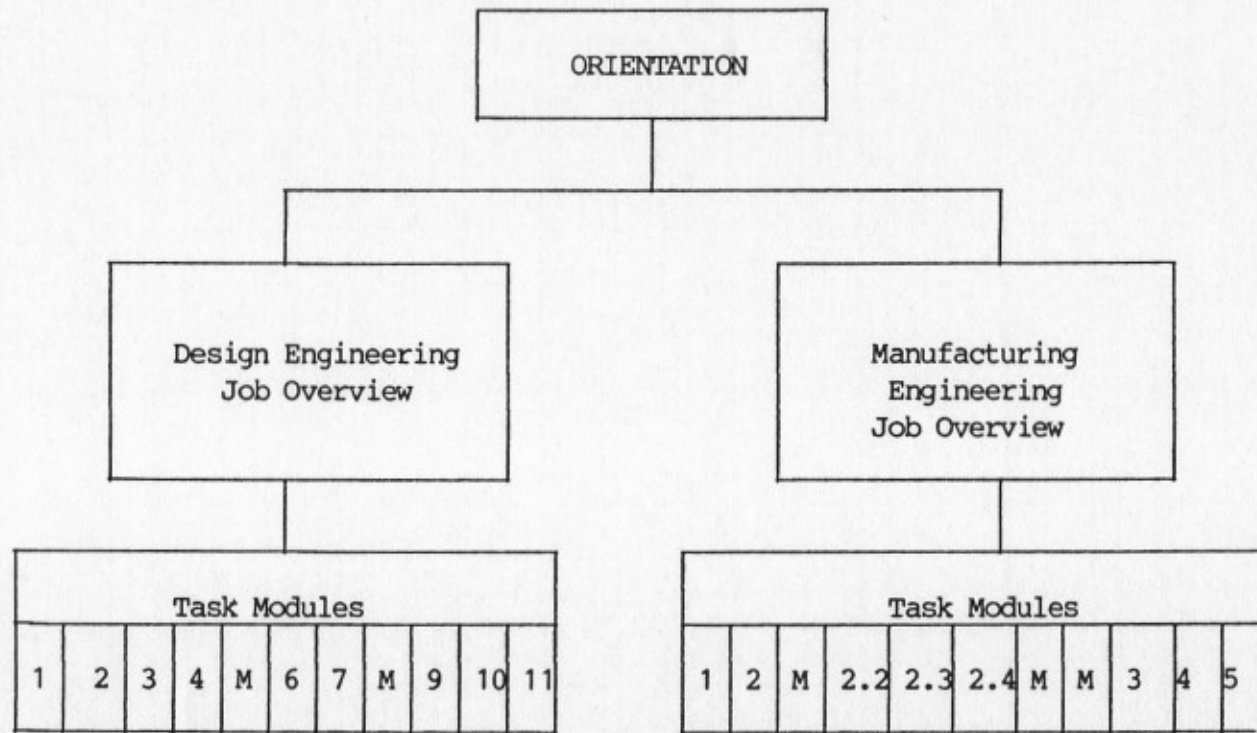
Skills & Knowledge Modules

S-1 Product Technology   S-6 Tools
S-2 Process Technology   S-7 Computer Programs
S-3 Business Concepts   S-8 Systems
S-4 Quality & ADT   S-9 Theory/Concepts
S-5 Skills   S-10 Professional Skills

Curriculum Architecture

The overall curriculum structure for XXXXX basic technical training is represented in the diagram below.

XXXXX-BASIC TECHNICAL TRAINING
Modular Curriculum Architecture*

```
                    ┌──────────────────┐
                    │  XXXXX SYSTEMS   │
                    │     OVERVIEW     │
                    └──────────────────┘
         ┌───────────────────┴───────────────────┐
┌──────────────────────────┐        ┌──────────────────────────┐
│   Mechanical Systems      │        │   Electrical Systems      │
│        Basics             │        │        Basics             │
│ ● Heat Generation Systems │        │ ● Power Wiring            │
│ ● Heat Reduction Systems  │        │ ● Control Wiring          │
│ ● Combination Systems     │        │ ● Communications          │
│ ● Air Delivery Systems    │        │   Wiring                  │
│ ● Terminal Units          │        └──────────────────────────┘
│ ● Pumping Systems         │
└──────────────────────────┘
         │              **              │
         └───────────────┬───────────────┘
                ┌──────────────────────────┐
                │    Control Systems        │
                │        Basics             │
                │ ● Sensors                 │
                │ ● Controllers             │
                │ ● Controlled Devices      │
                │ ● Auxillary Equipment     │
                └──────────────────────────┘
                            │
                ┌──────────────────────────┐
                │    HVAC Systems           │
                │    Applications           │
                └──────────────────────────┘
```
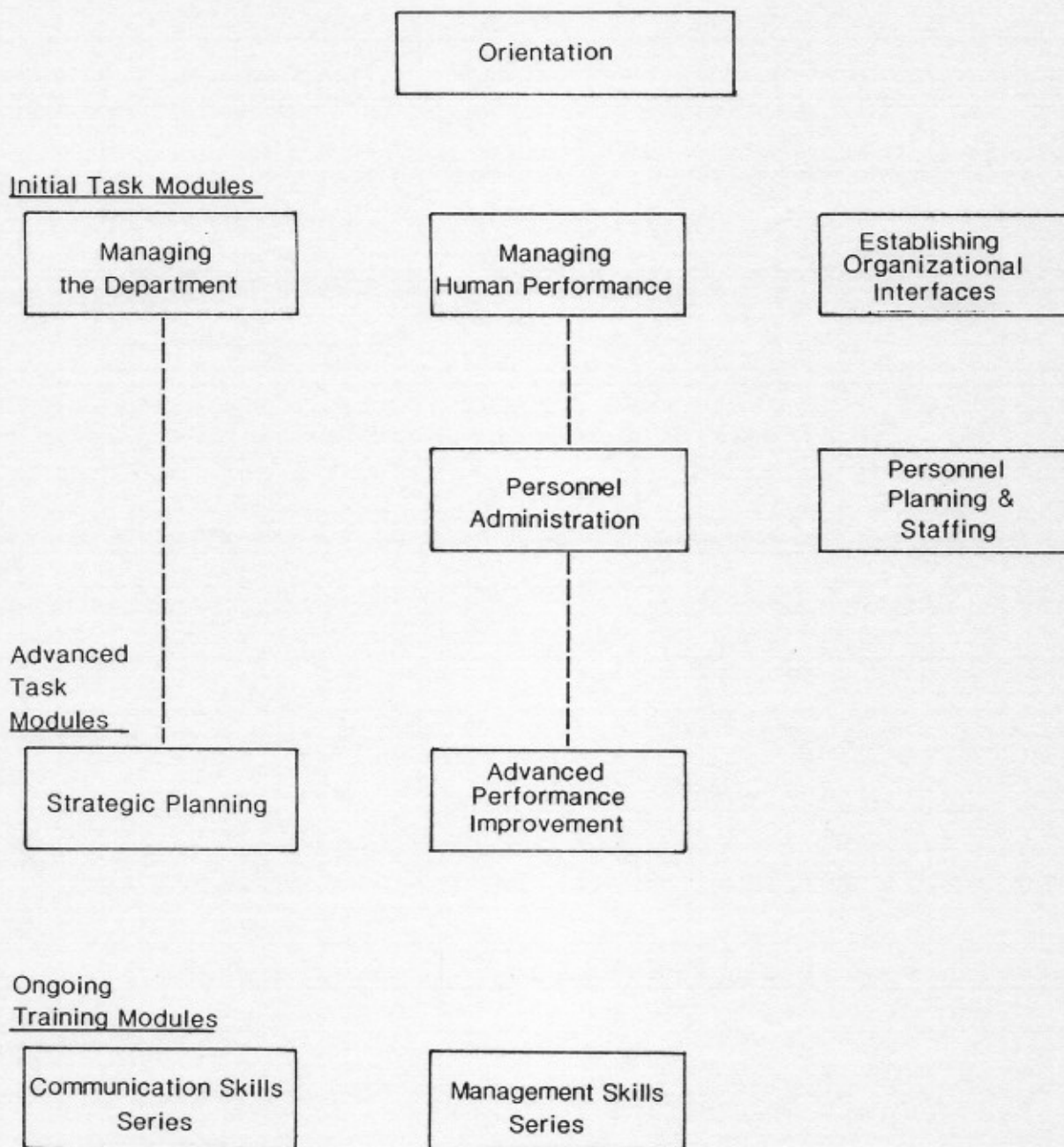
Note: This modular structure identifies the major blocks of training. Each block may be further subdivided into topical
*chapters or distinct training modules; i.e., heat generation systems may be divided into:

- Steam Boilers   ● Heat Pumps   ● Solars
- Hot Water Boilers   ● Converters

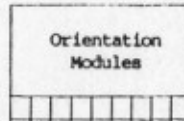**Note: Both mechanical and electrical systems basics are prerequisites for control system basics.

- 18 -
©R. A. Svenson & Assoc., Inc.

Curriculum Structure

```
                          ┌──────────────────────┐
                          │     Orientation      │
                          └──────────────────────┘
```

Initial Task Modules

```
┌──────────────────┐    ┌──────────────────┐    ┌──────────────────┐
│    Managing      │    │    Managing      │    │   Establishing   │
│  the Department  │    │ Human Performance│    │  Organizational  │
└──────────────────┘    └──────────────────┘    │   Interfaces     │
         ┊                       ┊               └──────────────────┘
         ┊                       ┊
         ┊              ┌──────────────────┐    ┌──────────────────┐
         ┊              │    Personnel     │    │    Personnel     │
         ┊              │  Administration  │    │   Planning &     │
         ┊              └──────────────────┘    │    Staffing      │
         ┊                       ┊               └──────────────────┘
```

Advanced
Task
Modules

```
┌──────────────────┐    ┌──────────────────┐
│ Strategic Planning│    │     Advanced     │
└──────────────────┘    │   Performance    │
                        │   Improvement    │
                        └──────────────────┘
```

Ongoing
Training Modules

```
┌──────────────────┐    ┌──────────────────┐
│Communication Skills   │ Management Skills │
│      Series      │    │      Series      │
└──────────────────┘    └──────────────────┘
```

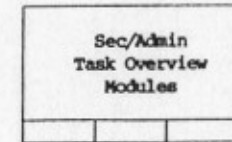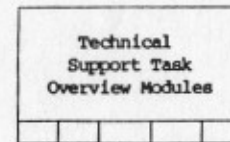Note: — — — — represents prerequisite relationships

LEVEL

1- Orientation

```
┌─────────────┐
│ Orientation │
│   Modules   │
├─┬─┬─┬─┬─┬─┬─┤
└─┴─┴─┴─┴─┴─┴─┘
```

2- Tasks

Management Task Overview Modules	Technical Professional Task Overview Modules	Technical Support Task Overview Modules	Sec/Admin Task Overview Modules

3 - K/S

SUPPORTING KNOWLEDGE/SKILL MODULES
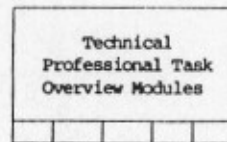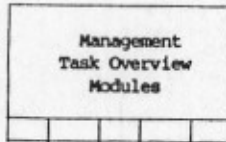
(Category)	Non Technical	Prod T/M	Eng T/M	Math/ Stats	Prods & Materials	Concepts & Principles	Tools/ Equipment	Technical Skills	Sec/ Admin.
(No. of Sub Categories/ Content Areas)	1	8	8	3	3	4	4	5	1

(Individual Modules)

4- Personal Development

```
┌─────────────┐
│  Personal   │
│ Development │
│   Modules   │
├─┬─┬─┬─┬─┬─┬─┤
└─┴─┴─┴─┴─┴─┴─┘
```

For further reading, see the following articles:

"How to Build a Training Structure That Won't Keep Burning Down", <u>Training Magazine</u>, September 1984, Pages 77 - 83.

"Using a Group Process to Create Models and Matrices", <u>Performance & Instruction Journal</u>, November 1984, Pages 12 - 15, 21.