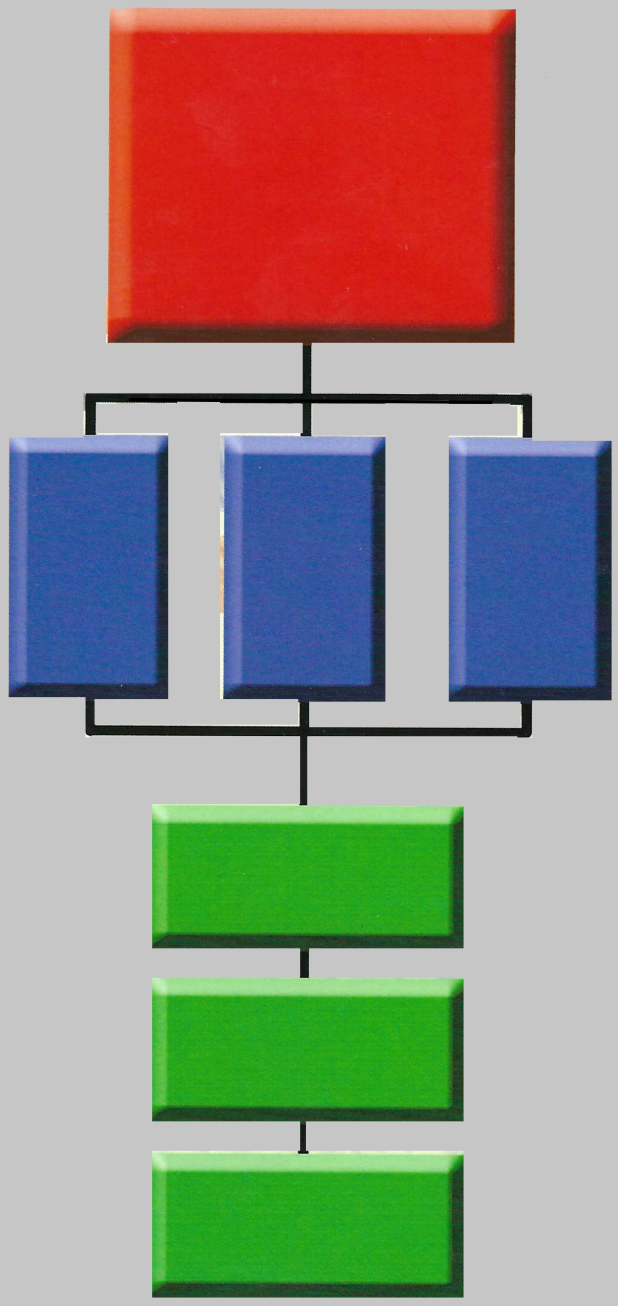
Common Sense ISD

Instructional Systems Development for Non-Trainer Managers in Small and Mid Size Business



Richard Cavalier

COMMON SENSE ISD

Introduction to the Scan Edition

As a mechanism specially developed to control the development of the Polaris Submarine, Instructional System Development (I-S-D) can probably handle your company's programming needs. Proved over decades in hundreds of Naval stations around the world, you can depend on it!

The Navy's version of the ISD process is likely still the world's best system—despite various 'simplified' proprietary versions on the market. A 'simplification' usually consists of eliminating the most demanding steps in the construction process . . .which makes internal checks chancy . . . which cancels the Navy system's fool-proof guarantee to deliver a workable program that achieves your objectives—as stated at the beginning--in the first formal presentation.

The Navy's ISD is awesome! Some colleges teach their own versions, as do some consultants. Proprietary versions have various strengths and weaknesses—if you buy, get a trusted opinion first. As a process, there is no single 'best' format. The military probably has the largest test-base for its program development. The Navy's demanding facts/specifics and built-in checks preclude oversights and chance-taking. You gain nothing by 'simplification' except hazards.

What is ISD? In essence it's the reverse engineering of any concept or programming idea. If you begin with a clear understanding of your final objective and then work backward by identifying every contributory need that precedes every valid checkable-point, then you will have created your own ISD system. It's valid, as an approach. However, it's not likely to be so sufficiently detailed as to be fool-proof. Only testing in use reveals that. Experimenting? Prove each detail.

Caution: Although ISD is the ultimate do-it-yourself project, this Author cannot let you believe that you, as a department head, should go-it-alone on your first attempt. ISD is too demanding for beginners to bumble through. In order to benefit, you need never be fully-conversant. Then how shall you use ISD? Learn its basics so that you can present useful information and facts on request to the company's ISD Trainers, if any. Not all Trainers are ISD competent; some are, but their ISD incompetent bosses won't let them function—a problem of one of this Author's clients. Professional Trainers have the tools to fulfill your Agenda, whether for meeting presentations or employee-training needs; but the Trainers can't intuit your purposes and needs. The better-prepared your info chunks are, the better your ultimate program will be.

Best way to begin the learning process: Enlist the supervisory help of an ISD specialist—Naval vet, if possible. All military ISD specialists can related to basic ISD techniques. He/she might or might not be already on staff. Non-ISD specialists often recommend alternative approaches—their limitations acknowledged. Decide early: Hurt feelings or hurt project? Not on staff?

Yet, available, round-about. The US Military trains hundreds of new ISD specialists yearly because ISD's demands don't encourage multiple simultaneous projects, and that ISD skill is commercially viable--permanently. Most discharged specialists probably become corporate trainers in business centers; and some might gladly moonlight on per-project basis. However, a retired specialist might live anywhere in the country; so a discrete ad in the help-wanted column of your local or regional newspaper is a good bet. Once the specialist has overseen your project (while you look over his/her shoulder) ISD's own structure will enable you to use it efficiently in the future. Or, you can keep your moonlighter handy for help as long as you choose.

Significant: This Author's "Common Sense ISD" book is the Navy's own original format, here translated from military jargon into business-ese--eliminating the cumbersome numbering systems needed to control worldwide applications. Otherwise, "CS-ISD" is the exact business approach to exacting specifications. A few collateral items created by the Author have been noted where included.

Although ISD was created in the mid-1950s, it has never been known to need 'improvement' or to be superseded as an overall educational construct. However, mimeographing of that time is not today's e-print-out. So, you'll see several significant forms reproduced both in their original mimeographed, pre-web, format and a facing clean re-typing. Original military state was used!

ISD will remake the construct and effectiveness of all of your future programs if you will learn its basic structure; learn from an ISD-specialist; and get out of the way of your company Trainers' demands for specifics and specifics and specifics. That's a small price to pay for the very best programs that you can create and then manage. In fact, it's brilliant.

So, what are you waiting for?

END

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COMMON SENSE ISD:

Instructional Systems Development for Non-Trainer Managers in Small & Mid Size Business

by

Richard Cavalier

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From a Declaration of Principles jointly adopted by a Committee of the American Bar Association and a Committee of Publishers.

Other business books by the same author:

Managing Through Training.
Sales Meetings That Work.

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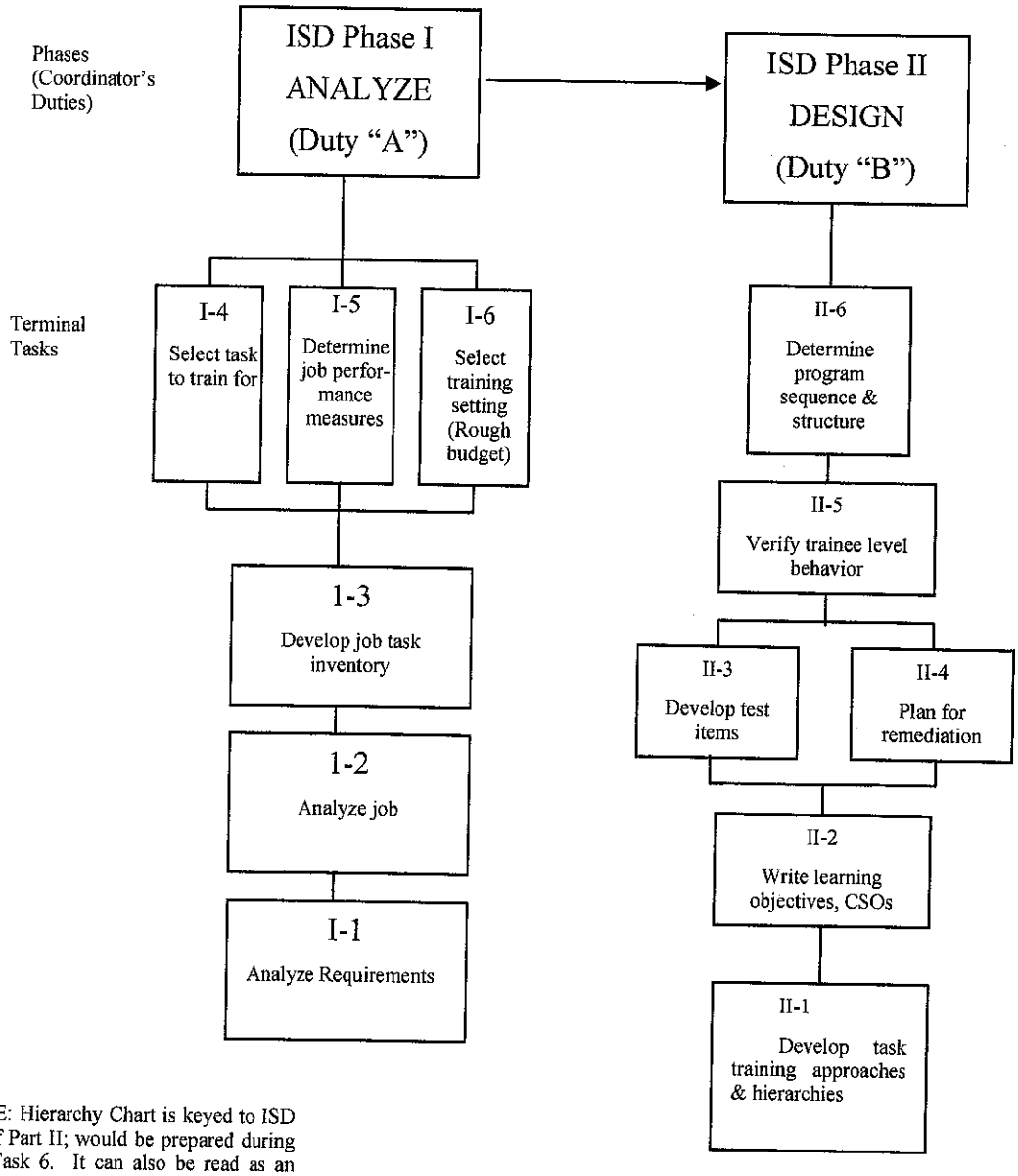
Richard Cavalier

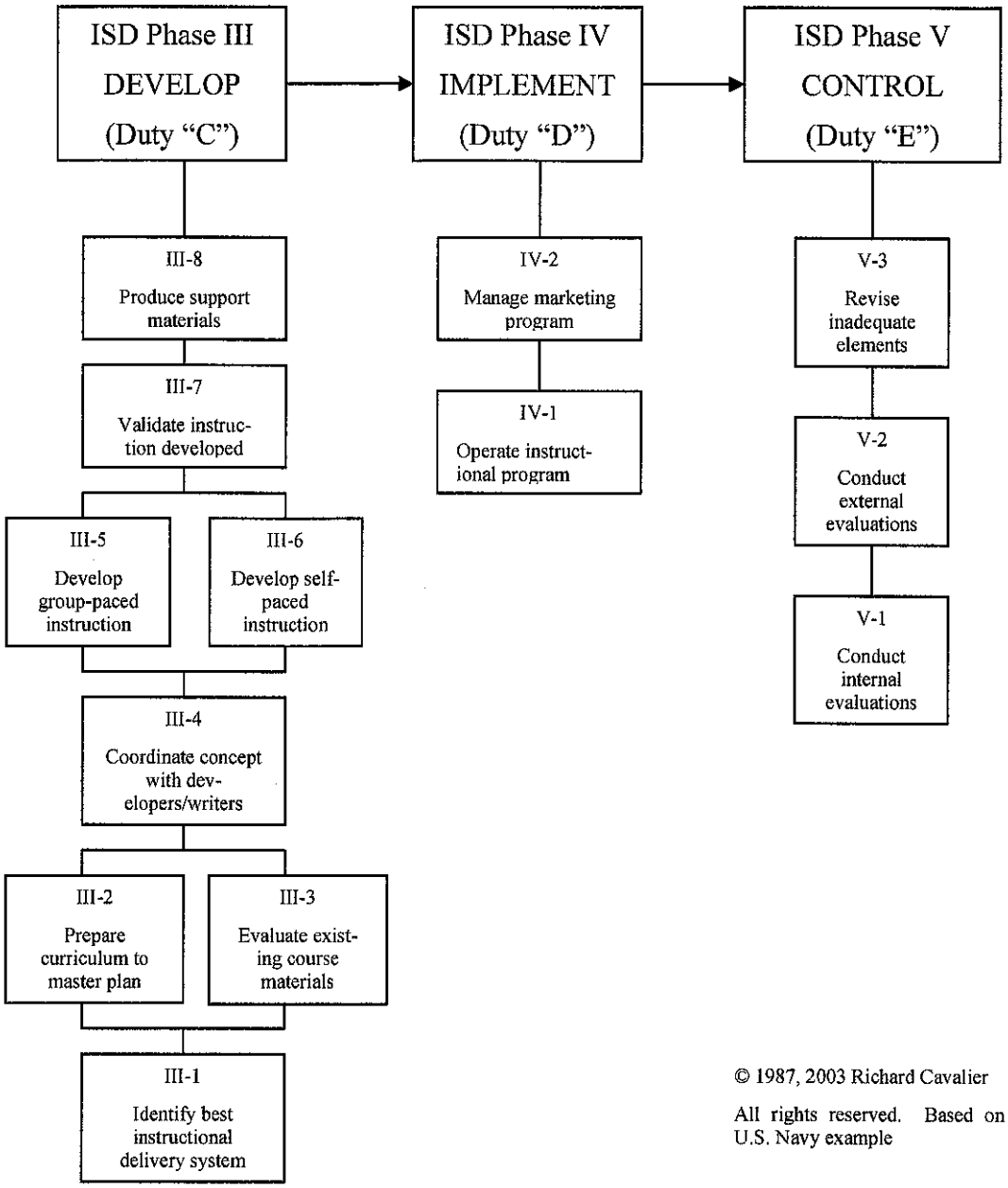
HIERARCHY CHART FOR



NOTE: Hierarchy Chart is keyed to ISD structure of Part II; would be prepared during Phase II, Task 6. It can also be read as an outline for the job of training project coordinator.

NOTE: Respective enabling tasks/steps not shown.

INSTRUCTIONAL SYSTEMS DEVELOPMENT



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FOREWORD

"Instructional Systems Development (ISD) is a methodology for ensuring that training is relevant to the job."

That reminder was contained in a consulting evaluation prepared for the US Armed Forces, in January, 1980, by the Human Resources Research Organization, Alexandria, Virginia. (HumRRO Technical Report TR-80-1.)

HumRRO found that despite the highly codified military procedures prescribed since 1975, ISD was not producing optimum results due to human failures: development personnel for instructional programs were not honoring the strictly derivative and iterative nature of the process. Shortcuts and guesswork were crippling an otherwise dependable methodology for reflecting the actual job via training.

At the millennium, some training consultants are deriding ISD for being awkward and slow, which it probably is. They neglect to say that it is absolutely dependable and predictable. And it appears that the consultants who object to the strongest ISD features (if they're looking for shortcuts or using guesswork, no matter on how many years' experience based), are short-circuiting the process in the same manner that was identified by the military a quarter-century ago. The consultants usually don't suffer because they can bill for their completed program, often at a premium. But you and your organization might suffer because any untoward results of those shortcuts and guesswork are yours! If the program misses the mark, who will remember exactly what that mark was, unless it was initially committed to writing?

The cute catch-phrase used currently is, "There's no '*there*' there." Pardon me for asking, but don't you think that a perfectly workable program is a '*there*'? Certainly it has seemed so for decades at the individual military installations and also for the many corporations for which we have previously helped to design and implement programs. It appears that complaints are essentially red herrings. Where would those complainers rather be? Where is *their* "there"? Can they offer anything better? Better according to whose research?

The Rise of Corporate Training:

The same human failings have plagued training for business purposes since its origins as a profession following World War II. Carelessness aggravated problems incident to such training problems in planning as could be presumed natural when based on a) shortcuts and guesswork that resulted in loose and inadequate training program structure; b) emphasis on media and formats rather than on content and its validity, and c) emphasis often placed under the almost perennial, amateurish supervision of corporate trainers, because (except in the most advanced organizations), the Training Manager's slot was most often filled by a super salesman brought inside to begin his management climb. No, not he/she–few women were around in management positions at that time. As a result of all these items, training developed a bad name–deservedly.

Yet expertise can and must be shared. The culprit was the slowness of business to recognize that *knowing* and *doing* are two different functions and that *knowing how to teach others to do* is still another vastly different function.

Few people possessed of advanced knowledge or dexterity skills are able to dissect and articulate those skills. Moreover, many well-educated individuals usually selected to oversee training did not understand the differences between *education* and *training*. So they *educated* the trainees, who left the classroom intellectually/verbally skilled but yet unable to perform the motor tasks necessary to perform to standard requirements because they often could not convert the intellectual knowledge unless they had had motor skills practice in the classroom or lab.

The conversion of book theory into on-the-job practice is the prime responsibility of corporate training and trainers; and ISD is still the single most advanced and detailed system for ensuring the applicability of the training to the real world job. ISD can carry you through any project in the design and development of training–no matter how complex or simple–if you will honor its disciplines!

When properly applied, ISD is remarkable. It's also one of the world's best-kept secrets, in so far as the world's user population is concerned. ISD is *do-it-yourself* supreme! That's a priority in function that's low on the priority lists of consultants who say there's no "*there*" there–as mentioned above. After all, the military uses it daily–and not all service people are Ph.D.s. More to the point, few of the trainers are Ph.D.s, either, whether or not that helps.

Although it's far more complex and time-consuming than guesswork and borrowed materials are, ISD has slowly crept into business training, largely because training specialists leaving the military have brought their wares into the corporate world. But the *disciplined* approach of ISD often clashes with the traditional trial-and-error-and-error-and-error approach common to the traditional corporate training world. Even into the 70s and 80s, ISD didn't always win in disputes because the older traditionalists (and some of their organizations) were often "in charge" and adamant; and corporate top management often didn't understand either the ISD process or the issue between ISD and trial-and-error. That was management by abdication. Small amounts of familiarity can provide great understanding, and we have tried to provide that familiarity in the companion book to this, *Managing Through Training: a Common Sense Guide for Non-Trainer Managers.*

ISD deserves your confidence. It is not an unproved thesis! Rather, it is the culmination of nearly three decades of groundwork in theory and methodology approved by major, known research agents, sharing both educational and training roots. It represents a synthesis of the very best! Curiously, this military paragon had its roots in a civilian publication for educators. No matter how you look at it, it's impossible to dismiss it honestly!

Specific Origins of ISD:

Although, as discussed at length in the companion book mentioned, education and training methods have different objectives and thrusts, they are often combined in any thorough training program. Education prepares us with theories/general knowledge that we as individuals can apply to the unforeseen future problems of life; whereas training selects from that theoretical universe whatever (and only that) which applies to the problem situation at hand each time!

When each discipline is used where appropriate, you can avoid wasting time making distinctions not germane to the underlying problem(s) if you use the term *instruction.* Then education and training methods can be used in conjunction without doing violence to either concept–and without making definitions your paramount concern in the program development process.

Instruction of some sort and complexity throughout the lifetime of the human animal is now known to be normal, but *competent training theory* is very recent.

The properly designed instructional program correlates theory and application as needed to fulfill the given job requirements, and ISD's Algorithms (found here in the Appendix) will help you to make proper choices quickly and accurately. That ease of usage has a foundation of 30 years of research and testing and formal application. Have confidence in ISD!

Throughout the 50s and 60s, social scientists expanded and refined the work begun in mass communications techniques by the landmark 1949 book, *Experiment on Mass Communication,* by Carl Hovland, Arthur Lumsdaine, and Fred Sheffield. Roleplaying and aspects of attitude change were examined for the first time during that era. In 1964, Homer C. Rose published *The Development and Supervision of Training Programs,* and the dichotomy between education and training was formalized. The military picked up on this book, and early ISD was invented. In 1975 military ISD was subjected to the reviews quoted above. But the dichotomy was clear.

Theories on audiovisual learning were being reformulated as a result of the impact of television on the school classroom as well as on the corporate training room. At that time, television first dominated thinking about the classroom. But the training field was coming together as a professional discipline.

Studies made in 1960 by Dr Joseph E. Kanner, of the US Army Training Command had indicated that there was no significant difference in learning when comparing color to black&white. That was not a popular finding with the TV manufacturers–enter Marshall McLuhan, who felt constrained to state (in 1964, likely under influence of his having already been hired by the television industry) that "The medium is the message." To us, the *message* has always been the message. Gagne would react against that slogan.

Also in 1960, the Educational Facilities Laboratories (and the Ford Foundation) issued *Design for ETV: Planning for Schools with Television.* The distinction between entertainment values and educational/ training/ instructional values had also been established. That difference is apparent even today, when peons to performers can be seen on Public Television–you know, the education folks on the air. Educational television today is not what it was in the 50s and 60s! But at least it now carries advertising–and we know how conducive advertising has been to unslanted news reporting in all other media.

In 1965, when Robert M. Gagne co-published his book, *The Conditions of Learning* (furthering that dichotomy) his disciples believed, possibly erroneously, that he had *originated* that concept. The distinction between education and training and the resulting dichotomy are permanent in this society, having been thoroughly researched for at least a decade sooner. For a further layman's discussion of related literature in this field, see Cavalier, *Sales Meetings That Work,* (Dow Jones-Irwin, 1983; 2001, in an expanded third edition); or Cavalier, *Managing Through Training,* (2002).

But the dichotomy between medium and message was corroborated and extended by HumRRO's 1971 report to the US Army, in *Comparison of Techniques for Guiding Performance During Training*; and that report was summarized in Cavalier (1983) in introducing it to the meetings field, which had somehow overlooked it. An ensuing two decades of formal studies demolished the cherished sales cliches of the A/V industry (including McLuhan's erroneous dictum), on which so much failed training has been predicated. American business must now try to catch up to reality. Having been introduced too late to ISD (and too often via returning service men who couldn't communicate with their own unskilled training superiors) many American organizations are now recalcitrant, paying more lip service than money or know-how to their own indispensable training efforts.

One of the reasons that TV had such an impact on public education is that the underlying theories and assumptions of modern education itself are relatively young: John Dewey published *Experience and Education* in 1938, when film was a rarity in the school and TV broadcasts didn't exist. Given the broad public acceptance of free tube-entertainment following World War II, TV had the power to demand to be accommodated elsewhere, including schools, but TV has not yet lived up to its promise in this country. Mexico, for example, broadcasts first-quality *school* instruction to all its villages throughout a country of widely varied terrain and despite poverty. We can't seem to learn that lesson, despite a crunch on adequate school buildings and failing educational systems. We do have the medium, Marshall–we just don't get the message!

As a result, all A/V media and methods were re-evaluated–upward–in the pop viewpoint. But *pop* didn't have all the answers, either. The fact of TV exposure itself seemed to confer cache' on products advertised, although advertising space is not necessarily synonymous with product quality. This does not dispute the value of TV advertising as an exploiter of the massive exposure of the sponsor's message.

In an increasingly technologized and visualized world, learning theories based on the printed word, aided with chalkboard and maps and still photos were deemed inadequate–without research! The Army's Dr Kanner found the opposite to be true. Simple images are still valid visuals–they don't need to be expensive, colored, and full motion in order to be useful. Is it any wonder that the manufacturers and service groups and consultants haven't flocked to these *proved but contrary theories?*

New ideas were flowing during the second half of the last century but they didn't fit easily into the marketers' plans or into traditional molds, and business abhors change and enshrines tradition. Or *did,* until the Age of Computers and radical daily change of electronic wonders. Maybe in the thought process business still does favor tradition. . .and that's probably why business can't seem to understand contemporary training well enough to appreciate ISD competence in that field.

Fascination with wonders has transferred to the schools, too. . .unfortunately, because few have bothered to study the underlying principles, even though the paucity of existing new teaching/learning materials has already been identified. Yes, the kids need to be able to control the machines, but the machines still must then be able to say something intelligent to the kids! That *something* is content: subject matter, and marvelous equipment is no substitute!

The issues and workable approaches to the theories of instruction were probably not fully codified until 1968, with Jerome Bruner's book *Toward a Theory of Instruction,* which described seven key characteristics. The National Education Association contributed Ira Gordon's ten

Criteria for Theories in Instruction, in 1968. These two key documents occurred within recent memory and indicate how tenuous a hold that training theory has on corporate realities. Many of today's corporate training managers-of-that-title simply are not versed in these theories and practices. The result is a mess that users recognize and the training field tries to blame onto ISD. For shame!

As theory, most early work was exploratory rather than prescriptive. Perhaps the first correlative organization of theory and knowledge in both education and training was presented by Philip L. Hosford in *An Instructional Theory: A Beginning (1973?)*. His prescriptive principles created a unified, systematic approach that generated a quantum leap in the understanding of the *conversion of knowledge into performance*. Isn't that the purpose of all training?

But to reiterate: training as a formalized discipline is less than 40 years old at this writing, but most or all of the persons who were aware of its beginnings are already gone from their respective organizations. Therefore, marketers can push almost anything, and the members of the Pollyanna Press will publish mostly things supportive of the advertisers' positions, regardless of their merit for you. The group communications field has already been subdivided by suppliers and press into meetings, training, and conventions; and now it's a profitable industry. *Caveat emptor*!

In this early, uncertain stage, B.F. Skinner was attempting to create his theory of behavioral technology. That led, in the 50s and 60s to the development of Programmed Learning and teaching machines. . .and in the creation of a handy means to manipulate the adult learner's animal self resulted but have since been reversed. Just another fad because "what's new" is not necessarily "what's best". Shame on Skinner et al. And shame on American business for being willing to be stampeded by unfounded fads.

Skinner believed–apparently falsely–that we can teach anybody anything if the content is broken up into small enough pieces. His theory, in turn, promoted time-and-motion studies, etc. We now know that early job minimization was a mistake–and that job enrichment programs are now undoing the work of Skinneresque "job efficiency experts." Without doubt, education's "publish or perish" dictum can be damaging to education and instruction. We know today–through formal research–that chopping a task into little pieces can interfere with the learner's gestalt understanding of the task and therefore with his performance of it. Remember bicycle riding! Can you chop that up into peddling, steering, and balancing–separately? And are some of your training requirements more complicated than that "simple" motor skill?

While Skinner was still the resident guru of business, Programmed Learning became the rage. Yet the HumRRO report of 1971 indicated that the PL format does not necessarily aid conceptual understand, which is wholistic, not sequential. As we wrote in prior books, "You might say that a hamburger is a programmed steak–chemically identical, yet changed for all time." Then why have some program designers ignored the developments of the related fields? Is the pull of the market so strong? Or are some of today's training managers still so insecure?

Reality Check:

Nevertheless, the 60s saw the first concerted efforts to deal with instructional objectives in a systematic way. Two entries include 1) A. E. Hickey's monograph, "progressive Instruction in

Business and Industry," in *Applied Progressive Instruction* (Wiley, 1962), and 2) Robert Mager's *Preparing Objectives for Programmed Instruction* (programmed; reissued for instructors almost unchanged, except for margins), in 1963 by Fearon as *Preparing Instructional Objectives*.

As an early attempt to identify and protect program purpose, Mager's approach became a mini-classic. Mager and PL reassessed and stressed the impact of organization of materials on learning efficiency. That's still a valued insight, but current research indicates that rigid sequencing in PL (left hemisphere brain processing) can interfere with conceptual learning (right hemisphere appeal): bicycle-riding, again. Is it now "Good-bye, Programmed Learning?" Not necessarily, if your task to be trained-for is related to counting book pages in sequence or putting one foot ahead of the other in sequence. On the serious side, bookkeeping might be considered to be essentially sequential, although accounting is highly conceptual–both dealing in the sequencing of numbers. Certainly the early organizational books for educators now need translation for trainers.

Since PL leans heavily on Skinner's theories, PL is now viewed skeptically by many professionals; it will probably survive at least in part because it adapts so readily to the computer's on/off logic system, which is itself sequential. The computer has an infinitely greater capacity to mimic human learning patterns, rightly or wrongly programmed.

On the whole, Programmed Learning is now seen as just one more format, rather than as a formal procedure applicable to everything, as ISD still is. PL is no substitute for ISD!

Overall Development of Training and ISD:

Although much slower to develop, ISD is not a patent medicine approached by one individual. ISD is thorough and is less susceptible to fakery than is any other method around today. Nor are any future developments likely to be more cohesive a system than ISD already is. The ISD system or process can be identified by that title as early as 1967; but the developing process appeared under such early titles as *Training Situation Analysis* or *Design of Instructional Systems* as early as 1963.

In the 1960s, R. M. Gagne's *Principles of Instructional Design* and later his *Conditions of Learning* helped to establish the general topic of instructional design. The latter work, although heavily oriented toward psychomotor skills, is considered to be a classic

Trainer Dr. Malcolm Knowles was contributing to the organizational efforts via his monograph, "New Media in Education" in *Adult Education* (Aldine, 1966). In 1967, Dartnell published a ring binder text on meetings methods and tips, to which this author (uncredited) contributed original work for the meetings/conventions industry's first collection of codified methodology for determining meeting participants' knowledge and tool/training needs. The Audience Profile and Message Profile and Objectives Profile that are much imitated today throughout the meetings industry are this author's original work, and were included in the book *Sales Meetings That Work*, along with all other forms we had developed. Based largely on our original materials and formats, that ring binder was seminal in the meetings field, which was as yet unformed among users. The forms' formats were based on our half dozen years' experience in coordinating multiple national conventions and corporate meetings using original methods for a number of organizations (for whom we consulted annually) simultaneously in each of twice-

annual seasons. We then learned the difference between *any one organization's needs* and *all organizations' needs.* Associations in the field have attempted to create widespread "expertise" by pronouncing thirty, one-company executives to have the same experience as one, thirty-company consultant. Convinced? Or do you seek their relatively meaningless boost to your ego?

You don't think training happens in meetings? Well, the industry breaks group communications up into segments–but that promotes the targeting of readers by specific function: i.e., controlled circulation. The segmenting of group communications into meetings, training, and A/V is a commercial, not a legitimate, segmentation. Don't be fooled by it. Qualifying for a controlled circulation publication *does not* indicate that you've *arrived* or are recognized as being qualified in your profession, no matter how it boosts your ego!

Also in 1967, J. P. Guilford's incisive book, *The Nature of Human Intelligence*, identified five mental operations used to process four kinds of information content in one of six forms. He established 120 variables known now as the function of *cognitive style* vs. ability. Notice the importance of content. And notice, also, the late date in man's history, as well as the recency in learning theory. Working below the surface structure of PI, L. J. Briggs' 1970 publication, *Handbook of Procedures for the Design of Instruction*, brought more formalism to the instructional process under the aegis of the American Institute for Research, Pittsburgh. Although advances had been made in structuring meetings, the original materials were scattered, and they were never collected by the publications in the meetings field. Is informing readers not important–or do commercial considerations count for more?

In this period of the systematizing of programming, this author's first bylined book, *Achieving Objectives in Meetings*, appeared (1973). It embodied the industry's first complete system for protecting the message against media but was intended to further train meetings professionals–of whom there were relatively few at the time. In the 1970-71 season, meeting planners were called together for the first time in the world's history of meeting planners by Jay Lurye, under the title of the World Meeting Planners. In the following year, Meeting Planners International (now called Meeting Professionals International) was formed, likely by borrowing Lurye's first attendance list, not necessarily with his approval. Lurye and Cavalier were previously co-workers at United Attractions, the organization that founded the convention consulting function, back in 1960.

By the mid-70s, HumRRO and the Rand Corporation were re-evaluating military versions of ISD. Each of the service branches was establishing its own system along similar lines, but the lines were not identical and interchangeable. The result was a competition internal to the military and a major advance (through competitions) to the training field. The Navy's system won. Ultimately, this author was able to interview the members of the Navy's award-winning team at Great Lakes (IL) Training Command before normal military transfers scattered them . . .and the specific methodology of the present book is the end result.

For the business world, one of the first correlative approaches to training was Carl R. Vartel's 1976 classic, *Instructional Analysis and Materials Development.* Even if his was a relatively narrow construct, little has been done since in the methodology of corporate training which was not either outlined or foreshadowed there. That book was prepared as a specific aid to technical education/instruction–and it stressed system: "Appropriate planning and organization are essential in the development of instructional materials so that the most effective learning will occur. This planning and organization should take the form of a 'systems approach,' which

Clearly, you or any other competent performer of any job or task can use ISD methodology to design and develop and implement training programs that will achieve observable, measurable, and verifiable objectives. . .reliably! Now, if you don't really know your job, you are in serious trouble as a trainer! And you're probably in worse trouble as a purchaser of consulting answers to the problems that you don't understand!

What follows here, then, is not THE methodology of ISD (which does not exist) but rather a faithful recombination and interpretation *for business* of decades of our book and article writings plus extrapolations from four branch versions of military processes, principles, and methods. The necessary conversions or extrapolations have already been completed. So what's included here is *what we have in our own hands-on experience proved workable* in the business world.

Our purpose in discussing the five phases of ISD in such detail in the five key units following is to give you a managerial overview of the process that will yield managerial control, whether you do much or none of the actual work yourself. The forms alone won't do that job! So don't skip through lightly! But the forms will guide your learning and doing.

No book can make you an expert in program development with a single reading–so you will probably refer to this book constantly. Yet this book is *complete* and will enable you to oversee even the most ambitious training programs *if you conscientiously apply its principles and methods.* Anything beyond that statement would be a guarantee–and no guarantees can be made for any newly-developed program prior to its test runs and–even if it should run flawlessly there–its initial actual run. However ISD guarantees that the program that you *seek* via proper documentation will be the program you actually *get*!

The collateral costing segments in the Appendices C & N have a military source. They concentrate on budgeting and cost-effective media, and are not necessarily a strict part of ISD procedure but are provided here in the certainty that money considerations will affect–and sometimes dominate–options and decisions. These criteria will help you to make choices that will not damage your objectives, at the very least, and will surely optimize your intended results when budget are adequate. Again, we provide original correlators to help you to apply the types of military how-to materials provided in the Appendix N. No, the entire military books are not contained here. If you want more than we've provided, see a Navy Training Command officer. Some reproduced military forms are very rough; some are very small-type and might not survive reduction, but they're worthwhile, if. That applies equally to the Algorithms reprinted for purposes stated in this text.

Adequacy is a concept that will recur in all training contexts. Adequacy is not a pejorative word in the ISD context; rather it states that performance is *satisfactory* without dwelling on the superior performance and performer, who cannot (by definition) be considered the norm and whose excess capabilities might offer no (usable) benefit.

By the time you have read and digested the substance of *Common Sense ISD*, you will be able confidently to set in motion the processes that will culminate in a working staff, line, or marketing program that will achieve the desired goals–every time. The segment objectives and checkpoints are stipulated by the process: honor the ISD process and it will reward you with a fine, workable, and achieving program! And if you cheat by looking for shortcuts or using guesswork, don't blame us for even the least of the disasters that could come your way with any guesswork program.

On first reading: To get the most out of this book, read through all five of the following phases before attempting to convert any of the information or operations into action in your project. In that first reading, keep in mind that some of the steps of ISD are sequential and some are conceptual; some, serial; and a few are to be performed simultaneously and interactively in wholistic fashion, as in bicycle riding or Federal/State tax form preparation. You'll know which.

Yet the language arts (and therefore this presentation) are only sequential or serial in nature. So if the process is working well, ideas will cluster and flow, even if not in perfect book "running order" for the given discussion. That's synergy coming your way! Synergy of the working parts is essential to the proper function of the entire process, and that synergy must take place in your mind, first and foremost. Have faith: mental pictures will transfer themselves to your operating program. The event is likely and automatic.

On first reading: Do not concern yourself with seeking synergy–you can't seek it. It arrives–the *Aha! Experience*. So do not concern yourself with it, lest you inhibit your own creativity during the useless search.

On second reading: This time jump back and forth as necessary to tie together the logically related elements. That will help you to master the components and see how each contributes to the whole. You can begin to do the actual work during the second time around. You needn't do that from memory because this book is at hand. In ISD: that's the "know/use/aided" category of competence. Check it frequently. And be sure to check your incipient programming at each stage recommended by ISD.

ISD is complex but not difficult. There's a difference. What *is* difficult is the need to make FACT-based decisions in areas traditionally governed by emotions, guesswork, or mindless response to the competition. Fact won't hurt you. Guesswork probably will.

Your Role in the Process:

As the originator and manger of a demanding programming process, you will have to carry the responsibility for resolving discrepancies between the ideas regarding the do-able; between the highly inflexible givens of machines and workplaces and the sometimes grudging accommodation by staff to those inflexibles; between the human impulse to "get something–anything–out there" and the time-consuming precision required to get the right thing out there in the right format to do the whole job right. That takes character and resolve. Yours!

In all real life, training situations relating to personal problems of trainees can interfere with their mastering the jobs/tasks trained-for. As a result changes (sometimes reinforcement) in their *a*ffective state/attitudes might be needed even in cases that look to be straight-forward skill or knowledge based. Be alert to hidden or disguised personal needs and factor them into all phases of your analytic and test procedures.

If affective states are always a consideration, even in cognitive and dexterity training situations; and if much of that dexterity/psychomotor training requires some cognitive input; and if some cognitive matter requires some skills practice, it's evident that you, as the Program Manager, will be dealing a virtually all time with interrelated learning domains. That's normal. Expect it.

Hosford has identified four possibilities of overlap in addition to the three pure domains–or seven constant variables within the three interrelated domains. The three domains and their variables do not have equal import in all training situations. Be alert to small changes in circumstances which can translate into major differences in approach. For example, if a salesperson is expected to demonstrate a machine, that person must practice the dexterity skills basic to the operation of that machine but need not learn all its tricks. Your how-to manual should describe the tricks for later practice. But the salesperson must also understand both your purposes in training him/her and even, to some degree, the repair/maintenance function before the salesperson will feel secure in making the presentation. Many valid corporate on-paper plans fail because the salespersons refuse in the field to attempt the complicated motor skills glossed over in the training room. Sales people will not knowingly make themselves look silly before a client! So forget the direct orders to demonstrate–they will when they feel capable. Attitudes and approaches to the given machine or widget will be colored by the fundamental differences in emphases: a) if the machine or widget is itself the product; or b) if the machine or widget is only the medium for demonstration, as with a slide projector that shows the image of the machine or widget, your product. So depending on the salespeople's concepts of need, their efforts (and therefore their demonstration) and results could vary significantly in that segment of the course which teaches operation of that machine.

Given that logical argument against "simple" solutions to training, it's easy to understand also why the job/task(s) to be trained-for must be separated: so as to identify *terminal* skills and objectives and also to identify the subordinate *enabling* skills and objectives of which the terminal behavior and objectives are comprised. The identification of the skills is a matter and product of the Analysis phase; and the objectives, of the Design phase. But it's all quite logical.

In our lives, the three pure domains of knowledge, dexterity/motor skills, and attitude are always interwoven. Our point here is that any assignment or identification of *primary* domain made in the Development phase using the Algorithms given in the Appendix can reflect primacy without excluding its related values. Program enrichment depends on accommodating valid–not at all extraneous–related elements. Consider all steps within each phase to be slightly adjustable according to your need, *first provided that those adjustment are not your disguised attempts to avoid fresh critical thinking, each time.* Avoidance is intellectual poison.

Fulfilling the Dictates of ISD:

The incipient training program in question originates with you. No one is better able to know when its dictates have been fulfilled. The dictates of that program will be best fulfilled when the dictates of the ISD process are fulfilled:

a) the rigorous derivation of training requirements from the job requirements, as identified 1) by objective measure of existing jobs or 2) by consensus of subject matter experts for potential new jobs, as appropriate;

b) the selection of those instructional strategies that maximize the efficiency of the training offered; and

c) the iterative trials and revisions of instructional materials throughout the developmental phases until the terminal training objective is met.

Then–and only then, according to ISD–is your project truly ready to be implemented. Then–and only then–will it deliver the desired results. . .dependably and consistently.

Finally, because some of our readers will be creating their first training program of any kind, we are providing additional helps and guides toward evaluations of such "jobs" or programs for generic situations. . .but placed in the Appendix, because such extra helps are not an integral part of ISD and are not absolutely necessary. Use and adapt whatever you need.

Do not try to read this entire book at one or two sittings, and do not try to read it as it appears–chopped into many numerated pieces. Rather, read the items that belong together–an entire Phase, if possible; but, if not, surely an entire Roman numeral designation for individual duties or tasks, together with their steps. You'll notice that sometimes words such as Job, Duty, Task and Step are capitalized, and sometimes they are not. The capital letters represent an attempt to separate the precise present usage under discussion from the generic concept of the same word. That selection process isn't always as clear as it sounds, but discrepancy won't affect the sense of the material even if you think I'm wrong. And if you can challenge our choices there, you're already learning!

And if you don't need dependable and consistent results in training, why are you bothering to create a new program?

A few Words About This Book's Construction:

There are no chapters in the traditional sense. ISD has five intrinsic sections or segments (called Phases), each with a few or numerous subsections. Each Phase is designated by a Roman Numeral, I-V. Unlike with true Roman Numeral outlining, letters for segments do not follow next–rather the engineering system of 1.1.1 is used. So your designations here, for example, are I-1-1 or III-2-7, etc. It's hybrid, but simple. Easy. Foolproof.

Although the book has no numbered chapters, every individual segment is numbered by the ISD numbering-code system: [Roman-Arabic-(Arabic)]; so I-1 is the smallest segment number, coming before I-1-1 or II-1, etc. If you know engineering's 1.1.1 system, you won't go astray.

Some of the original materials provided in this book have served both the author and his clients for decades. You'll identify these because they're positively ancient–of the Genus Typewriterus. Although we could have produced a more finished appearance by converting all forms to computer format, that would have destroyed the simplicity that can be seen at the heart of the ISD system and its decades-old related research (quoted in our books *Sales Meetings That Work* and also *Managing Through Training.)*

Suffice it to say that "adequate" is the operative word in ISD. "Sloppy" is not condoned, and "pretty" is irrelevant to learning. You'll learn from Genus Typerwriterus just as fully as from a computerized version. . .and that fact demonstrated here is worth more than any lecture on the topic. For proof, see the Frontispiece's computer-finished "ISD Hierarchy Chart for ISD." Do you really think you'd have learned less if the hand-drawn original were reproduced there instead?

Now carry that iconoclastic understanding forward into your considerations for costing and also for Instructional Delivery Systems media choices (aided by algorithms in the Appendix). Always use the most cost effective (not necessarily the least expensive) alternative Instructional

Delivery System that works, because the US military research long ago proved that skill–not expense–determines learning/teaching values.

Using those intrinsic divisions as separators here creates the most-controllable approach to the many pieces of this relatively complex (but easy, because of its common sense) but wonderfully accurate programming tool. The identification of related, free-standing forms and other related items by ISD-numeral was a military development–we have simply extended it to the whole of this book's text because that seemed the most logical and controllable method. Unlike page number changes, no matter how or how often this text might be revised in the future or others, the Romanesque designation will probably never change.

In the process, we have created original "correlator" forms, among other guides, that will help you to coordinate the many military-type pieces that might otherwise tend to overwhelm by their sheer numbers. However, to preserve both the proof of ISD's simplicity and to preserve due credit to the military we have placed military examples in the Appendix N. ISD is not difficult, but it is demanding of precision–never forget that. What you put into the ISD process is what you will get out: if you honor the system, you will have a program *guaranteed* to reflect and serve your input and initial objectives.. And if you choose not to do all the work yourself, a knowledge of ISD procedures will enable you to supervise other persons knowledgeably and efficiently, including professional consultants.. Then you will not be subject to unjustified rate hikes and silly blandishments that are not only profitable to the suppliers and "consultants" but also worthless to you.

Finally, in choosing whether to create highly-finished work via computer or to reflect the simple but workable items that any organization can replicate with a competent typist, we have decided to use our original handicraft. You can probably use those notes, too, because the idea of "The Medium Is The Message" is a distorting slogan that has been creating problems with content of meetings for nearly 50 years! HumRRO and the US military have already proved otherwise! "Pretty" has nothing whatsoever to do with instructional value! We'll prove it to you by printing photos of our hand drawn charts in an early Appendix section, rather than run them through a computer scanner! This is the least fancy system that any reader could possibly have, and it should be understood on that basis.

Because ISD has been promoted to its widespread (but somewhat disparate) status by the various Branches of US military and some colleges and commercial schools, there is no absolute "standard," although the US Navy, in the mid-60s, won an award for creating the best system. That award-winning system (explained to us personally by its specialist practitioners at Great Lakes Naval Station near Chicago) became our model for this book. However, the military has needs and procedures that require an exceptional amount of detail work, which our spare-time readers don't absolutely need (but might want to use if they prefer not to go mad in the control process). Anyone should understand if military draftees could handle it at that time. Therefore, we have "translated" the Navy/military version(s) into a system that will work for even the smallest business entity that needs to train employees, associates, or neighbors.

You can learn ISD procedures from this book. You can hire specialists who are leaving the military and who already understand ISD–there are thousands or perhaps hundreds of thousands–ordinary guys who learned something new and valuable. You can hire local school teachers and even paid consultants, if needed. But you are not alone. . .and you can in fact do-it-yourself!

A word about additional helps:

Money is basic to all considerations of alternatives; and so we have provided a special costing guide in the Appendix C. It contains items that are both this author's and those of the military. It's intended to provide additional help if you want it, but none of these added materials is essential for your purposes if you don't think so.

As an adjunct to the basic program (because anyone who does these collateral things once or twice can probably do them unaided forever) we have included both a series of 4 key Characteristics Algorithms (regarding various learning areas and objectives) and also a series of 12 Instructional Delivery System Algorithms (those pair with the preceding group–giving you 16 quick, precise guides to the correct media choices for your programming). If you happen to have access to computer-aided instruction, you can read "computer" for any of the visual items that can be converted to computer program or disk. Always remember that the slick new gewgaws that some suppliers would like to sell to you are not necessarily aids to instruction. Buyer beware!

Materials that are essential to your understanding of, or implementing of, the ISD process are contained in-place in the body of the book text, as numbered in Roman-Arabic-Arabic segments...except for the equipment Algorithms and related (noted above) which are too extensive for textual location because they would interrupt. ISD discourages avoidable interruptions.

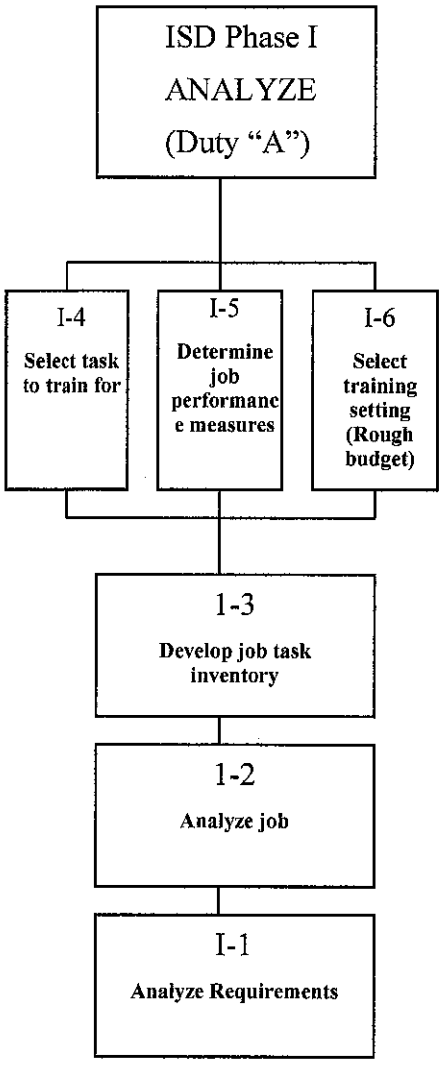
Therefore, the materials in the various Appendices are probably worthwhile, whether created by the author (Author Aids section *AppdxAA*) or borrowed from the Navy (*AppdxN:*). *Correlators* are author-insights and combine two or more Military Tasks or Steps on one sheet for better understanding and ease of use. Forms marked *AppdxN:helps* are not essential on format but might aid you inn concepualizing your needs.

The Appendix N helps marked "N:-," which are totally military, appear as photos of the actual mimeographed military originals. Some diagrams include a few of our notes, which might help you to see how easily the military material can be adapted to personal objectives.

In those early days of ISD's development (as a foolproof system) more than a quarter century ago, there were no production-photocopy machines and few unassigned computers. Programming had to work without "pretty" or "glitzy" elements. . .just as things have been working for thousands of years from the caveman to the invention of the first electronic lens medium–the film projector. The computer simply offers just a different way of getting the same basic, old-style images to your eye. But that computer ease could cost you more money than the incipient program is worth. It's your decision. But if you stick with the Algorithms, you can always get another supplier! Review the entire group of Appendices with your first reading of this book so that you know what's there for additional help if you want it. It also contains other material that we have originated and think might be useful to you.

Now, you show me *your* stuff!

Phase I
Analyze



Key Purpose:

To analyze the actual job. The Analysis phase is based on job-derived information if the job already exists, or on the best appraisals by subject-area experts if the job is yet to be created. In addition to identifying the duty areas and tasks of which the job is comprised, this phase requires that a) the specific tasks to be trained-for now be selected, and b) that an appropriate training setting be specified.

Overview:

Because all further decisions are dependent on job performance factors, the importance of an accurate, factual, current Analysis cannot be over stressed. The biggest single barrier to the proper fulfillment of this phase of the ISD process is human nature: the temptation to save time and energy by cutting corners, like guessing and borrowing. If the job to be trained-for is not precisely described by your data in hand, then you could produce a program that addresses those flawed date adequately but yet does not produce adequate performance on the current job. That shortcoming in assessment is commonplace in the training world–avoid it!

Even if you have previously performed a given job, do not attempt to analyze it from ancient memory. The methods, circumstances, and equipment have probably all changed over the years. Always conduct fresh interviews with job incumbents, their supervisors, and/or subject-matter (or subject-area or topic) experts before beginning the analysis duty.

When selecting tasks to be trained-for, honor the actual priorities of need (guidelines provided by ISD); avoid choosing easier tasks or tasks already adequately served by valid, existing materials. Make all selections objectively, and plan to adapt any valid existing materials much later, but only IF they prove to be still valid.

When you have completed this Phase adequately, you will have a perfect global understanding of the job to be trained-for, and educated opinion about how that training can most effectively be approached, and the data needed to back up your recommendations on how to proceed.

On this understanding are predicated all your future attempts to obtain executive support, budget appropriations, and the cooperation of peers and other employees who are or will be affected.

If your analyses are competently executed, your ultimate program will produce the desired, described results. Count on it!

Tasks to be completed in Phase I:

One: Analyze the Requirements

Two: Analyze the Job

Three: Develop the Job Task Inventory

Four: Select the Tasks to Train-for

Five: Determine the Job Performance Measures

Six: Select the Training Setting

I-1

Task One: Analyze the Requirements:

The job on which you are preparing to focus might or might not exist. That depends on the window of opportunity that you found in your marketing approaches to the Distribution channel and end users and/or the community. But existing job or not, one or more of those concepts needs to be examined to determine its applicability to your perceived advantage, whether in production, marketing, customer service, or elsewhere.

If none of the program ideas or problem-solving approaches is clearly superior to the others as a marketable program, you might wish to analyze several of the most likely. However, because the Analysis process is intensive and time-consuming, it's wise to narrow the field of candidate programs as soon as possible.

For the balance of this Phase and the entire ISD process, then, unless otherwise stipulated, the term *the job* will refer to your key training concept, whether it applied to an existing or newly-created job, ans existing or newly-created training program, or an internal or external (community-based) project.

Generally your internal program will relate to a duty area or specific task to be improved. Zero in on your target task(s) when considering the overall job. (Details under I-2-1.) Of course there's no way to know what external projects might be worthwhile until you've compared community needs with your organization's potentials and budgets.

So the primary step in the Analysis Phase is to determine the scope and extent of the need for training. What are the parameters? Why is training needed or desirable? What shortcomings have been identified in existing programs/services/products? If a new product or service is at the core, how best can you maximize the benefits delivered and received? If you are "covering" a competitor's programs, what substantial improvement can you introduce? What new ability on the part of the graduated trainee would justify his/her training? How proficient should that trainee be under what circumstances when he/she first appears on the job?

When you have answered the sense of those types of questions, you will have identified the job tasks to be analyzed.

It's reasonable to expect that some of the interpretations and assumption that you make early in the programming process will later prove inadequate or wrong. Therefore, be sure not to get hung up on early ideas and choices. Be flexible for as long as possible. However, there are enough checks and redundancies built into the ISD process (called *iteration*) to give you not only the opportunity but also the clear signals to make adjustments, if and when needed.

If you stay alert to the possibility that change or improvement could come at any stage of the process, you will be honoring the iterative nature of ISD.

Problems, if there are any, would most likely be generated by the discrepancy between the need to be precise in the analysis of the job despite the imprecisions and extrapolations on which many worthwhile marketing programs are based. Programs regarding actual products usually are easier because the parameters are already finite.

Obviously you will have maximum control if company employees make up the bulk of your trainee or instructor population–which might or might not translate into adequate control.

Always target a workable capability range. You have the right and even the obligation to exclude the incompetent or marginal performers early by selective invitation or formal entrance exam or stated prerequisites for entry.

The component least amenable to compromise is expertise. You must be, or have access to, an expert in the job or subject-area. That expert's authority is the sole justification to undertake a training program. Complete the following "Preliminary Needs/Discrepance Analysis Guide" before taking any further actions.

Preliminary Needs/Discrepancy Analysis Guide

1. Job Title and Department: description of function..

2. What must the trainee be able to do after training?

   Describe fully the a) behaviors or performance; b) conditions; c) standards.

3. Primary training domain: cognitive or dexterity or affective or combination? Specify.

4. Description of needs or discrepancy or problem identified. Function _____.

   a) how noticed?

   b) by whom (malfunction) noticed?

   c) frequency of recurrence:

   d) degree of seriousness:

   e) cost of ignoring:

   f) potential solution: __to be determined; __ already establishes: describe:

   g) other departments affected:

   h) comments:

5. Resulting instructional program should be:

   a) new: a) job; b) duty; c) task.

   b) revision of existing training program because:

   ___job or task has changed, given:

   ___product/service is modified so that:

   ___job performance by incumbents is inadequate, as indicated by:

   ___(internal) (external) job audit reveals:

   ___other; specify:

6. Related courses and materials (books, manuals, films, computer tutorials, etc.) that might be useful or adaptable (do NOT attempt to analyze at this point:

   Type: Title: Source:

7. Supporting documents (syllabi, lesson or session plans, manufacturer's specifications, engineering drawings, etc.):

8. Experts or authorities on this subject-matter area (other than professional trainers or job incumbents):

9. Job Performance Measures, if identified (predictive task tests of essential performance capability):

10. Degree of job proficiency required:

    ___absolute mastery: ___on the job; ___via training course; or

    ___practical command: ___on the job; ___via training course; or

    ___general familiarity: ___on the job; ___via training course.

11. If full proficiency is not possible or practical in this training course, how will the trainees' skills be augmented on the job?

12. Proposed Jury of Experts (selected from among authorities, subject-matter experts, job incumbents, etc.) to make or approve decisions being made regarding job training for this project:

Name: Function:

13. Concise summary of program purpose, format, and marketing advantages:

14: Positive impact if new or revised program is undertaken:

15. Negative impact if new or revised program is not undertaken:

16. Schedule of significant events or dates if undertaken:

17. Financial requirement (high/low/optimum, if available):

Calendar for budget commitments (see Appendix A):

Anticipated ROI:

18. Proposed calendar for development, implementation, and audits:

19. Endorsement (of needs and/or intent to use) by parties affected:

NOTE: This completed form can become a preliminary project justification when seeking enabling authority and initial appropriations. Copyright ©2003, Richard Cavalier

I-2

Task Two: Analyze the Job:

An accurate picture of the actual or proposed job or task is the indispensable source document, and job incumbents (current job workers and their immediate supervisors) are the prime authorities on the day-to-day function of existing jobs. In some cases, there are technical experts as well who can be consulted–and must be consulted in the case of jobs being newly created.

Key question: Are you training-for the entire job, or for only one duty area's task(s) for that person/job?

All parties must be agreed on one point: *What are the criteria for adequate job performance in that job's duty or task area?* How, when, and under what circumstances will the adequacy be proved?

All the experts or authorities you assemble for job assessment, whether job incumbents or subject-matter experts, can be considered your Jury of Experts. They will identify and resolve discrepancies.

Although you will ultimately be shifting your focus to training objectives and methodology couched in training terminology, your early information about job performance will almost surely originate with individuals who have little or no training know-how, regardless of any advanced degrees or how many needed dexterity skills they have. Most persons know what they're doing but not necessarily how or why they're doing it.

Therefore you must be prepared to accept their information in whatever form they can best express it. It would be counter-productive to force all of them to learn training techniques and

large blocks of terminology before they could communicate with you. Just be prepared to do the "translations" yourself.

The following Analysis segment contains several forms by which you can obtain information easily converted to your needs. Concentrate on the accuracy and validity of the raw data and opinions received–that's where the safety of the program lies.

I-2-1

Task Two/Step One: Gather the Job Information:

Our information-gathering forms will help you to get past one of the major barriers to the communication of ideas–the inarticulation of the seeker .But no form can help you to avoid the single biggest trap in the communications arena–jargon. Idiosyncracies expressed in the exotic and highly specialized use of language might help given groups to separate insiders from outsiders and might in fact help to express involved concepts briefly among co-workers, but that comprehension does not travel well, and persons outside the user group will not understand. Without understanding, effective training is not possible.

When making your requests for information, ask that common English be used. Ask that they tell you what the job really is–not what it should be and not what they were once told by the Personnel Department that it should be. Most written job descriptions are probably somewhat out of date. Ask that, whenever more than one person performs a similar job/duty/task, the group cooperate on a single description. A consensus view will be the most accurate. Get the approval of the supervisor who oversees that group so that the consensus view is further validated before you begin to use it in your programming. Any unresolved discrepancies in peer viewpoint can help to identify actual or incipient problems; unresolved discrepancies probably mean that the supervisor will need to make changes in the job, and those changes can affect your incipient program. Settle the problems now and remain alert to useful cues from other directions.

Basic schematics for correlating job information:

Probably the most common schematic form for conveying relationships of bodies of information is the outline, whether Roman numeral or decimal style. Most executives use one style at least occasionally, and nearly all language-oriented jobs require its use frequently. They both say the same thing–so be comfortable in your choice. A skeleton outline appear at the end of this section. It has enough information entered to correlate this outline with the other schematics of the book while offering you an example based on an every-day familiarity–an employee/typist's job.

Less articulate persons might be able to express concepts and relationships more easily in diagrammatic form than in words. The Job-to-Course Correlator coin diagram is presented as an example of how easily job tasks and steps can be correlated for reporting to you. So the job information can be presented in a way that's useful to you without depending on language-oriented logic. Such visualized relationships are just as valid as the written outline format. Diagrammatic notations can always be amplified, if necessary, in later conversations. Ideas are what really matter–and ideas are mental concepts that language tries to approximate. Schematics can often approximate concepts as well or better than verbal descriptions will.

Anyone in business understands the duties and tasks that are comprised in the job of a secretary. To complicate our example, we have stipulated *legal secretary* in the coin diagram format of the "Course to Job Correlator" (see Appendix AA.)

Here's how it works: The job of Legal Secretary (Personnel Departments and purists call all jobs *positions*) is made up of a cluster of duties, here set arbitrarily at six. Duties are generally labeled with letters. Notice that Duties D, E, and F are to some degree interrelated; and that relationship will later be reflected in time frames, to be discussed.

Consider Duty D–Typing: This is shown in a defensible breakout of tasks. The exact breakout is irrelevant because what's important here is the fact that the diagram under Course IV–Typing (Duty D) is identical to the Course IV entry of the Roman numeral outline discussed. This is only an instance and example of the high degree of transferability of items that on their face seem to be discrete and incompatible. Don't let irrelevancies overwhelm you.

It's easy to correlate materials if your diagrams and outlines concentrate on ideas. Either form–Roman numeral or coin diagram–can be considered source documents regarding the job itself; and the next section–Phase II–will instruct you on how to convert all the basic documents, of whatever format, into training-oriented documents that you can act on.

In actuality, your sources might not provide documents that match so neatly, but the idea is valid. Just talk with the originator if clarification is needed and slot it according to your program's Master Outline. Never guess at an interpretation. Guessing introduces a high potential for error into programming and outcome.

Structure your inquiries to associates accordingly. It is the later responsibility of the Jury of Experts to resolve discrepancies, spot inadequacies, and eliminate irrelevancies. Get the facts now, but deal with them later, when instructed to do so.

The two forms of schematics (coin drawing and Roman numeral outline versions of "Legal Secretary," used in this Phase) relate to the content of the same program. Content is central, of course. But content outlines alone can't reflect the time required for instruction; and so a descriptive calendar of events is needed. All three types of schematics can be found here.

The most common form of time-related schematic is probably the monthly calendar, with key dates entered with color or bold printing. For something as simple as a single event, no diagram is needed. However, a rough block calendar showing how a fifteen-week course (for instance) might be repeated three times within one calendar year (without horrendous conflict with holidays) appears in Appendix AA. It is keyed to a defensible breakout of the schematic data for Legal Secretary, if that's set in a time frame. Notice the staggered beginning dates for various courses, as indicated by the Duty Areas' identification letters.

But the time notations given in the block calendar have a more comprehensible relationship when delivered on a PERT Diagram, as is also located here. The Performance Evaluation and Review Technique (PERT) was developed by the US Navy with consultants and suppliers working on the Polaris submarine. PERT represents timed logic and identified optimum flows and bottlenecks in complex projects.

Notice that as Secretarial Courses V and VI are phased in after the first month, Course III soon phases out. Note also that when the Filing course switches from manual file to computer file, the latter coincides with the introduction of the Computer Literacy course.

Although this calendar discussion is chronologically premature according to a strict ISD procedure (not strictly required until Phase III), it is logically related to the information now being gathered ("How long did it take you to learn this part of your job?" and probe: "To be able to do the job properly?" and "To be able to do the job easily to job specifications?"

Try to develop a sense of program running time early in the process because that sense will aid you in viewing alternatives among methods and in making choices you can live with. Program content will ultimately dictate time, of course, but you need a feeling for how much material can be presented in a normal hour or week. There's no sense whatever in scheduling an attempt to teach an entire encyclopedia in an hour, although you might easily teach familiarity with its Tables of Contents in that time.

Whatever your ratio of job incumbents to subject matter experts and/or verbal to schematic source documents, keep a sense of balance. Ask for everything you need, but not substantially more than you truly expect to need, or you'll be buried in trivia. It's easier and more effective and more efficient to go back for more information to a few people who have presented the start of something worthwhile.

When will you find the time to develop the diagrams and schematics for gathering job information? Well, all the schematics that appear in this section were developed from scratch as needed within a span of three days' thinking (not three days' labor); later, they were rendered in final (show-able) form in less than one hour each. Keep in mind that you should not be diagraming *their* jobs–you are presenting an example that they can follow in diagraming their own. . .and for all practical purposes, you can present the coin diagram given here as the example.

You're about to embark on a time consuming project that will benefit from meticulous attention to detail. Spending time up front to organize your thoughts and to focus the viewpoints of other participants will pay dividends early and often.

I-2-2

Task Two/Step Two: Collect and Analyze Job-Related Technical Documents:

In addition to the descriptions and data on actual job performance already provided by subject-area experts, including job incumbents, consider any and all technical information and documentation that might have a direct bearing on either the job/task being trained-for or on the overall marketing program.

Collect all technical publications and relative technical memos relating to the job, to job-related problems, or to describe equipment used in the performance of this job. It's easy to punch edges and place them in a ring binder to avoid file chaos later.

If the job entails the manufacture of parts or equipment, gather those documents also–especially anything published by other manufacturers for your guidance in using their products.

There are three important considerations when you begin to analyze: internal, external, and correlative. Could the organization's own current plans for the product/service in question make the program itself obsolete or inadequate within a relatively brief time? If so, should that problem best be handled with an extremely flexible program or with an early course outline provided to managers, stating the "musts" of the topic? Outlines are easily changed. That option

assumes that the managers (or their choices of substitutes) know the material well and simply need to be guided into a consistent pattern of describing for teaching. On the ISD basis, that is not a safe assumption to make in every case, or you would not be having problems that need to be solved by a new training program.

Small modifications can sometimes work great changes on training approaches. Might any planned new products/services or new models of existing products make the training project irrelevant? If built-in obsolescence is part of your marketing strategy (cars, publications, films), consider your training pay-back period for the time and money invested before embarking on a major new program at all. It might be cheaper and wiser to deal with the problem for a short time longer than to try to dispose of it with training.

Training should never become the catch-all solution to every problem–nor its blame collector. A client manufacturer called us in to determine what was wrong with a training program that did not prevent wild overcharges to the company's original estimates for the cost of warranty service. A training audit consisting of a) paper outlines plus b) a few hours in various classes plus c) conversations with repair persons themselves together established that the training was adequate but that the engineering was deficient: Although there were $2 repairs and $200 repairs properly identified for the product, some of the actual field repairs were made to $2 repair items located behind $200 repair items, with the result that the home office warranty value and the charge-back-time value to the field office repair persons had huge discrepancies. This was not the fault of training! The problem was solved by minor product redesign–to bring the cheap repair items forward and place the more complex things in back. That simple discovery (but with a longer interim time span for implementing the engineering changes) solved the problem; it also ended the arguments between home office and field–immediately.

If part of your marketing strategy is based on perceived shortcomings in a competitive product or service, could a relatively minor correction or improvement by the competitor make your program irrelevant or obsolete? Assuming that the implementation of your program automatically identifies the competitor's weak spot and stimulates him to correct it, can he do so before you have realized the projected full benefits of your training program? If so, to what do you charge the lost expenses? Remember that there are other ways besides training by which to react to the competitors' weaknesses.

Similarly, if a community-based project is in planning, is the underlying problem significant, substantial, and likely to persist long enough to justify your involvement in the development process for the solution? Poverty, battered wives and children, emergency housing, and language classes for immigrants are among problems that won't be eliminated by next week.

Not related to the nature of your product? Yeah–right!

Finally, are all of the materials consistent with each other? Are the key points that were stressed by the job experts actually confirmed in the existing literature? If not, could general understanding, rather than specific training, be at fault? Perhaps most important to your own sense of confidence in the emerging new direction: Are the information and data being gathered still consistent with the program's original direction? If not, are your questions misguided or was the initial direction wrong? If there are any discrepancies of consequence, resolve them before proceeding with the ISD process.

I-2-3

Task Two/Step Three: Collect Job-Related Training Materials:

Early in the process of organizing your ideas (see our companion book, *Managing Through Training*) you probably asked peers and department heads to suggest programs that address identified problem areas or potential solutions. Nice, but don't get carried away with unfounded ideas; simply explore the most likely ideas and then decide their relative values.

If you might be doing a program that's external to the company, such as for your marketing chain or the community, you might also find helps in our related material in the Appendix AA.

Collect materials that other people in your organization think might be appropriate. To simplify this section and place here only the information really necessary to this segment, we have placed the original form entitled "Inventory of Instructional Programs" in Appendix A. It should help you to organize whatever material arrives. Check that form now and determine whether it might help you to solicit information from others in your organization. Do not attempt to evaluate that older material now, or your viewing of the existing material could skew your entire approach to evaluating the true and currently-existing program needs. Put all borrowed materials aside for now because they will figure into your evaluations at a later point in the ISD procedure

Although you should NOT attempt to analyze existing training programs and support materials now (in order to avoid prejudicing your own decisions), this is still a logical time to collect them. When you are gathering information and documents from job incumbents and other subject-area experts, they are sure to hand you training materials, too. Take it. Stack it safely. *Don't read it now!*

I-2-4

Task Two/Step Four: Select the Train-for Topics (Preliminary):

When any company creates a highly technical new product or process, the need to train the end user is self-evident; so the company Training Department or training consultant is usually involved early in the product development procedure. The marketing assignment in that circumstance is to capitalize on the custom-designed user-training package, which could be exceedingly complex. For example, airline pilot familiarization with new models of aircraft was done in the actual plane until the advent of the jumbo jet, which was so expensive and rare that one could not be spared for training. So the cockpit simulator became a money-saving essential; and the simulator could not have existed without the computer.

Every new product or process should be recognized as being itself a potential *barrier* to end-user acceptance when the advantages and benefits are not fully perceived by that user. Complexity scares people, both on-the-job and outside, whether customer or community. If your program serves to simplify areas perceived as complex, it should be regarded as a sales-support essential rather than as a marketing-plus option. If such a situation has escaped the eye of your company's trainers, determine why. They might not be aware of product changes. Or they might not want to invite in new work for themselves.

Except in the case of something as complex as the cockpit simulator, few new products tend to create entire new jobs. Training for *totally new* job functions, especially in highly-complex

fields, should probably be a Training Department function; otherwise you can assign it to a competent training firm or consultant. That costs. Many small and mid-sized firms have more time than money–and this is the do-it-yourself option of ISD.

Essential Terminology (also see Glossary in the Appendix G.)

Your incipient program could easily create a new *duty area* for an existing job. A duty area is defined as a cluster of activities having a purpose and making an identifiable contribution to the whole job. Most *duties*, similarly, are made up of a cluster of *tasks,* defined as discrete assignments with a definite starting and stopping point. Tasks are generally considered to be the smallest meaningful division of labor on the actual job. *Steps* (also called *elements*) are finite operations within any task that have contributory value but no intrinsic meaning (for instance, error erasure and correction within the typing task).

Notice that this particular step of this task in ISD is somewhat complicated (not an indicator) but would serve no good purpose if performed in a vacuum. On any job, which will generally be far less complicated than the comprehensive ISD process describing it, the tasks and steps are simpler, as indicated in the "Secretary" coin diagram discussed earlier. Check that again if you don't remember clearly.

Most training programs that might originate as a marketing thrust would tend to concentrate on duty areas of one or more related tasks; yet there will be exceptions. So the balance of this book will deal with tasks in the context of the total job; and you will make sound decisions every time IF you place even your most modest programs comfortably with the context of the trainee's ranking duty area or total job.

Lower level employees don't need the same information that their company as a whole might require. Learn to segregate and assign in each new instance of participants. How would the user-manager identify the proper trainee if the likely target job/duty areas are not identified? You do not want to obligate busy managers to be trained in your program before assigning it down the ladder. Or do you?

Given the scope of the job or duty area, and given the relatively limited task changes that might be introduced by a minor revision of policy or variation in product, it will be necessary to select which duties/tasks will be trained-for and which will not. That will tend to be a judgmental decision based on what *must* be taught, what *can* be taught, and what portion of the essentials that you can ignore or afford to take on, given a commitment to first quality. Quality itself is not synonymous with media glitz. Preliminary choices are subject to re-evaluation later in the ISD process; so a safety factor is built in.

It is essential that the judgments be related to the issues alone, because the media pool from which the training delivery system will be drawn numbers nearly 100 discrete alternatives. The computer alone can now replicate or consolidate many of the original 100. Nevertheless, choose for the original media strengths and replicate on the computer, if you wish. It is possible, in choosing media, to spend dozens or hundreds of times the amount of money actually needed to do the job adequately. Details in the Appendix. Such excess mediation is a waste of money.

The issues are, of course, priority related. You must decide, preferably in consultation with your full Jury of Experts, which tasks are essential and which are useful; there's no reason to spend time or money on non-essentials–if they really are non-essentials. Some of the useful tasks

might be taught as easily on-the-job by the manager, with no negative effect on the training. Available time would determine whether or not to include an optional tasks in your course; and available time often reflects available budget.

As a result, you might be called upon to perform in miniature the same *type* of prioritizing procedure followed for a major program, such as the cockpit simulator on jets. ISD does not say that any program whatsoever can be exempted from the full ISD process. While your less complex programs would have their priorities and processes resolved faster, there is no shortcut: you must perform all ISD procedures stipulated.

Prioritizing topics is best done in two stages: a rough-cut winnowing of the clearly extraneous subject matter, followed by preparation of a formal Job Data Worksheet. The latter, covered as the next step, focuses on the finer points of the job/task.

Winnowing probably works fastest with a quick skim of all the materials available, during which time the obvious discards are identified and struck. The next pass is made with colored markers in hand. A two-color code will serve not only to separate the *must* categories from the *probables*, but it will also let subsequent readers/advisers enter objections in the margins.

If your Jury of Experts (the group of subject matter/area authorities) is relatively small, circulating a single, color-coded for copy in rotation for notes lets everyone know immediately whether there's a consensus on key points. The Boss should see the document last; otherwise, later entries could reflect intimidation. Besides, The Boss rarely knows exactly how every job should be done. Also the first to view the topic list will not see the later entries unless you circulate the whole. Discrepancies here could indicate disagreements about what constitutes the job itself–if so, there's a mistake hidden somewhere in perceptions or written descriptions, and the mistake must be found and corrected! View this ISD step as a safety mechanism.

If the group of subject matter/area authorities is large, then remarks might have to be returned to you on separate copies. Those notes must then be collected and collated point by point (how lucky to have the computer available) and then returned to all experts so that everyone knows what everyone else thinks before the first meeting, if any. The purpose in both cases is the same–to see whether there's indeed an early consensus about priorities.

After the rough-cut sorting of *musts* and *probables*, those notations in the margin are a guide to the creation of a loosely categorized *Task List*. The level of activity designated as tasks on your "Secretary" coin diagram (or your corresponding Roman numeral outline), plus the corroborating materials found in technical documents, should have yielded relatively clear break-outs of topics. Those breakouts should be collated from the many source documents onto individual, single-topic sheets. It is not necessary that these entries be in any particular order–that happens later. It is important to group like things together so that you get the sense of each job/duty area/task under consideration. For clarity, the ISD Hierarchy Chart provided at the front of the book (and repeated later) is detailed to the Task level, although some tasks have additional steps and elements within them. Our book numbering system reflects the elements, too. Now the selection process can begin in earnest.

GUIDELINES TOWARD PRIORITIZING:

a) select every item that the majority of experts and/or job incumbents feel to be essential to proper job performance;

b) select every item that the majority of experts feel to be essential to proper use/appreciation of your product/service. When the essentials are selected out (or are arguable), subject the remaining tasks to an objective review, considering:

c) descending order of number/percent of workers/trainees who perform this task;

d) descending order or percent of time spent performing this task by the target/primary worker group;

e) descending order of average percent of time spent by all workers exposed to this task on the job, whether or not they do it;

f) descending financial or time cost in making a significant contribution via a discrete but valuable portion of a complex job;

g) any other logical system that can yield benefits by removing decisions from the purely subjective (including conflicting opinions of job incumbents) to data-based decisions.

At this point, you have a sheaf of single-topic job/duty area sheets, each with a list of related tasks/steps. Anything identified as clearly necessary by the majority can probably be included. Be alert to strong contrary opinions from persons who should know, for whatever reason. These plus the clearly *not* needed items can probably be dropped immediately for further discussion now, but do not discard it until discard proves safe.

Because these single-topic sheets together form the source documents for your preliminary Task List, the list should prove to be essentially accurate even if it needs fine tuning later. The Task List will later be incorporated into the Job Data Worksheet Collator. It will then become the first formal document of the process that begins the conversion process from raw data into training orientation.

Remember that all tasks entered on training documents must begin with an accurate action verb followed by a concise summary of what the trainee must *do*. This work forms the next step.

I-2-5

Task Two/Step Five: Construct Job Data Worksheet/Correlators:

With your Task List as your guide, begin to correlate and consolidate all the data that properly belong with each task to be trained-for. The objectives is to produce a document that yields a perfect understanding of the tasks and the proficiency levels that the trainee must attain.

The Job Data Worksheet brings together the three components of a *Complete Statement of Objectives* for any given task of any job/duty area. In gross detail (fine details will be added or refined in subsequent stages of this and following Phases), you will1) outline each specific action-verb Task that will be performed on-the-job; 2) describe the conditions under which that Task will be performed on-the-job; and 3) establish the standards by which the trainees' performance level in class will be measured.

Do NOT attempt, at this point, to determine whether norm-referencing or criterion-referencing is more appropriate for grading classroom test performance. See the sample Job Data Worksheet, in Appendix "AA: I-2-5."

Notice that only one task of the primary Duty is contained on one page, together with component steps and elements. Additional duties and tasks that make up the overall Job will be contained on separate pages. The end result could be a sheaf of pages under each Duty Area. Proper breakout at this stage will simplify the task of creating the related job analysis and design documents, as well as your Master Syllabus. When working with ISD, take the time to get organized and to say that way: ultimately it saves substantial time and labor.

Correlating Formats:

Once you have made a proper breakout of tasks and duties, you have control of both the ISD sequential format (Phase I/Task1/Step 1/Elements 1-a, b, c; etc) and the traditional Roman Numeral format (Job Duty I/Duty"A"/Step 1/ Elements a, b, c; etc). The two do not correlate exactly throughout the numbering system, but they do correlate precisely in the treatment of *subordination.* That is, both the ISD and Roman numeral formats operate on a descending order of importance. Only the labels differ in the two methods–the end result is essentially identical.

Ultimately, your own numbering system can be anything you wish it to be, (including engineering's 1.1.1.1), as long as it's logical enough for you and your colleagues to work with. Understanding the numbering system used here is essential only to your mastery of the ISD process and to correlating that with common outline formats interspersed or in the Appendix.

Because various outline formats yield identical end results, you are able, arbitrarily, to consider the key "Hierarchy Chart for ISD" to be a job description for the Job of ISD Project Coordinator; therefore, each Phase of ISD is equivalent to a Duty Area of the Job, and each Task under each Duty Area of the ISD chart is equivalent to be a Task of the Job. Ditto for the corresponding but arbitrary designations on the coin chart for the Job of Legal Secretary (seen in Phase I-2-1).

Only the numbering system is different among the various print formats shown. And those print formats correlated with the drawings. But if you can shift gears in your car without losing your sense of direction, you can do the same here. The need to correlate will occur in Phase II-6-3, when the Master Syllabus is roughed out as a traditional outline for general discussion of the program being planned by ISD methodology. The Master Syllabus will be composed of your material on cards also converted to schematic Hierarchy Charts. Make an adequate one that will serve your needs–for how long?

Finally, keep in mind as you work through Phases I, II, and III that strict military format calls for rigid identification by number and/or letter for each and every duty, task, step, and element/sub-step identified as a contributor to the train-for objective. Yet it would be silly for you to create an elaborate coding system if only one or a few ISD projects are planned. Too much cross-referencing would be required for too little advantage.

If it's possible for you to describe each train-for duty, task, or step in a couple of words (or abbreviations), you're free to use titles rather than code numbers. Some perfectionists still choose both. This book provides for either or both. You decide what's wisest for you.

The following example is a direct presentation of a military example of a Job Data Worksheet. Notice that it answers perhaps every possible question in its presentation of the requirement for that Job title:

JOB DATA WORKSHEET

Job title: Medical Corpsman

Duty code/title: Applying first aid

Item code (optional): A-001

Job Performance Measures: Task 1: Perform first aid measures for drowning. Elements:

A-001-001: Position the casualty on his back.

Conditions: Performed in all climactic conditions, generally outdoors, in all atmospheric conditions, including toxic atmospheres. In a non-toxic atmosphere, a pharyngeal airway device, if available, may be used in administering artificial respiration. In a toxic atmosphere, the M1 resuscitation tube may be used with the M17A1 field protective mask to administer artificial respiration. Mouth-to mouth, mouth-to-nose, and mask-to-mouth methods require a high degree of respiratory endurance. Elements: Casualty may have other minor or serious injuries–check.

Initiating cues: Casualty is unconscious and is not breathing. There may or may not be a slight pulse. Elements: Same as A-001.

Standards: All steps listed below performed in order listed and to the standard listed for each step. Elements: Victim should be immediately repositioned on back without making further injury. Movements must be made carefully but quickly.

Notes: Detailed information listed in (publication) FM-21-11. SOP is to begin external heart massage and resuscitation procedures even when there is no pulse. Elements: Severe bleeding from other injuries requires attention concurrent with an attempt to restore breathing.

(End of Task One; End of Task Page; Begin new page:)

Job title: Etc.

Duty code/title: Etc.

Item code (optional): A-002

Job Performance Measures: Task 2: Perform first aid measures for first degree burns. . .etc.

Conditions: Etc.

(Direct re-use of military example.)

Author's Note: Task 2, with any subsequent tasks, would be continued on as many pages as are necessary in order to fully describe the Duty of Medical Corpsman. You should be assisted in creating your documentation by using the "Job Data Worksheet/Collator" form.

At this point, it's useful to see the "Job Data Worksheet/Correlator," form in the AppdxAA section at the end of this book, as I-2-5; p135ff.

I-3

Task Three: Develop the Job/Task Inventory (JTI):

Once all the Job Data Worksheet/Correlators are completed, you have essentially described the job and its key components. And, as mentioned, you have prepared a transition document because the Correlators correspond quite closely to the JTI. But whereas the earlier job-related inquiries represent what-the-job-is, the JTI views the same Job through the trainer's eyes: what-the-job-should-be! Yes, the two should match, and any discrepancy seen now represents a mismatch to be located and corrected now. Which document is faulty?

The documents to be prepared during Tasks Three, Four, and Five of this Phase represent a translation from the *doer's* to the *teacher's* language; the identified job remains identical. And although you have recently completed a prioritizing process on what (among all information collected) is essential or useful on the job, you will next re-prioritize for what is essential or useful in the classroom. Again, budget is a factor. If the budget is limited, do fewer and/or smaller things well. Never do ambitious things poorly.

From the moment that costs become a factor in your considerations, you will find help in the Appendix C of this book.

I-3-1

Task Three/Step one: Prepare a Job/Task Inventory:

Using the sheaf of Job Data Worksheet/Correlators, construct a comparable Job/Task Inventory. It must be completed to such a degree that it represents the correlative, on-paper trainer's view. The trainer should have the same view of the job that you now have, once he has read the documents being prepared in the balance of this Phase.

At this point, it's wise and proper to introduce job-related sequence into the documents, if you have not already done so. When the JTI is fully and properly prepared, the progress of the trainee from one point to another should be readily apparent to any job incumbent or subject-matter/area expert who might review the JTI. You shouldn't need to clarify.

JOB/TASK INVENTORY

I-3-1

Project Title: Project Director:
Job Title: Job authority(s):
Duty:

When assessing the Job under consideration, be sure that you separate it into Duty areas and then be certain that you have considered all of the following categories of relative information for each of the identified duties:

Prior step(s) or courses if sequential:

Prerequisites to entering this course:

Location where job is performed:

Actual job conditions:

Performance standards on-the-job:

Tools and Support material or equipment needed:

Priority of need (essential/desirable/optional):

Within each duty, also describe the individual Tasks (with an active verb) that make up the Duty that helps to make up the Job. If in doubt, see the "Legal Secretary" material, including the coin diagram. Essentially: "do what?" to accomplish that Duty?

1.

2.

3.

4. Etc.

NOTE: For purposes of both control and flexibility, do not place more than one Duty on a single page, no matter how many pages nor how brief the description. Simply duplicate all of the reminders above and fill in one for each Duty.

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I-3-2

Task Three/Step Two: Estimate Needs for Support Materials/Media:

Many, and perhaps all, of the tasks appearing on the JTI can best be learned/taught with the aid of collateral materials. This can include the wrongly-used check list–properly used in situations that require rapid job performance in strict running order. These lists must be brief in order to be useful; when more information is required, the check list is the wrong route.

Any tools that are properly used on the job, as well as any visual presentations or distributor/customer literature needed to assure a practiced presentation in the training classroom, as well as outside, later. If you must purchase A/V equipment this project, make that entry, too. How many? The main purpose is to enable you to estimate gross costs so that budget constraints can be observed. You could make a Hollywood spectacular, but does your project need it, and can the budget stand it?

The respective column on the preceding Job/Task Inventory provides for the entry of needed materials opposite the task to which they will relate in the training classroom. As a central mechanism, re-enter equipment each time it should be used. Then it's easier to determine, if you have five entries for a slide project, whether you need five projectors or one projector used five times. However, if you were to enter only the first use of projector, and if that particular duty area/task were later to be dropped during early planning, it's possible to overlook subsequent uses for the needed projection equipment.

The cost implications of these needs can have a major effect on your programming plans. Later chapters deal with actual selection and cost effective purchasing. There's also special help for costing in Appendix C, as stated before.

Obviously, the desirability of selecting any given task for training is a different consideration from the *practicality* or *affordability* of training-for that same task. These are judgment calls IF the circumstances do no dictate affordable support materials; it is never a matter to be settled by flipping a coin.

Before making the selection implicit in Task Five (Job Performance Measures) and Task Six (Training Settings) of this Phase, you must re-select the tasks to be trained-for, *this time from the viewpoint of the trainer*. Support materials and media must be considered; and so you should make the appropriate entries in the respective column of the JTI form before proceeding to Task Four.

In preparing your initial list of collateral needs, consider all of these categories:

EQUIPMENT & COLLATERAL MATERIALS NEEDS

1) Documentation and references: any existing materials that might make a contribution to your resources in planning or in teaching/learning. Don't evaluate yet.

2) Tools: physical implements needed in performing the actual task.

3) Support materials: workbooks, checklists and/or any other aids permitted on the job, plus consumables, such as products, pencils, paper, oil, rags, paint, lumber, etc.

4) Support equipment: any and all mechanical items used by the trainee/job incumbent in actual performance on the job: typewriters and computers, timers, power generators, repairable mechanisms, microscopes, telescopes, ladder, rope; plus meters, gauges, rulers, etc., if used on the job.

5) Test equipment: any mechanism needed primarily for the purpose of evaluating the trainees' proficiency in task performance: meters, gauges, tape measures, micrometers, self-scoring machines, etc., although not needed by the trainee on the job. NOTE: Do not confuse instructor needs with trainee needs, since the number of items needed can vary vastly in a program in which a few instructors will matriculate hundreds or thousands of trainees over the life of the program.

Any and all of these items needed for any task or element (or for the duty area as a whole) should be indicated opposite the appropriate duty area/task on the preceding JTI.

When the JTI is properly completed it will become a document of long term planning value–part of the permanent foundation for the program already underway.

Enter the appropriate information on your JTI now.

I-4

Task Four: Select the Tasks to be trained-for:

In the rough cut prioritizing completed during Task Two, you winnowed out the tasks that do *not* need to be learned in a training environment.

Within the steps of this task, you will assess those job duties/tasks that are definitely or possibly dependent on the training environment (classroom, on-the-job, field trips, etc.) For best results. Then you must determine–on the basis of those needs, the resources available, and the practicality of providing that environment–which tasks shall in fact be trained-for.

I-4-1

Task Four/Step One: Determine Criteria:

Criteria for the selection of the duties/tasks to be trained-for should be agreed upon in advance of task selection by the Jury of Experts from these categories. Consider all of the following categories that apply to each given task:

SELECTION CRITERIA FOR TRAIN-FOR ITEMS

1) Ease of learning: any task/step easily and quickly learned on the job should *not* be trained-for unless it is an important prerequisite to a subsequent step or task.

2) Tangential relationships: do not train-for tasks that are clearly optional and do no materially affect the trainees' performance or proficiency.

3) Percent of job incumbents who actually perform this special task O-J-T (on-the-job): ignore tasks performed by only a few persons among many–trainees can be trained on-the-job if assigned to that special task.

4) Percent of time spent performing this Task on the job: ignore tasks that are performed only occasionally–they can be trained-for O-J-T if assigned.

5) Task criticality: train-for any task/step if it's essential to quality, safety, personnel welfare, etc, *even if not performed frequently or by the majority.*

6) Task delay tolerance: length of delay that's tolerable between discovery of the trainee's need to perform this Task and the subsequent opportunity to train him O-J-T. If tolerance time is short (bottleneck potential, train in class. If tolerance time is elastic, go with O-J-T.

7) Frequency of performance: do not train-for any occasional tasks of O-J-T or supervisory assistance will suffice.

8) Task learning difficulty: if time, effort, and/or assistance needed by trainee are greater than available by O-J-T methods, train in class. If beyond class time, do not attempt in this program; prerequisites?

9) Probability of deficient performance: the degree of likelihood that trainees will fail to perform the task adequately O-J-T unless adequately prepared in classroom.

10) Immediacy of performance: the lapse of time between the training event and the first performance O-J-T, with the time lapse viewed as a contributing factor to trainees' forgetting and failing.

11) Practicality of training: can the workplace conditions be replicated elsewhere, or convincingly mimicked, if that suffices?

12) Any other considerations peculiar to your organization/product/service, including secrecy of proprietary information.

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I-4-2

Task Four/Step Two: Validate the Criteria:

If the entire Jury of Experts has not participated in the determination of the criteria to be used to select the train-for tasks, then they must be consulted now

All job incumbents and job supervisors who have contributed to your information-gathering efforts early in this Phase should have a chance to view the JTI being finalized. If there are not too many individuals, they might also be consulted at this earlier stage. . .by commenting on the criteria selected from the list above. For instance, what is the cut-off line between various percentages of usage or frequency that would trigger training-for here, rather than by On-the-Job (O-J-T)? What degree of difficulty of training is beyond the experience of the job supervisor–or beyond their available time in a normal day? Delay tolerance in hours or days for O-J-T learning?

In any case, your entire Jury of Experts should view these criteria and be agreed that the training that fulfills these stipulations and observes these limitations will be training-adequate.

I-4-3

Task Four/Step Three: Make the Task Selections:

With all the criteria in mind, and with all subject area experts in accord, return to the Job/Task Inventory and complete the given Priority column. Indicate whether each task's training is considered essential, desirable, or optional.

If in doubt at any point, go to the appropriate entries on the Job Data Worksheet/ Correlator below and re-evaluate. Do not guess. Do not flip coins. You must be able to defend every decision made now, even if later developments in the iterative process require slight adjustments or significant changes.

At his point, it's useful to see the "JOB DATA WORKSHEET/COLLATOR" form in the Appendix AA: I-2-5; p135ff.

I-5

Task Five: Determine Job Performance Measures (JPM's):

Job Performance Measures are quality tests or check points that can be used to evaluate the proficiency of job incumbents (and later, trainees) on tasks that they actually perform on the job. In general, both the Job Data Worksheets and the Job/Task Inventories broke out information by

each task and step while describing the job from the incumbents' and trainers' viewpoints, respectively.

Here, the emphasis is on the cluster of steps or tasks or duties which represent culmination points of a given proficiency. One cannot test for each and every minor point of a program– distractions and boredom would quickly set in, and the time required would far outrun the value derived.

Therefore, the ISD process calls for the determination of those tests or check points which are *consequential* to the job. If your job incumbents suggested such items, they were probably entered in the final column of your Job Data Worksheet/Correlator. Bring those forward now and subject them to the criteria you established for all other points being analyzed.

Do *not* under any circumstances select tests or checkpoints merely because they are easy to observe. That's self-defeating. Do not re-use any pre-existing tests without first re-evaluating and re-validating them first. Do not get bogged down in irrelevancies.

Rather, search for and demand *predictive indicators* of the level of proficiency needed. That is, any job incumbent whose job performance is adequate shall be able to perform the tests/checks correctly; and assume that failure of the trainee to perform the same tests/checks adequately would foreshadow failureon the job in that task.

Job incumbents and job supervisors often know what these tests/check points are because they are often the locus of problems or rejected products. Quality control often centers on candidate tests/checks. Yet those indicators represent triggers made from other viewpoints and so are not guaranteed to be valid for training purposes. Get statistical backup to their opinions.

Don't be afraid to dig, stretch, and probe. The document you prepare as a result of this investigation is another foundation stone for the overall program. It must be solid. Never forget that most jobs are at least somewhat different from the Job Descriptions now on file in the personnel office. The job incumbents and their immediate supervisors must be the determiners.

Your Jury of Experts should agree on the validity of the choices as reflected in the completed Job Performance Measures Worksheet. If their numbers are manageable, all job incumbents and supervisors who contributed information should be asked to review the JPM's.

Keep in mind that you are seeking as *few* tests/checks as will represent job proficiency. That is, if the job candidate can do these several things, he/she can succeed in the job. Think task clusters rather than individual tasks, whenever possible. If one or two "knockout" tests/checks would adequately predict performance for an entire duty area, so much the better!

Complete the"JOB PERFORMANCE MEASURES WORKSHEET" located in the Appendix AA section at the end of this book, as AA: I-5 Worksheet; p135, before continuing. (see Appendix.)

I-6

Task Six: Select the Training Setting:

Once you know *what* you should be teaching, you should also have a good idea of how and *where* such a program can or must be taught. The *how and where* considerations are termed the *training setting*. Under ISD, training must be provided in the most cost-effective (not necessarily the cheapest) setting; so choices between alternatives must be examined, together with their financial ramifications .Generally, there are three key settings, each with its own internal alternative or variable: O-T-J; at various local sites; or at a central ("resident") school.

The training setting has a major impact on the costs associated with the introduction and maintenance of the overall program, of course. Since no one is entirely free of the constraints of the budget, it would be wise to estimate costs for at least three most-likely alternatives before settling on one. It is contrary to the ISD function not to compare alternatives, unless examination proves that there are none–a highly unlikely circumstance.

Competent financial analysis of any proposed training program requires essentially the same type and degree of scrutiny that would be applied by your organization to any other investment. As stated earlier, the budgeting process is more or less continual from this point. However, costing appears in this book as a part of the Appendix C, following the whole of the ISD five-Phase structure, to honor the ISD rule that individual training elements not interrupt a cohesive series unnecessarily.

Apart from the overall budget, you must deal with the paid out and imputed costs to create and later to implement the program; to buy and amortize presentation equipment (media) if needed, including computers and other collateral materials; and to justify all these decisions through present-value-of-future-dollars calculations.

Although the basic developmental costs can often ride "free" on the part time efforts of a salaried employee, materials and media usually cannot. Rarely does any organization maintain excess training facilities–shortage is the norm–so classroom space will probably be paid. Yet the largest visible portions of any budget relates to the cost of media and the professional preparation of any portions of the content and collateral materials specified

As already noted, HumRRO has demonstrated that the expense of the medium selected does not necessarily translate into better results; that low cost formats can outperform high priced media, depending on the skill with which each is prepared and used.

Consequently, much of what you commit to will depend on both the abilities and the existing facilities of the parties to the decision-making process. Don't buy new A/V projection systems if existing systems are adequate. Don't make so elaborate a plan that a hotel meeting room is inescapable, whereas the dealer/distributor could probably provide free space for something more modest.

And don't ask audio-visual suppliers to function as consultants. The maxi-media show is a great source of profit to them, since it can cost more than a thousand dollars per minute of screen time; yet it violates training principles with its assault on the senses through fragmented attention. Yes, participants usually clap–but for the entertainment value, not the paucity of learning! For a more extensive discussion of this issue, see the author's companion volume, *Sales Meetings That Work*, especially Chapter 7.

Your cost-effectiveness studies must be conducted regardless of whether or not your organization will bear all costs throughout the lifetime of the given program or whether you will simply provide seed money for the master program structure and give away the operable results, with no further involvement. Of course thee are an infinite number of commitment points between.

What matters is that the implementation and maintenance costs must be borne by someone; and if they do no accrue to your organization, they will accrue to the user. Costs will affect the user's ability to execute the program properly and even color his/her attitude toward it. No enthusiasm, no program.

Moreover, especially in the case of training intended for ethnic groups and the unemployed or under employed, there might be little money available, beyond operating costs for space and tutor salaries, to support the purchase or rental of equipment and other support materials, no matter how desirable the program. Few community-based groups (including ethnics) have equipment or space beyond the bare essentials.

Your choice, therefore, might lie between a) furnishing a basic course that can be augmented by local groups according to their individual resources (and you'll accept ragged, uncontrollable patterns or results); or b) fielding a complete, self-contained training package that minimizes local obligations (yielding predictable results at higher up-front costs to you).

The "best" or best-produced program in either case is the one that maximizes the beneficial results at the most defensible cost levels. A cheap program is no bargain if it sacrifices your objectives; and beauty is irrelevant if the pretty program can't produce measurable results. In fact, any program that initially skates past any reservations from the end sponsor because of its slickness might cause resentment and backlash if it later proves to be disappointing. You are, after all, asking others to become involved with something that affects their job performance, and therefore their careers and lives. Don't expect them to take kindly to being cheated.

If you don't have the budget to cover the entire job that should be done, then do a portion of the job–any portion that has a real value–and do it well! You can always do additional portions in later programs. And if that plan is unworkable, consider scrapping the whole idea now, before an inadequate version does damage to user programs and your reputation.

Budgeting material in the Appendix contains a more detailed discussion of costs. Your purpose at this point is to create ballpark estimates of needs and costs that help you to determine general direction, rather than any specific usage or brand name systems. Read the related Appendix matter now for perspective, but do not now complete the forms contained there, because those forms relate to the actual selections made later, in Phases II and III.

Balances and trade-offs are as basic a part of the estimating process here as with virtually any other manufacturing venture. Make rational choices. You'll probably have plenty of opportunity to defend them from the unbelievers.

Complete the following "Training Setting Worksheet" now.

Richard Cavalier

TRAINING SETTING WORKSHEET

Project Title:

Project Director:

1. This Worksheet evaluates a project based on a (Job) (Duty area) (Task/Step) level described as:

2. Primary domain: ___Cognitive: ___Psychomotor; ___Affective.

3. Appropriate task/content matrix (refer to appropriate Verb Algorithm, III-2-3)

4. Consider all basic circumstances:

a) number and geographic location of trainees

b) related resources already available

c) amount of supervision required

d) learning decay rate (forgetting)

e) behavior extinguishing (un-learning the old before learning the new)

f) underlying motivation of trainees (and employer, if other than us)

g)

5. Overall instructional setting; choose only one of the three key categories if any one is adequate in all aspects; other wise combine (select):

On-the-job training, via:

__job performance aids for current incumbents

__self-help packages for current incumbents (including computer-based)

__instructor-led packages for local or field use

__Support training or coaching by peers or supervisors.

Field (or otherwise decentralized) formal classes, via:

__traveling instructor at our local or field site

__special trainer-training for our local or field supervisors, who will be permanently assigned at their respective sites

__distributor/dealer/end user facilities (specify)

__computerized self-help packages for trainees

Central or resident school and classes, via:

__Classrooms

__ laboratory

__simulator

__other (specify)

__OR combination of _____ and _____, above.

6. Required proficiency level is (absolute mastery) (practical command) (general familiarity) to be achieved (select):

___on-the-job: specify behavior/conditions/standards already established and expected to be med on entry (prerequisites)

___on completion of training: specify behavior/conditions/standards considered acceptable to begin job, if less than 100% of needed job performance level; state grace period for gaining 100% proficiency on-the-job, if delay is tolerable or expected

7. Is a job-level proficiency level really practical as an objective of this training program? (Yes) (No). Why?

8. Ballpark estimates of costs (re: Items 4 and 5 above; see also "Instructional Delivery Systems Algorithm" (located in Appendix N; used in Phase II), including:

a) cost of design and development of this basic program

b) physical plant for (simulation) O-J-T) (class rooms) (other: describe)

c) product(s) and/or job equipment dedicated to training

d) workbooks and other print materials that must be produced

e) A/V sequences and modules that must be produced

f) A/V support equipment not already owned or available (including computers)

g) personnel costs:

__instructor training

__instructor salary

__travel/hotels/per diem

__incidentals

h) amortization expense of borrowed plant/equipment/ facilities, etc.

j) any other identified cost items not specified anywhere above

9. Cost of not training: damage/errors/rejects/lost opportunity, etc.:

10. Marketing/PR value of the completed training program:

11. This projected training program (is) (is not) within the established company guidelines for ROI (demonstrate how).

12. Does your Jury of Experts concur in this assessment? If not, why not? Reconcile conflicting viewpoints or justify your over-ruling of their opinions

NOTE: This Worksheet, when completed, can constitute a program justification. Simplified or amplified, depending on user needs, it can also form the basis for committing job and training personnel who might need to be involved later, as well as for obtaining initial appropriations.

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IN SUMMARY

On completion of the activities and documents detailed in this phase, you should have a perfect understanding of the Job as it is performed; the Job as it is viewed by the job incumbents and their supervisors, and/or the Jury of Experts; and the Job as it can be measured; plus the benefits that the completed program will be able to offer to both the trainees and the sponsoring organization. The same is true of this job's duty areas or tasks, if your focus is narrower.

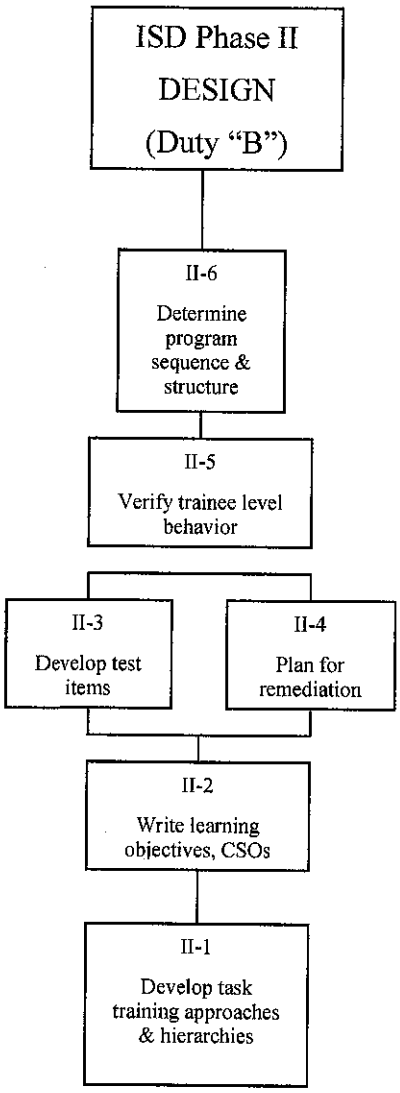
In a sense you are initially committed by these documents, which form the foundation of the design phase following. However, because of the derivative and iterative nature of ISD, you will have ample opportunity to adjust, fine tune, and even correct for unforeseen events, if such events do occur between start and completion.

Trust the ISD system. If you give it the meticulous evaluation it calls for, the program you are now ready to begin designing and developing will reflect the understanding you have of the job to be trained-for. . .accurately and completely. The ultimate program and your initial vision of it will coincide.

And, if your underlying documents are accurate and proper, both the program and you will succeed! Measurably!

END PHASE I

Phase II: Design



Richard Cavalier

Key Purpose:

To design instruction strictly derived from the job performance Analysis of Phase I so that the trainee can *learn to do.* The Design Phase must convert all the job-derived data into training-oriented components whose relationships to each other and to the job can be demonstrated. Using the facts, needs, and documents already assembled in Phase I, you will now create a blueprint. The task hierarchies, learning objectives, tests, and other instructional formats selected now–including a Master Syllabus–will guide the detailed writing and actual construction of program components during Phase III

Overview:

The work of this Phase translates job performance factors into learning objectives, according to specified training approaches. The sequence of these first three Phases, then, is from *what the job incumbent does*, to *what the trainee needs to learn to do*, to *what the trainer must do to facilitate that learning.*

To understand the nature of the learning that must take place is the essence of the Design phase. That understanding is aided by decision-making charts and Algorithms provided.

The learning objectives are highly specific descriptions of the desired learning that must take place. A Complete Statement of Objectives (CSO) stipulates a) the specific task(s) to be accomplished; b) under what performance conditions; and c) to what standards or other measurable criteria. A CSO is the ultimate expression of all the pertinent facts uncovered and all the expert judgments made to date.

Writing CSO's is simple enough. But jobs and tasks are not always simple, or else training programs might not be necessary. The most complex tasks are naturally those most often trained-for: training is *intended* for problem-solving. . .no matter who is bad-mouthing either ISD or problem-solving itself. So don't let rumor or an intrinsically-complex job or task sour you on writing intelligent CSO's. Remember that a CSO is not *complete* until it specifies all three of the criteria above: task, conditions, and standards.

Complex jobs/duties, logically, can be comprised of either a sequence of discrete tasks or a series of interrelated tasks. . .simple or intricate themselves, serial or wholistic. The teaching of the needed behaviors/capabilities might be equally intricate. To recognize these sequences, concepts, and interdependencies, the Training Hierarchy is created. As a consequence, the training design must distinguish between *Terminal Objective(s)* (criterion action, primary-task, etc.) and those *Enabling Objectives* (supporting, secondary, sub-task, etc.), of which the former is/are comprised. The terminal and enabling appellations apply to both cognitive and psychomotor skills, as well as to attitudinal considerations.

Obviously the ability to break out the component tasks/steps of any job is critical to the proper and adequate execution of the Design Phase. Therefore the thrust of this section will be the conversion of the job-related facts and documents carried forward from the Analysis Phase into the task hierarchies and CSO's–all made programmatic through the Master Syllabus. It sounds much more complicated than it really is. If you doubt that, look at the "Secretary" coin diagram again–it looks very complex regarding a very simple and easily-understood job.

Because the Design Phase is so closely related to the Development Phase (next section), there is often some confusion about which element belongs where. Don't belabor the categories. When you recognize that certain Design Phase and certain Development Phase tasks should be worked in tandem, do it. It's like working out your Federal and State taxes to coincide, because you can't complete either of those until you complete both.

In the functioning ISD process, the five Phases are pursued interactively and wholistically. You might treat the Master Syllabus and original CSO's as the initial plan, subject to modification when reworked and refined according to educational principles applied during the Development Phase. Or you might say that the Design Phase is the trial programmatic effort, and the Development Phase is the real-world how-to version of the same program.

In any case, keep your eye on the terminal objective(s) for this section: to generate valid CSO's for your project so as to create an intelligent Master Syllabus for the overall program. Refer to the materials and documents regarding Phase I and Phase III (the preceding and following sections) as often as necessary to merge the information. That is not only wise, but it is the embodiment of the *iterative* nature of program development using ISD.

Generally, one begins Phase II in earnest only after it seems likely that funding is sure, because the ISD process is too demanding to be tackled on a throw-away basis. Once funded, you can proceed without loss of anything, assuming that the Job in question has not changed.

Tasks to be completed in Phase II:

One: Develop Learning Approaches & Hierarchies

Two: Write Learning Objectives & CSO's

Three: Develop Test Items

Four: Plan for Remediation

Five: Verify Trainee Entry Level Behavior

Six: Determine Sequence & Structure

Task One: Develop Learning Approaches and Hierarchies:

Here we decide how closely the Terminal Behavior after training will match the actual job requirements for that behavior, and under what conditions and standards. Budget limitations might preclude a 100% replication of on-the-job (O-J-T) proficiency; if so you must determine what lesser percent of job proficiency is acceptable on the completion of the training course and how and when the balance will be taught/learned on-the-job. Ideally, the training course will be able to accomplish the entire objective. Be sure to distinguish smoothness of performance from competency in performance–things always smooth out with practice, whether or not done correctly.

In Phase I, outlines and coin diagrams provided (arbitrary) schematics of what constitutes a Secretary's Job. The counterpart schematic that advances that initial schematic understanding for ISD is the Training Hierarchy Chart in the Frontispiece at the beginning of this book. A hierarchy is simply a sequenced visual expression of the logical job/task relationships, arranged in a chronological and dependency order. The dictionary says it's an arrangement of things in a graded series. Both knowledge and dexterity skills can be sequenced, and attitudinal elements can be placed among them. Basically, all will go smoothly if you start with the Terminal Objective and work backwards toward the increasingly less-sophisticated or less-complex contributing steps and elements at the bottom. The farther way, the higher the item number–then just teach in that reversed (or a logically-related) order: from simple to complex.

Defining the term hierarchy is easy, but creating one is more involved; Yet creation will go smoothly if the training/learning objectives are first properly defined. That's relatively easy, and it's wise to look upon any major difficulties as possible signals of a mismatch in your own interpretations of job-related documents gathered to date.

Placing Arbitrary Elements:

Hierarchies are common sense approaches to a lot of details that probably never mattered before to anyone but the job worker and supervisor. For instance, the Phase I coin diagram for the job of Legal Secretary shows task steps related to the correction of the typist's errors. You always knew that corrections take place, but do you care where it's taught? If you were teaching basic keyboard typing, the corrections topic could be fitted into any of several places, including accuracy tests and correspondence-appearance considerations. Which would serve your purposes best? Reason it out for any like circumstances of any Job or Task.

Since the beginning typists' work is wall-to-wall errors, no good purpose is served by correcting too early in the drill sequence; student forgetting could (and likely would) occur before the correction skills are used. Catching and correcting your own or someone else's errors might be dull and un-motivating; so arbitrary placement is ruled out. However, as the student typist achieves some degree of proficiency, the traditional time-and-speed tests emphasize the productivity handicap caused by mistakes. Correcting mistakes uses critical time and therefore causes a loss in the words-per-minute on the proficiency test. So the minimization of errors (accuracy drills) and the speed of making neat corrections will coincide in both purpose and

placement. All things considered, speed or accuracy (and not probable amounts of forgetting) should dominate your decision.

At that point in typing/keyboard proficiency, then, the independent step/element skill of correcting errors can be inserted logically and with a synergistic effect. You couldn't ask for a better fit. But you still aren't obligated to use the corrections step at this (or any other specific) time. It's your program. You decide–as long as you don't forget to include it!

That's the logic model for determining hierarchical relationships. In general, you should train-for only those tasks and steps whose proficiency is essential to the next or later tasks/steps. Normally one starts with the simplest or most basic tasks/steps and works upward to the most difficult. In actual application, the lower-order tasks/steps are explored only to the level at which entering trainees would already have the given performance skills–the program prerequisites.

These supposed prerequisite skills must later be confirmed to be both adequate and extant, as well as necessary. ISD will tell you when to consider those items.

II-1-1

Task One/Step One: Select the Appropriate Learning Analysis Approach:

The Job/Task Inventory (JTI) completed in Phase I-1 lists the tasks that any incumbent *must perform* on the job; but here the learning objectives describe the underlying knowledge, motor skill, or attitude that the trainee *must master in class* in order to be able to perform the JTI tasks on-the-job.

Determining the individual components and interrelationships of a task (or its statement) is called *developing a learning hierarchy.* The learning objectives are developed directly from the hierarchy.

There are three key approaches to that hierarchy: the procedural, the hierarchical, and the combination. Each serves a particular purpose. Use the following guidelines when determining which approach to take:

KEY APPROACHES TO A LEARNING HIERARCHY

1. If any given task is not simply the last element to be performed, but rather is accomplished by performing a series of steps, follow a *procedural* approach.

2. If the trainee cannot learn to perform the necessary task without first learning preparatory skills or information, follow a *hierarchical* approach.

3. If the trainee must learn to follow series of steps, and if one or more of those steps requires preparatory skills or information to be learned or requires decision based on subordinate types of knowledge, follow a combination approach.

The characteristics for all of these three approaches follow, with a unifying diagram in Appendix N:

Characteristics of a Procedural Approach

The Procedural Approach is strictly sequential. It does not require the trainee to master any other new skills or knowledge before learning to perform each step in sequence. The outcome and knowledge of each step are fixed. East step is independent and can be taught separately, but each is initiated as the result of the previous step (occasionally, simultaneously actions is required, such as the interacting tuning and volume controls dials of a radio). More than one person could be involved in the performance of the task–team effort–without disqualifying it as a procedural approach.

Needs for the fulfillment of the procedural approach:

1) identify sources of information, including personnel and publications, etc.;

2) identify conditions that initiate the procedure(s);

3) identify how the procedure(s) is/are begun and precisely what initiates the first step;

4) identify all steps in sequence;

5) identify when the procedure is stopped.

Key question: Is each step of the task something the trainee either can *do already* or can learn most effectively by *doing in sequence*? (Example: making a sandwich: a) get out the bread and place slices side-by-side; b) get out the selected filler; c) get out the butter and condiments; d) get out a knife; e) cut the butter; f) spread the butter on the bread; g) add the selected filler; h) add the selected condiments; j) place the bread slices atop each other; k) place the whole on serving plate; l) serve; m) if your mother isn't with you, clean up your own mess. If you want to be fearful of these procedures, you're going to need to try a lot harder at fearing.

Characteristics of a Hierarchical Approach:

The Hierarchical Approach is used for complex tasks; it identifies subordinate skills and knowledge that must be achieved at any of the steps in order to perform the task at the required proficiency level. Various tasks can be grouped around a particular duty, system, or piece of equipment under consideration. The complex terminal task is viewed as the culmination of a number of less complex contributory steps, each of which might in turn be broken out into simpler elements. (Example: baking a cake: a) get out the main ingredients (flour, eggs, water, sugar, oil); b) get out a mixing bowl and mixing tools; c) get out condiments; d) get out flour or ready-mix; e) turn on oven to pre-heat; f) break eggs into bowl; g) add measured water and oil to bowl; h) add condiments to bowl; j) mix thoroughly for x minutes; k) pour into baking pan; l) place in oven; m) bake for y minutes; n) check for proper done-ness at end of y minutes; o) remove from oven if done or cook for z added minutes; p) turn off oven.

Notice that this straight-forward procedure could be treated as a Combination Approach if you believe that it's necessary to teach trainees how to break eggs, and/or measure water, and/or use the oven, and/or check for done-ness, etc. Or you could make kitchen prowess a prerequisite to entering the course to learn only this given cake recipe as a generic skill.

Characteristics of a Combination Approach:

The Combination Approach is used when the task in question consists of both simple and complex steps or of a sequence of complex steps. It can encompass either dexterity skills or complex decision-making. Analyzing or designing are examples of a complexity best suited to the combination approach Each step can require the trainee to learn information leading to knowledge skills or practice psychomotor skills and/or to make decisions based on subordinate knowledge or dexterity skills. Actions within each step are controlled by the results of the immediately prior step if the sequencing is proper; and the results of the current step initiate the next step following. (The best common example is probably that of driving a car: simple once you learn, but complex nonetheless. Now consider the interrelated, sequential steps, many of which require prior learning. No, we won't list them here: this is a not a kindergarten course!

See the diagram "Alternative Approaches. . ." in Appendix N for a conceptual diagram of the preceding material.

II-1-2

Task One/Step Two: Construct the Appropriate Job/Task Hierarchy Chart:

Because the running order of the subject matter presented to trainees is largely determined by the hierarchical (or procedural) chart, this step requires and deserves careful appraisal.

The most efficient way to construct a hierarchy chart is to reason backwards from the desired Terminal Behavior to the indispensable immediately-prior step, continuing until the initial step or prerequisite skill is located. If the complex task is made up of several complex steps, determine whether those steps are themselves simple or are dependent on the trainee's first acquiring enabling information or dexterity skill. Continue working back to the initial step/element identified as a prerequisite skill, with no further prerequisites to itself.

Always begin with the most complicated task within any given Duty Group at the top of your chart. Indicators of complexity or importance: tasks that involve a large part of the job time, or which require many sub-procedures or steps for completion, or which tend to be among the most difficult to perform or are the source of most errors. Your job project could be based on duty areas, tasks, or steps. Probably only The Boss has more duties than anyone cares to identify and train-for.

If two or more tasks/steps seem equally complex, start with the one that requires the greatest percentage of job time or is perceived by more than half of all job incumbents/workers to be the most difficult. Among the difficult: operational decision points; tasks that must be performed perfectly from memory; tasks requiring checklists or other job aids to assure proper procedure.

Generating the Chart: Want to save time and temper? Write all your task/element-type entries individually on a 3x5 card and space them on a card table or wide counter. Then arrange and re-arrange the cards until you have the rough equivalent of our "Hierarchy Chart for ISD" as used in this book. Then commit the final arrangement to concrete by photographing the table or counter arrangement in its final form or by sketching the final arrangement for reproduction. Okay–even concrete can be chipped away; don't be afraid to make later changes to the "final" arrangement if some important new consideration shows itself. Flexibility throughout the process–iteration--is a prime characteristic of ISD. *Refusal to change despite good cause* is probably the only real mistake you can make with ISD.

Now let's get more complex: If you use white cards for elements and separate colors for jobs, duties, and tasks, you'll simplify your recording process. Now, under the most complex of the identified duties, bring down all its elements (or sub-steps) in inverse order of complexity–always the simplest at the bottom. Repeat this process for all the duties that make up the job or that portion of the job being trained-for (individual duties). Treat each step-chain of each task separately. Any complex job or duty area could have many white-card packets. Repeat this process for each of the remaining steps in turn. If you discover duplicate sub-steps or elements, flag them for either elimination on their second and repeat occurrences or for special attention/ training.

As an example, the complex (but easily-understood) task of map reading appears below. Notice how it breaks out the many steps into manageable units–and how our notes show how it (and other ISD how-to's) can be adapted to your particular viewpoint or needs. It's important to recognize that in this step of ISD, the job/duty/task/elements under review are being sorted and organized only as they pertain to specific task of this given job of 'getting there". . .and in a

dependency-order only. *Dependency order in performance* and in *running order in actual classroom instruction* are not necessarily identical. Notice the handwritten numbers indicating an alternate (but equally valid) sequence under the "Read Compass" chain in the center. You have much flexibility in establishing dependency chains! Use common sense.

Sequencing: The determination of running order is called sequencing and is completed during a later task in this Phase. Do not attempt to give a numerical order to your table-top packet-patterns at this point.

When all the elements (or sub-steps) for all the steps under consideration have been completed, check for errors. Read your hierarchy charts from the simplest elements at the bottom to the complex terminal task at the top, via the enabling steps. The progression should be small-stepped and logical. Any gaps represent possible errors. Are the interrelationships apparent? They should be. Where there is no direct bridge, are you introducing another prerequisite or a different topic? Resolve all discrepancies on paper before considering the initial (revised?) pattern to be complete.

When you're satisfied that the dependency orders are accurate and complete, protect the pattern by transferring each individual task/step hierarchy to a separate sheet of paper–intact, by drawing it exactly as it appears on the table.

When finished, continue with the next task for that duty area or job. Also continue with the next task in this Phase II.

This is a good time to view the "Hike" sketch showing creation of a simple hierarchy chart. See Appendix N.

At this point, it's probably helpful to review the author's sketched material, located in Appendix AA: a) coin diagram, b) Roman numeral outline, two-page spread; c) Secretary-PERT d) calendar/PERT. These have been used successfully by major corporations.

EXAMPLE OF TERMINAL OBJECTIVE

Course: Field Training Lesson/Session Topic: Service/Repair

Terminal Task(s): Locate and repair three items of malfunction of machine.

Type of Objective: Terminal task.

Learning Objective: Trainee must troubleshoot and repair our product photocopy machine.

Test Conditions: Malfunctioning machine capable of proper function when serviced/repaired.

Performance Standard: Trainee shall diagnose and isolate individual faults to the respective electronic board and/or mechanical component levels, using company repair manual, no coaching (field conditions), while watched and evaluated by instructor

Learning Domain: Cognitive/Problem solving

Task Level: Remember-use-aided.

Test Items: Instructor shall pre-fault machine at three points: interrupt electronic flow-control of ink, dislodge mechanical drive chain for paper feed; and loosen connection in wiring for self-diagnostic trouble light.

Support Material: Our "Troubleshooting Made Easy" handbook plus "Company Repair Manual."

Media Selection: Booklets above plus film "Troubleshooting Made Easy."

Equipment Required: Photocopy machine; tool kit, including circuit tester, repair handbook and manual stated.

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EXAMPLE OF (RELATED) ENABLING OBJECTIVE:

Course: Field Training Lesson/Session Topic: Service/Repair/Diagnosing

Learning Objective: Trainee must list the sequence of steps required to diagnose and isolate fault in our product photocopy machine.

Test Conditions: From memory and trainee choice of support materials.

Performance Standard: All steps must be listed in the correct order as presented in "Troubleshooting Made Easy" handbook.

Learning domain: Cognitive/recall.

Task Level: Remember.

Test Items: The following symptoms indicate a fault in the flow of ink to the printer head (list symptoms): Trainee must list the correct sequence of steps required for trainee to isolate the fault to the circuit/component board level. No deviation is permitted from steps specified in "Troubleshooting Made Easy" handbook.

Support Materials: "Troubleshooting Made Easy" plus trainee's choice of other materials.

Media Selection: film,"Troubleshooting Made Easy."

Equipment Required either video player or computer disk, instructor's choice (he/she specifies)

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LEARNING OBJECTIVES ANALYSIS WORKSHEET

Course: Lesson/Session Topic:

Task (from JTI, Phase I):

Type of Objective: __Terminal; __Enabling

State the Objectives (using only action verbs):

State the Job/Test Conditions:

State the Performance Standards:

Primary Learning Domain:

__cognitive (knowledge, problem solving, etc.)

__dexterity (fine or gross movements, or combination)

__affective (attitude to be strengthened, changed, or extinguished)

Task Level (See II-3):

__ remember

__ remember-use

__ remember-use, aided

__ remember-use, unaided

Describe Key Predictive Test (for any/all valid predictive tasks/steps):

Selected Support Materials (including visuals–see Phase I-3-2):

Preliminary Media Selection (See Phase III):

Equipment Required at test site, (specify whether job or classroom):

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II-2

Task Two: Write Learning Objectives from Hierarchy Charts:

Converting the countless task/step/element (or sub-step details of performance represented in the hierarchy charts into specifications for training is the purpose of this function.

All Learning Objectives must be definite learning specifications written in terms that stipulate exactly what the trainee must be able to do on completion of each training step or task

When properly formulated, such learning objectives must state all three of the following requisites (as CSO's);

1) the specific *performance/behavior* that must be demonstrated: what the trainee must be able to do to demonstrate his proficiency. The stipulated actions (verbs) must be observable, measurable, and verifiable.

2) the *conditions* for performance or demonstration: specify the "givens"–the instructor helps and job aids, if permitted; the created problems/faults or created barriers or simulated "natural" conditions that the trainees must solve or overcome during the performance or demonstration. It is especially important that repair personnel, for example, not be handed "perfect" machine examples if trouble-shooting is intended to be one of their Terminal Behaviors because customers don't demand repairs on functioning machines.

3) the *standards (criteria)* for performance: the exact proficiency required–such as perfection, or 90%, or four-out-of-five tries, etc. Generally criterion-referencing is often applied to dexterity/psychomotor skills (which tend to atrophy rapidly if underused); and norm-referencing, applied to knowledge/attitude areas of learning (which tend to improve with use).

However, the dictates of the job itself must govern, since certain required types of knowledge must be absolute: should your surgeon or dentist be permitted an 85% proficiency rate as being sufficient before working on you? Ditto for architects, engineers, and many other public-trust professionals that you might be training.

When you can write your program Job/Task Learning Objective(s) in a phrase that stipulates what behavior or action, under what conditions, and how measured (all three as presented above), then you have created a Complete Statement of Objectives (CSO).

Any entry level skills (prerequisites) expected of trainee candidates must be reflected here and will be tested for verification in Task Four, following. Generally, prerequisites fall among the lowest enabling objectives: it simply isn't wise to trust any critical tasks to prior and differing instruction by unknown sources. When in doubt, prepare a refresher sequence covering critical skills and information or other independently-gained knowledge.

The properly formulated Learning Objectives that embody all three ISD requisites (behavior, conditions, and standards) are, as stated previous, known as the Complete Statement of Objectives. Because your CSO's govern most subsequent decisions the need for accuracy and precision cannot be overstated.

In every instance, the performance/behaviors and the conditions and the standards must reflect the actuality of the job itself either perfectly (whenever possible) or to the best-possible approximation (when cost or time available or logic preclude training to perfection. In the latter

case, subsequent O-J-T training should be planned at the same time to get the new graduates up-to-speed before their remaining deficiencies cause problems or discourage them.

If your CSO's reflect the job itself–no guesswork or outdated descriptions by old timers on staff–you will be able to fulfill the remaining dictates of ISD properly. Virtually all else remaining (the bulk of the work) is a fulfillment of these early findings and commitments.

For a prime example of hierarchical chains, see Appendix N, "Get (Hike) from Point A to Point B; p206." It's mentioned also in the next ISD segment; be sure to study it.

For examples of different facets on learning objectives of various types, see the accompanying material and Appendix items. For examples of Learning Objectives expressed as a Terminal Objective or Enabling Objective, see the charts, "Examples of Learning Objectives" and also "Six Types of Standards for Objectives," both in Appendix AA; p175ff. Although not strict ISD procedures, they should help you to integrate the materials gathered. Solidify your own understandings now.

Then complete your own Learning Objectives before continuing, using the "Learning Objectives and Tests Correlator" in the AA section p155.

At this point, it's useful to see the following forms, located in the Appdx AA section at the end of this book:

"Complete Statement of Objectives" as II-2; p147

"Six Types of Standards for Learning Objectives," as II-2-c; p152

"Examples of Learning Objectives" as II-2-a; p153

"Learning Objectives and Tests Correlator, as II-2-b; p155

II-3

Task Three: Develop Test Items:

Testing is often thought to be an esoteric discipline. It needn't be. When dealing with attitude problems or extremely complex learning chains, testing can be an intricate process in which seemingly minor differences in test structure or phraseology can create significant disparities in results. Concern for cultural bias has about ended the reign of the once-sacrosanct standard IQ test.

Consequently, the field of testing has become a specialty area for some educators and consultants. If your project should present tough questions about testing, seek professional help. Local colleges or schools should be able to suggest someone who can assist you. This need could occur with community-based projects not linked to company products or services.

At all times, be aware of the tendency of schools to create test items that are easily measured because they have previously been coached in subtle ways–and so learners' specific test-memory (cramming, more than learning) is at issue. The difference between education and training viewpoints is explained in more detail in our companion book, ***Managing Through Training***. Also, the students'/trainees' ability to present a high score on a written test is not necessarily a

guarantee that the related psychomotor skills have been learned. You don't really learn how to ride a bike or drive a car on paper alone.

However, we will proceed on the practical assumption that if the projects you are contemplating are centered on your own organization's products or services, the authorities for job performance–and therefore for identifying critical testing points–are accessible on staff. Use that know-how!

Even if the new training project will be used far down the marketing chain, you will still be dealing with familiar products and services. The expression of the testing points will reflect product-service weighted by your understanding of the underlying relationships with the many dealers/distributors and the capabilities of their staffs, your ultimate trainees.

The mistake most commonly made by beginning instructors is to develop tests of subject matters that do not relate directly to the Terminal Objective(s) for the Job, regardless of how well that same material relates to the subject itself.

That is, the trainees might be led to "know" a lot of information and be able to prove it in writing without being able to "use" it (that is, to convert it into job behavior/action). If so, the time spent on such learning is essentially wasted in training. Your organization is probably not running an institution of higher education! Your choices must be observable and measurable under stated conditions of the Job! It is one thing to describe artificial respiration and quite another to perform it properly . . .or to pass the car-licensing written driver test but later fail the road test.

Similarly, because the road test itself will demonstrate whether the trainee driver is able to execute left turns and right turns, the pair of turns *per se* need not be individual test items in writing, even through the proper lane maneuvers will first be taught from diagrams in the course.

Concentrate on the Predictive Terminal Objectives for motor skills; these imply the adequacy of their component enabling objectives. If *doing* is your terminal objectives, then *doing* is the only valid test. *To do* becomes the criterion implicit in *criterion-referenced* testing of a Terminal Objective. And the trainee must still *do* under the stated conditions, to the stated standard.

In knowledge-based tasks, of course, the doing is evidenced in intelligent decisions and/or mathematical problem-solving and/or the identification of chemicals and proportions in a symbolic formula. Even so, if you teach algebraic formulae step by step, the terminal test is to solve an algebra problem correctly, not merely to re-state the formulae. The trainee might properly be asked to re-state formulae during interim quizzes and reviews, when short-hand answers permit the most ground to be covered fastest in verbal discussion and correction.

In know/use task situations, you must never confuse information with the ability to perform! Yes, this is the Information Age, but you still can't perform everything you can conceivably learn about! By diluting the applied subject matter, idle information can interfere with learning. For the same reasons, tests of irrelevant information are worse than useless because they offer false evidence of progress!

Besides diluting the course work, irrelevancies waste money. To hold trainees in any class long enough to gain small incremental benefits can be prohibitively expensive. All valid information is worth knowing. . .it's simply not necessarily worth training-for in a single course unless relevant to (inadequate) performance. Strictly speaking, any matter that negatively affects

performance cannot be defined as "irrelevant."That's the thesis on which public trade school and professional job specializations are based.

It's obvious that in many tasks, speed and confidence come only with abundant practice of the job routine. When measuring performance, be sure to distinguish between *correctness* of performance (which is critical) and *speed* of performance (which can be tolerated at the minimum standard set because speed will surely improve).

Similarly, if absolute perfection from memory is needed on the job, then perfection from memory must be the criterion for classroom testing. However, if performance time is elastic and job performance aids (such as manuals, checklists, or phone calls to home office) can be permitted on the job, then they can also be permitted in classroom testing. In this case, any *ultimate* correct response, even if aided or assisted, would be acceptable even under the criterion-referenced mode. The use of aids in the classroom tests although not permitted on the job must be considered cheating by both the teacher and the trainee.

Checklists again: Back to the source example: Jet pilots needed to invent checklists because take-off a) was extremely complex and b) needed to be performed completed c) in exactly the identical running order every time d) under time constraints so severe that there wasn't time to re-think each item–just to *do* it! If your job situation approaches, that, then use checklists. Otherwise they can provide a false sense of adequacy or completion.

One manufacturer of electronic equipment (among several we've served) was told (in our field research by field repair managers) that a quick way to trouble-shoot was to see whether the correct signal was being sent through the middle of the machine. That localized trouble-shooting to front-half or back-half of the machine–or 50% of possible problems eliminated immediately. Speed! Efficiency! Teaching *where the "middle" of several machines actually was* became a training program addition. However, the home office electrical-path gurus recognized that they knew where the signal should go (basic engineering) but did not know what that signal was accomplishing if received in the middle (basic customer service); and so the gurus couldn't coach newer field reps who needed specific information. The gurus themselves asked to join the new class–as trainees!–when the knowledgeable managers arrived to teach that skill in class. So any worthwhile program that you construct will probably have future uses that you haven't even thought of. Give your new program the time it needs for proper development.

In the last analysis, the Terminal Objectives worth testing-for are almost surely directly related to the predictive test points for job performance, as discussed in Phase I. That, too, is an indicator of the derivative aspect of ISD in operation.

It is essential to both the ISD process and the subsequent success of the program that the tests you design reflect the respective job/tasks accurately. All instructional materials, lectures, and one-to-one coaching must prepare the trainee to fulfill the practical test requirements. The trainees' verbal comprehension of course information, while fundamental to their ultimate performance is pointless if they cannot pass the practical tests already held to be accurate predictors of job success. Public schools must depend to an unhealthy degree on verbal/ intellectual comprehension because there's no practical way to test future life. That, in turn, creates the gap between "educational" testing and "training" testing. Just be sure that your school system test maker understands your ultimate practical needs, and things will work out well.

Clearly the task of test development is not simply a matter of multiple-choice vs. essay questions. In fact, the decision to choose multiple-choice over essay or fill-ins might itself depend on whether the same type of information used on the job can be aided or must be recalled accurately from memory. Multiple-choice questions offer clues–that's aiding. In this sense, like begets like.

What should be evident is that much of testing should be based on common sense, and it is for this reason that the tendency of educators to look to testing gurus was decried by Valletuti and Salpino in the book cited.

Despite that preamble, in testing–as in any other specialty area–there are rules and methods that should be observed. Anyone can use those rules–including you! So don't be intimidated into thinking you're an inadequate test-maker. You (and/or your subject matter experts) know what the proper performance should look like–now let the trainees show that to you. That's a training test!

The next several steps of this task are dedicated to your selection of tests appropriate to the Learning/Training Objectives inherent in the job/tasks being trained-for. Should there be any question in your mind: the Learning Objective is what the trainee *needs* to learn, and the Training Objective is the corresponding methodology of instructing so that the trainees *can* learn it. Logical pairs! Don't let terminology give you a headache.

Remember that your viewpoint throughout the balance of Phase II is learner/trainee oriented. What are their needs? Phase III has the how-to Algorithms for trainers that will guide you in fulfilling needs identified here.

Complete the next two steps as a coordinated effort. Then go back to your Learning Objectives and Tests Correlator (Phase II-2) and write a Complete Statement of Objectives (CSO) for each and every train-for task in that training program (AA; p147 &154; pick phase).

When preparing to verify and select the most appropriate verb for the given task/steps–concentrating on Terminal and Enabling Objectives–refer to both the verbs of the two categories above and the twelve categories of learning Algorithms contained in Phase III-1-1 and in III-1-2. This classification system will be valid for all job/task types.

When the senses of all three entries (the JTI, categories above, and the Algorithms) are compatible, you will have fulfilled this step properly. However, you are acting prematurely if you attempt to assess testing requirements before completing the next ISD step. So do that now.

Notice that every task identified in all five Phases of text bears the same numerical designation as its counterpart block in the ISD Hierarchy Chart. That ISD Hierarchy Chart was created exactly according to the methods and instructions given in this Phase II material. Each of the five Phases (or "Duties of the Job of ISD Coordinator") is an independent whole; yet each acquires a dependency relationship in the *procedure* that comprises ISD.

To give you a better understanding of the fine points of determining numerical sequence, here's a specific example. All of your step-level hierarchies will translate into, and contribute to, your final big picture; so it's wise to treat this basic material with respect. Any significant error, if undetected now, could cause problems later.

Your first challenge is to determine whether the individual items are dependent, independent, or supportive in nature as each contributes to the respective Terminal Objective.

An example of a commonplace, but complex, Terminal Objective (comparable to what some of yours might be) appears in this section N:helps as the task "Hike from Point A to Point B."

Notice the skill's two major component task chains: hiking and navigating the hike. Both contribute to the overall skill "Hike," and both also include plug-in skills (prerequisites or previously-taught) such as reading maps and compasses or personal-readiness issues before hiking. If plug-ins, these topics will not be taught in this course.

Two component task chains ("Compass Reading" and "Map Reading") can in theory be handled either as single-track or parallel track subject matter. Logic suggests that, given a total elapsed time for the combined instruction of well under two hours (it's not rocket science), a single-string sequence would be best. All of the map-related learning before the compass-related learning (or vice versa) is equally good, but surely both before "Orient Map to Compass." Hike Charted Route" can be learned either before or after orienting map to compass. So understand that *no* Hierarchy Chart is absolutely the *only possible* way–test possible new sequences as often as you wish. If these two topics have life beyond this incipient course, then teach it wherever needed in the organization.

Similarly, such independent objectives as "Sight Compass" and "Avoid Metallic and Magnetic Attractions" could in theory be handled either as train-for elements or as prerequisites, just like "Sighting the Compass" or "Reading Map Grids," even though "Avoid Magnetic Attractions" is a no-brainer in actuality.

As an example of the options in running order of study, all of the seven dependent steps are numbered two ways under the Enabling Task "Read Compass." Which would work best for you? That's the determiner.

By this easy and logical evaluation process, you can sequence all the Learning Objectives for your entire project. However, be sure to read the discussion for Step Three before returning to Step One to begin the actual work that culminates in the (Project) "Hierarchy Chart" and its counterpart, the "Master Syllabus."

As before, working with color-coded 3x5 cards on a table-top will be the easiest way of exploring dependent and tangential relationships prior to numbering the final sequence(s). Yes, yellow stickies might work on the table top, but they don't have much permanence for filing.

II-3-1

Task Three/Step One: Determine the Task Level:

Almost everything the trainee must learn can be easily divided into two key categories: remember and remember-use. These are essentially background/education oriented or training/ performance oriented, respectively. Generally, the *remember* category items do not need to be testedbecause eventual book learning can be assumed; but Enabling Objectives of the *remember-use* categories must be tested in order to assure the conversion of book learning into performance.

During the performance of the action of this Step, you will need to call upon the material just completed with your "Learning Objectives & Tests Correlator." Keep it handy.

II-3-2

Task Three, Step One: Determine the Task Content Type:

In the preceding step, you determined how you wish your trainees to behave during testing of the course content–to remember only or to remember/use (somehow). In this step, you will determine the *nature* of the content to be learned.

Just as the appropriate test format differs for the use or remember categories, so also it differs for the type of task content. . .and the two major categories are interactive.

There are five key types of task content: fact, category, procedure, rule, and principle. Distinctions among these five categories is critical to the proper choice of test format.

Key definitions: *Facts* are simple association between/among any two or more objects, events, names, parts, functions, dates, locations, etc. *Categories* are groupings according to similarity of characteristics or concept, whether objects events or ideas. *Procedures* are sequences of steps that must be performed in order–and always in the same way under the same circumstances. *Rules* are by, nature, sequences of steps that are variable to meet a variety of situations, including circumstances and equipment; they can involve complicated decision-making steps. *Principles* explain the workings of natural or created events or circumstances; they can be either diagnostic or predictive and are based on cause-effect relationships, theoretical statements, statistical evidence, or physical or scientific laws.

In the most complex of the interactions between the two sets of classification systems, principles can be treated as either remember or use in nature, depending on the source of the knowledge being tapped. If the information was taught in the course and classroom, then *remember* is the proper task level designation. But if the trainee's personal experience is being tapped, then the proper task level is *use*.

An Algorithm for coordinating task levels with task content types is provided in Appendix N. Find the best-matched description of your task(s) in the "nature" (left) column and then locate its mated test "format" in the right column, in the corresponding "level" block. Review the "Testing Coordinator" now.

Using all information sources cited, validate and review all the verbs previously used to describe your duties/tasks/steps; make any corrections now; enter the final verb choices in the appropriate location in the Learning Objectives and Tests Correlator (II-2). Complete a Correlator for each task to be trained-for in the program before going on into the next ISD step.

For additional help, see "Twelve Types of Learning Algorithms with Characteristics" (16pp) in Appendix N and also the "Testing Coordinator/Algorithm" and its example, the "Knowledge vs. Performance Objectives Task Level Chart," both below.

Richard Cavalier

TESTING COORDINATOR/ALGORITHM

If this is the nature of the task to be learned...	Then these are the most appropriate test formats:
FACT: Recall or recognize any information, including names, dates, places, definitions rules, parts, vocabulary, etc.	RECOGNITION: Matching or true/false or multiple choice. RECALL: short answer or fill-in or list.
CATEGORY: Remember characteristics of each category and/or the guidelines for classification.	Short answer or fill-in or list.
PROCEDURE: Remember the steps of the procedure.	Short answer or fill-in or list.
RULE: Remember the formula or the steps of the rule.	Short answer or fill-in or list.
PRINCIPLE: Remember the cause and effect relationships or the statement of the principle.	Short answer or fill-in or list.
AT THE "USE UNAIDED" LEVEL:	
CATEGORY: Classify or categorize objects, events, ideal, etc., according to their characteristics (from memory).	Performance or matching or true/false or multiple choice or short answer or fill-in.
PROCEDURE: Apply the steps of the procedure in a single situation or on a single piece of equipment (from memory).	Performance.
RULE: Apply the formula or rule to a variety of problems or situations (from memory).	Performance or matching or true/false or multiple choice or short answer or fill-in.
PRINCIPLE: Use principle to explain, predict, or diagnose why or how thing/event did or will happen (from memory).	Performance or true/false or multiple choice or short answer or fill-in.
AT THE "USE AIDED" LEVEL:	
CATEGORY: Given the category characteristics and guidelines, categorize objects, events, ideas, etc., according to characteristics.	Performance or matching or true/false or multiple choice or short answer or fill-in.
PROCEDURE: Given the steps of the procedure, apply the procedure in a single situation or on a single piece of equipment.	Performance.
RULE: Given the formula or rule steps, apply the formula or rule to a variety of problems or situations.	Performance or true/false or multiple choice or short answer or fill-in.
PRINCIPLE: Given a statement of the principle, explain, predict, or diagnose why or how thing/events did or will happen.	Performance or true/false or multiple choice or short answer or fill-in.

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KNOWLEDGE VS. PERFORMANCE OBJECTIVES

(Verbs: Task Level Chart)

Knowledge:	Performance:
Task level: Remember Verbs: recall, recognize, recite, define, etc. Simple proof of intellectual mastery of given knowledge.	Task level: Use Verbs: choose, determine, operate, position, demonstrate, etc. Higher, more complex levels of learning; require Trainees to act on knowledge gained.
	Examples:
1. Describe in writing the principles on which a voltage meter operates.	1. Determine the voltage of the given ex: using a voltage meter (provided).
2. List the exclusive features of our Model 90 W.	2. Demonstrate the exclusive features of our 90-W product in 3-min sales presentation.
3. Define in writing the terms "primary colors" and "secondary colors."	3. Using any of the three primary color paints provided, mix the secondary color green.
4. Decode each of the following dot/dash symbols into corresponding letters.	4. Using standard Morris code, send message stating: "This is a practice transmission."
Notes: Most knowledge objectives fit into one of these categories: a) recall or recognition b) symbol learning c) systems descriptions, nomenclatures d) procedures*	Most performance objectives fit into one of these categories: a) classification b) rules and principles c) procedures

* Most procedures require the recall of a rule or process, followed by a physical performance; pay special attention to the sense of the verbs when using the Algorithms.

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II-3-3

Task Three: Step Three: Write/Construct the Test Items:

As the paired categories show in the "Testing Correlator/Algorithm" (above), your tasks could require a combination of written and performance (demonstration) tests. At this point, you should be ready to rough out sample test questions and/or describe the critical points of the performance/demonstration tests.

Your roughs must reflect observable and measurable proofs that your trainee has in fact learned the Terminal or Enabling task/step that this given test addresses. What is proper, of course, depends on the learning domain (cognitive; dexterity/psychomotor; or attitudinal) as weighted by the task level and task content type. The actual development of tests will be done in Phase III, and numerous charts there will guide you.

In actual use in class, your tests should be scheduled at logical periods, and they must be fair, clear, and uniformly administered and judged. Here are some practical guidelines:

Test points: Pre-tests can be given as the opening event of the program to establish entry capability. Progress tests should be given after the conclusion of any significant instruction–any

Enabling or Terminal task. Comprehensive within-course tests (mid-term tests) cover all testable material to date, often with special help or remedial work following. Post-tests (identical to the pre-test) are given to indicate the trainee's progress. Since trainees have previously seen the test material, re-using it is not a comprehensive exam. Comprehensive exams are given on completion of the instruction, can include any and all material covered, and are often proctored to assure that test conditions are being met by each trainee.

Fairness: Does the test truly reflect the competency that can be expected, given the instruction, workshops, and materials? Do the progress tests for the individual tasks or steps require only the knowledge/dexterity skills actually possessed by trainees at that task or step? Do the lesson/session progress tests reflect accurately the skills acquired during that lesson/session? Does the comprehensive task test reflect all the critical skills learned and also needed on the job? Does the performance/written for the Terminal Objective reflect the actual job?

If you have *no* to any of these questions, examine the broad implications underlying them, and make necessary changes in your own testing notes. Then evaluate any pre-existing tests that might have been forwarded by other sources. Because these tests might have been used by other trainers for other purposes in the past does not mean that the tests are valid for your course. Perhaps most significant, have you taught and test every skill considered to be predictive of successful performance on that job?

Clarity: Are your instructions to the test-takers explicit? Are you seeking any of several possible answers to be examined in turn (troubleshooting skills) or the one best answer (discrimination skills) among the several? Do your "essay" type questions suggest an approximate number of words appropriate to a full response–say 50 or 200 words? Are you multiple-choice or pairing items so obvious that guesswork, rather than learning, could suffice to pass the test? If so, repair.

If, on the pilot administration of a test, you discover that some phraseology is ambiguous to the guinea-pig test-taker(s), it is your obligation to work out the test solution under all the other legitimate interpretations and to credit correct answers to the unintended interpretations, as well. Then rewrite/reconstruct that test item to eliminate unwanted interpretations during future use with actual trainees.

Uniformity: The administration and grading or judging of written tests and/or demonstrations must be uniform if the tests are to be considered valid, useful, or legitimate in establishing rank orders among all test-takers. Are instructions to the test proctor/administrator explicit about the specific conditions and standards of testing? Have you stated the exact nature and count of pre-faults to be set into the test equipment for "discovery" during testing? Are the pre-faults to be located only or located and repaired? What number of instructor-assists can be permitted, if any? The acceptable tolerance or variation or range of response if estimates or safety limits, etc., are at issue? In short, have you made it impossible for any test proctor to *mis*understand an particular instruction and thereby unintentionally aid or hinder his test-takers? This is especially important during competitions, or when several proctors will work simultaneously with very large groups, or when different proctors will oversee numerous future repeats of the same course.

Given unrecognized instructional variations or biases, all records (including both course and individual class norms and historical records, if important to you), would be distorted. If your tests or testing procedures are invalid for any reason, it will be impossible for you to draw any valid conclusions about not only the tests, but also about the adequacy of the course itself, even

if good. In other words, you could have a fine course that tests out merely average because of test distortion; or have a failure in test-fulfilling course material that looks passably good on paper.

Invalid tests could create a situation in which you don't know whether the trainees or the instructors are at fault for inadequacies; and if you can't locate faults, you certainly can't correct them! None of this is intended to intimidate you or drive you to "professional test-makers. It is intended you to take a hard and common sense look at the materials in hand and available.

Finally, if budget limitations will prohibit your training to standard on-the-job skill levels, determine in advance what lesser competency level is acceptable, and then write/construct tests to answer both the lesser and standard level. Your duplexing here will prepare the Phase III developers of course materials to design for both the classroom needs and the on-the-job augmentation training that follows.

Take care in writing/constructing your tests: they guard your objectives! Review the "Testing Coordinator/Algorithm" in Appendix AA, now. Then complete your test items for all predictive tasks before continuing in the ISD outline.

II-3-4

Task Three/Step Four: Conduct Pilot Checks of Tests:

All test items written/constructed in the prior step must now be given a trial run. Tests based on performance/demonstration are relatively easy to validate because any current job incumbent/worker performing the task adequately should be able to perform the test adequately. If not, the test is probably askew and must be adjusted. Then confirm that a trainee-candidate given the brief excerpt of instruction germane to this test item can in fact succeed in that test and task. Naturally, the trainee-candidate tested must have all entry-level skills required for actual trainees who will take the course work later. Notice that ISD checks its own actions frequently and does not require you to conduct the full course before being confident of its pieces.

Knowledge-based skills and attitudinal states are somewhat more difficult to judge because the criticality of time frames and the permissibility of job aids (manuals, checklists, etc.) tend to color needs. That is, many job incumbents tend to forget the formal details of educational information that they would be perfectly able to update in practice if called upon and if time permitted. As an illustration, many fine advertising writers and journalists have long since forgotten the rules for diagraming the parts of speech on paper, even though they might use the language exceedingly well every day. By contrast, a grammar teacher would be able to do the diagraming of sentence structure perfectly but might not be able to write a press kit or report on a complex political situation comprehensively. Analyze! Is your Objective and Terminal Behavior really *diagraming*, or is it a specific written-language skill leading to clear communications? If any such dichotomies exist in your tasks/steps at the Enabling or Terminal Objectives level, resolve them immediately.

In handling the preceding problem, one would presume the ability of the incumbent writer/journalist to diagram *if refreshed* briefly in class but would not call upon them to upgrade now--that would probably be a waste of time. That does not mean of itself that diagraming is not a proper Enabling Objective for the course. . .it simply means that only a trainee-candidate writer will be tested--not a job-incumbent writer whose work is already satisfactory, diagramed or not.

However, if you were training teaching assistants for a language program, then the job-incumbent teacher would in fact be tested on the particular phraseology of your diagraming test items to determine whether any interpretations of the rules of grammar would interfere with the proper grading of the trainee tests. But caveat remains: Generally, if a job-incumbent who performs adequately on the job cannot pass your test, probably the test needs adjustment.

Pilot testing is an area in which the iterative nature of ISD gets full play. Expect that some elements of many of the test items will need to be clarified or simplified (or toughened!) To reflect the conditions and standards necessary for adequate job performance. Plan to adjust. And each time you adjust some significant element, re-test that item on a different job incumbent and different trainee-candidate, if available.

In the rare case that job incumbents themselves determine that your tests–although passable–are irrelevant to the actual job, then consider that there is a problem in analyzing the Job (Phase I documentation) or in translating that analysis into Learning/Training Objectives (Phase II documentation). What is job-fact today? Yesterday is irrelevant! Do not continue past this point in the construction of your program until any discrepancies in the results of pilot tests can be clearly attributed to isolated, one-time mistakes by the test-taker.

Logically, the trainees should be expected to fail the pre-test–otherwise, why train them? Equally logically, a typical trainee-candidate must be able to pass any test of prerequisite knowledge/dexterity skills essential to the current training project. If the prerequisites are properly assessed, a pass or fail in the prerequisite areas will tend to predict pass or fail in the actual program's task test. That is, if the candidate does have the prerequisite skills you're stipulating, and if your training is adequate, the candidate *should* pass the pre/post tests, the actual course test, and then perform adequately. If this doesn't make sense to you, re-read until it does. It's logical.

By the numbers: The testing of selected individuals on a policy basis need not embrace large numbers in either group unless substantial amounts of money and time are at stake in the final program. That is, if your Job Experts and candidate-trainees are truly typical of their respective groups, several success (or failures), if consistent within the group, are suitable indicators. You are not dealing with public-opinion surveys and their plus/minus margins of error based on thousands of inquiries.

In every instance of valid testing, every test-taker (job incumbent or trainee) must be able to perform to the stipulated standards under (identical) stipulated conditions. When both your pilot test groups (incumbents and candidates) are performing adequately, you can proceed to the last steps of this task.

II-3-5

Task Three/Step Five: Conduct Pilot Checks of Tests:

All test items written/constructed in the prior step must now be given a trial run. Tests based on performance/demonstration are relatively easy to validate because any current job worker performing the task adequately should be able to perform the test adequately. If not, then the test is probably askew, and it must be adjusted. Then confirm that a trainee-candidate (or ersatz staff "trainee") can in fact learn to perform this task-test (not necessarily the full job) if given the brief

excerpt of training that's germane to this test item. Naturally, the trainee-candidate tested must have all entry-level skills required for actual course work trainees later.

Knowledge-based skills and attitudinal states are somewhat more difficult to judge because the criticality of time frames and the permissibility of job aids (checklists, folders, etc.) tend to color absolute needs. That is, many job incumbents tend to forget the formal details of the educational information but would be perfectly able to update that learning if called upon and if time permits. As an illustration: many fine advertising writers and journalists have long since forgotten the exact rules of diagraming the parts of speech, even though they use the language exceedingly well every day; whereas a grammar teacher would surely be able to diagram well but would not necessarily be able to produce outstanding advertising or adequate news articles. If any such dichotomies exist in your tasks/steps at the Enabling or Terminal Objectives level, resolve them immediately: analyze!

In handling the preceding problem, one would presume the ability of the incumbent writer/journalist to diagram if refreshed in your class; but you would not necessarily call upon them to upgrade now (before the course starts), although you could make that a prerequisite. The key consideration is whether diagraming is a necessary part of the ultimate job. If so, obviously you must teach it before you can test it (unless you intend a pre-test to establish skill levels).

However, if you were training teaching assistants for a language program, then the job-incumbent teacher would in fact be tested on the particular phraseology of your diagraming test items, to determine whether any of your own curious interpretations of the rules of grammar would interfere with the teacher's grading of his/her trainees.

Generally, if a job-incumbent performs adequately on the job but cannot pass your test, the test needs adjustment. Period.

Pilot testing is an area in which the iterative nature of ISD gets full play. Expect that some elements of many of the test items will need to be clarified or simplified (or toughened) to reflect the conditions and standards necessary for adequate job performance. Plan to adjust. And each time you adjust some significant element, re-test that item on a different job incumbent or different trainee-candidate. Details, yes: more built-in insurance.

In the rare case that job incumbents determine that your tests–although passable–are irrelevant to the actual job, then consider that there is a problem in analyzing that job (Phase I documentation) or in translating that analysis into Learning or Training Objectives (Phase II). You must determine the *facts* of that job now!

Do not continue past this point of action until any discrepancies in the results of pilot tests can be clearly attributed to isolated, one-time mistakes by the test-taker. Repeated mistakes by various test-takers indicate your mistake, not theirs!

Logically, the trainees should be expected to fail the pre-test–otherwise, why train them? Equally logically, a typical trainee-candidate must be able to pass any test of prerequisite knowledge/dexterity (or motor) skills essential to the current training project. If the prerequisites are properly assessed, a pass or fail in the prerequisite areas will tend to predict a pass or fail in the task test following. That is, if the candidate does have the prerequisite skills you stipulate, and if your training is adequate, he should pass. If he fails, check both the prerequisites, the training JPMs, and related analysis documents (Phase I).

By the numbers: The testing of selected individuals on a policy basis need not embrace large numbers in either group unless substantial amount os money and time are at stake in the final program. That is, if you job experts and candidate trainees are truly typical of their respective groups, several successes (or failures), if consistent within the group, are suitable indicators either way. You are not dealing with public-opinion surveys and their margins of error.

In every instance of valid testing, every test-taker (job incumbent or trainee) must be able to perform the stipulated task or job to the stipulated standards under stipulated conditions.

When both your pilot test groups (job-incumbents and candidate-trainees or ersatz "trainees") are performing adequately, you can proceed to the last Step of this Task.

II-3-6

Task Three/Step Six: Codify Testing and Administration:

Once validated in iterative pilot testing and adjustment, the tests (write, use, or demonstrate) become scripture: all further development stages of the program are dedicated to making the trainee capable of passing the tests and/ consequently, of performing predictive and actual job tasks.

Protect and preserve the tests by a) codifying the tests, standards, and conditions; b) establishing a plan for administration, including scoring, procedures, test security, resources, data reporting/collection and consolidating; and c) continuing the analysis and interpretation of data for the purpose of continual monitoring and refinement of the program: that's quality control!

The policies adopted now will become your long-range administrative control plan. In essence, the policies and procedures you codify are those of the related documents of Phases I and II: Job Data Worksheet/Collator; Job/Task Inventory; Job Performance Measures Worksheet; and Learning Objectives and Tests Correlator.

In codifying the administrative details, you are really preserving critical information that might otherwise be forgotten or misplaced in what could be an appreciable span of time between this point and the implementation of the completed program. You can adjust policy as needed in the future–so be idealistic now.

II-4

Task Four: Plan for Remediation:

Even the best training program will occasionally see an underachiever among the trainees. The reasons will not always be apparent, especially if he/she possesses the entry-level/prerequisite skills. Sometimes the person is undergoing stress in personal life or simply lacks motivation, however well skilled.

The best time to set policy regarding underachievers is now. If the trainee's personal problems of the moment will not become permanent; if he/she is otherwise a qualified candidate; and if you don't want to lose your employment investment to date–assuming satisfactory prior period of employment–he/she will need remedial attention.

On the other hand, a new-hire underachiever who has a motivational problem and has no past record of achievement with the organization is a prime candidate for termination. Should such a person have been hired by field managers, consider that the organization's field recruiting and hiring policies need to be refurbished. If he/she was hired by the central personnel office, find out who goofed and why. Probably the job descriptions are askew.

Keep in mind that some of your tests will be norm-referenced (to this class or all course graduates of the past, if you're merely updating, or to current job incumbent peers); but others will be criterion-referenced: the trainee either can or cannot pass the tests predictive of job performance.

If the job/task itself is not tolerant of errors or shortcomings, then the testing cannot be tolerant, either. In the case of norms, you can afford to bend the rules a little under extenuating circumstances involving a valued employee. In this situation, it's not wise to take on new problems in new employees.

There are two main approaches to the remediation program, if you choose to operate one: coaching in this class, or just dropping back to repeat needed material on the job. In either case, you must adjust the basic program before conducting the next course cycle! *Never* go forward with known errors!

If your tests are properly geared to Enabling and Terminal Objectives, then normal progress testing will reveal any breakdown in the trainees' progress almost as soon as it happens. Trainees should be counseled regarding the shortcoming, coached in any corrective work that needs to be done (reading or lab/workshop), and check-out on the corrective work assigned.

Trainees should then be able to perform adequately on the same or similar test items and should be functioning to their own best capabilities at the next test point. If not, they must be closely monitored, coached again, and then must test adequate or be considered for dropping-back, now or forever. Training should be able to rescue most persons, but except in do-good mentalities, it just isn't always possible. Consider it failure in this instance if you must flagellate yourself; but absolutely no one is always free from failure in life. Don't ruin yours by worrying about it.

Sometimes, if an otherwise competent individual who carries a job load should fall behind in a course that involves much detailed matter and much homework, it's very difficult–purely on a time-available basis–to catch up with the class. Dropping him/her back for the next cycle (if there is one) is highly preferable to crating a bad case of nerves in both the trainee and the instructor. Exercise good judgment.

Considerations on how to project the remediation needs for your program will include the frequency of course cycles, travel and maintenance cost of trainees, and the degree of control you actually have over the trainee (little or none in the case of dealer/distributor staff or the general public, via public service programming).

Purely as a matter of public relations, keep in mind that if you should aggravate either the principal/ owners or their employees in your marketing chain, problems will result. You must decide whether it is better to refuse to certify a givenclient's trainee or to risk his/her damaging your product or your organization's reputation through the type of incompetence already demonstrated during the training program. In other words, do you want the problems in your class or out there? It's not unknown for hostile employees later to punish the trainers by

"accidentally" damaging the product equipment, thereby causing both needless warrantee costs and an unjustified string of service complaints. Have a powwow with your sales rep for that organization, his/her sales manager, and The Boss, if necessary. Decide and commit! There's a lot to protect.

Probably the most effective and defensible approach to that situation is to have a private talk with the recalcitrant trainee is he/she does not respond to the standard coaching. He/she should be told that you have no choice but to report the failure to his/her own boss if there's no shape up, because your product/service is sensitive to mistakes. Then talk by phone with the trainee's supervisor if the unacceptable behavior continues. . .even if that results in the trainee's removal from contact with your equipment forever. Most clients will appreciate your candor if you seem sorry to need to report and don't force an escalation.

And if the faltering trainee does shape up, make a special point of praising him/her so that he/she realizes that the rub is a thing of the past in your eyes. The extra strokes can turn a marginal attitude into a positive enthusiasm. You can't ask for more from anyone.

Commit your remediation policy to paper, and definitely add it to the testing policies just established . . .you're also on your way to establishing an SOP manual for customer training. More fall-in from the ISD process!

II-5

Task Five: Verify Trainee Entry Level Behavior:

In Task One, you estimated the entry level skills (dexterity or knowledge) or attitudinal states that the trainee-candidates should (or must) have. Before one can develop valid course content outlines and materials, it's essential to verify your earlier estimates with live representative candidates.

If the trainees were to have either significant deficiencies or significantly greater skills on entry, problems would almost surely arise from the mismatch with your programming. In self-paced instruction, the overqualified trainee presumably can skip ahead to his self-determined entry. But if deficient, how can a candidate back up to pre-program levels? Under group-paced instruction, obviously the deficient trainee could fall farther behind the class, while the overqualified trainee could become bored and then tune out.

Less obvious is the threat that the entire class of short-fall trainees could fall behind the established company schedule. The results–if the class term cannot be extended–could be disastrous: inadequate instruction sending unqualified trainees to the job site.

Conversely, numerous overqualified group-paced trainees might feel that they are just wasting their time. If a group agree that the course is wanting, that adds to the training load. A whole classroom of overqualified entrants might get rebellious, if the original schedule is kept, and they'll complain on your evaluation forms–or directly to management.

While a wise trainer who's working with a "packaged" course would test for advanced levels and jump ahead in the material if there's consistent, class-wide over qualification, such consistency will be rare unless all trainees happen to have nearly identical backgrounds (fresh out of the same trade school or college specialty area, etc.). But in real life, most variations from

the prerequisite range can cause problems. Accept the fact of your need to verify, and get on with!

No matter how complex or sophisticated the prerequisite skills, they are usually among the lower levels of your train-for Enabling and Terminal Objectives. If your tests are valid, the stipulated prerequisites should enable the trainee-candidates to plug in at or just minimally above the lowest trained for step. That is, a first pre-test of your lowest train-for steps should produce a marginal response prior to training but an adequate response from the "guinea pig" individuals or group after completion of that step's training.

There are three eventualities:

POSSIBLE ALTERNATIVES

1) If the tests are valid, and if the entry level skills of the trainee candidates test out as expected, then the work you've done to this point can safely be presumed to be valid, and you may now proceed to Step Six of this task, sequencing.

2) If all the trainee-candidates uniformly possess the lowest proposed train-for skill but if only some clearly possess significantly higher skills, give a subsequent pre-test for the next higher Enabling Task or Step, as appropriate. If the majority perform adequately at the higher step, consider beginning at the higher level by offering early coaching to the few deficient trainees. Alternatives include an early start (a day or a week, as needed) for the deficient trainees, to be joined later by the better-qualified. From that point on, only one combined class will be held, with no distinctions between the groups. The instructor would normally remain aware of any developing problems via the progress tests.

3) If the trainee-candidates uniformly fail to pass the entrance best based on your prerequisites, you must either raise the stated proficiency levels or lower your train-for Enabling or Terminal Objectives and/or skills. Which alternative is the more cost-effective? Budget and skill availabilities in the job marketplace are the key limiting factors to be balanced or traded off.

Except for the uniformity of prerequisite skills that will result from stipulating a trade school or college specialty, you should not be surprised by ragged pilot test results. The practical problem confronting you in the latter case is to extrapolate from the results: to try to peg the average skill level of the candidates and to determine how to compensate (early coaching, train-for, or reject).

Be alert to the matter of practical equivalencies. There are instances in which substantially different educational backgrounds might create a false illusion of narrow-band competency differences. For instance, if you are teaching trouble-shooting/maintenance on your company's complex electronic equipment, you might hire either technical school graduates with electronics training or graduate engineers. While the latter should have infinitely greater command of the principles of physics (an educational consideration), both groups are equally humble before your product equipment (a training consideration); and the new trade school graduates are probably a good deal less expensive to hire. If their practical electronics know-how is roughly equivalent, as demonstrated by entrance tests of prerequisite knowledge (say, circuitry or other needed skills), then probably they can be trained in the same class that builds on that given material.

While the ideal answer is separate classes for significantly different groups seeking the same training outcome, it's also possible to create a special booster course–or a frequent series of them–as a means of creating a combined groups large enough to justify an infrequent, but more costly key culmination course. This technique would be especially effective in cases in which salesmen who now specialize in one product group are exposed to other product groups before

being given a new, consolidated marketing course in full-line presentation techniques. This is a frequent need when a valued product salesman is promoted to nation-account sales/service status.

There is no proper solution to problems of this type. . .other than to avoid dumping your problems onto the individual trainee. If he/she performs the present job adequately, then he/she deserves to be treated with respect for his/her present level and should not be treated as being deficient in any higher skill whatsoever until he/she is clearly designated as a candidate for your new course. Then all you need to know is, "Are you willing to work at it?"

The possible approaches to the problems of ragged entry level skills uncovered by entrance-level testing and/or predictive task tests are legion. Only you can make the value judgment that those approaches present; and only your imagination (constrained by budget, of course) will limit your range of responses.

Identify and weight the practical alternative according to their relative contributions to your marketing or community service purposes. Make the most defensible decision and run with it. If your organization didn't have confidence your ability to make such decisions, it's not likely that you'd have been given the assignment. Besides, you can always ask when you don't know.

Take advantage of qualified counsel that can be offered by your subject matter experts and trainers and job incumbents. Yet the solution of the problem of entry level skills will affect the outcome of your program. Since that's your responsibility, you should be most jealous of your right to make the final choice, according to the ISD documentation you've developed. Be aware that failure has no takers of shared responsibility besides your own. So never be dissuaded from putting your ISD documentation ahead of all other opinions.

II-6

Task Six: Determine the Sequence and Structure of Learning Objectives:

In Task One, you developed task and step hierarchies based on a dependency order of complexity, leading to discovery of the simplest train-for task and/or entry level prerequisites.

In the preceding task, you verified or adjusted those entry level stipulations. If your efforts to validate have required any changes whatsoever in entry level behaviors, be certain that all those changes are reflected in an adjusted hierarchy chain for the step(s) affected.

The objective of this task is to sequence all the pieces of pieces of all the hierarchy steps into the proposed running order of the new program. As previously discussed, the dependency order of learning is not necessarily synonymous with the running order sequence on the job. One complicating factor is the presence of "independent" topics–those that are not a part of any chain and therefore might be placeable in any of several locations. Sometimes such topics are attitudinal in nature.

Another complicating factor is that the hierarchy charts that you have previously developed reflect separate step chains for Enabling or Terminal tasks *considered as separate entities.* Yet, in reality, all these separate charts are not entities but are part of the whole program. Structuring all these pieces into the whole is much akin to the piecing together of a picture puzzle. When you

know the picture for the completed puzzle (usually shown on the cover) you can begin to sort the pieces by color. Ditto for the "job picture" created by your

ISD documentation. By analogy, the known job/duty(ies) comprise the picture, and the step-chains are your color-coded pieces.

In carrying out this task, you must put the task/step/element (or sub-step) pieces together in such as way as to create an intelligent flow of information.

Although it's relatively easy to determine the inverse order of dependency within a given step-chain culminating in an Enabling or Terminal Task hierarchy, it's less easy to meld several task hierarchies, especially if there are several interdependencies that don't respond to an optimum chronology. That is, the last-learned skills tend to be the best-remembered for test purposes; yet two or more essential tasks could have equal claim to the last-learned slot in that Terminal Duty. Therefore, other considerations would have to be factored into the decision.

As was true for determining the dependency order for steps, do not interrupt procedural or other closely-linked steps if it can be avoided; and be sure to examine all the alternative placement points in the hierarchy pattern before deciding on a good spot for the "independent" learning item, be it an element, step, or task.

Make a value judgment now, because you will have the option of adjusting later, when Phase III development begins. Optimum programming calls for optimum sequencing: that logical correlation of dependent and tangential relationships of subject matter which produces the most learning in the shortest length of time. Again, there is not always a clear best; so let the cost, importance, and expected longevity of the program guide you when deciding whether to adopt one defensible choice or to test-run several pilot variations before committing.

Below, in Phase II-6-1, is a three-step approach to programming; because the steps are interactive, read all three as a unit before completing any. Be sure you've read all recommended materials before beginning to work at it.

II-6-1

Task Six/Step One: Determine Program Sequences and Structures:

Any two learning objectives could have any of these three relationships: dependent, independent or supportive. When fulfilling the requirements of this ISD step, you must determine which of the three is applicable not only vertically within any single task's given step-chain, but also tangentially across different tasks.

Keep in mind that you should be concentrating on Enabling Objectives and Terminal Objectives when determining relationships. This does not preclude your noting items that recur within different chains that need be taught only once–sequence to be determined.

PRIME CHARACTERISTICS OF THE THREE, KEY, CHAIN-RELATIONSHIPS

1) dependent: mastery of one item requires prior mastery of this or some other item;
2) independent: items are totally unrelated to each other but need within the job.

3) supportive: items are largely discrete, but some transfer of learning probably takes place from one objective to the other.

The consequence of these characteristics and relationships are clarified in the Appendix N chart, "Types of Hierarchical Relationships."

II-6-2

Task Six/Step Two: Sequence the Learning Objectives:

The objective of this step is to put an actual numerical sequence on the instructional order of a) all the steps comprising, and culminating in, an Enabling Task; b) all the Enabling Tasks contributing to a Terminal Task; and c) all the Terminal Tasks culminating in the particular Duty being trained-for.

It is possible to sequence all the duties within the overall job being trained-for, but such total reworking is not normally done unless the overall job is being reassessed–or invented from scratch. Sequencing is guided by the three relationships established in Phase II-6-1; that is, dependent, independent, or supportive.

If several independent competencies are required, their respective task/step chains can be sequenced; and the various tasks can be taught either wholly, in sequence; or in parallel tracks, simultaneously. The latter is the high school system: math, social studies, and English for part of the day, every day. But within either of those disciplines, clear sequences occur, and the course work progresses accordingly.

Determining Relationships: The first key relationship to be weighed in this task step is the *dependent* item. At the element (or sub-step) level, it's usually relatively easy to determine dependency orders because the material is so simple. It's also easy to spot direct dependency chains and even key supportive (or tangential) relationships at the task level if the actual job is itself more or less sequenced. This includes processes, which must usually be performed in a very specific sequence in order to be successful. However, if the job requires an operator to interpret and to respond variously to certain signals or indicators, then a random order of response learning would be the training norm; and in this interpretive circumstance, true dependencies might or might not exist. If not, evaluate your alternatives in terms of topic, budget, and potential.

If your program will be extensive, you might want to use a numbering system that will reflect successive levels of achievement. College courses, for instance, are numbered Math or Chemistry 101-102-103 through 401-2-3 to indicate both the course year and the sequence. Dependency chains of prior learning are indicated by *prerequisites* stated for each course in which they are a factor. For instance, basic math is always a prerequisite for algebra, trigonometry, and probably chemistry, but the basic math itself is not taught in any of those courses.

The complexity of your project and the length of time over which intensive training must be sustained (clock and calendar) will all affect your choices. Because parallel tracks can give psychological relief to the trainee, they can help to eliminate the boredom or burnout that some-time occasions unrelieved concentration on a single topic over a long period of time.

A second key relationship to be weigh in this task step is the *independent* item. Given only the caveat that independent items not interrupt any dependency chain or supportive relationships unnecessarily, you can place such items at will. A wise use of independent items is to provide a change of pace from the book work in class, such as lab work or field trips. Independent items make perfect time-adjusters when a dependency-chain does not round out a full day or week. Also, easy or fun items can be scattered to help relieve bone-crushing study sessions. Occasionally the independent items might function as introductory refresher material. If placed early in the session, they might help to spot the better students–so the slow learners can be given extra attention right from the start!

Obviously the independent items have many good uses–don't be too quick or too arbitrary when placing them. Yes, they can occur at any level–duty, task, or step. Place them judiciously.

A third key relationship is the *supportive* item: Sometimes it's difficult to assess supportive relationships because they can operate in unusual or subtle ways. For example, it's been noted that a trainee who has learned either typing or piano playing can usually learn the opposite discipline more easily than the norm because the ability to make finely-tuned motors responses rapidly from black marks on paper has already been honed. Yet one would not generally think to give preference to piano players when seeking candidates for a speed-typing course.

Nearly any apparent similarity between two items *could* contribute to a *positive transfer of learning.* Grouping unlike tasks simply because they related to a given topic or product line or marketing strategy *could* prove to be supportive. There's also the possibility that such groupings could prove to be worthless, which is no worse than arbitrary placement and–for the underlying logic–more defensible.

Determining supportive relationships is not particularly important if the course will be run only a few times; however, for a course that will be repeated frequently, supportive relationships might be worth demonstrating via special testing. Save and use whatever prove out, and consider the rest to be independent items.

Whether or not supportive relations exist in your project, it's wise to group items that require facilities not easily replicated or ignored. For example, if you can borrow laboratory only once a month, all your lab sequences must be completed at that time; and the class schedule must be bent to suit. Or if you have access to costly equipment only occasionally, the same grouping is needed. If such constraints on access prove difficult or detrimental, then you must either seek more frequent access via dedicated, scheduled time or fight for a budget appropriation to replicate the needed facility. Be reasonable. You don't need to build a new lab in order to get a Bunsen burner.

Rationality is the foundation of sequencing; what seems reasonable will probably prove to be workable in the long run, but you have no advance guarantee. Actual experience during the testing phase will determine. Adjust as necessary. As a safety factor, ISD provides for a pilot run of the developing program to be conducted at an appropriate point; and final adjusts can be made then, too, if needed but not found sooner.

In fulfilling the requirements of this ISD step, you will in actuality create a succession of hierarchies. That is, all the steps must feed into their respective tasks, and all the tasks must feed into their respective duties, and all the duties, into the overall job. The sense of this hierarchy would be that of the coin diagram for the Job of Legal Secretary, as seen in Appendix AA.

However, the ISD format, as visualized in graph form, would be similar to the ISD Hierarchy Chart that appears in this section. The work of drawing the appropriate hierarchy chart is a part of the next step, but it will be helpful to you to have a mental picture of where the sequencing of tasks and numbering of task-chains will culminate. Take a moment to review the ISD Hierarchy Chart for this ISD book now. It's in this section, (II-6-3), ahead.

Notice that every task identified in all five Phases of this text bears the same numerical designation as not only its counterpart block in the ISD hierarchy itself, but also as an identifier for the forms that are needed in order to complete the various sections of the entire work. This ISD Hierarchy Chart was created exactly according to the methods and instructions given in his Phase. Each of the five Phases (or Duties of the Job of ISD Coordinator) is an independent whole; yet each acquires a dependency relationship in the *procedure* that comprises ISD.

To give you a better understanding of the fine points of determining numerical sequence, here's a specific example. All of your step-level hierarchies will translate into, and contribute to, your final big picture; so it's wise to treat this basic material with respect. Any significant error, if undetected, could cause problem later.

Your first challenge is to determine whether the individual items are dependent, independent, or supportive in nature insofar as each contributes to the respective Terminal Objective. An example of a commonplace, but complex, Terminal Objective (comparable to what some of yours might be) appears in this section as the task "Hike from Point A to Point B."

Notice the skill's two major component task chains, hiking (needs plug-in skills) and navigating the hike (needs plug-in skills). Two component step chains of the latter can in theory be handled either as single-track or parallel track subject matter. Logic suggests that, given an estimated total elapsed time of under two hours for the combined instruction, a single-string sequence would be best. That is, all of the map-related learning taught before the compass-related learning (or vice versa) but both before "Orient Map to Compass." "Hike Charted Route" can be learned before or after "Orienting," even though actually done afterwards.

Similarly, the independent objectives "Sighting a Compass" and "Avoid Metallic and Magnetic Attractions" could in theory be handled either as train-for elements or as prerequisites, just like "Sighting the Compass" or "Reading Map Grids."As an example of options in running order of study, seven dependent steps are numbered two ways under the Number 8 Enabling Task, "Read Compass." (see Appendix IV.)

By this easy and logical evaluation process you can sequence all the Learning Objectives for the entire project. However, be sure to read the discussion for Step Three before returning to Step One to begin the actual work that culminates in the Project Hierarchy Chart and its counterpart, the Project Master Syllabus.

As before, working with color-coded 3x5 cards on a table-top will be the easiest way of exploring dependent and tangential relationships prior to numbering the final sequences. Yes, yellow stickies are less likely to move, but they are less likely to be filed for future reference.

II-6-3

Task Six/Step Three: Chart and Outline the Program:

While sorting all the leaves represented by the numerous learning objectives and task/steps/elements, you probably couldn't see the shape of the tree you're cultivating, much less spot it in the organization's forest of marketing and technical training programs. In this step, your program's tree takes clear form.

While sequencing the Learning Objectives during the preceding ISD step, you (3x5) carded a new and complete hierarchy into existence. Now that hierarchy should be committed to paper as a permanent reference chart. It might look like either our ISD Hierarchy7 Chart or the Hiking Hierarchy–or like neither of them, depending on your program's own specific relationships. Only two obligations remain in Phase II:

1) Element (sub-step) One: Finalize the Project Hierarchy. In Step Two, you numbered each terminal Objective and Enabling Objective in dependency order. That order–and those serial numbers–should be transferred to the Project Hierarchy Chart.

Once you have completed the schematic drawing of your Sequenced Hierarchy Chart, it will simplify discussion of the program *as an entity* for your job incumbents and the Jury of Experts: the tree will have shape! Doesn't our complete chart aid you in understanding the book's (and, therefore, ISD's) make-up?

For those persons who have a substantial knowledge of the subject matter area, the hierarchy chart is a shorthand way of discussing program content without getting involved in specifics. Yet there will be other interested parties who might not be so familiar with the subject matter areas but might still have a need to know, so as to aid program implementation. They might respond better to an umbrella outline of the main points of the program, called the Master Syllabus.

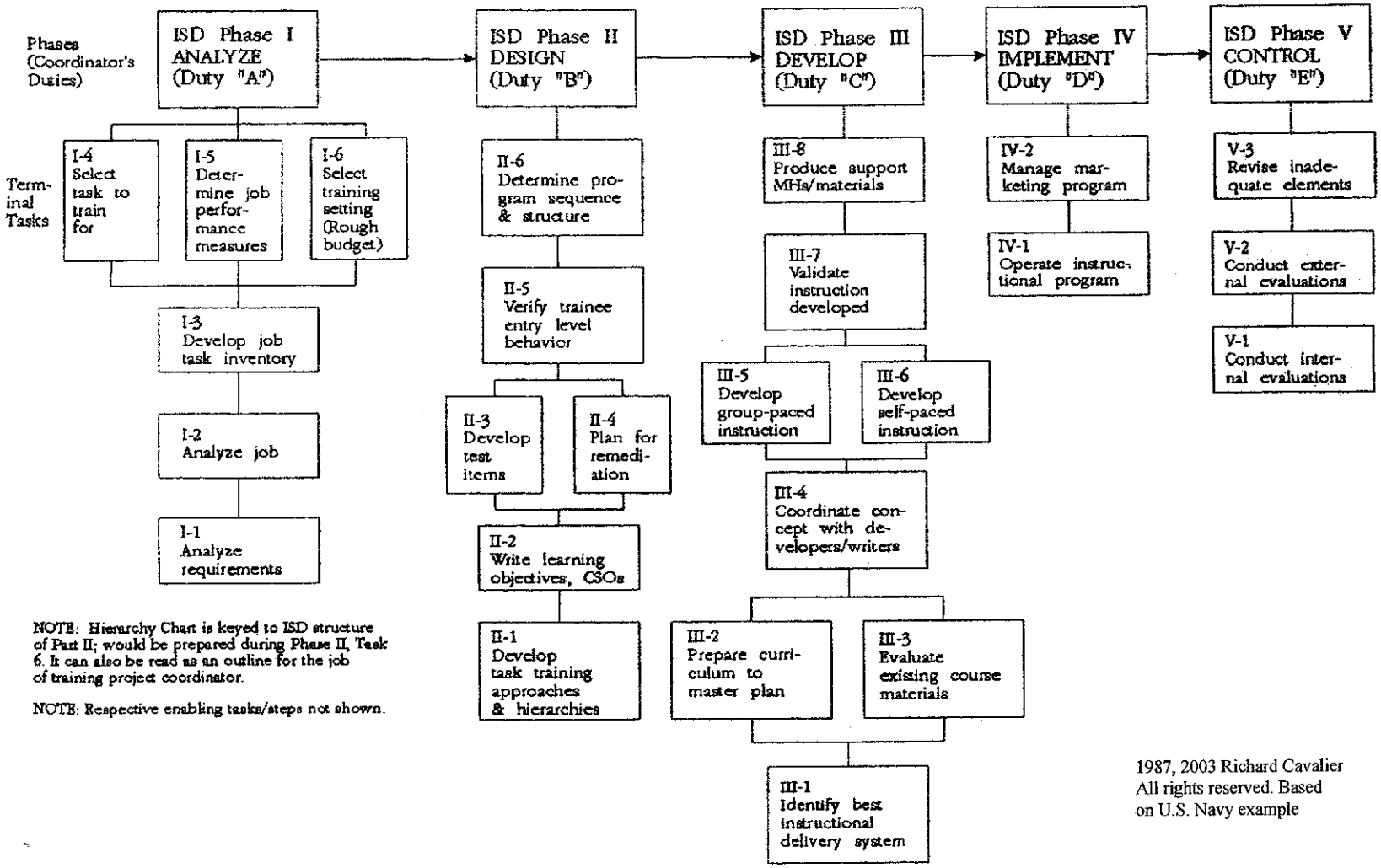
2) (Element (sub-step) Two: Finalize the Master Syllabus. Articulating the Hierarchy Chart in discussion format, the Master Syllabus serves as a reference guide and as a managerial control mechanism. It's less detailed and therefore easier to work with than is the comprehensive Curriculum Outline from Phase III, which will describe objectives in full in order to stipulate the actual program content.

Your Master Syllabus is essentially a topic outline, and it is derived directly from your sequenced Project Hierarchy Chart. Its key sections should reflect Terminal Objectives, and its subsections, the Enabling Objectives. For control, you might note your original corresponding Learning Objectives numbers in parentheses–quick reference if you should be challenged for specifics.

The accompanying "ISD Master Syllabus" is derived directly from the ISD Hierarchy Chart on the reverse side of the Part Two title page.It's a good example of the ease and scope of discussion made possible by this quick conversion of the ISD chart into a familiar outline form.

In order to be consistent with the Phase I thesis that each new job for which you crate a program can/should have a separate name (Roman numeral designation) we have used the title of "Coordinator of Instructional Systems Development" as its Job/Roman I heading. Each of the five ISD Phases becomes a Duty Area (retaining their letter-type designations, although not

HIERARCHY CHART FOR INSTRUCTIONAL SYSTEMS DEVELOPMENT



NOTE: Hierarchy Chart is keyed to ISD structure of Part II; would be prepared during Phase II, Task 6. It can also be read as an outline for the job of training project coordinator.

NOTE: Respective enabling tasks/steps not shown.

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necessarily retaining the original letter that might have been given during preliminary organizational stages of Phase I).

In this scheme, the Job of Legal Secretary (from the coin diagram) could become "Job/Roman II: Legal Secretary," also with lettered duty areas; and your own project now being developed could become "Job/Roman III: _____. (see next overleaf.)

Because the Roman numeral outline expresses relationships through its letter/numeral system, those relationships will remain stable even if the letters/numerals are shifted. For instance, if the Job of Legal Secretary were our only program, we could express the Duty Areas as Courses I, II, III, etc., rather than as the ISD-preferred letters A, B, D, etc. Shifting the various designations up or down the Roman scale does not change their concepts. Don't get bogged down in petty details just because the ISD format and the Roman format are not perfectly compatible. The Roman outline strictly alternates numerals and letters in heading sub-sets; whereas ISD uses numbers for all tasks and steps otherwise found under the Roman numeral head. In the language, we all say "Task One/Step One." Nobody says, "Task A/Step small-a." Enough said. This asymmetrical but compatible outline/diagram paradigm occurs again in Phase IV-1.

Generally, the running order of the outline will reflect the dependency order of a single numeric chain; but you might plan to run school-type simultaneous scheduling of topics, as reflected in the PERT Diagram for the Job of Legal Secretary (Phase I). In that case, because the outline cannot reflect a PERT or hierarchy chart's sense of simultaneity, you simply use an exactly equivalent numeral or letter designations for the equivalent importance level of the information. Because content, not flow, is the focus in this section, timing is largely irrelevant.

When constructing the Curriculum Overview (Phase III), you will have both the need and the opportunity to reflect the practical constraints of availability of staff, classroom, labs/workshops, and major equipment. So save those worries until then.

Your objective in this step is to create an intelligent approximation *on paper* of the content and scope of your project. When you're satisfied that your chart and outline do that well, you will have fulfilled this step's requirements.

Having read and considered these three steps of Task 6 as a unit, you should be ready to return to Step 1 and begin your actual hierarchical sequencing. Do that now.

MASTER SYLLABUS FOR ISD COURSE

(Topical Outline cast as Job Descriptions keyed to this book's ISD Hierarchy Chart)

I. Instructional Systems Development (or Job of Project Coordinator for ISD)
  A. Analyze (ISD Phase I; (also Duty "A" on coin chart in Appendix A)
    1. Analyze the Requirement (ISD Phase I-1)
    2. Analyze the Job (ISD Phase I-2)
      a) gather the job information (Step I-1-1)
      b) collect and analyze job-related technical documents (Step I-1-2, etc)
      c) collect job related training materials
      d) select the train-for topics
      e) construct Job Data Worksheet/Correlator
    3. Develop the Job Task Inventory (JTI) (ISD Phase I-3)
      a) prepare a Job Task Inventory
      b) estimate needs for support materials
    4. Select the Tasks to be Trained-for (ISD Phase I-4)
      a) determine criteria
      b) validate the selected criteria
      c) make the task selections
    5. Determine the Job Performance Measures (ISD Phase I-5)
    6. Select the Training Setting (ISD Phase I-6)
  B .Design (ISD Phase II; (also Duty "B" on coin chart)
    1. Develop the Learning Approaches and Hierarchies (ISD Phase II-1)
      a) select the appropriate learning analysis approach
      b) construct the appropriate Task Hierarch Chart
    2. Write the Learning Objectives from the Task Hierarchy Chart aLnd prepare Complete Statements of Objectives (ISD Phase II-2)
    3. Develop Test Items (ISD Phase II-3)
      a) determine the task level
      b) determine the task content type
      c) write the test items
      d) conduct pilot checks of tests
      e) codify testing and administrations
    4. Plan for Remediation (ISD Phase II-4)
    5. Verify Trainee Entry-level Behavior (ISD Phase II-5)
    6. Determine the Sequence and Structure of Learning Objectives (ISD Phase II-6)
      a) determine the relationships among all the Learning Objectives
      b) sequence the learning objectives
      c) chart and outline the program
        1) finalize the Program Hierarchy Chart (sub-step or element)
        2) finalize the Master Syllabus (sub-step or element)

C. Develop (ISD Phase III; (also Duty "C" on the coin chart)

1. Categorize Objective(s) and Specify Learning Strategies to Identify the One Best Instructional Delivery System (with augmentation?)
   a) select the appropriate training objective(s)
   b) select the instructional delivery system
   c) verify the appropriateness of alternate systems
   d) evaluate the practicality of systems
   e) specify the most efficient learning strategy for teaching the Terminal Objective(s)
   f) specify the course instructional delivery system
   g) select the instructors
2. Prepare the Curriculum Outline and Instructional Management Plan
   a) write a Course Summary
   b) prepare the Instructional Management Plan
   c) prepare the Comprehensive Curriculum Outline
3. Evaluate Existing Course Materials
4. Coordinate the Instructional Concept with the Developers and Writers
5. Develop Group-Paced Instruction
   a) prepare a verbatim training script
   b) develop the Instructor's Guide (Optional)
   c) prepare the Trainee Guide
6. Develop Self-Paced Instruction
7. Validate the Instruction Developed
8. Produce the Support Materials and Modules

D. Implement (ISD Phase IV; (also Duty "D" on coin diagram)

1. Operate the Instructional Program
2. Manage the Marketing Program

E. Control (ISD Phase V; (also Duty "E" on coin diagram

1. Conduct Internal Evaluations
2. Conduct External Evaluations
3. Revise the Inadequate Program Elements

(End of ISD portion, as reflected on the Hierarchy Chart)

II. Support (or Job of Legal Secretary (See Phase I-2, "Legal Secretary" coin diagram

A. Convert content of Course I (to become Job Duty "A")

B. Convert contents of Course II (to become Job Duty "B"

C. Etc.

III. Additional Title (or Job of _____ (your own project)

A. Duty "A" Description

B. Duty "B" Description

C. Etc.

NOTE: This Master Syllabus also serves as a quick-reference topical guide to this entire book. At this point, you should not have any difficulties whatsoever in shifting gears between various formats of the same material. Do you loose your sense of direction when you shift gears in your car?

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IN SUMMARY:

The ultimate product of your labor during Phase I was a perfect understanding of the job behavior to be trained-for, plus the documentation needed to direct and to support your conclusions. In Phase II, you converted the description of the behavior on-the-job to a description of *learning* objectives. In Phase III, the emphasis will switch to *training* objectives and methodology–how the needed instruction can be delivered most effectively, so that the trainee can *learn to do.* More documents.

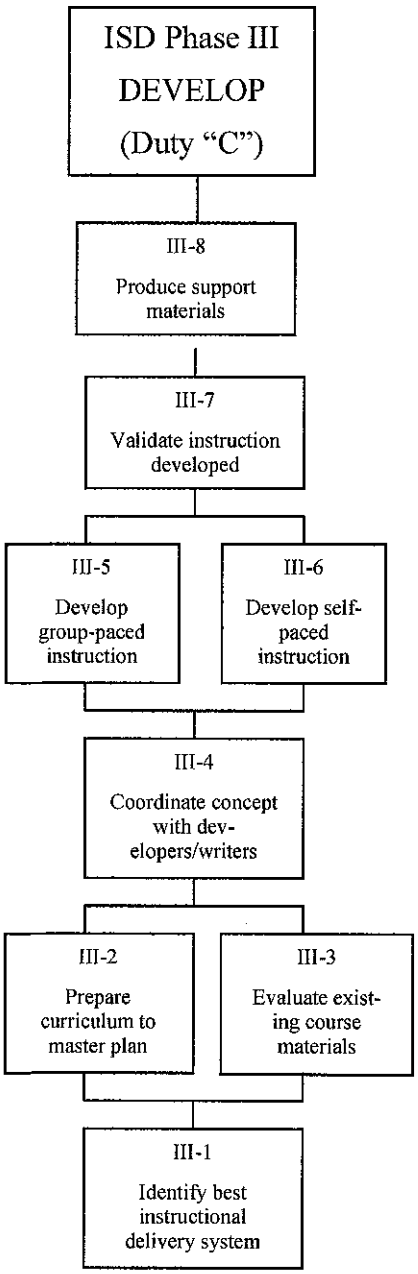
It is a small complication of the overall Job of ISD that all the pieces do not have a perfect correlation from Phase to Phase. However a precise correlation cannot be expected when fairly comprehensive algorithms and other structured guides must be balanced with your judgment calls.

If the overall job of developing instructional systems were not complicated, the ISD procedure would not have been needed. And if the judgmental elements were not responsive to logic and common sense, the ISD procedure would not be possible.

But ISD is effective! The end result of the process is not simply a collection of documents... rather, it is a synergistic functioning *event* whose tasks and steps guarantee you that the program being developed will be strictly derived from the job and so can teach your trainees to do that job.

Bear with the complications. They point out the mechanical gaps that your judgmental spark will jump start to make the mechanism operate.

ISD Phase III: Develop



Key Purpose:

To create or stipulate the actual activities that will enable the trainees to acquire the skills specified in the Learning Objectives and tests already designed in Phase II. Your viewpoint now should shift from learner needs to trainer methodology.

Instructional development begins by classifying all Learning Objectives by category to determine how the instruction can be most effectively presented to the trainee. Two sets of algorithms presented in Task One will aid that process in translating learning needs into training needs.

Overview:

Your Master Syllabus will now provide an overall cohesion for discussion and staffing approvals, and your Learning Objectives and tests (all from the prior Phases) will provide specific criteria. Using them, you must now write the lectures, create the visual materials, and construct the demonstrations, lab experiments and/or workshop exercises that will turn theory into practical knowhow, assuring that the trainees' on-the-job performance will be adequate. All those pieces together will make up your *training curriculum:* the sum of all the planned experiences.

In short, it's one thing to set parameters for whatever should be taught or trained-for, but it's quite another actually to develop the learning materials and activities that will permit the trainees to learn the prescribed skills (Phase III). Different approaches to those learning experiences have different values in different circumstances, as the various algorithms of this Phase will establish. Algorithms are special methods used in solving mathematical problems– here applied to non-mathematical concepts.

During this Phase, you will apply the corrective algorithms and media to facilitate your Learning Objectives. Choices should approximate those of the Training Setting anticipated in Phase I-6; but if changes prove to be needed, now is the time to change. Phase III is also a continuation and confirmation of choices made in Phase II, augmented by charts for the "Types of Relationships" and the "Matrixes for Testing," as well as the algorithms of this Phase.

These charts and algorithms provide the bases you will need to be able to work with knowledge and performance objectives. We will not deal with "pure" motor skills–such as sports or telephone pole climbing, which are generally coached in small groups or one-to-one. Instruction and practice must be closely integrated in the purely motor skills; and individual trainee achievement and feedback tend to guide the process more than does any format.

Similarly, relative little specific help can be offered for problems in the affective domain. Attitude is suspect whenever people are not doing thing that they once did or could do or could do more of, if they chose. Sometimes the appropriate response lies with training (new understanding of and therefore appreciation for, critical tasks), but sometimes problem attitudes of employees lie with faulty company policy or supervision. Be alert to the differences. Follow the guidelines for appropriate knowledge and performance skills in the former case. Examine policy in the latter. From the employee's point of view, being forced to perform as the organization desires can be seen as punishment; or is it somehow rewarding to perform other than as desired; or are practical obstacles (not the employee's fault) placed in the way of theoretically desired performance? Problems with policy, along with very fine points of human

will, might be best resolved with the help of motivational specialists. Motivation is internal and is not dependent on ash trays and prizes–those are incentives. Many policies have no value beyond, "I'll show you who's boss!" and can be enforced only at high cost in morale. Dump any such policies. The matter of motivation vs. incentive is covered at length in Cavalier's book *Managing Through Training.*

The objective of the work of this Phase is to convert all the information and Learning Objectives into Training Objectives so that the trainer(s) who will enter at Phase IV will know exactly what he/she must do and can set about doing it. The boxed forms following are based on military guidelines, although modified.

Most of the skills will be the straight forward know/use type, especially if they are to be delivered far down the marketing chain. But if you take on decision-making skills, be forewarned that problem-solving is the most complex form of learning and demands the highest degree of creative thinking. Problem-solving encompasses all the lesser levels of knowledge and performance skills (even including dexterity skills, in the case of equipment repair). It usually requires the trainee to recall information, follow procedures, classify objects or facts, and either to select rules that govern or to formulate a new rule. Trouble-shooting is a prime example of applied problem-solving; and it is often augmented by expert systems, based either on printed decision-trees, interactive computer-aided programs, or electronics-based expert analysis.

As you proceed, note that the verbs you select in Phase II still apply here, but now the viewpoint has changed from trainee to trainer. Shift gears, not direction.

Tasks to be completed in Phase III:

One: Identify the Instructional Delivery System

Two: Prepare the Curriculum, Master Syllabus, and Instructional Management Plan

Three: Evaluate Existing Course Materials

Four: Coordinate Concepts with Developers/Writers

Five: Develop Group-Paced Instruction

Six: Develop Self-Paced Instruction

Seven: Validate Instruction That Developed

Eight: Produce Support Materials and Modules

*

III-1

Task One: Categorize Objectives and Specify Learning Strategies to Identify Best Course Instructional Delivery System:

During the current process, you will verify and refine all the choices and decisions you have made to date regarding the nature of the Job/Duties/Tasks to be trained-for and will select the best strategies for written/visualized development and practice/performance segments.

Categorizing is the critical first task in development. Learning Objectives are categorized for three main purposes: 1) to help determine the most appropriate and effective learning strategies; 2) to provide a basis for reviewing and evaluating existing instructional materials that might be included or adopted; and 3) to help determine the most effective delivery system to use in a course, whether group-paced or self-paced.

The terms *select* and *specify* will be used repeatedly in the material following. To simplify, just consider *select* to refer to the decision-making, and consider *specify* to refer to the creation and forwarding of all paperwork needed to commit and acquire.

III-1-1

Task One/Step One: Select the Appropriate Training Objective:

Using the following "Algorithms for Training Objective Characteristics," select the one algorithm, among the twelve categories outlined, which *best* expresses the sense of the action verbs that you previously confirmed on the "Learning Objectives and Tests Correlator," in Phase II-2. Read through all twelve algorithms before returning for further consideration to those that seem most appropriate. If more than one category seems applicable, read the fine points for the respective behavioral characteristics of each algorithm. Choose the closest match.

Should there be difficult choices or discrepancies, return to the Job Task Inventory (JTI) and Job Performance Measures (JPM) entries that do correspond (Phase I documents). Be guided by job-analysis documents while tracing the source of discrepancies. If the original job analysis is accurate, then your later decisions might wisely be revisited. Think and choose among all alternatives.

Enter your final selection (in brief) on the "Algorithm Correlator" that's been prepared for this step.

For additional helps, when working with this process, cross-reference your needed items as taken from the "Algorithm Correlator" (immediately below in this step) and its counterpart, "Algorithms for "Instructional Delivery Systems" (2 parts) in Appendix N.

At this point, it's useful to see the "Algorithm Correlator," located in the Appendix AA: III-1-1.

Once you have matched the appropriate pairs, here, then see the "Twelve Types of Learning Algorithms" charts with candidate systems (including best equipment; Appendix N.)

ALGORITHMS FOR TRAINING OBJECTIVES CHARACTERISTICS

Pair with "Algorithms for Instructional Delivery Systems," found in the next segment by matching the numbered gerunds/verbs (here) with your tasks - type(s) (next).

1.) *Recalling Bodies of Knowledge:* To answer, define, express, inform, select, etc. Deals with verbal or symbolic learning and/or the acquisition and long term maintenance of knowledge so that it can be recalled at will. Examples: recalling nomenclature, functions, complex relationships, natural or physical laws, or discrete facts; decoding or translating.

2.) *Using Verbal Information:* To apply, arrange, choose, compare, determine, etc. Deals with practical application of information; follows initial learning of information through guidelines for Recalling Bodies of Knowledge (above); implies limited uncertainty of outcome; usually ignores alternatives not given: Examples: based on academic knowledge, determining which equipment to use for a specific real world task (does a hammer belong with screw or cord or nail?, etc.); or comparing alternative modes of operation or making educated choices.

3.) *Learning and Using Rules*: To choose, conclude, deduce, predict, propose, select, specify, etc. Deals with choosing proper action based on application of known rules; the rules are not to be questioned; if/then situations are common modes. Examples: applying rules of the road while driving; solving mathematical equations (geometric, algebraic, etc.), scoring for both the correct equation and the correct process of steps; selecting proper tools for given tasks; applying rules of etiquette or protocol, or rules of order at meetings.

4.) *Making Decisions:* To choose, design, diagnose, develop, evaluate, forecast, formulate, organize, select, etc. Deals with choosing a course of action when alternatives are not specified or the consequences of given actions cannot be foreseen, pro or con; weighing alternatives, including potential trade-offs of less-than-ideal potential actions; forcing decisions to be made with inadequate information. Examples: developing strategies, diagnosing malfunctions and following corrective procedures; deciding whether to continue or abandon a project underway; selecting school course work.

5.) *Detecting:* To detect, distinguish, monitor, etc. Deals with vigilance (active, alert-seeking, or awareness), often regarding low threshold clues; to scan for cues or target objects. Examples: detecting abnormal sounds in an engine or electrical motor bearings; spotting target objects from the air; locating errors in typewritten materials; monitoring noises produced by traffic, aircraft take-offs, etc.; detecting unacceptable variation from any norm.

6.) *Classifying:* To identify, recognize, differentiate, classify, etc. Deals with recognizing non-verbal patterns (whether visual, aural, or recurring within given contexts); to identify problems or their sources *without* solving the problem(s). Examples: determining the completeness of application blanks apart from correctness; classifying books according to subject area (math, history, or literature's novel, poetry, short story, etc.) or intrinsic category (ancient, medieval, Renaissance, or modern history); inspecting assembly line products; sorting and grading of quality in clothing or vegetables, etc.

7.) *Identifying Symbols.* To identify, read, transcribe, etc. Deals with the recognition (rather than the interpretation) of symbols, signs, trademarks, etc. Examples: reading schematic drawings, maps, acronyms; checking advertising logos; identifying symbols used in typography, computer program design, etc., *without* performing the processes called for.

8.) *Communicating by Voice:* To answer, advise, communicate, converse, direct, express, instruct, interview, list, speak, order, report, etc. Deals with all aspects of voice communication, including enunciation, speed, precision of delivery, as well as correctness of the message model (code or grammar), in native, foreign, or specialized languages; often requires use of previously-overlearned verbal skills, or overcoming interference.

9.) *Recalling Positioning and Related Movements and Procedures:* To activate, adjust,. align, assemble/disassemble, calibrate, inspect, operate, service, and other difficult or complex motor acts. Deals with somewhat complex chains or sequences of events, movements, positions,; procedural check lists may be used. Examples: inspecting for repair or maintenance; assembling/disassembling equipment or models; operating stationary equipment or small appliances.

10.) *Steering and Guiding as Continuous Movement*: To drive, control, maneuver, regulate, steer, track. Deals with perceptual-motor skills involving *continuous* vigilance toward surrounding, deals, etc.; generally requiring smooth muscle coordination and eliminating over-control/over-responses; estimating changes in positions, velocities, volumes, accelerations, flow; knowing cause/effect and display/control relationships.

11.) *Performing Gross Motor Skills.* To carve, cut, draft, draw, mix, run/exercise, sew, sharpen, type weld, write, etc. Deals with perceptual-motor skills involving manual or bodily dexterity, more than strength or endurance; repetitive mechanical skill or precise motion or behavior; low-level attention span guiding routine; fine tolerances more than

exertion; often an element of a larger task or job. Examples: using hand tools or small appliances; drafting/drawing/painting; playing musical instruments; doing exercises in unison or marching in formation; using typewriter or computer, etc.

12.) *Attitude Learning*: Accept appreciate, approve, comply, improve, endorse. Deals with patterns of behavior consistent with given attitudes or values; concerns *willingness* to perform, *not ability* to perform, to a standard; integrating a value or attitude into an existing pattern of behavior. Examples: complying with safety regulations; conforming to noise abatement procedures; cooperating with cleanliness standards for person or work space; assisting other beyond obligated response point. Compliance is the key. #

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III-1-2

Task One/Step 2: Evaluate the Most-Likely Algorithms for Instructional Delivery Systems:

In the last analysis, those paired algorithms for characteristics and delivery systems should make it clear that although cognitive or affective tasks can be approached via passive study programs and active discussion, such activities as discussion and vicarious practice (watching others' demonstrations, live, filmed, or taped) does *not* serve the trainees' dexterity skills, which *must* be practiced. Trainees must practice with all tools and other aids that will be used on the job, including equipment, preferably under job-like conditions.

Keep in mind that a procedure or complex task might require more than one active verb and therefore more than one delivery system. Sometimes these two systems will be inter-changeable; sometimes compatible at low cost; sometimes convertible from one mode into the other at a cost lower than purchasing two complete systems (for instance, convertibility of audio/visual materials from paper to film to tape, etc).

There are many practical considerations–including but not limited to cost–yet to be dealt with. Meanwhile, you will have fulfilled this ISD step when you have selected the appropriate algorithms here to match the algorithms of the preceding step. These sheets of characteristics are select-only; don't try to memorize them. Enter each selected alternative for the one proper category of algorithm in the applicable column of the "Algorithm Correlator," from Step III-1-3. It follows. Fill it in as soon as you've matched characteristics with needed systems.

ALGORITHMS FOR INSTRUCTIONAL DELIVERY SYSTEMS

(Pair with "Algorithm for Training Objectives Characteristics" found in the prior segment)

1.) *Recalling Bodies of Knowledge:* Assuming stimulus criteria a) limited or full visual movement; b) black/white to full color; and/or c) voice sound range; plus training setting criteria concentrating on individual trainees preferably at fixed locations.

2.) *Using Verbal Information*: Assuming stimulus criteria of a) limited to full visual movement; b) black/white to full color; and/or c) voice sound range; plus training setting criteria concentrating on individual trainees, preferably at a fixed location. Alternatives: CAI or computer multi-media augmented with equipment and materials needed; branching teaching machines, still visuals; tutor with diagnostic tests plus instructor guide with student exercises and tests. Alternatives allowing both fixed and remote locations; branching programmed texts, with or without paper simulation; and microfiche with self-scoring tests.

3.) *Rule Learning and Using:* Assuming stimulus criteria ranging from plane line or pictorial to solid objects to environment; visual movement from limited to full; visual spectrum from gray to white; audio from voice to full sound to ambient sound; and/or tactile or internal/external motion clues; plus training setting criteria concentrating on individual trainees, preferably at fixed location. Alternatives: operational equipment with instructor using handbook; simulator with instructor using handbook; procedure trainer with instructor using hand handbook; CAI or computer multi-media; branching teaching machines.

4.) *Making Decisions:* Assuming stimulus criteria of visual forms from alphanumeric through plane pictorial to solid objects; still to full visual movement; voice to full sound range; and tactile and/or external motion cues; plus training setting criteria concentrating on the individual trainee, preferably at fixed location, possibly in a team setting. Alternative: computer multi-media or CAI augmented with equipment and materials; branching teaching machines, for fixed locations. Alternatives permitting remote locations as well; microfiche with self-scoring tests; branching programmed text with self-scoring tests. Alternatives permitting teams at fixed locations; simulator with instructor and diagnostic tests; manual simulations game with instructor land diagnostic tests.

5.) *Detecting:* Assuming stimulus criteria requiring full visual environment, full ambient sound and/or external stimulus motion cues; plus training setting criteria concentrating on the individual trainee, at a fixed location or individual on-the-job training. Alternatives: operational systems with simulated signals and instructor using handbook (permitting school or on-the-job training); simulator with instructor using handbook; simulator with augmenting displays and logic; procedure trainer with instructor using handbook;; procedure trainer augmented with displays and logic.

6.) *Classifying:* Assuming stimulus criteria of any visual form; still to be limited to full visual movement,; reduced, exact, or enlarged scale; voice to full sound to ambient sound; plus training setting criteria concentrating on the individual trainee at fixed location. Alternatives: computer multi-media or CAI augmented with equipment and materials; branching teaching machines; simulator with displays or instructor. Alternatives permitting fixed or remote locations; study card sets; microfiche.

7.) *Identifying Graphic Symbols:* Assuming stimulus criteria fulfilled by black/white plane figures; plus training setting criteria of individual trainees, preferably at fixed location. Alternatives: CAI with visual display; branching teaching machine. Alternatives permitting fixed or remote locations: branching programmed text; microfiche with self-scoring tests: study-card sets with self-scoring tests.

8.) *Voice Communicating:* Assuming stimulus criteria of plane pictorial or solid object forms; still or full movement; voice to ambient sound range; plus training setting criteria of individual or team setting at fixed location. Alternatives: simulator with instructor using handbook and diagnostic tests; procedure trainer with instructor using handbook and diagnostic tests; audio language lab using active-compare mode, and manual simulation game, instructor supervised.

9.) *Recalling Positioning and Related Movement:* Assuming the added complexity criteria of difficult motor acts requiring smooth motor performance on completion of training; plus stimulus criteria of any or all degrees of visual form, visual movement, audio range and tactile or motion cues; plus training setting criteria concentrating on individual trainee at fixed location with small group or team setting. Alternatives: operational system in lab with tutor; simulator with tutor and tests; procedures trainer with tutor and tests; logic trainer with tutor; CAI with photo or operable mockup; teaching machine with photo or operational mockup; microfiche with or without photo or operable mockup; branching programmed text.

10.) *Steering and Guiding–Continuous Movement.* Assuming stimulus criteria of full visual environment; external stimulus motion cues; fine and broad movement manipulative acts; plus training setting criteria of individual or team training at one fixed location; adaptable to independent instruction at multiple locations. Alternatives: operational system in real environment with instructor using handbook; simulator without motion platform with full visual field and instructor using handbook; procedure trainer with instructor using handbook.

11.) *Performing Gross Motor Skill.* Assuming a criterion-referenced degree of any motor skill or tool handling; plus a training setting of individual trainee or team at fixed location. Alternatives: tutor working in an operational job-like setting with equipment/tools, if required on job, and actually performing the tasks being learned, while using a handbook and diagnostic tests; simulated job setting augmented with actual tools plus computer multi-media and/or A/V equipment *capable of showing film/tape demonstrations and/or of recording trainee performance for immediate playback.*

12.) *Attitude Learning.* Given any degree of needed attitude change or reinforcement (affective domain of learning) and assuming training setting criteria of individual trainee at fixed location or small group or team settings, also at fixed location. Alternatives: operational job setting with instructor using handbook and diagnostic attitude tests; simulated job setting with instructor using handbook and diagnostic attitude tests. #

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III-1-3

Task One/Step Three: Verify the Appropriateness of Alternative Systems:

In the preceding step, the selected algorithms stipulated the particular stimulus criteria which your selected alternatives (among all the candidate delivery systems) were capable of delivering; training settings were also outlined.

The information was presented in standard training terminology. If you're hesitant with terms, see the Glossary in the Appendix. However, few non-trainer executives are familiar with the range of stimuli and their appropriate response modes on the part of the trainees. Therefore another chart is provided here to assist you in verifying *the appropriateness to your program* of the various systems that could be used.

In time you might become familiar with all the prior algorithms and with all the systems; to simplify the effort for this one program, verify only those algorithm categories previously selected and entered on the "Algorithm Correlator," (III-1-2).

Using the "General Characteristics of Training Delivery Media and Methods Chart" following, confirm that the characteristics given in the several segments of the chart are in fact *appropriate* to your training program. Practicality and costs are other factors to be considered in other steps ahead; for now, deal with appropriateness.

In fulfilling this step, consider the intrinsic nature of the characteristics outlined. If any discrepancies exist between the algorithm category–as explained via the chart–and your program, objectives, or understanding of the learning/training objectives, note the fact(s) and reasons(s) in the related column of the "Algorithm Correlator." Verification also includes that of determining the appropriateness of alternative systems. A discussion for that purpose follows. It's long but logical and represents identification, not new learning or memorizing. You can easily find the situation that confronts you–or that you can create to suit. Do not continue to the next step until this verification step is complete.

GENERAL CHARACTERISTICS OF TRAINING DELIVERY METHODS AND MEDIA

STIMULUS CAPABILITIES:

In training, as in psychology, that which provokes a response is called a *stimulus*. One or more stimuli might be involved in the overall task itself or in the task training. Presenting stimuli of equal intensity simultaneously can be confusing and therefore inappropriate unless confusion itself is the element to be discerned and overcome. Generally, then, one stimulus mode prevails for a given element, even if several types of stimuli are presented in sequence during the session or lesson. The following are generic characteristics of various stimuli specified by the algorithms of the preceding step:

Visual Stimuli:

1.) Visual Alphanumeric: words, numbers, or any other type of symbols presented in any graphic form.

2.) Plane Pictorials; any two-dimensional image, such as a drawing or photograph.

3.) Plane Line Construction: any two-dimensional image made of lines, such as graphs and charts.

4.) Solid Objects: any three-dimensional reality (or its visual image) when viewed actually or hypothetically from "inside."

5.) Environment: any three dimensional reality (or its image) when viewed actually or hypothetically from "inside."

Visual Movement:

1.) Still: any static visual field, such as a drawing, printed page, or photographic frame.

2.) Limited Movement: any basically static visual field in which the appearance of motion of any elements is achieved with animated transparencies, camera movement, or other methods (also termed semi-animation).

3.) Full Movement: any visual field in which all elements can move, including real objects and equipment, (computer) simulators, or movies on film or videotape.

4.) Cyclic Movement: any visual field which progresses through a fixed sequence and then repeats the identical sequence; also called closed-loop programming.

Visual Spectrum:

1.) Black and White: any visual field composed of only full black and full white tones, as in a drawing or printed pages.

2.) Gray Scale: any visual field composed of black, whites, and gradations of the two, seen as gray; typical of photos and B/W television.

3.) Contrast Color: any color used to highlight B/W or gray scale elements.

4.) Full Color: several or all colors (in printing, four-color inks blended, if necessary) used either to represent reality (an acceptable teaching/learning device, although not essential) or to create pleasing graphics (entertainment value).

Scale:

1.) Exact Scale: exact-size depiction of reality by real object or same-size representation, including drawing, simulator, etc. Also know as one-to-one scale.

2.) Proportional Scale: any representation of reality in other than exact scale, as with a table-top sized scale model or world map, etc., if downscaled; or any atomic molecule, if upscaled.

Audio Stimuli:

1.) Voice Sound Range: limitation of the audible range to the human voice and spoken words or other vocal sounds, but no other sources.

2.) Full Sound Range: reproduction of all the significant elements of the sound(s) being trained-for, including sound-recognition exercises. Can include music tones, birdcalls, or normal operating sounds of equipment.

3.) Ambient Sounds: any complex environment which captures (by recording) or simulates the real-world of the given task being trained-for; includes but is not limited to the train-for stimulus.

Other Stimuli:

1.) Tactile Cues: any skin-based signal received through the sense of touch, both personal (hot, cold, pleasant, itch, etc) and those related to objective phenomena (size, shape, texture, etc)

2.) Internal Stimulus Motion Cues: any sensations felt by a person when he/she moves the limbs.

3.) External Stimulus Motion Cues: any sensations felt by a person affected by outside force: includes sway, roll, and other inertial feelings produced by a moving vehicle, etc.

TRAINEE RESPONSE MODES;

1.) Covert Response: any response created by the trainee intellectually but not acted out in any observable manner: "What exit route would you take in case of fire?"

2.) Multiple Choice: any selection from a limited set of alternative responses.

3.) Pre-Programmed Verbal Performance: any brief *rote* answer to a question having a limited set of correct answers; formulae-type phrasings, as in medical or military or law enforcement descriptions of conditions.

4.) Free-Style Written Performance: any written response composed in the trainee's own words.

5.) Decision Indicator: any verbal or perceptual motor response in which the trainee indicated which alternative he chooses in a branching decision tree (divergent choice mode).

6.) Voice Performance: any response in which the trainee speaks, either to mimic or to indicate comprehension, as in conversation or in orders followed.

7.) Fine Movement Manipulative Acts: any response mode in which the trainee makes sensitive or otherwise small movements to skillfully affect instruments, control keys, etc. Can include operation of small instruments or keyboards/computers, etc.

8.) Broad Movement Manipulative Acts: any response mode in which the trainee makes large or strength-related movements, such as levers or wheels on large equipment or the operation of hand-held tools.

9.) Tracking: any response mode in which the trainee continuously controls or responds to constantly-changing situations or systems, such as steering a vehicle or holding to a compass bearing.

10.) Procedural Manipulative Acts: any response mode in which the trainee performs any sequence of steps in a given procedures. Can be performed either from memory or using checklists (here, properly used).

INFORMATION FEEDBACK LOGIC:

Form of Feedback:

1.) Intrinsic Feedback: any information that the trainee receives as cues from his own internal movements or from body tissue sensations (called *proprioception).*

2.) Action Feedback: any externally-sourced or -displayed cues inherent in the task, such as machine movement, instrument display, or screen queries or answers, via dials or gauges and/or printed or computer-assisted or -controlled programs.

3.) Augmented Feedback: prompt provision of qualitative information to the trainee regarding elements beyond the objective data results of his performance, such as some reference group norm or criterion standard.

4.) Reconstruction Feedback: any critical analysis or evaluation of the trainee's performance, generally on completion of an exercise or a significant block of instruction.

Content of Feedback:

1.) Correct-Response Data: any indication to the trainee of correct response provided either immediately after responding or automatically if trainee fails to respond within the time allowed.

2.) Score Data: any quantitative information about performance (expressed as real numbers, percentages, or rates) given to trainee.

3.) Diagnostic Data: any information given to the trainee regarding the nature or causes of deficient performance, with prescribed remedial practice or review.

4.) System Performance Data: the trainee discerns or observes changes in the state or function of a system as a direct consequence of his actions upon the system by his initiated changes of elements, proportions, etc., or by manipulation of mechanical controls.

Time Schedule for Feedback:

1.) Immediate: any indication of results provided in direct relationship to the training, as appropriate to the function (that is, following each individual response or procedure, rather than the overall task).

2.) Fixed: any indication of results provided at arbitrary or prescribed times, such as completed exercise or day or other interval.

3.) Variable: any indication of results according to a variable schedule based on the nature of the instructional sequence itself as training progresses.

EVENT SEQUENCE LOGIC: Relate the following to trainee response modes:

1.) Linear: a fixed sequence of instructional events by strict adherence to outline and stipulated training aids, including computer-based programming.

2.) Cyclic: a strictly limited variation on linear sequencing by repetition of one or more elements during a given program, such as repetitious drills or exposure to a closed-loop film.

3.) Branching: a variable sequence of instructional events determined at least in part by the trainee's appropriate response or conscious choice of direction. Generally augmented with diagnostic inquiry and remedial actions.

4.) Automated Adaptive: any automated (machine) sequencing and pacing of instructional events designed to maintain the trainee's competence at his threshold level of learning ability at all times. Often computer-based.

5.) Trainee-Initiated Inquiry: any mode which permits the selection, sequencing, and/or pacing of learning events by the trainee.

6.) Dynamic Modeling: any mode which permits the trainee to operate a real or simulation model and observe results and effects; this is the logic timetable for procedural tasks, manipulative acts, and tracking.

INSTRUCTIONAL SETTING: The physical surround will be one or more of the following:

1.) Individual Trainee at Fixed Location: any fixed study station for individualized instruct, such as A/V mechanized carrels or computer terminals (CRT's) or fixed programming.

2.) Individual Trainees with Simultaneous Instruction by Broadcast in Multiple Locations: any site (school, company workplace, or home) that can be used in conjunction with tele-communications, via scheduled radio or television broadcast (a la PBS or cable narrow-cast). Trainee-selectable computer network programs would also qualify here, if scheduled.

3.) Individual Trainee with Independent Instruction at Any Location: any site that can be used for independent study; usually based on portability of books or computer-based programs.

4.) Small Group: in psychology, the task-oriented small-group is comprised of five to nine persons, often without designated leader. In classroom (group communication) situations, a small group might embrace twenty but is limited to thirty maximum–the classroom's practical top limit for individualized attention to the trainee (once observed by public schools, too).

5.) Large Group at Single Location: any lecture/address site used by more than the classroom-30 group, regardless of whether tables or auditorium style seating is used.

6.) Large Group with Breakouts: any auditorium-sized crowd which is occasionally subdivided into small groups (either definition) in order to conduct workshop types of program segments.

7.) Large Group at Dispersed locations: two or more groups of either small or large-size meetings simultaneously and connected with each other (or to the home office) by telecommunications equipment, either audio alone or computer or two-way TV.

8.) Team Setting: any site equipped to enable a group of individuals to perform as a team on procedures and/or mechanical devices. .#

Now, in the context of this task's "Algorithm for Training Objectives Characteristics" and the "Algorithm for Instructional Delivery Systems" and the "General Characteristics" algorithm directly above (not numbered to match), you should be prepared to commit to your choices. Be sure that you are pairing the numbered items in the first-named two Algorithms and that they agree perfectly. If not, there's a mismatch that suggests that something has been misidentified; if so, correct it now. When ready, you should have a trio of choices that describe the nature of the job and the proper general instructional delivery systems from which to choose your system when instructing for that job. It couldn't be much easier, even though the underlying material is quite complex. But it works routinely for the military--are you bright enough to keep up with them? ISD doesn't require you to be a genius!

Ready with your choices? When actually working, now would be the time to fill in the "Algorithm Correlator" that follows:

At this point in reading, it's useful to see the "Algorithm Correlator," located in the Appendix, Author's Aids at the end of the book, as III-1-3; p160.

III-1-4

Task One/Step Four: Evaluate the Practicality of Systems:

The appropriate instructional delivery systems were determined by the paired algorithms of Steps One and Two; and their generic characteristics were combined and elaborated in Step Three of this Task. All given alternatives have comparable validity when recommended by the proper algorithm; yet they are not all equally practical in the context of your program. Both complexity and costs can vary considerably and are fairly considered here. As HumRRO has reported, expense of the medium is *not* an indicator of effectiveness–the skill with which the medium is used *is* the determining factor. Nevertheless, you must both do and pay.

Many subjective elements might enter into your own appraisal of what is practical under your circumstances. Key among them will be the ability of your intended trainers or proctors to perform (if needed) as would be required by any given delivery system; the willingness of the involved departments of your organization (or your marketing chain) to commit to a given level of complexity; and both the cost and cost-effectiveness of the alternatives available. The last are covered in fair detail for decision-making in the Appendix; the facts are concrete.

But the ability and willingness factors, (while to some degree measurable by objective testing and demonstration [of ability] or conversations and questionnaires [gauging attitudes]), will leave room for you to exercise good judgment. Even the best program can be sunk by a lack of

trainer/proctor cooperation; so you need to be certain that the requirements of site implementation are within existing or trainable abilities of instructors, whatever their level or relationship to your company or program.

Generally, people will be enthusiastic about programs that will improve their own job skills, assuming that they recognize their present limitations; so it's wise to present any training requirements for your amateur trainers or instructors or proctors in terms of easy-to-gain skills that qualify them for further advancement. When properly approached, most people will accept the challenge because they bring enthusiasm for the job if the company doesn't kill it. More in Step Seven.

You must understand what you're asking others to become involved in implementing. That understanding (on both sides) is your prime obligation in judging practicality. That might take some amount of familiarity with instructional media–equipment. Can they handle it? If you yourself are not well versed in media, review the Media Pool used by the Navy and contained in the Appendix. There are nearly ninety entries, and relatively few of those are electronic, apart from computer-assisted systems, despite heavy trade magazine emphasis on A/V formats. New computer/multimedia capabilities now replace some older types of equipment with a floppy disk or CD–but the image for the eye is identical to the old. You can wisely pay for ease of set-up, but it's a waste of money to pay for ego trips by "using the very latest." So you do have cost-effective alternatives for most of the high-priced media formats. Check them out.

For additional helps with this material, see the Media Pool in Appendix i. It contains about 100 potential types of presentation media ranging from the very most simple to the most complex, often with variations of each which were known at that time (a decade or more ago). That excludes recent electronic wonders,' but you can read those into the alternatives where appropriate.

Once you feel comfortable with the various media–and with their relative lead-times in mind–return to the Objective of this Step: evaluating practicality. The following guide, "Practicality Tests for Instructional Delivery Systems," outlines the types of considerations that must be included when evaluating each of the instructional delivery systems and its stipulated media alternatives. Apply all of the tests to each candidate system. Keep your worksheets. Cost-related considerations can be found in the "Costing Guide" in the Appendix, and some changes might be necessary. Make those budget comparisons now, before deciding on the most practical system for this program.

At this point, it's useful to see the"PROGRAM COSTING GUIDE," located in the Author's Aids Appenix cost section at the end of this book, as C: III-1-4; p167.

The IDS approach to cost-effectiveness calculations requires that three alternatives be investigated for each different category determined on the paired Algorithms of Steps One and Two. It's to your own advantage to invest the time needed to become convinced of the propriety and defensibility of the system(s) to which you commit yourself and your associates. Will the system(s) have sure future value (amortize?) or are you talking about a one-shot, possibly reused?

As you evaluate each of the systems applicable to your Task Objectives, indicate in the appropriate column of the "Algorithm Correlator" (III-1-3) whether the stipulated systems are

okay or problematic for your purposes. If the latter, state *why (not) considered* in a few concise words, as a permanent reminder and proof of consideration, if ultimately unused. If you are the final purchasing authority, you can skip the writing, but not the thinking.

The final choice (to specify) of equipment to support these systems will be made in a future step in Phase III. At this point, you should not be interested in brand names or minor competitive cost quotations–only the generalities needed to support an okay/problem/reject decision.

Complete your evaluation process for this project (by using the following "Practicality Guide" for help). Select by algorithm before proceeding to the next ISD Step. Be certain that the stipulations here comport with the decisions that you've made previously.

PRACTICALITY TESTS FOR INSTRUCTIONAL DELIVERY SYSTEMS

In evaluating systems, even if one should appear to be ideal, strive to complete at least two sets of evaluations so that there is a defensible, true choice. Should you indicate only one system, and should that one system later prove to be unworkable for any reason, including cost, this entire evaluation process must otherwise begin again; it's faster and surer now. When possible, evaluate three systems, and apply all these tests to each of them. The set of three applies to each Terminal Objective to be tested-for (or predictive skill to be tested). There might be overlaps in the case of multiple tasks with similar action verbs, and the initial evaluation should pertain there, too. You may, for your personal convenience, apply a rating scale to indicate relative importance of the various Tasks, if you now suspect that you might need to compromise on costs later. Those Tasks at the bottom might need to be dropped from the course (but addressed by other means).

1) *Validity of Technical Solution*: The system(s) selected must be capable of fulfilling algorithm needs fully and easily; marginal systems should be avoided. Mix several media to cover all needs, if necessary, according to their intrinsic stimulus capabilities.

2) *Capability of Trainees (and Instructors):* Any human or skill limitations or other constraints normal in, or common to, the target trainees (and/or instructor/proctors) must be accommodated by the system(s) selected. Consider trainer-training for amateur instructors in order to permit more ambitious systems to be used, if ROI justifies.

3) *Scope of Program:* Some systems are practical only with large (or only with small) numbers of trainees; limitations envisioned are firm.

4) *Programmatic Support Available:* Where will the course syllabus and support materials be developed? If internally, are personnel, time, and equipment available? If externally, can the supplier or consultant meet the time frame? Can we afford the cost and appropriate the finds in time to meet any lead times, considering our fiscal-year funding cycle, if not already budgeted?

5) *Cost Constraints*: Will costs be wholly absorbed by your organization or shared by marketing chain partners and/or trainees? By free choice or contractual obligation? Is that arrangement enforceable? At what point will the marketing chain invest? How will that affect the cash flow and appropriations internally? Are cash needs periods consistent with the budget cycles? Generally, it is wise to reject any high-cost alternative when low cost alternatives already available will produce the same results: packaging and effectiveness are two separate considerations.

6) *Compatibility with Our or Their Existing Systems:* Can either the ease of implementation or significant cost-savings be realized if an existing system/capability is adopted? If so, can it deliver all needs of the selected algorithms as it stands, or can it be modified so as to fulfill the algorithms? If not, can the existing system be augmented for significantly less than the cost of the new system in order to fulfill all the needs of the given algorithm(s)? If not, reject the existing system for this program!

7) *Lead Time:* Comparable-effect media which require long calendar lead times for development might be unworkable; consider movie film vs. video tape vs. computer-animation–is motion essential to your project? It is not necessarily essential to learning! If not, consider using 35m slides instead. Film is the better guarantor of controlled projected image, but video is often the far cheaper medium. The computer can monitor a complex program, bit's sometimes too expensive to program for the courses of minor importance. Quality of detail is the criterion where needed. Do you need to be able to count the rocks in the Grand Canyon or just show the Canyon? You are obligated to meet the lead time of the necessary quality of image.

8) *State-of-the-Art Equipment:* That usually means expensive. Does your program truly require or depend for success on a system not yet proved in the field? That's a high risk situation to be introducing into your new program. Is the effect worth the risk? What will happen to your program if that unproved product gets a delayed introduction or is not available in sufficient quantity? Or proves to be defective or inadequate? Except in the case of an expensive simulator itself cheaper than the original equipment (for example, a cockpit simulator, amortized, vs an actual jet plane, taken out of service), you are making a mistake if you let the equipment wag your dog.

9) *Innovation:* Do the paired algorithms offer or suggest alternatives you had not previously considered? Can the scope or effect of the overall program be enhanced by variations?

10) *Other Constraints:* Any special circumstances whatsoever which must, by policy, be accommodated–whether internal, in the marketing chain, or with the general public, accordingly. Any decision to create a major training system capability or school must be harmonious with plans for the geographical site, as well as with your organization's investment guidelines. If a pilot test is desirable, has a nearby target group of trainees been identified, and are they willing to participate? At whose expense? During business hours? On demand? Do not overlook any aspect of relationships that have a bearing on the program. If in doubt, enquire; and flag the appropriate item until the question is answered.

III-1-5

Task One/Step Five: Specify the Most Effective Learning Strategy for Teaching the Terminal Objective(s):

A learning strategy is the specific plan by which the instructional content of the individual lesson is arranged and presented (delivered) to the trainees.

A competently designed learning strategy seeks to product the: a) maximum effectiveness (fewest errors); b) maximum efficiency (least time to perform to standard); c) maximum retention (slowest rate of forgetting, or learning decay); and d) maximum attitudinal support (trainees should feel that they are learning and want to cooperate).

Your Terminal Objectives were identified in the process of creating the Task Hierarchies and Master Syllabus in II-6. Ordinarily, each Terminal Objective becomes one lesson, whether in sessions that are one hour or multiple and one week long. Be certain that the latter does not really mask a more complex duty/task that might be more advantageously broken out into more manageable and more flexible proportions.

As a rule of thumb, each Terminal Objective will be the end point of its respective lesson, if it's simple and will be tested. In the case of a complex Terminal Objective with several Enabling Objectives, you might need a separate lesson for each Enabling Objective. Golden Rule: Any unit of learning that terminates in a job-related performance test is a candidate for a separate lesson.

In general, the teaching of topics will follow your own sequenced Hierarchy Chart from bottom to top, left column to right. As before, logical progressions and dependent chains should not be interrupted by independent learning objectives without good reasons. Some lessons–or the tasks on which they are based–might prove to be more complex than previously recognized. If so, break out according to the basic sequencing structure and redefine related Terminal Objectives. As before, color-coded cards will help you to explore alternatives.

Lesson vs Session:

Lessons are units of learning related to a specific objective. Some lessons will be quick and easy, while others will be involved and difficult. You might need only a half hour to complete and test one lesson but might need several hours or days to complete another. Therefore a consideration of session (or basic time unit) comes into play. You session might reflect hours, days, or weeks. In public schools, a session is often a calendar quarter, containing countless lessons. Practicality, common sense, and specific need govern and become the norm for planning.

Lesson and session plans will be developed in future tasks of this Phase, but an understanding of their interrelationship is important to the proper fulfillment of this step.

In this ISD Step, you will begin the process of converting all previous information into teachable formats. That's done by specifying the overall best learning strategy for each Terminal Objective. The best, in this case, reflects all your prior findings so far in this Phase: the results of the paired algorithms; the appropriateness of alternative instructional delivery systems, as test for

validity of general characteristics; and the practicality of the two or three best candidate delivery systems.

In fulfilling this Step, you will create an umbrella Learning Strategy, which will guide the later development of the lesson and session plans, which in turn form the "Comprehensive Content Outline" (Phase IV-2). From among the two or three alternatives examined for each trained-for Terminal Task, select the best, seen as furthering your program purposes.

Checklist for Six Key Lesson Components:

Six key lesson components mark the effective learning strategy; be certain to include all:

1) *Statement of Objectives of the Course*: From the trainees' viewpoints, the purpose of the course expressed as specific knowledge or actions that the trainee will be able to demonstrate on completion (that is, terminal behavior required). All core (essential) information should be mentioned by title or category.

2) *Introduction:* A motivational explanation of the relationship and importance of this course to the trained-for job (and/or to future promotions and career and/or to the quality of service provided to the end user/customer). State whatever is true and appropriate–often phrased as, "Why are you here?" or "What's in it for me?" The last is often referred to as WIIFME! stuff.

3) *Core (essential) Information:* A concise presentation of the essential information to be learned. Additional, optional, or "enrichment" information and materials can be identified, but must be segregated.

4) *Examples or demonstrations:* Indicate how the core information is to be used; give specific job applications when possible.

5) *Practice:* Opportunities to practice the material/information just learned, whether knowledge or performance based.

6) *Feedback to Trainees:* Immediate information regarding correct answers, the individual's own program, plus any other suitable reinforcement or strokes. Point out the source of common errors, especially if the circumstance is likely to recur on the job. #

At this point, the development of your program reaches a complexity at which many executives might want outside help from a professional. If your organization's professional trainers (Are they skilled in ISD program development?) are not able to take on the job now, you might call on curriculum developers at a local community college as moonlighters or hire a commercial training consultant. Caution: Does your chosen curriculum developer appreciate the differences between education and training?

No, you will not have wasted all your efforts to date if you should call in an outsider. Rather, this is a good time to do so, if needed. In fact, your subject area and subject materials are already so throughly organized that any school-based or professional consultant should be able to review in a few hours the information that might otherwise have taken him weeks or months to collect, analyze, and organize. That saves you both time and money. Expect any consultant to want to shield himself/herself from any problems you might have overlooked or from any misinterpretations–the best way is a statement in the written consulting contract that states: "On the basis of the facts as presented herein." Then state those facts in writing and state the degree to which the consultant should review and criticize, and you will have a contract that will eliminate disagreements over assignable faults. If ISD is properly executied, there won't be any faults or fault-finding.

If the consultant audits what you've accomplished to date (presuming your facts to be correct but examining your conclusions and interpretations of the facts), the consultant can perhaps move into the recommendations stage almost at once. That speed can have a profound effect on cost-savings. . .allowing you to economize by calling for paid expert assistance for only those areas in which it is truly needed.

If you organization's trainers or a consultant can see all of your formal documents (as stipulated in this text), the documentary completeness can be more quickly gauged, and it will not be necessary to start from scratch unless there are significant mismatches between the realities of the analyzed job (Phase I) and the later conversion of those real needs into learning and training formats and objectives (Phases II and III). Any consultant must see the actual job performed, if it exists. If not, he/she must know purposes and Terminal Behaviors needed. If you have conscientiously applied the sense of the materials covered in every Task assignment to date, it's unlikely that your decisions to date will need to be rethought or discarded.

It's also likely that you will have so firm a grasp on the needs of your program that you will choose to continue working with your own organization's internal job authorities and other staff– and only later with the needed suppliers. In either case, you will be better able to resist the blandishments from suppliers who promise much more than they can deliver.

In order to assist you if you continue to be personally involved in specifying learning strategies, we provide guidelines and a "Learning Strategies" worksheet." Complete this worksheet now, before continuing into the next Step.

GUIDELINES FOR LEARNING STRATEGIES

Lesson Components for Knowledge Objectives: When developing lesson content and materials for most knowledge objectives, include the following components:

For Knowledge-Based Performance:

Objectives: State clearly what the trainee is expected to be able to do on completion of instruction. Set the explicit conditions and standards of performance. Preferably, use only such terminology as the trainees can understand on entry.

Introduction: State the purposes and overview so that the trainee has a proper orientation toward the course and lessons. Answer these types of questions: What is the lesson about? Why should "I" (the trainee) learn the information of skill presented in this lesson? How does this lesson relate to previous or future instruction? Why should "I" learn the information or skill presented in this lesson? How does this lesson relate to previous or future instruction? Do "I" need to know anything else about this lesson that has not been presented previously or recently?

Core information: Give a brief, concise statement of essentials. Such Core–or essential– information includes fact, names, places, events, functions, definitions, procedures, formulae, equations, etc., which students must be able to recall or recognize. Exclude non-essentials from this statement. The adequate statement of core information satisfies the following criteria: a) accurately and exactly states all information necessary to meet the Objective; all such information must be available and accessible to the trainees; b) specifies by title or category the information to be learned and, when appropriate, states the number of item (the latter, essential to *listing* behaviors of file clerks, bookkeepers, etc.); c) presents concise and logically-organized information; d) excludes non-essential information; any critical information not required in support of the given Objective should be taught in another lesson.; e) avoids unknown or unfamiliar terms and symbols or fully explains them if they can't be avoided; f) provides additional help for remembering core information; aids can include illustrations and graphs, restatements of relationships of the new material to previous learning, or mnemonic devices, such as acronyms, chunking, slogan, rhymes, etc.; g) organizes all procedures/steps/operations into small groups (George Miller has demonstrated that seven items is the optimum "chunking" grouping, plus or minus two). Do you have trouble remembering out-of-area telephone numbers? Do Miller's findings suggest why?; h) avoids adding unnecessarily to the memory load via the additional help/aids provided.

Practice: Specific application(s) of knowledge learned to date. Whether it's called practice, rehearsal, or lab/workshop, practice is the key to learning and retention. Generally, learning is said to have occurred when the trainee can perform as directed three times in succession under the conditions and to the standards set.

Overlearning: Practice beyond the point of learning. It can contribute to long term retention, proficiency, speed, and confidence. Some or all of the following criteria will apply:

a) requires the trainee to perform the exact Task stated in the Objective under the same conditions and to the same standards; b) requires memory or use of only information stipulated in the statement of core information; c) uses the appropriate test item type; d) provides adequate directions, tools, materials and/or writing space for completing the test item; e) uses graduated practice (partial demonstrations) for any objective which requires recalling complex or lengthy information. Remember that recognition behavior is easier than recall, and that cued recall is easier than unprompted recall. Structure accordingly, offering more cues early lin practice than is permitted in the final practice and/or test–but gradually reducing those helps. Sequence all graduated practice toward accomplishment of the final practice litem(s).

Feedback: A trainee's main source of context for viewing his work. At the knowledge level, feedback need simply provide trainees with the correct answer to compare with their own. Among criteria: a) provides an accurate and complete answer, including any acceptable alternatives; b) provides immediate feedback to the trainee; c) related corrected items (errors) to the corresponding practice items, in like manner to the test; d) provides guidance for remediation, including location of required information.

Lesson Components for Performance Objectives: When developing lesson content and materials for most performance objectives, include the following components:

For Performance-Based Performance:

Objectives: State clearly what the trainee is expected to be able to do on completion of instruction. Set the explicit conditions and standards of performance. Use terminology that the trainee can understand on entry.

Introduction: State the purposes and overview that the trainee has a proper orientation toward the course and lessons. Answer these types of questions for the trainee: What is the lesson about? Why "I" (the trainee) learn the information or skill presented in this lesson? How does this lesson relate to my previous or future instruction? Do I need to know anything else about this course that has not been presented previously or recently?

Core Information: Give a brief, concise statement of essentials. Such Core–or essential information includes lists of Steps or operations required (including safety precautions, etc., as separate steps); or lists of critical characteristics distinguishing one type of object or category from another; or a statement of the rule or principle to be followed, as applicable. The statement of core information is followed by an explanation which satisfies the following criteria: a) relates the core information to the trainee's prior knowledge or experience; b) flags particularly important information and tells why a procedure must be performed precisely as taught; c) makes the explanation job-relevant: how and why and when used; d) ensures that students can remember or recall verbally all the critical information stated in the core information before being required to apply it in practice exercises and tests; chunking (George Miller's Magic 7 items) and other mnemonic aids should be used; including visuals, graphics, and checklists, if aided recall is permitted on the job; e) avoids unfamiliar terms or explain them when the can't be avoided; do not use alternative terms if the job itself requires precise terminology or if their customers, for example, already use different terms for the same items; f) points out common errors and their sources and explains how the errors can be avoided.

Examples or Demonstrations: Both represent specific applications of the core information, but they are not simply interchangeable. Examples are used for rule and classification objectives, and demonstrations are used for procedure objectives. Many examples might be used; but only one correct demonstration is shown, to avoid negative learning. Here's how to develop adequate examples and demonstrations:

a) examples: always present a range of examples that show both the norms and the extremes of the rule(s) or classification(s) that the trainee can reasonably be expected to encounter; ensure that the examples range from easy to hard; present examples in steps in the objectives have steps, and label the steps clearly; present the steps in solving equations or formulae, etc., also clearly labeled. In any case, be sure to keep examples consistent with core information and practice and test items. For classification objectives, present both valid examples and "non-examples" The latter lack some critical component or characteristic that's essential to fulfillment of the complete Objective criteria, and the learner must identify/supply it.

b) demonstrations: only the approved version of any procedure should be presented; *absolutely no "wrong way" demos, which create negative learning!* If personalized variations

are permitted or encouraged, state the limitations and essential; demonstrations may be presented live by the instructor or might be shown in motion format through A/V devices, if motion is essential but the demonstrated item is not available; or might be sequenced by Steps in workbook photos or drawings. To demonstrate; describe the specific situation, tools, and materials or

equipment; perform all steps in proper order; indicate common error points, but do not demonstrate erroneous procedure; exclude all non-essential information from the demonstration. Do exactly what they must be able to do; if complex, begin to perform the Task/Step slowly, while verbalizing the steps; repeat at a faster rate; then repeat it at the standard rate of performance.

Feedback: A trainee's main course of context for viewing his work. Adequate feedback satisfied these criteria: a) provides the accurate and complete answer or correction of procedure immediately, with explanation; b) shows all the steps worked out logically for correcting errors on step-by-step procedures; c) points out common sources of errors and tells how to avoid them; d) provides a different interpretation of the identical material if the trainee fails to comprehend or perform; Do no use a different procedure or additional background or enrichment material until the original has been mastered to the degree necessary.

Format Models for Complex Types of Knowledge and Performance Objectives: Highly specialized or intensive instruction needed to achieve the objective level of proficiency can usually be optimized by the use of one or more of the following five techniques of handling difficult-to-learn subject matter. When developing lesson content and materials for most know-use objectives, include the following components:

Highly illustrated lesson material: pictorial and graphic representations carry much of the load of interpreting and communicating the relationships and information; printed words provide titles and clarification.

Chunking: breaking up lengthy procedural sequences into shorter sequence blocks and/or clearly-labeled steps; breaking up large bodies of information into smaller, logical pieces (defensibly organized) to facilitate memorization and learning.

Memory Aids: any acronyms or other memory hoods, if unaided recall is needed (example: "A-B-C for Sales: Always Be Closing") or checklists or specially-marked rulers, symbol charts, etc., if aided recall is permitted on the test and/or on-the-job.

Visual prompting: using arrows, highlighting, or any other visible means of directing attention to key items.

Practice: concentrated practice through the point of learning (three correct performances in succession) and even beyond (overlearning to maximize retention, speed, confidence, etc.).

NOTE: Job incumbents and/or subject area experts who have previously mastered the difficult information can often provide insights on how they overcame the problems. These insights can often be converted to strategies and test items. Enquire. #

III-1-6

Task One/Step Six: Specify the Course Instructional Delivery System:

In its simplest sense, the *delivery system* is the method used to package the necessary knowledge and dexterity skills or other performance skills and to present them to the trainee(s). It includes a) all the trainers/authorities involved; b) the media they need to do the job; and c) any workshop/practice equipment needed by the trainee(s).

All previous work under this Task presented your best alternatives for choosing–and culminates in this Step–the determination of a comprehensive instructional delivery system for the overall training program envisioned in the project. Earlier work in the evaluation of alternative delivery systems were directed to the task level of each of the Terminal Tasks and their Enabling Tasks–topics viewed independently.

Here, the problem is to accumulate all that data, to narrow the alternatives to only that one system which will handle all steps of a simple Terminal Task or to that one combination of learning strategies and media devices that will most effectively and efficiently handle all the complex Terminal Tasks.

There is no single "best" system or method of instruction which applies to all instructional objectives, under all circumstances! No panaceas. No magic boxes. Such claims are only sales pitches! Don't buy!

Your task of evaluation and selection, therefore, requires that you determine the essential minimum needs of each of the tasks and then reduce those minimums to the least number of candidate systems which can answer to every task while not introducing an unnecessary variety into the type of A/V and other media required. The matter of physical and budgetary practicality then comes back into the equation, as does the availability of instructor/proctor staff.

There are two major categories of instructional delivery systems–group-paced (sometimes called instructor-led) and self-paced (now often computer-controlled). It might be necessary to use both categories in different places in your program.

The group-paced program is the format of the traditional public school system. It tries to accommodate the "average" student, if such exists; that means pushing the slow learners and probably boring the brighter students. The same thing can happen to groups of trainees, although if the prerequisites are properly set, the range between slow and quick learners should be significantly narrower than in the general population.

The group-paced program sacrifices some measure of individual attention to gain control over staff and calendar schedules, classroom space and equipment, and ultimately the budget. Individuality can be protected to some degree by the provision of outside tutoring, and by remedial helps for the slow and special projects for the quick.

The self-paced program (not to be confused with self-help) is a means of permitting all trainees to proceed at their own best rate on stipulated material. It also permits trainees with spotty knowledge to concentrate on their own areas of known weakness and bypass areas of known strength. Obviously, what's "known" needs to be tested. On the negative side is the lack of control, unless the self-paced project is computer-controlled and will not permit advancement with prior mastery. Even so, library and equipment facilities must be available for study and workshop over longer period than generally stipulated for the same material in a group-paced course. Then the quick will not be delayed, and the slow, not locked out. Should the facilities include a laboratory or access to major equipment or computers, the cost of expert staffing for the elongated time period could be considerable.

Calculate! This selection is not made by tossing a coin! Some guidelines follow:

Guidelines for Determining the Proper Instructional Delivery Systems Category

1) *Category:* The category selected must be absolutely consistent with the "General Characteristics of Training Delivery Methods and Media appropriate to the paired Algorithms of Phase III-1, 2, and 3.

2) *Calendar:* Available calendar time must be considered if you have a choice of either system mentioned above because self-paced materials often take a longer time to develop and test. (For workable, additional calendar styles, see Appendix A.)

3) *Personnel:* The personnel requirements in and out of the classroom must be weighed; the instructor-led course has the more favorable ratio of staff to trainees.

4) *Revisions/updating:* If the material requires frequent revision or updating, the group-paced/ instructor-led program is best because any changes in lecture content can be reflected almost instantaneously. By contrast, any changes in self-paced programs would require reprinting or re-photographing of film or tape or reprogramming of computers, etc.

5) *Numbers:* Consider the numbers very carefully because having too few trainees in a stable, group-paced "cycle" increases the per-trainee costs unnecessarily; so the self-paced mode in an unchanging program ultimately could be equally or more cost effective, even though its initial cost might be higher. If the numbers of potential trainees far exceed available classroom facilities (and/or expensive or rarely-available equipment), a combination of self-paced preparation linked with scheduled access to equipment for the newly-qualified trainees would stagger their qualify dates and so would minimize crowding.

6) *Nature of Job:* Does the intrinsic nature of the job being trained-for suggest a preference between group- and self-paced? For instance, trainees who will work with teams should probably be trained with groups; trainees who will work alone, especially in isolation, might benefit from self-paced modes. If the valid system is heavily print or visual oriented, in relation to printed/lectured text, self-paced has an edge. If the train-for tasks are conceptual or wholistic, live instructors are preferable because instructors can answer individual questions. #

Keep in mind that you are now beginning to deal in an area related more to people than to teaching/learning details. This is, although the training delivery system must be valid for its objectives, it must still earn the respect and cooperation of all parties before it can fulfill its promise.

Trainees:

The trainees, to whom much of the course material will be new, will not have enough perspective to make judgments until they are well into the program. So if it looks sensible and well-run from the beginning, they will tend to accept and work with it. Their negative criticisms, if any, would not be voiced until the end; so providing a useful channel early will aid both sides. On the whole, the attitudes and potential responses of the trainees are fairly predictable.

Instructors and Proctors:

Predictability is not necessarily sure for those chosen by arbitrary methods. to be instructors or proctors. Patience and personality are critical factors in platform skills, but if you select for those traits, you'll be far ahead. Generally, honor the military discovery that it is easier and surer to teach competent job incumbents and their managers the necessary training skills than it is to teach platform stars the requirement of complex jobs. As a result of that finding, you will probably need to borrow the services of individuals who are already holding down another job assignment in your organization. How much time can they give you?

Whether the selected individuals see the instructor/proctor assignment as a burden or opportunity will depend in good measure on the validity of the instructional delivery system you choose to support for fulfilling your Master Syllabus. Each prospective instructor must recognize that he will be fully supported. In the next ISD step, you will select those instructors. In fulfilling this step, complete the accompanying "Course Instructional Delivery System Worksheet." Since the variables are infinite, work with the *sense* of the elements outlined!

At this point it's useful to see the "Course Instructional Delivery System Worksheet,"located in the Appendix, as AA: III-1-6.

III-1-7

Task One/Step Seven: Select the Instructors:

Whether choosing primarily by category of skills or by personal name, you must designate the person(s) who will teach your program according to the Course Instructional Delivery System selected in the preceding ISD Step.

As cautioned earlier, only if these instructor candidates are capable of performing according to the demands of the delivery system can you hope to realize the potential of the program and its projected benefits.

Capability can include potential as well as present fact. If the best potential trainers are in fact job incumbents or incumbents' immediate supervisory, they are not likely already to possess basic classroom teaching skills, termed *platform skills*, but they do have critical know-how, and that's worth more. It is wiser to plan to teach the needed platform skills to competent job performers than to teach that same job to candidates whose virtues are limited to the corresponding platform skills.

It has been common in industry to hire professional trainers who are polished in platform techniques and then teach them about the product and service before they can instruct others. That method could require months to achieve skills comparable to job incumbents. That is not necessarily cost effective. It can lead to high overhead if the program will be relatively brief in duration. . .leading either to layoffs of newly-hired trainers or additional optional programs created in order to keep the new staff trainers busy.

Further, the instructor whose information is based on script rather than on actual experience often suffers a credibility gap (real or imagined) of varying degrees with job incumbents and their supervisors, other subject area experts, and occasionally with somewhat experienced trainees. Try to avoid mouthpieces as instructors.

This credibility syndrome, when it occurs, seems to occur regardless of the quality of instruction. Yes, it has an ego base; and yes, one should be able to educate the egoists to overlook the gap. But in reality its effects are often subtle, and some damage has probably been done before the problem is identified. Don't create an added burden for yourself.

The military no longer tries to teach job skills to platform stars. Rather, competent job incumbents (or other subject matter experts) are taught the needed classroom/group leadership techniques. That's called trainer-training, even in corporate usage. If you begin with job incumbents who have good rapport with their peers (reflecting personality traits such as patience, kindliness, generosity, even temper, etc.), you probably have a prime candidate for classroom instructor. And if he/she can do the train-for job well, this is select-for Valhalla!

A valued job incumbent who becomes a competent instructor has double value to the company because he can be assigned to either job as needed. Moreover, he often becomes more promotable and more visible because of his newly-acquired platform skills–a benefit to him, as well. Very few job incumbents refuse the opportunity to take trainer-training when the topic is approached in that way.

Whether you attempt to platform-train your instructors internally or externally, via commercial schools, depends on the numbers. If you need one or only a few at scattered intervals, the commercial school is the logical (if expensive) choice. If you will need a half dozen

or more trainers in a relatively brief span of time, it will be less costly to train internally, if you can arrange that.

When ISD was still relatively new, one of the best sources of permanent in-house trainer-training was the Aerospace Education Foundation, in Washington. The Foundation sold to the general public its complete trainer-training course, with all audiovisual and workbook materials, derived from the U.S. Air Force version of platform and underlying ISD skills. But that sale to the public was discontinued a decade or so ago.

Platform skills are basically polish on top of common sense. As stated earlier, patience and personality count for the most, because the skill of speaking before an audience has long been available from Dale Carnegie, Toastmasters, and other groups. The one true skill needed, in addition to the ability to get organized, is the ability to phrase new information in the form of questions so as to draw out the knowledge-level and comprehension of the trainees; lectures are no-brainers.

If these alternatives are not acceptable to you or your organization, you might lean on the speech coach at the local high school or community college. These teachers are already involved in the public-speaking topic, and they specialize in turning raw young talent into quite professional debaters in a relatively few hours of only one or two courses. They can help you, in the moonlight, to upgrade your selected trainer candidates.!

Finally, there's along term benefit to the organization that's often overlooked. By decentralizing and multiplying in-house training capability among job incumbents, you upgrade the ability of the entire organization to respond to future problems with training-related skills and solutions.

Make your decisions now: train internally or hire from the outside; conduct trainer-training in-house or via commercial course in-house if it's a company-wide program; or send a couple of candidates out for a commercial course.

With the personnel decision in mind, you are prepared to continue with the related tasks of this Phase.

III-1-8

Task One/Step Six: Specify the Course Instructional Delivery System:

In its simplest sense, the delivery system is the method used to package the necessary knowledge and dexterity skills or other performance skills and to present them to the trainees. It includes a) the trainers/authorities involved; b) the media they need to do the job; and c) any workshop/practice equipment needed by trainees.

All previous work under this Task culminates in this Step–the determination of a comprehensive instructional delivery system for the overall training program envisioned in the project. This is a watershed point in the ISD process. Most of what has been accomplished to this point has been done as foundation. All of the documents are interrelated but to a greater or lesser degree are descriptive rather than specific. That includes even the Master Syllabus of general program topics.

Now, knowing the training needs, the available subject matter content and dollar resources, and knowing the skills of the potential trainers, you (and the authors of verbatim scripts, exercises, and written tests and references) will create the actual curriculum. You are bound, of course, by the prior Phases' documents BUT now you're creating for the classroom, not for internal discussion or control.

Every decision must be dictated (or at least justified) by the prior documentation. Honor those documents–that's why they were created! Do not permit arbitrary decisions by would-be authors who were not involved in developing the controlling documents. . .they have no roots.

The writing of the actual course work might be in the hands of strangers from this point on, but the control documents are shared; so control is still in your hands. . .where it belongs. . .and where ISD will keep it.

So, your earlier efforts in the evaluation of alternative delivery systems were directed to the task level of each of the Terminal Tasks and their Enabling Tasks–viewed independently. Here the problem is a) to accumulate all the data, b) to narrow the alternatives to only that one system that will handle all phases of a simple Terminal Task or c) to that one combination of learning strategies and media devices that will most effectively and efficiently handle the complex Terminal Task(s). *There is no single "best" system or method of instruction which applies to all instructional objectives, under all circumstances.*

Your task of evaluation and selection, therefore requires that you determine the essential minimum needs of each of the tasks; then reduce those minimums to the least number of candidate systems that can answer to every task while not introducing an unnecessary variety into the type of A/V and other media required.

The matter of physical and budgetary practicality comes back into the equation, as does the availability of instructor/proctor staff previously selected..

As described in III-1-6, there are two major categories of instructional delivery systems: group-paced (sometimes called instructor-led) and self-paced (often computer controlled). It might be necessary to use both categories in different places in your program. If you need a refresher, return to that segment now. Then specify!

III-2

Task Two: Prepare the Curriculum Outline and Instructional Management Plan:

In completing this Task, you will be determining the specific on-paper form of the program and establish the control mechanisms to guide implementation and later review.

The four key components of this operation include 1) the course summary (a rationale); 2) an instructional management plan; 3) a comprehensive curriculum outline; and 4) the lesson/session plans that fulfill the curriculum outline.

This is the point at which the military and corporate methods most differ because your one or few programs do not require the documentation needed by the military in order to keep track of thousand of courses through several layers of training school commands, as implemented by trainers who will never meet the course developers. Moreover, some persons say that change in the current world of electronic speeds doesn't permit a full ISD work-up to be made in every instance. That's the choice of the individual training designer. But although electronics are the

big new topics of discussion, they do not impact all business equally and they don't affect established small and mid sized business to the same degree as with the giants (or the start-ups) in that field. . .and maybe not at all. Take your pick. Yes, things can often be determined on the basis of intuition and felt need, but intuition cannot be passed along, and its program can never be fully understood in the future except by those actively involved early–no outlines, no referenced discussion. It's your choice. Be aware, however, that if you cheat on the ISD methods, nothing is guaranteed thereafter in that program.

Because these documents are essentially through-points rather than end-points, the degree of detail (distinct from full care always required) needed in order to control your direction and outputs should determine the complexity of these documents. You should be prepared to invest all the time and detail necessary, but not beyond. Be honest with yourself: don't claim a lack of need to disguise your unwillingness to do the detail work implied. And be concise: don't create so overly-detailed a sheaf of papers that job incumbents and subject matter experts will be discouraged from reading and digesting the content.

To enhance your chances of making the most useful decisions, read the entire balance of Phase III before beginning the actual work of III-2-1.

Curriculum Master Plan

Course Summary: Purpose and rationales for the course; nine point box. See III-2-1.

Instructional Management Plan: Logistics for the course; comparable nine point box. See III-2-2.

Master Syllabus: General Outline of program content. See II-6-3.

Curriculum Overview: summary packet of actual written and experiential content. See III-2-3.

a) Module Synopsis: the gist of your response to the Terminal Objective. Make a separate Module Synopsis for every Terminal Objective identified to train-for.

b) Lesson/Session Topic Guides. Use specific descriptions of the (several?) Lessons/sessions that together comprise the given module and full its Terminal Objective and its dependency-chain.

c) Master Course Schedule: Specific clock time/day/week stipulated for the given Module(s).

Instructor Guide: Standardize material for group-paced programs if no script. See III-5-2. This step is optional or unnecessary with group-paced programs. See III-5-2.

Trainee Guide: standardize material for self-paced programs; optional with group-paced programs, but it doesn't hurt. See III-5-3. #

For a major operation containing complex courses, documents could number in the thousands. This is the point at which the military and corporate methods most differ. Because your one or few programs do not require the degree of documentation needed by the military. The military must establish and keep track of thousands of courses through several layers of training school commands, implemented by every-changing trainers who will never meet the course developers.

Moreover, in these days of rapid change in technology and its off-shoots, some will argue that there isn't time to do a full ISD work up on each new need. That's the choice of anyone making a program. Just be aware throughout, that if you cheat on ISD, the results are not guaranteed. Yes, much can still be accomplished by intuition in some situations–but intuition can't be passed along; yet a valid ISD program is good for the life of its Terminal Objective(s).

Do only what's necessary–but do everything that's necessary, and do it well.

These documents are essentially through-points rather than end-points. The degree of on-paper detail (distinct from full care that always required) that you feel you need to control your direction and the outputs of your experts and authors should determine the complexity of these documents.

You should be prepared to invest all the time and detail necessary, but not beyond. Be honest with yourself: don't claim a lack of need to disguise your reluctance to do the detail work implied. And be concise: don't create so overly-detailed a sheaf of papers that job incumbents and subject matter experts themselves will be bogged down in trivia when reading and digesting the content.

III-2-1

Task Two/Step One: Write a Course Summary:

As a guide to anyone who will have any occasion to review, study, fund, approve, or implement the program, write a concise explanation of the purposes and key characteristics of the program. Consider:

COURSE SUMMARY

a. Statement of Purpose: Was the course intended to solve a problem or to seize a perceived opportunity? Is it a revision of an existing course or a totally new course? State rationale.

b. End Product: What will the trainee be able to do as a result of completing this program?

c. Trainee Data: Who are the trainees? Found in our staff, new hires, marketing chain personnel, or general public? Prerequisite training or education needed? Approximate number? Any special background or physical requirement (strength, eye glasses, height, multi-lingual, etc.)? Coming from or going to another course?

d. Course Data: Estimated course length in both course hours and calendar day? Locations where taught? How many trainees per location per cycle? How many cycles projected? Classroom needs and calendar? How many instructors and support staff needed? Annual frequence of repeats? (For additional calendar styles, see Appendix AA.)

e. Selected instructional delivery system: group-paced/self-paced/combination? Supported by demonstrations/laboratory work/job simulator/practice?

f. Implementation calendar: First cycle? Second? Subsequent? Location of first cycle? Location

of next cycles?

g. Project personnel: Who is the project director (or Number Two, if you're in charge)? Who are the job experts? Who will write and produce the needed course materials? Instruct?

h. Assistance and adjustments required: How will this project affect the other departments (be specific)? Is it required or voluntary? Does it require instant response or convenience response? What types of reporting/tracking/data will be needed?

i. If you have restricted information that's needed by only a few recipients (or should not in any case be circulated) send it in a covering memo to the key parties, asking for confidentiality. #

When your Course Summary is under control, proceed to the next ISD step.

III-2-2

Task Two/Step Two: Prepare the Instructional Management Plan:

Even the best on-paper program will not function simply because it's on paper. Therefore you will need a logistical plan for dealing with all aspects of the implementation of the program.

In essence, the Instructional Management Plan is the how-to counterpart of the Course Summary just completed, although you will have different and more information, not necessarily in the same running order. Consider:

INSTRUCTIONAL MANAGEMENT PLAN CHECKLIST

1) Personnel Needs: Who will be assigned to the project and on what calendar? When must the course materials be developed and by whom? When will instructors be needed? How obtained and trainer-trained?

2) Facility Requirements: How many classrooms, and where? How many workshops and where? Laboratories? What is the make up or configuration of these facilities? Clock and calendar times needed? Proctor needed for security? (See Appendix A.)

3) Equipment Needs: Product equipment? Test equipment? Media equipment? Computers? Dates needed? Insurance or security needed? Purchase/borrow/rent?

4) Normal Schedule: Days/dates? Number of trainees? Number of instructors? Proctors? Early/late hours for facilities? Multiple shifts? Weekend? Date of initial course cycle?

5) Qualifying Staff: How to qualify? Volunteers, selectees, or appointees? Background required beyond job incumbency? When identified? When trained? Where and by whom trainer-trained?

6) Qualifying Trainees: Who will be admitted? Our choice or open registration? Selected by marketing chain? New hires? Prerequisites? Pre-entrance exam? Where and by whom administered, if exam is needed? By whom graded? When must testing be completed in order to be completed prior to first cycle date? For outside trainees, will grades be reported to immediate supervisor within our company? Outside, to that company? How to handle occasional trainee ailure or need for remediation?

7) Transportation, hotels, per diem: How and by whom will travel arrangements be made? Who will pay? Who will control the movement of trainee candidates to assure full but not crowded classes? How will financial arrangements be made clear to all parties?

8) Internal accounting: What accounts will be charged for staff while on special assignment to develop or instruct the program? Accounts for product equipment used? Purchased? Facilities? Consumable materials? Related travel? A/V presentations and printed materials?

9) More specific initiating documents: What paperwork is needed beyond program descriptions to assure that the Instructional Management plan is actually carried out? Budge Appropriations? Personnel transfers/temporary assignment authorization/new-hires? Public relations and/or advertising support? Space reservations for classrooms, laboratories, workshops, libraries, etc.? Firm authorizations for changes to configuration or structures for the needed space? Special instructions to Accounting Department to break out all assignable costs? Any other initiating paper? List all needed paperwork in this item; assign responsibility for the timely completion of all listed paperwork. #

There is no "correct" format or all-inclusive checklist for the completion of your Instructional Management Plan because it must describe your program–which is likely not a format itself. Common sense will do it.

When your Instructional Management Plan is under control, proceed to the next ISD step.

III-2-3

Task Two/Step Three: Prepare the Comprehensive Curriculum Outline:

In Phase II-6-3, you prepared a Master Syllabus–whichoutlined the key topics contained in your overall training program. People who are reasonably knowledgeable in the subject matter will understand the thrust of the program by reviewing the Master Syllabus, especially if they have already participated in establishing Job Task Inventories and Job Performance Measures.

A *curriculum* by contrast, provides not only specifics on the subject matter to be included as content but also on the many and diverse experiences which together comprise the total teaching/learning content of the course. In your business program, the curriculum might include lab work, visits to assembly lines, ride-with coaching, or business library research; the latter would be valid either for determining employment prospects for community-based activity or for assembling data for marketing purposes. In a high school, the formal high school curriculum includes woodworking or home economics and gym, none of which content or can be adequately reflected in a book-learning syllabus. Sports teams are extra-curricular activities supported by the standard curriculum's gym class. Keep these distinctions in mind as you create your basic curriculum outline.

Whether or not specifying a summary outline, the Curriculum Overview deserves attention. It might be created as a one-stage or two-stage process, depending on the circumstances of your program and the amount of short-hand notation acceptable to your co-workers.

It's a one-stage process when you or any member(s) of you Jury of Experts have absolute expertise in the subject matter. . .when what you set out to be taught can be assumed to be valid and complete unless validation tests prove otherwise. One-stage work-up is also likely if extensive segments of technical or hard-fact material borrowed from other proved programs can be used.

But it's a two-stage process if there is any significant disagreement among the Jury of Experts about subject matter or the degree of detail "needed" to cover a given topic "adequately." If such disagreements should occur, look back to your test-related documents (in Phase II-3) and Job Performance Measures (Phase I-5). Adjust your initial (argued) outline to fulfill those tests, including the predictive indicators identified in Phase I-5. The proper degree of detail or technical depth is derived from the job itself, not a majority vote! Excess detail will increase learning time but not necessarily the proficiency that results.

You are almost surely dealing in a two-stage effort if you are creating a program for a new type of job–or a job that is new to your organization but not necessarily new to outside associates or experts.. That is, you could have a good idea of what you want to teach, but in fulfilling the dictates of you initial curriculum outline, your program researchers and developers might find

that certain information is classified or restricted as proprietary. Or you might find that the data from various sources are not compatible and so do no yield the clear direction or interpretations that you were seeking. In that case, the lesson/session plans will reflect the real world outside your initial outline; and a summary of lesson/session plans will become your comprehensive final.

The comprehensive Curriculum Overview serves two purposes through its lesson/session plans and its module synopses.. First, it guides the program developers in constructing their lesson, support materials, and visual presentations. In that sense, it coordinates and manages the component lesson/session plans. Second, held in the permanent file, it serves to guide outside evaluators who must review the program and its accomplishments, as the brief but important Phase V of the ISD process.

Your program might be taught by numerous skilled instructors in frequently repeated cycles at various sites (the military circumstance which might or might not be applicable to your company, except possibly for new sales hires or for community or broader publics). Then you will be creating lesson/session plans that are so comprehensive that you do not need a separate Comprehensive Curriculum Outline–the collected lesson plans will serve nicely when prefaced by the Master Syllabus and/or initial curriculum outline. Let common sense and your judgment about developer/instructor capabilities be your guide.

Conversely, if your program will be taught by only a few instructors or will be basically a self-contained package–comprised of a lectern script, audiovisual materials, and printed matter from which unauthorized deviation is not likely–then your Comprehensive Curriculum Outline will dictate the content of the program to the developers; and detailed lesson/session plans will not be needed. Standardization of classroom activity will be achieved via the Instructor's Guide and/or Trainee's Guide that will be issued as part of the basic package.

Somewhere within this broad range of responses, your project and program will fall. Opt for the most useful form of outline.

In fulfilling this step, you will prepare a document which contains a) the Course Summary Prepared in III-1, plus b) an Instructional Management Plan, including its array of components, and c) a Curriculum Overview.

Although it is a cousin to the Master Syllabus, your Curriculum Master Plan is not necessarily a Roman or decimal outline. It is, rather, an accretion of all the documents, judgments, and choices made since preparation of the sequenced Hierarchy Chart (II-6). It's intended to correlate for the writers or other developers of the actual classroom materials all the information they need to write to your specifications. You're accumulating these automatically.

Because the Master Syllabus essentially followed the sequence established by the sequenced Hierarchy Chart, the Master Syllabus and the Curriculum Overview will probably agree in running order but might not. They should also agree on the breakout of content–that is, each Terminal Objective should have formed a major section of the Master Syllabus, and each Enabling Objective, a subsection within.

Even if that Terminal/Enabling Task breakout is not the format of your Master Syllabus, it must be the format of your Curriculum Overview. A proper Curriculum Overview has three distinct components:

First: The Module Summary. Your Curriculum Overview organizes its lessons by Module. Each module will correspond to one Terminal Objective's dependency-chain from your Task Hierarchy Chart. The modules will be sequenced to reflect the Hierarchy Chart's sequencing, from lowest enabling tasks/steps through the Terminal Task. All of this has been predetermined by your serial numbering of Terminal Objectives and their Enabling Objectives) on your Sequenced Hierarchy Chart (II-6).

Note that while each Module/Terminal Objective must be supported in full by the grand total of assembled lesson topic pages, each lesson topic does only a portion of the work of fulfilling that Terminal Objective.

Refer to the two military examples following this discussion: one Module Synopsis page and one of many Lesson Topic Summary pages supporting it. Exact format is not important. Relating Module titles and/or numbers to related Terminal Objectives is another easy way to create another control mechanism.

If yours is a reasonably complex program, it might be wise also to invest the extra time and effort needed to transfer the individual Job Task Inventory (JTI, I-3-1) numbers to your Module page. It's an easy was to collect data that proves that you have indeed covered every significant task selected for training.

Also notice that the objectives as stated in the Job Performance Measures (JPM) Worksheet (I-5) and the type of test that will indicate competence. This, too, is cumulative matter, not new description. All of it can be picked up from prior documentation to compare and re-validate.

Treat your developing outline as an initial stage even if you suspect that it is near final. By remaining flexible until the actual lesson plans (distinct from the descriptive lesson topic pages here) are completed, you will stay free to adopt better ideas and improved sequencing that might be suggested by the developers in tasks ahead.

NEVER make the mistake of minimizing the Curriculum Overview in order to disguise less plan shortcoming that might be caused by budgetary problems or statistical information incomplete at the time of writing classroom materials. Disguises would institutionalize the shortcomings and prevent later upgrading.

Your Curriculum Overview must have absolute fidelity to both the job itself (as described in Phase I documents and also in the learning and training objectives for that job, as described in Phases II and III documents. If compromises must be made for any reason, however cogent financially, they must be identified as compromises–and they must be understood as risks to the integrity of the ISD process as well as to your overall program. Prepare your Curriculum Overview pages now. Samples follow.

At this point, it's useful to see the "Comprehensive Curriculum Overview," located in the Appendix AA section at the end of this book., as III-2.

As mentioned earlier, the Module Synopsis page should list the training materials, consumable materials, and media dn other equipment needed. If more than a couple of items must be listed, use attachments rather than extend the cover page beyond a single sheet. The Module page should be a condensation of its addenda, not a repetition.

The third component in any Curriculum Overview is a Master Course Schedule. This schedule must accommodate all of the modules that make up your program; the total number of class hours must at least equal the sum of the hours required by the individual Terminal Task modules (and their lesson/session plans) Generally, because time is lost in transferring between classes or instructors or because the required information doesn't quite fill a time slot, there's some slippage. Expect your calendar time to be somewhat longer than the simple sum of class hours divided by a six or eight hour day.

It's significant in this context to note that in general, the training profession (and the Internal Revenue Service) believe that six working hours is a "full" day. Many programs stretch the class day by adding homework assignments to the six classroom/lab hours, but that can quickly become counter-productive. For a three-day course, one or two extra long days might be permissible because the entire course is so brief, but with a weeks-long course it could create problems. So be sure that free time is allowed in the overall evening schedule for them to deal with family issues and the need to relax.

Refer to the Master Course Schedule in the Appendix N. Then create one for each Terminal Task Module that comprises your course. Notice that this schedule covers only the lesson topics of the first module. However beginning in the afternoon of the second day, the thirteenth lesson topic (presumably by Enabling Objective title or number) is introduced, and it's continued on the following morning.

This is an illustration of how the simultaneous, parallel, or non-sequential segments of the program are handled when you schedule. Simply honor the ISD dictum that dependency chains not be interrupted unnecessarily, and your schedule will be proper.

It should be evident that your Master Course Schedule bears the same relationship to the PERT Diagram (should you choose to construct one) that the Curriculum Overview bears to the Master Syllabus or the Sequenced Hierarchy Chart–that is, the details fulfilling the earlier schematics.

When you are satisfied that all of the documents prepared in this task do–as a whole–adequately describe the purpose, scope, needs, and schedules for your program, then you have completed this ISD step and task. Proceed to the next.

III-3

Task Three: Evaluate Existing Course Materials:

While collecting job data in Phase I, including technical documents, you probably collected existing "shelf" or borrowed course materials as well. At that point, you were cautioned not to read it so that the easily-available items would not prejudice your decisions. But now is the time to read and evaluate all the related training materials that are available to you.

So these materials into three groups–one that is usable intact; one that is usable with adaptation; and one that is unusable regardless of the reason. This last category can include material that needs so much revision that it is in fact easier to begin from scratch; scrap it immediately.

Don't expect miracles from old (probably outdated) materials. Relatively little course material can be used directly for different courses because of different emphasis, even when the subject matter is highly similar. Possible exceptions to the do-no-use rule: existing modules for

core technical subject areas (such as product equipment) that later serve specialty interest courses (such as sales, maintenance, user operations, etc.) often can be used intact or with slight modification. Some core material might be valuable as source material, meaning that it can easily be cut and shaped, if over detailed; or easily augmented with special explanatory material if its level is slightly too difficult; or easily updated if product changes are minor.

Yet the reality of training is that most shelf material is not particularly useful in other contexts. If it was prepared for a different trainee level (prerequisites or IQ) it can be too superficial or too technical for your program, however valid for the original. If the concepts are outdated, it's probably hopeless.

Such decision must be made rationally, not by guesswork. Every item of existing training material that you examine must meet the same criteria established for the development of original materials.

That is, learning categories and learning strategies and learner/trainee characteristics and delivery systems of the shelf materials must be either directly comparable to the new needs or must be easily adjustable. Then the module/lesson topic formats must be reasonably compatible with your newly-determine norm. And if the technicalities match, all of the components (lectures/outlines plus workbooks and guides plus visuals plus tests) must be available, too–or you must make up new ones.

This is a logical point at which to examine"library" programs available commercially from some publishers. The good thing about library programs is that they're ready now; the less marvelous aspect is that they are generic and are not necessarily aimed at your particular problem. Most training-program publishers have long ago learned that they must sell editorial services in order to "personalize" these generic programs. If so in your case, you're back into calendar considerations and also hoping that their editorial fixer-upper will understand your needs. Also at this point is the question that if you must re-evaluate and revise library material, can someone at your own company do as much from scratch? Keep in mind that such "repair" writing is not "literature"–it's how-to; and the writer must come to understand the *job* how-to (not necessarily be able to perform the job) before he/she can write/edit appropriately. In that case, do you really need someone else's library material? That's a decision that only you can make, at the time you need to evaluate your options.

In short this is the point at which you evaluate everything available, including all the materials that you might have received from others in the Analysis stage of Phase I-1.

EVALUATING EXISTING COURSE MATERIALS

Evaluation of the existing courses and their materials is time consuming but not difficult. It's a three-stage process that is eminently sensible:

First: read through the materials and highlight those portions that seem either highly applicable or problematic. Concentrate on the Terminal and Enabling Objectives, if you can identify them. The use of color coded markers will simplify later work and aid comparative opinions if several experts cooperate.

Second: returning to the key shelf materials and usable passages from larger works, including library items, complete a form for "Learning Strategies for Knowledge or Performance Objectives" (III-1-5) and/or "Course Instructional Delivery System Worksheet (III-1-6) describing the shelf materials. Complete these forms before forming any judgment whatsoever about ultimate suitability of the applicable borrowed materials.

Third: compare the two forms just completed on shelf materials with the corresponding objectives, both Terminal and Enabling, as determined for your new overall course. Either the items match, or they don't. Don't hedge. Accept the decisions that your forms help you to make if you hope to keep ISD's guarantees working for you.

If the two sets of forms do match, the existing materials can probably be used virtually intact. If the materials are valid but prepared in an unusable format, they can often be translated without too much problem; so they could be usable with revisions. If you have a poor match, or if the existing materials call for an instructional delivery system which you cannot provide, then they are perhaps unusable except as resource material.

Don't compromise the program standards established in the learning strategy (III-1-1) and instructional delivery system documents (III-1-2) no matter how tempting the apparent "saving" of time or money might seem at the moment. Compromises in the standards of the program could result in weak modules, at minimum, or a failure of the program to graduate trainees who can actually perform to standard.

You and you Jury of Experts should evaluate the existing materials before they are turned over to the developers (or "authors") of the training materials. . .also to avoid prejudicing their viewpoints ("If they think it's good. . .") or "selling" them on dubious quality.

That evaluation must be completed now, because the next ISD task initiates the actual process of authoring verbatim materials, which includes everything not borrowed intact.

The evaluation of existing course materials is a critical process. Give it the time and thought it deserves. Review and evaluate all shelf material now. Then go on with the ISD process.

III-4

Task Four: Coordinate the Instructional Concept with the Developers/Writers:

The key work of this task is done in conference. Before calling that conference, you must be familiar with all the remaining tasks of Phase III and must be ready to assign to the developers/writers all the remaining task of this Phase.

Even if you have previously carried much or most of the load for this project, you will now be virtually required to delegate the actual writing of the printed and visual materials to others (because of normal time constraints of your primary job), whether or not you consider yourself to be a good writer. On the other hand, if you are the best-able to do the writing, then congratulations–you've just landed a new assignment!

As a rule of thumb, one week is thought to be required to create one hour's lecture (40 minutes) together with related workshop activities (20 minutes) in original typescript/art. Production time (printing, photography, processing, construction, etc.) is additional. Very few executives would be able to conduct the affairs of both their own corporate position and this special training project without substantial help. For assistance with business meeting planning, see Cavalier's "Sales Meetings That Work." Its complete how-to methodology was the meetings industry's very first and is now standard.

To this point, you have identified all the needs of the overall program and its instructional components, although in an isolated format. That is, based on your Job Data Worksheet, Job Task Inventory, Job Performance Measures, and other documents in Phases I and II, you created a hierarchy chart. In that chart, each of the dependency items relates to all the others within its dependency chain; and each of the Enabling Objectives relates to its own terminal objective. If you have honored your ISD imperatives, all of these related perfectly to the job and its performance measurement factors. So far, so good.

But that's analogous to assembling a long list of needs and objectives that you might have for a house: living room, kitchen, formal dining room capable of seating *how-many?* Comfortably, an office with a stone fireplace, three bedrooms, each with half-bath, plus a full bath; plus the master bedroom suite, with its whirlpool bath and twin sinks, plus garage–how many stalls? You still need to choose the brick or other sheathing, plumbing–copper?, roof, and wiring. You and the architect (here, your Jury of Experts and/ or job incumbents)have described the general type of structure needed to fulfill your dictates, but the list of needs and wants is not a housing design. Your architect must first create a floor plan and elevation and give you the blueprints for the design you said you'll approve. Would you expect blueprints for a house but not for a program that might be equally complex?

If the construction tradesmen cannot begin to turn these housing designs into a reality until they have the blueprint in hand, the same is true of your developer/writers. Your work to date is their blueprint for the writing and structuring of all tasks following in Phase III.

Who will do the actual development work from this point on? Several alternatives, including your own associates:

Long before this point, many companies have simply rush out and hired an A/V producer or a training consultant or media specialist and waited for lightning to strike. Disaster has struck far more predictably: beautiful-to-look-at program components that teach little and so cannot solve the root problem that prompted the program. If you don't already know ISD technique, then you cannot adequately judge anything that anyone wants to sell you. Period.

Any outside supplier can assign even strange writers to your job within a few days of his inquiry. Those writers can prepare scripts and workbooks full of well-turned phrases that might or might not serve your program, even if they get past your first whiff.

The conviction level of any written training program or module can be only as deep as the writer's understanding. When you are dealing in general marketing trends or attitudinal states, then the writer might have some actual expertise to offer. Do not confuse cliches about teamwork or cooperation or loyalty with subject matter expertise!

By contrast, a job-competent instructor can clarify and augment written material as necessary when instructing as well as when providing authority to the outside writers. But if that same job expert talks into a tape recorder, even an avowed non-writer can "write" the needed material. So look to your in-house options first.

However, language specialty areas alone are no substitute for job-knowledge. You need both style and substance–real know-how. Create that combination somehow, using staff in conjunction with any outside writer you might need to employ. Such tandem operation works well because you get both needed halves simultaneously, without "training" the writer first.

The people who really have the expertise to see that your project is done right are the same people who have helped you to analyze, design, and develop the program to this point. Their drawback, in most instances, is that language skills seem not to be evenly distributed among the general population. Writers have a corner on grammar and style, the way engineers have a corner on slide rules and calculus. . .but the job being trained-for is not likely to be one of those tool disciplines. So don't be impressed by non-related credentials.

One good way to create the needed tandem operation can be picked from the three potential ways that follow–or any other way that you choose:

First, you might hire a training specialist/consultant to work in your offices. He/she will provide the form and organization and production know-how to guide all of everyone's efforts but will never need to become a specialist in your organization's products or services. That can save months of time. Similarly, your staff will be guided in such a way that all their efforts are usable as prepared–no spinning of wheels or limitless drafts of materials occasioned by quick but superficial starts on format. Your staff need not learn the consultant's field, either–so it's a win-win situation. Your consultant should be able to guarantee you the usability of the tandem output.

The dollar cost of having a consultant/training specialist in-house for several weeks or months is not negligible. On the other hand, if his/her guidance can assure you of the usefulness of the materials being prepared, it might be a good buy. . .certainly better than wasting several months on "free" but unusable stuff. In-house is not truly free. Think cost-effectiveness.

Second, if your experts are scattered among several distant facilities (preventing a consultant from being centrally housed) or if you simply cannot afford a tandem operation, then you can ask your Jury of Experts to prepare first drafts of needed materials to be sent to a consultant/training specialist for editing and rewrite. Although cheaper in dollars, this method is more given to time slippage. Moreover, a consultant might hesitate to assure you of the usability of materials if he has not yet analyzed needs or audited the learning/training objectives prior to attempts to write in-house.

Third, hire a consultant to audit and advise when as needed, wherever needed. Assume that your consultant must and does audit prior to advising and coaching in-house writers, even by telephone or internet. If your experts create the first draft, it would be wise to minimize their problems with articulation by encouraging the authorities to talk into a tape recorder while discussing things they know well. If the in-house version is *complete*, that's the best situation you can hope for. The consultant can sort out and use the best phrases later, if necessary.

This is probably the best time to introduce the concept of video-conferencing into the preparatory stage. It's full-motion and much cheaper these days, and it can permit your consultant to "travel" to any locations to "meet" with your authorities. You can buy expensive units that can be used in the future for larger video-conferenced events (including training), or you can buy mini-cameras for individual use–for under $100 per camera. Don't ignore this major time- and money-saving option. In this way, the authorities can verbally walk through every Predictive Indicator Task with the consultant–and get everyone on track simultaneously.

If you also tape, once that audio or video tape is transcribed, the typescript becomes an authoritative resource easily circulated for additions, corrections, and approval. Then it can be handed to any training special-writer as content-perfect; with the outsider efforts limited to restructuring to presentable format, if needed, and stylizing. Because under this practice the outside never originates any of the content, you have considerable control throughout, much as with the consultant who might have worked in tandem, in-house.

Regardless of the method you select, you must give your tradesmen the blueprints from which to build the house. In this case, your blueprints are comprised of the Curriculum Master Plan components, including as much of the content material from the Curriculum Overview as can be circulated without restriction. Generally there should be no problem with anyone's viewing the Sequenced Hierarchy Chart, Master Syllabus, Learning Objectives, and selected Instructional Delivery Systems–rarely do these compromise any proprietary information.

However, if the analysis of your job-related problem might be useful to a competitor–and if confidentiality cannot be assured by enforced restrictions or other means–discuss only on a need-to-know basis but do not circulate this material in print. Your consultant's contract can also provide for absolute silence and non-competitive clauses.

No blueprint can convey more than the factual material. Yet a project of this scope has overtones of values and subjective judgments that cannot be conveyed in the documents. For that reason, if for no other, a coordinating conference is almost unavoidable,.

Prior to that coordinating conference, give a copy of the pertinent and release-able Phases I, II, and III documents mentioned above. Invite the Jury of Experts and any other job incumbents who assisted (whether or not on the Jury). Bring in your outside assistant, if any. And if your organization's own Training Department will take over the balance of this project, bring in both the department head and the assigned writers. Your object is consensus on all elements not committed to factual form in the documents. To help assure that the documents will in fact be read, ask all recipients to bring in a list of questions or to mark their notes in the margins, to be collected.

During the conference, clarify the organization's purposes, your expectations, and the eventual benefits from the program to both the organization and the trainees. Be certain to impart a clear understanding (indicated by their discussion and questions) of all four of these key areas:

WRITERS' CRITICAL AREAS OF UNDERSTANDING

1) *Comprehension:* Be aware of the importance of giving everyone the same appreciation for the details, decisions, and subjective prospects of this program as you had when you began to champion it. The developers/writers must know what you can and cannot afford by way of classroom materials, visuals, product equipment, consumable materials, and A/V equipment, if any. Parameters for spending–as well as program content–must be fully set out. If you control the budget, state that right now.

   Be prepared to discuss these kinds of points in detail: a) Locations and numbers of classrooms and trainee load; target starting date; continuing calendar; group- or self-paced. b) Types of instructional materials. Will you use printed workbooks, photos, models, charts and graphs, chalk or chemical boards, simulators or computers or actual products? c) Attention to the prescribed structure: Does everyone understand that the program materials must faithfully reflect the JPM's, Performance objectives, learning objectives and selected instructional delivery system(s)? Do they understand that the writing must be "lean"–that is, only what's *required* for trainees to learn to perform to standard. Do they understand that the stipulated test items shall guide the knowledge levels? That the stipulated demonstrations shall guide the practice and later the performance levels? That all trainees shall be proficient to the "X %" degree under the conditions and standards established–including perfection under criterion-referencing, if needed? D) Attention to trainees: Do the developers/writer understand that the "lean" materials first created are subject o augmentation if they prove inadequate in the pilot test run(s)? That such augmentation is preferable to over-writing in the first instance? That enough practice must be provided so that trainees can be *fairly* expected to perform to various step-standards as well as to Terminal Standards? Is everyone aware of the need to build feedback into the program at every stage by whatever methods are best for that program segment–discussion, Q&A periods, verbal quizzes, written tests, written questionnaire, after-class counseling, etc.?

2) *Media:* The appropriate stimulus or stimuli were set out in the Task One algorithms and allied documents. Do your developers/writers understand cost-effective mediation? Can they distinguish between the training-needs and packaging-wants inherent in the choices between graphics that might be printed in workbooks or on computer or preprinted on chart-sized sheets or projected from still slides? Which alternative will serve the program best? Is motion necessary or merely wanted? If needed, will it be achieved with film or video or semi-animation? Can computer graphics provide for both the printed and graphic forms? It is still not necessary to specify brand names, unless only one brand can do the job. Lest anyone have the nation that only A/V equipment can do the "media Job,' call attention to our Appendix "MP," the Media Pool identified by the military.

3) *Training Devices:* Can the developers/writers all distinguish between tools (that every trainee must be able to use) and test equipment (which only the instructor uses to grade trainees' performance) and consumables (paints, oils, wiping rags, mixing containers, pencils, notebooks, etc.), because the quantities ordered depend on usage rates. Of all equipment and media that might be needed, what is already owned and available? In what quantities? On what schedules? Is all testing equipment (meters, gauges, etc.) that will be used by the instructor now available? When and by whom will such training devices and supplies be ordered? Which items are discretionary, and within the budget range, can the developers/writers plan confidently?

4) 4) Cost effectiveness: Do the developers/writers understand that they as individuals are also responsible for the development of a program that is not only effective but cost-effective, as well . . .in other words, that they are to use the least costly medium or combination that will achieve the entire objective? In the area of media, with its seductive lure of entertainment appeal, your dollars are most in danger. Caution! So much emphasis has been placed on the razzle-dazzle of maxi-media visual presentations that the public often overlooks the facts that many flashy presentations have no real instructional value even though the presentation might have won awards for its technical values (direction, lighting, costumes, camera angles, etc.). For an extensive discussion of visual learning and the media, see Cavalier's *Sales Meetings That Work.* #

Once you have presented all the factual and subjective guidelines, open up the conference to comments and the interchange of ideas. The presentation of the envisioned program in a cohesive manner for perhaps the first time can trigger new insights and ideas. Often the enthusiasm rekindled or generated here will result in volunteer effort by individual members of Jury of Experts to prepare specific items or technical passages for or with the writers. The more personally involved each of the conference members feels, the broader will be the support for the ultimate program when implemented.

When you are familiar with all the needs set out in the balance of this Phase, call your conference.

When your developers/writers of instruction have a clear understanding of your intentions, the necessary written program documents and budgetary guidelines and when to create those items, then they and you will have fulfilled the dictates of this ISD Task. Authorize the developers/writers to begin their work: all the following(applicable) tasks of this Phase.

III-5

Task Five: Develop Group-Paced Instruction:

In this category the instructor's needs and expertise govern all (according to the actual Instructor Guide), but he/she is boss! A complex program might require both group-paced and self-paced segments, taken from this Task or the next.

As noted earlier, all instruction and instructional material developed shall be based on the documentation for the course executed in Phases I, II, and III. . .whether broadly circulated prior to the conference or held closely. There can now be no secrets from the development/ writing staff.

Group-paced instruction requires a) an instructor who is competent in the subject matter; b) an Instructor Guide to provide shape and control for both the individual instructor and the entire instructor (or cadre) corps who might teach the course from time to time (or even simultaneously, in various locales); c) Lesson Topic Guides (or scripts) re: the content/subject matter; and d) a Guide to Instruction/Instructor Activities Guide detailing who does *what* and *when* in the classroom. An Instructor Feedback form is a wise adjunct.

We will address those four key elements as Steps of this Task; but again, the numerical sequence reflects the dictates of the language–the process is iterative and maybe simultaneous.

The group-paced instructional delivery system is sometimes referred to as instructor-led. Correspondingly it tends to center on lecture formats (live or demonstration or A/V with practice/workshop period interspersed.

Before anyone can begin the writing, you must make a critical and far-reaching decision based on your program needs: whether the instructor will use a *verbatim script* or an *outline of content* as the basic instructional control document. Your option will be dictated by program realities: budget and instructor capabilities.

If your program is simple, quite flexible, and conducted by expert instructors more or less under your supervision, you might feel perfectly safe in using an outline of content called a Lesson Topic Guide. It is an augmented version of the Curriculum Overview, which in turn was an augmented version of the Master Syllabus. This format is common to commercial schools, public schools, and continuing corporate training schools because it is relatively quick to make up, yet easy to revise. It yields quite satisfactory control over program content when taught by competent instructors and should–despite perhaps wide variations in instructor aptitudes and personalities–yield similar results in performance proficiency among all trainees. At least, that's the theory; reality is not always so homogenized. But Roman numeral outlines of preferred run-of- programs have proved successful for us many times in the past. . .and the local managers across the nation have liked both the time-saving features and the opportunity to ad lib their local inputs without distorting verbatim scripts.

If your program is technically complex or legally sensitive, or if it will be presented under a variety of conditions by an unpredictable collection of meeting leaders or instructors of uncertain skills, you should favor a combination of verbatim script and recorded audio or audiovisual modules or computer-controlled segments. Verbatim presentation modes can be provided together with any vicarious demonstration materials and workbooks or instructions, in a self-contained training package. Properly constructed, that package can then be used with comparable results by anyone who possesses the minimum skills you stipulate. The trainer skills must be consistent with the determinations made in Task One of this Phase. Discrepancies? Resolve them before continuing.

Here's a thumb-nail summary of an actual language-instruction program designed to permit volunteer tutors to teach phonetic content previously assigned to certificated teachers: The program (*Practical Word Power*) was developed as a combination Lesson Topic Guide (left-hand page of instructions) alternating paragraphs with a verbatim script (right hand page). The paired pages stipulate and control the content and run of program for eight sessions of two hours each–in less than 250 pages. It can't be done wrong, and there's lots of room for instructor personality and additional resource input. A tutor's workbook and script, this training program can be conducted by anyone who speaks standard English and needs no supervisory oversight.

If your program requires verbatim script, proceed to Step One of this task; it requires only curriculum outlining for competent instructors who are already adequate in the job skills, jump to Steps Two, Three, and Four of this Task, depending on the option you choose. Here, you need *not* complete the unneeded items. So begin the authoring of instruction now, using the more applicable of the next two Tasks (5 and 6) according to need for group- or self-pacing.

III-5-1

Task Five/Step One: Prepare a Verbatim Training Script (Option):

Guided by the documentation, conduct a conference as a mock presentation of the "course" in cooperation with the appointed job expert(s). Describe course content and indicate equipment and demonstrations needed. It's best not to have a audience apart from the direct participants.

If your course has multiple Terminal Objectives, plan multiple single-objective conferences. Each will result in a program module. The conference objective is to leave the session with a workable skeleton of a lesson/session, with much of the necessary explanation and technical terminology firmly established. The process is speeded if the most-capable individuals bring notes or rough drafts to the mock presentation conference. Work at one Terminal Objective each time, but always include the Enabling Objectives with their respective Terminal Objectives.

Run a tape recorder throughout both the initial presentation conference and all subsequent repeats or alternate versions. Otherwise some very fine material seems to get lost from one version to another. It's better to record and transcribe duplicate material than to loose unique material.

Don't attempt or expect to give or get a perfect performance in these conferences–that's not the purpose. The creation of adequate "lean" content is all that matters. When you reach a point at which you need specific equipment or media, read that information into the recorder. Dictate a brief summary of the content of any A/V modules, as well. Leave nothing to chance; make no assumptions, especially about likely memory. Adjourn.

Ask the steno to make a quick-and-dirty transcription of the tape. The ideas, terminology, and support material indicated do matter; the punctuation doesn't. Now edit out all the irrelevant and repetitive material, and get a clean-typed draft. Circulate that to all participants in the mock presentation conference–plus other experts, if any. Get their comments in writing in the margins of the transcript pages, and be sure to transfer all comments onto attachments to your master pages. You'll quickly see areas of agreement and discrepancy. Resolve the discrepancies fast.

Then correct the factual details in the program and get a fresh retyping of the adjusted version, which now becomes your semi-final master script.

With the semi-final in hand, prepare a pilot class with several potential trainee candidates (or their equivalents) or other ersatz "trainees" picked from among organization staff. They should have no more subject matter background than the actual trainees will have. It is essential to the validity of the test that the instructor use the verbatim script intact–nothing deleted (even if it appears impossible for the ersatz trainees to comprehend–note it and fix it later). The ersatz trainees' questions tend to make holes and inadequacies apparent. If any, revise to suit. If changes are significant, retest the newly adjusted semi-final script with a few different ersatz trainees.

In general, trainees adapt well to a rough presentation if warned in advance that it's in a trial state; so successes and failures will tend to be that of the program content rather than its slickness. Besides, perfection of the original is quite unlikely; so don't even hope for it.

If any module's trial class fails to train to standards, adjust and test again with a different group of trainees. The repeat group should be on target with the appropriate tests if the proper revisions were made. If there are repeated failures of the ersatz trainee to perform to standards on completion of any trial session, there is a serious flaw somewhere. It could be in the job analysis, identified Terminal Objectives or the writing of content. It could also be a shortfall in the trainees' entrance skill levels. If so, should the prerequisites level be raised?

To determine whether documents or trainee preparation is the culprit with failures, select new test trainees with a higher level of entry skills and run yet another trial session with the questionable script. If the trainees still fail to perform to standard, scrap the verbatim script and all its underlying selection documents. Return to the basic documents and re-evaluate for the job and course, prepare a new outline of content, and create a new mock presentation. Test as before. It would be wise, once a script is abandoned, to assemble a different authoring team to create the new versions so that faulty items are not unwittingly carried over into the new.

Yes, it's possible, when a individual or team is especially proficient in the subject matter and job performance, to create a program which works well the first time out. That doesn't mean *perfect*, but it is common with professionals and occasionally with amateurs. One or two revisions is the norm with in-house development; so don't be overly critical of any minor shortcomings.

Once the trial class succeeds, refine the script to reflect any insights gained; and consider the revised script to be ready for presentation to the first official class with a pre-tested semi-final version: that is (revised) spoken script, hand-lettered charts, and photocopies workbook materials, etc. Production is so expensive that it's best to have a legitimate training class confirm the validity of the materials before they are committed to ultimate final form (III-8).

If you need a Student Guide, proceed to Step Three now; otherwise proceed into Validation (Task 7). Implementation, even if achieved under this discussion of the development of group-paced instruction) is the subject matter of Phase IV. Master that Phase IV material before conducting your first official class with legitimate trainees.

At this point, it's helpful to see the "Course Instructional Delivery System Worksheet,"located in the Appendix AA section at the end of this book, as III-1-6.

III-5-2

Task Five/Step Two: Develop the (optional) Instructor's Guide for Group Paced Programs:

If you bypass the verbatim script option, you must create alternative tools and controls for the instructors. Without verbatim script, each job-competent instructor must formulate his own explanations and comments, based on the Lesson Topic Guide (which in turn is based on the Curriculum Overview of the Curriculum Master Plan. The amount and degree of variations in explanation–even among qualified people–will astound you. But if each instructor's demonstrations, drills, and practice sessions are based on activity notes that you provide, no two presentations will be absolutely identical, although the material presented will be much the same.

So, to provide optimum control in what must be acknowledged to be a loosely-controlled instructional delivery method, your documentation should be especially concise and precise. The documents will fall into two categories: a) the Instructor's Administrative Guide and b) the

Instructor's Classroom Guide, which is comprised of the lesson topic guide and the activity guide combined in a single reference, page by page, topic by topic. Easy.

Instructor's Administrative Guide:

Everything essential to the proper conduct of the training program as an entity must be described in practical terms. Much of the same material of the Curriculum Overview might be condensed and presented here in nugget form.

Elements that aid instructor comprehension and peer review include a) a foreword page with a statement of purpose; b) a table of contents; c) safety warnings or legal notices (re: patents, trademarks, copyrights, import restrictions, etc.) and d) a quick blurb on "How to Use This Administrative Guide."

The how-to-use section should call attention to the dual entries in the Classroom Guide portion–the content to be covered and the objectives and materials that determine content. All the preferences and understanding that you wish to convey to the various instructors should be included here.

Your attitude toward the tests is important: are they critical, criterion-referenced proofs of proficients, or pro-forma indicators for upgrading sessions for marketing chain personnel or community residents–or somewhere between? Tell your instructors exactly what you expect of them so that they have a fair chance to perform to your expectations.

There is no "correct" format for the material above; but if it uses the words and tone of a business conversation, then the information you present will be accessible. Competent instructors take direction well; it's part of their professional tool kit.

Instructor's Classroom (Lesson Topic) Guide:

The content of the instruction (although not verbatim comments) will be determined in this section. The Lesson Topic Guide consists of the merger–in slightly modified or augmented form–of existing materials. As the following form indicates, content and activity appear side-by-side on every page of this segment. It's easy to recognize the Curriculum Overview as a derivative from the Master Syllabus, contained in full under the "Presentation" item. The main difference is that whereas the Master Syllabus identified only the key topics related to Enabling and Terminal Objectives, this version will contain all instructional delivery details that are essential to your giving trainees a complete understanding of the Terminal Behavior topics.

In the last analysis, everything that *must* be taught to the trainee (reflected in Learning Objectives) *must* be included in the expanded outline of content shown here. Be as detailed as the complexity of the subject matter itself warrants.

Similarly, most of the entries for the *activity* column are a direct steal from the related entries of the Lesson Topic Guide pages contained your Curriculum Overview. All diagrams, drills, exercises, demonstrations, A/V presentations, and practice sessions must be stipulated. Any other techniques that would help instructors to enhance and enrich the teaching/'learning process (without violating the "lean" provisions) belong in the activity column, too.

Don't underestimate the importance of this segment of the Instructor's Guide: the completeness of your presentation here will determine the general uniformity of the program as *events* under various instructors.

An adequate Lesson Topic Guide will tell any subject matter expert how to organize and interpret his own knowledge so as to fulfill the Terminal Objectives stated. An example of a complete format (in a generic skeleton) follows. If your documents are as well thought out as the sample fill-in outline and as complete as the skeleton version, your courses will proceed just as you have planned

At this point, it's useful to see the "Lesson Topic Guide," located in the Appendix N section at the end of this book, as III-5-2.

Unless they might provide assistance to competitors, you might also include diagrams, mnemonic devices, printed comparison charts, and even problem-solving or problem-analysis guides. Again, do not duplicate classroom materials here. . .but complex formulae can require a good deal of time to copy from a chalkboard, for example, and mistakes are easy to make. Putting a copy of the master version of complex materials in the student guide can be most efficient.

If everything provided is computer-printed or line art, an inexpensive stapled booklet format should be adequate for use with employees, and a colorful cover might dress that up for use in the marketing chain or community. We're talking about cost-effectiveness now–nothing apart from common sense prevents you from using hardcover binding and gold leaf printing. Don't let suppliers stampede you into emotional decisions regarding the packaging.

The most common solution is probably an imprinted ring binder (course title plus organization logo), with the related, preprinted notes handed out prior to each new lesson/ session. Don't hand out everything all at once, or you'll never control the eyeballing.

In the last analysis, your ring binder notes provide an orientation in print–a road map to the course–so the trainee knows at all times where he/she and the class are in terms of overall assignment. Prompt reporting of test results in classroom and lab work will establish each individual's achievement to date.

There is no "correct" format. Use your own best judgment and revise and mix and match as needed. And don't forget to provide a Feedback form for trainees, whether bound into their Guide or handed out on completion.

Complete your group-paced Trainee Guide in draft form before continuing. (See Navy examples in Appendix N).

III-6

Task Six: Develop Self-Paced Instruction:

When the experience level of the trainee population is far more ragged than you might choose, and/or when you do not have the luxury of setting different dates for courses of different levels of entry skills, then self-paced instruction is likely to be a preferred alternative to a group-paced melange. Each trainee could then be plugged into your slightly-higher standard course at his/her own equivalent skill level when ready.

Richard Cavalier

FOUR KEY FORMATS IN SELF-PACED DELIVERY SYSTEMS

1) instructor-led and -managed;
2) proctor-managed;
3) computer-managed; and
4) programmed learning (paper- or machine-managed).

Each of the four has advantages and limitations that should be weighed carefully before deciding.

Here are some of the main characteristics of each:

Instructor-led and -managed: This is a hybrid category–with some group work and much individual activity by trainees. When the information to be provided is fairly consistent regardless of trainee skill levels and/or when live instruction and supervision are required, the lecture segments can be delivered to all levels at once, but the laboratory and workshop assignments can be self-paced. One alternative is to call the lowest skill level trainees into class a day (or week) ahead of the more skilled so that the entry level skills are comparable in both groups on the first day of the combined standard session. Another alternative, when entry level skills are comparable but learning aptitudes are disparate, is to deliver basic instruction early in the day, followed by supervised lab/workshop sessions, with each trainee permitted to leave the classroom for the balance of the day when he/she has completed the assigned work to standard. As a third alternative, extra-credit work could be assigned to quick learners–but what's their reward? It should be significant, even if not expensive.

Proctor-managed: If decision-making or branching-choice elements of the instruction require skilled value judgments or personalized assistance, a proctor can be assigned to oversee testing and administrative paperwork at distant locations (including across the street). Thereafter, the bulk of the course work should be adequately mastered by the individual trainee working alone (in a carrel?) using the print, A/V, or computer modules. This format presumes the existence of a Learning Center that can be the headquarters for all activity, and one-to-one is a common relationship between proctor and trainee, although not essential. The essence of this format is proctor guidance but not instruction when trainee decisions are not routine or formulaic in nature. The proctor signs off when the trainee is able to perform the Terminal Behavior to the established standard under the established conditions. It is wise, if not imperative, that the appointed proctor greet each new trainee prior to the start of the program, present a brief personalized orientation, even if a Trainee Guide is available, and make it understood that an interchange of information from time to time will be expected.

Computer-managed: The computer is an ideal alternative in technical or highly detailed instructional programs because the computer has endless patience for repetitive sequences or for baby-sitting for dunces. It is also highly cost-effective when a) the student load is too thin or unpredictable to justify frequent scheduling of classes; b) when the degree of detail is abundant but routine (all variables already foreseen); or c) when one-to-one training on the job is too disruptive or time-consuming for individual attention. Computers are used for some types of branching diagnosis in trouble-shooting were the possible causes are all known (often called *expert systems*). Car shops use these expert systems on computer to determine whether the spark plugs or distributor or whatever are faulty.

However, the computer is not necessarily the best choice for wholistic concepts since (as HumRRO research has shown) sequential format–the root of both computer and programmed learning sequences–is not conducive to conceptual learning. While the computer can deal with both linear and branching decision formats, the trainee might from time to time need help in extricating himself from endless loops into which and amateur can fall. Is trainee access to a proctor or computer programming specialist needed? Definitely, if a motor skill or computer-usage skill is being learned. Computer programs generally have built-in loops to avoid dead-ends. The dead-ends are sometimes less frustrating than are the loops.

Programmed Learning: This hard worked and over-valued predecessor to the computer-managed program has values and limitations that must both be carefully observed. Perhaps outdated now, PL might still serve sequential matters when and where neither an instructor nor computer can be made available–an unlikely occurrence. When purely sequential subject matter of a non-judgmental nature is involved, PL can be quite useful, especially because it can be used wherever the trainee is located. That's potentially a huge savings in transportation and hotel costs. Essentially knowledge-based; any performance tests must be either proctored or mailed-in after open-book exam. As mentioned above (and elsewhere), programmed learning does not necessarily aid conceptual learning. Do not mistake the numbering of information "frames" for PL, which has a stipulated method handling both correct and incorrect answers (see Robert Mager's book, *Preparing Instructional Objectives* (programmed). However, the second edition is essentially the first edition with different page margins–so either will do.

One of the formats above should serve your self-paced program well. Yes, you can combine elements as needed. The creation of self-paced instruction might begin with tape recorded demonstrations aby job and subject matter experts to produce a first draft (refer to the preceding Step).

However, a group-paced system or an instructor-led/self-paced combination (with feedback) system allows for misunderstandings to be clarified instantly whereas the proctored, computer-based, or programmed learning formats require meticulous attention to detail and a far more iterative development process between writer and pilot tests. When a competent instructor will not be available, the written materials must be explicit and foolproof, and only abundant testing will assure you of the discovery of all problem areas, whose corrections must also be tested. For this reason, the self-paced programs are often far more time-consuming to originate than are the group-paced programs. . .and they're also slower to be turned around for changes.

Think about the long term before committing. And ignore the current challenges to the value of all instructor-led programs. Too many critics have something else that they'd like to sell instead.

The testing of actual trainee candidates or ersatz "trainees" should follow the pattern set in the preceding ISD Step, as well as in the following ISD Task. Complete your "Information Sheet and Lab/Workshop Session Report" (See Navy example for "Trainee Guide," in Appendix N).

III-7

Task Seven: Validate the Instruction Developed:

If the development of instruction proceeds roughly from the lowest Enabling Objectives to the Terminal Objective, and if the individual modules (reflecting dependency chains) are tested as each individual module is completed, it's obvious that any errors or insufficiencies in the writing will be caught and corrected before they can become deeply ingrained in the fabric of the developing program. That's the reason for repeated testing throughout the development process, even though it would be much more convenient for the staff and even the trainees not to be bothered again and again.

Clearly, the testing of segment by segment in roughly the running order of the completed program would be a safety mechanism. To prevent your running out of candidate trainees or ersatz "trainees" during an extensive testing period, you can re-use any trainee for a *different* segment. Do not under any circumstances re-use any given ersatz "trainee" to re-test the same segment on which he/she or the instruction (to be determined) failed. A second trial on the same material with the same individual(s) would blur the lines between what is actually taught the second time and what the "trainee" remembered from the first attempt. It would not truly measure only the effects of the corrections. Skewing must therefore occur. Don't invite it!

Because every legitimate trainee will ultimately take all module tests, the re-use of the same ersatz "trainees" elsewhere in the pilot testing is permissible. So occasional repeats of the same "trainees" in different segment, piecemeal style, is potentially helpful. Ditto for the probably-longer time lapses between various presentations/testings of the successive modules because the "trainees" will probably forget more between testing than will the actual trainees–so their ersatz success is an endorsement of the final. Try to under-promise and over-perform!

Almost never will negative results show a clear source; so you must be prepared to analyze the results. That is, the trainees or the instructional materials or the prerequisite levels and/or the instructor could be contributing elements to a shortfall in proficiency.

If there is a shortfall, the exact deficiency must be diagnosed. Is the trainee lacking knowledge skills or performance skills or the combination of know-use skills? In a remedial session that repeats the material under question, does the trainee grasp the material? If so, then perhaps the trainee was at fault; but if an exact repeat of instruction fails to provide the desired skill, suspect the program: is the Terminal Training/Learning Objective clear, and does the instruction actually fulfill the Complete Statement of Objectives?

Continue working with any failed trainee until he/she has mastered the material. Then consider that the content and methods employed the second time might be a better (or additional) approach to the Learning Objective. If a substantial program will be repeated numerous times in the future with large numbers of trainees, it would be wise to create a new dual-track test of the same material. Re-test with ersatz "trainees," using the revised approach to the same Learning Objective and instruction. Then compare. Or you might devise and test a combination of the two approaches, if new approaches can still be plugged into the old format without undue difficulty.

In any case, do not permit any element of instruction to be carried into the final program until it has proved itself in pilot tests at the module stage.

A Remediation Guide used by the military is located in Appendix N. Your own version of it will help you to pinpoint the source of any possible problems. It will serve not only for trial runs of the developing program, but also for permanent use in a Learning Center environment.

Although one can logically presume that a program that tests adequate in all its pieces will also test adequate in its entirety, keep in mind that the overall program is a continuous event that cannot be fully evaluated until after the pilot run of the entire entity–its initial *actual* presentation.

That's why most program developers tend to regard the first actual presentation as the end of the development process rather than as the start of the implementation phase. Keep in mind that the overall ISD process is continuous, and so both interpretations are equally acceptable in actuality, even though presented differently in ISD.

Validation runs might be conducted for both the parts and the whole for several very practical reasons. First, if there is a flaw in any early unit, it can be caught early and won't reverberate throughout all the course materials. Second, many types of materials must be produced in a more expensive form before they are useful in a longer course, and after-the-fact is the wrong time to discover errors or highly desirable additions. Third, the pacing (or flow) of the program as a synergistic entity cannot be gauged in a piecemeal fashion. Therefore, in the initial actual presentation, validity of the parts is presumed (subject to fair verification), and the observers can concentrate on the program as an entity. . .a synergistic whole.

The program event could be easier than expected, leading to a slight telescoping of time; or more difficult than expected, leading to expanded discussion/workshop/lab time; or more grueling than anticipated over an extended period of weeks, leading to a mid-term break. Be alert to human response apart from written feedback. Yet feedback from all participants is necessary; so plan for it. (See "Trainee Feedback Form" and "Instructor Feedback Form" in Navy materials, Appendix N: helps.)

If you stay flexible (nothing's in concrete) under such circumstances, it is often possible to make minor adjustments to the programmatic/administrative aspects of the course without changing the component units or their content. *How* you present might affect *what* you present.

It is both normal and desirable for developers (and later, the instructors) to make small changes after every cycle. That reflects both increased familiarity with the material and the growth of the instructor as a teacher. These adjustments are to be encouraged so long as they do not depart from the stipulated Learning Objectives or do not add time to the "lean" instruction.

Interim tests need not include every Enabling Objective if the mastery of several of the Enabling Objectives is implicit in the performance test for the Terminal Objective. Use good sense. Tests are not and should not be allowed to become ends in themselves. The purpose of the test is to demonstrate proficiency in knowledge and/or performance areas predictive of trainees' successful on-the-job performance. No other reason or purpose is relevant. This is not a time for a kindergarten report card.

Trial runs of any program, whether in part or in whole, costs money in personnel time, even if you don't pay out of pocket expenses might be incurred. But you should pay for all participants' costs. Consider these costs to be your insurance premium, and pay them willingly.

Validation at this initial level is different from, and in addition to, the continuing validation of the operating program, as discussed in Phase IV. Allow for both.

Validate your overall program pieces before implementing any and/or before producing the final (initial distribution) form of instructional materials and visuals.

III-8

Task Eight: Produce the Support Materials and Modules:

While a case could be made for claiming that needed materials that are being run through the company's own photocopy machine are being "produced," we can focus better on the problems, costs, and time lapses if we restrict the term to production of those items finished or furnished by outside suppliers.

Under this definition, not all programs will require the production of support materials; many will require only modest purchases of slides or photocopies consumables. But inevitably the more ambitious programs, especially if crated for the marketing chain, get earmarked for additional funds for prestige packaging. *Packaging* is not necessarily a box or shrink-wrap; rather, it's the concept of "container"–such as film or video or whatever else that can be fancied up rather independently of your program. Use it when absolutely needed, but use it sparingly because after momentary interest (never proved to transfer to the content) it is non-contributory.

If your packaging is clearly labeled, permanently identified, and found justified for prestige purposes (say, four-color printing where two-color would serve as well), relatively inexpensive, the expenditure might be defensible.

Unfortunately, packaging is often confused with content. Marvelous maximedia presentations are often equated with substance when they are in fact frappes. To producers, glitzy is more profitable than plain, which has more competition.

There is absolutely no programmatic justification for any expenditure whatsoever that does not serve the purposes of a given learning objective, or in the case of Curriculum Outlines and lesson/session plans, etc., serve the administration of the program.

Cost-effectiveness analysis requires that you justify every increment of cost over the state of adequacy. Because overspending is easy when dealing with media, especially audiovisual formats, much of the final post-ISD segment of this book (Appendix C) is given over to budgeting and costing considerations. Consider the topic of costing materials to be inclusive in this Step, although there are no specific form needed Read it as if included here as III-8-1. Read it again at any time when you're facing blandishments from outside producers and other suppliers

The biggest single problem in having your program needs realized by any outside producer is to get producers and suppliers to understand that a cost-effective analysis of all components does not preclude creativity–in fact, in the arts, restrictions challenge the creativity! Remember that problem-solving has been identified in psychology as perhaps the highest form of creativity. So do not let suppliers and others with different value systems or other motives sway your judgment on creative input and output.

How early should you begin to produce? That's perhaps the second biggest problem. As stated earlier, you should avoid producing expensive materials in final form until after the initial actual presentation, if that possible and practical. And you own schedule would determine how long a delay can be tolerated between the initial presentation and its repeat cycles. Obviously, your delayed-product might fit within that slot. Or you can do it early and take the risk.

Then how early should you begin to produce? That's perhaps the second biggest problem. Consider your alternatives. If you can use slides rather than the final filmstrip or studio videotape, for example, it would probably be a mistake to go into final filmstrip form prior to the initial run of program. But slides can easily become mixed up in order–do you more value the flexibility of the interim or the fool-proof nature of the final? Then do it!

If your first actual presentation were being made to a group of fewer than eight or ten trainees, can't you work with photocopies of the original artboard? Or can't you first shoot a home-made videotape of something that you hope to put into a film later? All these things are possible in theory–the question applies to your flexibility and capability. There is an alternative for virtually any expensive media form that–by buying re-thinking time–performs a service that far outweighs the inconvenience of a two-stage purchasing process. The costs are modest for most interim stages, and the cost-savings against potential repairs could be major. Consider this to be additional insurance premium, too. ISD is iterative and has redundant safety features built-in. Never try to dismantle them. . .they're working for you.

Taking Bids: Depending upon the complexity of the program and the largesse of your budget, you might have gone to outside consultants and/or suppliers, including producers of stagecraft and A/V, as early as the time you first developed the Master Syllabus or as late in the development process as now, when all components have already been tested in their rough formats. Or at points between. Now is cheaper, because you can spin your wheels by buying from outside sources too early in the process.

In any case, your documentation is your control mechanism when talking to suppliers. Your Master Syllabus contains enough of the content so the supplier knows how comprehensive or

difficult the material might be–which governs the amount of instruction time which must be allowed. Ditto for any presentations needed in order to hype community-based projects.

Your Curriculum Master Plan will provide an absolute guide to the subject matter and the degree of detail for the outside consultants/writers, if you choose to assign that work outside.

Whereas you were dealing in highly nebulous concepts very early in your conceptualization of the program–and therefore were in danger of being misinterpreted or misled by suppliers–you now have highly specific guidelines on paper. Those specifics are you bases for competitive bids. Generally, you should expect to take three bids on identical specifications. You might see three suppliers separately; it is not unknown for clients to have one presentation meeting and call several competitors into the same room for discussion. It is certainly an effective way to stimulate the competitive spirit and also to deliver identical material to all; it is also not overly diplomatic.

If there are proprietary elements included, you are within your rights to skirt them, or to discuss them but refuse to distribute copies. But generally it's best to put every fact-based parameter and subjective expectation on the table in that first meeting. That helps to preclude the supplier's asking for additional money on the basis of "Changes" to initial understanding. Bidding low with intent to overrun the agreed budget is a severe problem in the meeting/conventions trade, and you should be prepared. For an extensive discussion of production theory and methodology, consult Cavalier's companion book, *Sales Meetings That Work (*1983 and 2000*),* especially Chapters 7, 18, and 20.

At all decision-making points, let yourself be guided by the Algorithms for Instructional Delivery Systems, (II-2 and II-3), the Media Pool found in Appendix N: mp, and the costing methodology of the final segment.

With such preparation, and with confidence in the ISD directive to produce "lean" programming, you can't go far astray. In fact, ISD assures you that you will produce effective, cost-effective modules that you can be proud of!

IN SUMMARY

Although by far more complex, demanding, and time consuming than any other phase in the ISD procedure, The Development Phase (III) has witnessed the conversion of early plans and ideas into reality, an event governed by a specific programming structure and supported by *your* professionally-selected instruction and instructional materials.

Because an event cannot be captured on paper or reviewed prior to its unfolding, you must count on your paper mechanisms to provide all the direction that your associates in writing/ development might need, plus all the control that you and your organization might require. The more comprehensive your paperwork, the more likely it is that the final event will actually fulfill your action plans and your expectations. Properly prepared forms virtually guarantee success!

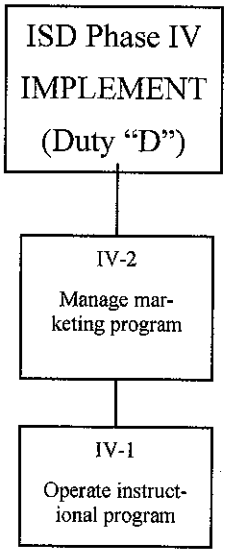
It is the job of the ISD procedure to govern the fulfillment of those plans. If your paperwork was proper and adequate, the performance of your trainees will be adequate to job performance, as well. If you have invested meticulous attention in the translation of ideas from format to format as the job data progressed into training objectives and then into learning objective and

then into actual program components, then you will have aided the cause of synergy; your event will become more than simply the sum of its parts. . .it will be a potent entity, a superior training, marketing, and/or corporate/professional/community responsibility tool whose effectiveness might surprise you.

Then, again, success shouldn't surprise you: ISD is as nearly perfect as you are!

Phase IV:

Implement



Richard Cavalier

Key Purpose:

To operate and manage the dual programs being newly implemented–whether instructional or marketing-related. Guidelines for this phase have already been established and are incorporated into your Curriculum Master Plan and its components, including the Course Summary, Curriculum Overview, and Instructional Management Plan (all in Phase III-2).

Overview:

As the originating executive, you should now understand better than anyone else how to implement the action plan that you put on paper weeks or months. You might or might not want to oversee all the details of the plan yourself, depending on how extensive the program is and how many hours you can give to it within the target period. Nevertheless, you do want to be sure that the individual appointed to manage either or both of the program entities understands both the documents that you've prepared and his/her specific role in implementing them via continuing elements of programming.

Tasks to be fulfilled in Phase IV:

One: Operate the (first actual) Instructional Program

Two: Manage the Program

#

IV-1

Task One: Operate the Instructional Program:

As discussed in detail in our companion book, ***Managing Through Training***, you might be creating a dedicated training program for one internal purpose, or you might have a training program embedded within a marketing- or community-response plan.

Because of the characteristic program-within-a-program structure created by a training project intended as the core of a marketing or community-relations project, two distinct entities could emerge. They should be considered as separate structures even if both are ultimately identical and managed by the same individual. Separate handling (on paper, if not personnel) is essential if the training programs will be operated at multiple locations.

These are some items for the Instructional Program Coordinator's attention; all related to the classroom personnel, events, and costs:

COURSE-NEEDS COORDINATOR

1) *Trainee Pipeline*: The count and scheduling of trainees. Provision for their travel, maintenance, on-time arrival; needs while in the course; including provision for free time/entertainment. What provision will be made in advance for extra-heavy demand? Under-utilization of capacity? Will the participation be required or voluntary (likely leading to pay raise or promotion) on the part of trainees?

2) *Course/Class Cycles*: Determine the frequency of classes and their geographical location and/or rotation, if variable. Avoid holiday periods! All decisions must be consistent with capabilities at various facilities.

3) *Facilities, Material, and Equipment:* Coordination of the equipment and reusable and consumable materials with the lab/classroom/workshop site(s). Permanent modification or reconstruction? Rotating modifications to serve two or more continuing programs alternately? Liaison with other sponsoring groups, especially if community-based?

4) *Instruction and Training Support: Instruction and training support:* What is the mechanism for assuring that materials will be shipped to designed/designated training locations in due time? How will the instructors obtain assistance with any problems, especially if at a distance or if not on your organization's staff?

5) *Inventory Management*: Keep track of supplies and equipment, especially when on loan to various training locations. Re-order consumables in a timely manner to avoid out-of-stock situations, which could cause the cancellation of a scheduled cycle.

6) *Instructor Training and Supervision*: Who will select the local instructors/proctors, and by what criteria? (See Phase III-1-7). How, when, where, and by whom will the instructors be trained, if needed? To whom will they report for course-related issues? How and when will specific classes and locations be assigned? How will the instructors be evaluated on the job, and by whom? How will feedback be obtained and processed? See the accompanying military "Instructor Evaluation" form (Appendix N) for the types of skills and practices that should be monitored.

7) Trainee Administration: How will the trainee proficiency grade levels be collected? Reported to trainees' immediate supervisors, if? What permanent records will be kept by trainee name? Classes' group achievement? What other categories might or should be established for permanent statistical arrays? Consider individual class performance vs overall proficiency levels; group range of proficiency levels; high, low, and average/median test scores of each. Do module test results indicate any recurring problem areas, suggesting a need for course (segment) revision?

8) *Remedial Program (or Attrition)*: How will the *occasional* failure be handled if he/she does not respond to remedial coaching or counseling while the course is in progress? (Frequent trainee failures suggest that something is amiss–either with the prerequisite level or the how-to or the delivery). Find and fix! Because sunk-costs of personnel grow with longevity, whether or not productivity does, most immediate supervisors say re: failed new hires, "Better now than later." However, it's not good management to discharge job incumbents who can still perform worthwhile jobs for the organization. A lateral transfer into a new job might mask the failure for that employee's peers–and everyone will benefit from the comfort level achieved.

9) *Instructional model*: If several, or numerous, sessions will be operating more or less simultaneously at different sites, should each be monitored? By whom? Who will determine which of the various versions (recorded if not scripted) is the best exponent of the original plan, and by what criteria judged? How will the superior elements of the best version(s) be modeled into the other versions? Who will make the revisions?

10) *Authority:* To what degree will your program coordinator have the authority to make decisions and changes in all the above items (#8 and 9) that do NOT involve modification of the course instructional content? What is the chain of authority for all other decisions? What about major changes of personnel among trainers or proctors?

11) *Cost Control and Budgeting*: To what degree is this coordinator responsible for cost containment in future runs? At what point does he/she flag the usage of consumables beyond the original projections(especially if breakage, theft, or loss adds to the count of so-called reusable materials)? Will this coordinator be responsible for projecting costs for the subsequent years for budget requests? If not, who will be? #

This is not necessarily a complete list of items to be overseen by your coordinator–that will depend on the composition of your program(s) Yet it does establish the broad range of items that must be addressed in a continuing manner throughout the life of the program.

If your Master Syllabus and Curriculum Overview are properly sequenced, you or your Program Coordinator can create a Quick Reference Control Chart for the wall. The accompanying chart uses the Master Syllabus created in Phase II-6 as its first example plus the Legal Secretary coin diagram as its second; here, it fakes both in partial form. If you choose to make one up, such a QRC chart will give you a fast reading on any and all programs in operation without getting entangled while cross-referencing the individual Module Course Schedules each time.

At this point, it's useful to see the three forms, located in the Appendices.

Course Needs Coordinator (preceding)

Quick Reference Control Chart

Instructor Evaluation Form

Student/Trainee Performance Record

Although an audit of the mature, functioning program is an intrinsic part of the ISD process, achieve in Phase V, it is wise for the Program Coordinator (or the corporate Training Director) to verify that the program is functioning as it should on a random review basis. (See the "Instructor Evaluation" form and the "Student Performance Record" in Appendix N.)

IV-2

Task Two: Manage the Marketing/Community Program:

As noted in the preceding Task, any program-within-a-program is best treated as two separate programs. Your instructional Program Coordinator can carry the responsibility for all the details of classroom-related events, problem, and reports, as previously shown. But someone must also be carrying the long-term responsibility for operating the overall marketing or community-based program of which the instructional might be a part or a nucleus.

Depending on the extensiveness of the program, you might wish to appoint a special departmental coordinator of the Marketing/Community Relations or Training program. In general that departmental coordinator is assigned to determine whether the functioning training classes are in fact achieving your own organization's objectives in having established the course. Should he/she has the power to take direct actions? If not, how should determinations be measured and registered.? How and when reported? To whom?

Here are some of the considerations; for additional helps, see Appendix A.

MARKETING/COMMUNITY PROGRAM COORDINATOR

1.) *Specific Assignment:* Exactly what will the departmental coordinator do? How much responsibility and authority will be delegated to him/her? Does the authority extend to staff, scheduling, and course content? If not, what distinctions, and why? To whom shall he report, and how frequently? Which person shall decide which issues? Expectations and assignments should *never* exceed authority unless specifically designated as a *discovery-only* process.

2.) *Continuing Validations:* When and how will the actual classroom programs be monitored? Who will review the capabilities of the Instructors? Of the trainees? Who will determine the need/desirability of revisions/additions/updates?

3.) *Liaison:* Especially if other company departments and/or distributors or dealers are involved, there must be open (not necessarily constant) contact to conserve the feeling of involvement. Is this part of this coordinator's assignment? How will he/she obtain and process feedback for associates who might be cooperating?

4.) *Measured Results:* Early in the development process, you had specific objectives for the marketing program, whether expressed as ROI or orders generated or dealers signed or whatever. This is the time to dig them out again and take the measurements that will justify the program's continued operation. Does this program really measure up? If so, prove it; and use it as a model for others in the future. If not, what are its shortcomings (which, if you've been honest with ISD, should be minor)? Correct any shortcomings immediately if the program will continue to operate over a long

period of time. Or, if this cycle of the program is already complete, correct this category of problem before the next cycle.

5.) *Sundown*: At what point (time or achievement) will this program be declared either finished or permanent? What statistical or other corroborative evidence (beyond its internal measures) will be needed? Endorsement from participants in the marketing chain or community? What is the point of diminishing returns after which the program might be canceled even if successful? Might the success and popularity of the program justify its retention even after the point of diminished economic return is reached? Can budgets other than the Marketing Department's budget be tapped for such continuation–specifically Public Relations or Community Outreach or Human Resources departments?

If you have a competent coordinator of the instructional program, you might not need or want a manager of this particular segment of your marketing program. If not, you've just reviewed the additional work you'll have to perform if you hope to fulfill the dictates of this task yourself.

If you are ready with many details of the envisioned program, you might get additional thought-provoking material regarding Marketing or Community programs in the Appendix.

This Phase is never truly "completed" until the program is ended. But at regular intervals, the continuing evaluations that are built into this Phase will merge with the audits of the next Phase. Correlate the two now, so that you enjoy seamless reviews.

IN SUMMARY

Because this Phase is essentially an executive process, rather than a training operation, it's not appropriate–and surely not necessary–to belabor the executive decisions and authorizations which must underlie its fulfillment as an ISD function.

However, it; would be a mistake to interpret the briefness of this presentation as a denigration of the importance of this Phase. Most executives who might undertake such a training program development already have the skills and staff that will make the work manageable. Unless the mechanisms that support the program do in fact function adequately, the objectives and functioning of both the instructional program and the community or marketing program will be compromised.

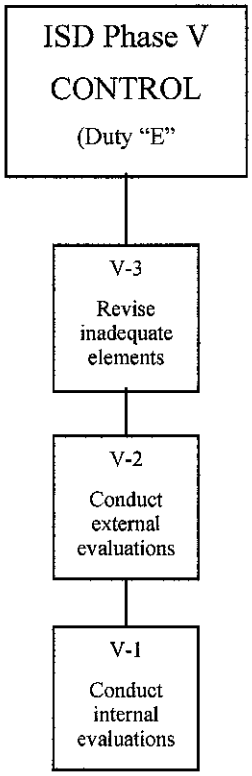
On the other hand, if the dual program functions smoothly, it will encourage the marketing chain, the company's own staff, including the Human Resources and Public Relations departments, and even top management to repeat the adventure in the future.

You are working in the first instance for the success of this program for your company, its trainees, and yourself. You are also working for the success of the ISD programming concept as a business tool. Obviously, they're interdependent.

There's a lot riding on the quality of supervision accorded to the various aspects of this Phase. Go for quality!

END PHASE IV

Phase V


ISD Phase V
CONTROL
(Duty "E"
V-3
Revise inadequate elements
V-2
Conduct external evaluations
V-1
Conduct internal evaluations

Phase V: Control

Key Purpose:

To define and codify the procedures and criteria for evaluating the instruction and instructional materials to determine how well they fulfill the training requirements and how (if at all) they should be modified. Both internal, continuing evaluation and also external, periodic evaluation or audit are included in this Phase, and their slightly different focuses serve related but distinct purposes.

Overview: Job Performance Measures, marketing objectives and even community priorities and conditions all change over time. Just as the preceding Phase differentiates between the focus of the embedded instructional program and the focus of your organization's marketing or community-based program surrounding it, so also does this Phase differentiate between the internal evaluation (to determine whether the training is doing the job designed-for) and the external evaluation (to determine whether that training is still needed, independently of quality).

Both types of evaluations are essential and integral to the ISD procedure. Guidelines for those functions are provided here.

Tasks to be fulfilled in Phase V:

One: Conduct Internal Evaluations

Two: Conduct External Evaluations.

Three: Revise the Inadequate Program Elements

V-1

Task One: Conduct Internal Evaluations:

Is your new project succeeding as a training vehicle? How do you know? Applause, if any, is logical feedback for present moment satisfaction. But that's not what you were teaching, or you could have done it with a raft of cartoons.

The essence of internal evaluations is *trainee proficiency.* If you don't measure their proficiency, you can't claim success in achieving it!

Initially, these evaluations and feedbacks were intended to serve the iterative process of testing, adjusting, and verifying the instruction being designed and developed. Here, similar analyses are pursued in order to verify *throughout the life of the program* that the original objectives are in fact being served by the instruction and instructors who are intending to serve.

Internal refers to evaluations conducted by any individuals associated with the design and development of the program; by nature it is often subjective and imprecise–but for that reason, quite responsive to human considerations. The "Guidelines for Subjective Judgments" unit appears below, in the Appendix. *External* includes everyone else who is either being trained or might be just an observer. (See Task Two, following.)

A comprehensive internal evaluation includes not only the type of informal feedback received earlier from trainees (or ersatz "trainees") regarding the program and training materials under development (Phase III-7),but also their specific evaluations on the overall completed course and its instructor.

Internal evaluators can return to their original analyses and re-think those, if necessary. If the job has not changed and if the trainees are succeeding on-the-job, keep hands off for now. If you choose, internal evaluators can also borrow the forms used by the military for use by external evaluators. (See the accompanying "Trainee Evaluation" form in Appendix N).

All the documents considered together will indicate the felt appropriateness of the training and the motivational vigor of the instructional program *as originally designed and developed.* The job could have changed, or the organization's approach to it might have, or the product/service focus might have. The likelihood of intrinsic errors is extremely rare (given the iterative process) and probably indicates your own or someone else's shortcuts or sloppy thinking. No, ISD is not quick–but it is virtually foolproof when its dictates are honored!

Results of inquiry can be tabulated in careful numerical array or grouped into broad categories, such as *favorable, neutral, or unfavorable* folders. Your needs determine.

Possible changes identified by these methods tend to be relatively minor–in the nature of refinements rather than reversal of an approach. That's also logical insofar as the trainees don't yet have the perspective from which to suggest sweeping changes, and the instructors are usually expected to be guided by what's already on paper. The instructors might find that time allowances for various modules or segments are different from estimates– or from what classroom experience indicates is general, if variable. But *why* variable? Find that answer, too.

Changes such as these–once validated–can be made on a running basis. Often a suggestion sheet containing comments from several or many instructors can be circulated to flag the potential problem errors without requiring conformity from those who don't share the problem.

Ultimately, the shortcoming of internal evaluations as a category centers on it in-looking nature. Needs change in the real world of jobs and marketing, as well as in the world. Sometimes that change is imperceptible and sometimes precipitous–but changes occur. These changes might not always be apparent to the instructors and/or training staffs who positions are by nature relatively insulated from the real marketplace. However, their trainees are often very aware and can rebel. Your task, therefore, is to be sure that real-world opinions are forever fed into the analysis and feedback process. Never ignore the field sales managers if your work impinges on their work! Ditto for other categories.

This shortcoming is a no-fault shortcoming. . .which is why the external evaluation is its scheduled companion. See the next Task.

At this point it's useful to see the "Quick Reference Control Chart", located in the Appdx AA section IV-1.

V-2

Task Two: Conduct External Evaluations:

Periodically (anywhere from each six months to two years) the functioning program must be reviewed by "outsiders," whether company training staff or audit-consultants or other knowledgeable observers. These outsider cannot include previous participants in any aspect of the project development effort because they are too prone to "read into" the results whatever they knew they were seeking originally. Both the instructional program and the overall marketing or community-relations context should be evaluated, but the former *must* be.

Outside viewpoints have many advantages: clarity, lack of bias, lack of built-in blind spots, lack of possessive favoritism. There is no substitute for periodic outside evaluation.

The individual(s) you select to review the functioning program must be competent in training design because, should discrepancies be noted, they might need to review such ISD documents as the JTIs, JPMs, Complete Statement(s) of Objectives (CSOs), Training and Learning Objectives, Knowledge Performance Objectives, and the Instructional Delivery Systems. Your organization's Training Department should be able to do it quickly now, even if they were not available when the project started. No Training Department–no biggie. You and others still have the necessary knowhow–it's simply not located in a single department.

External evaluation should proceed on two levels, course and personnel:

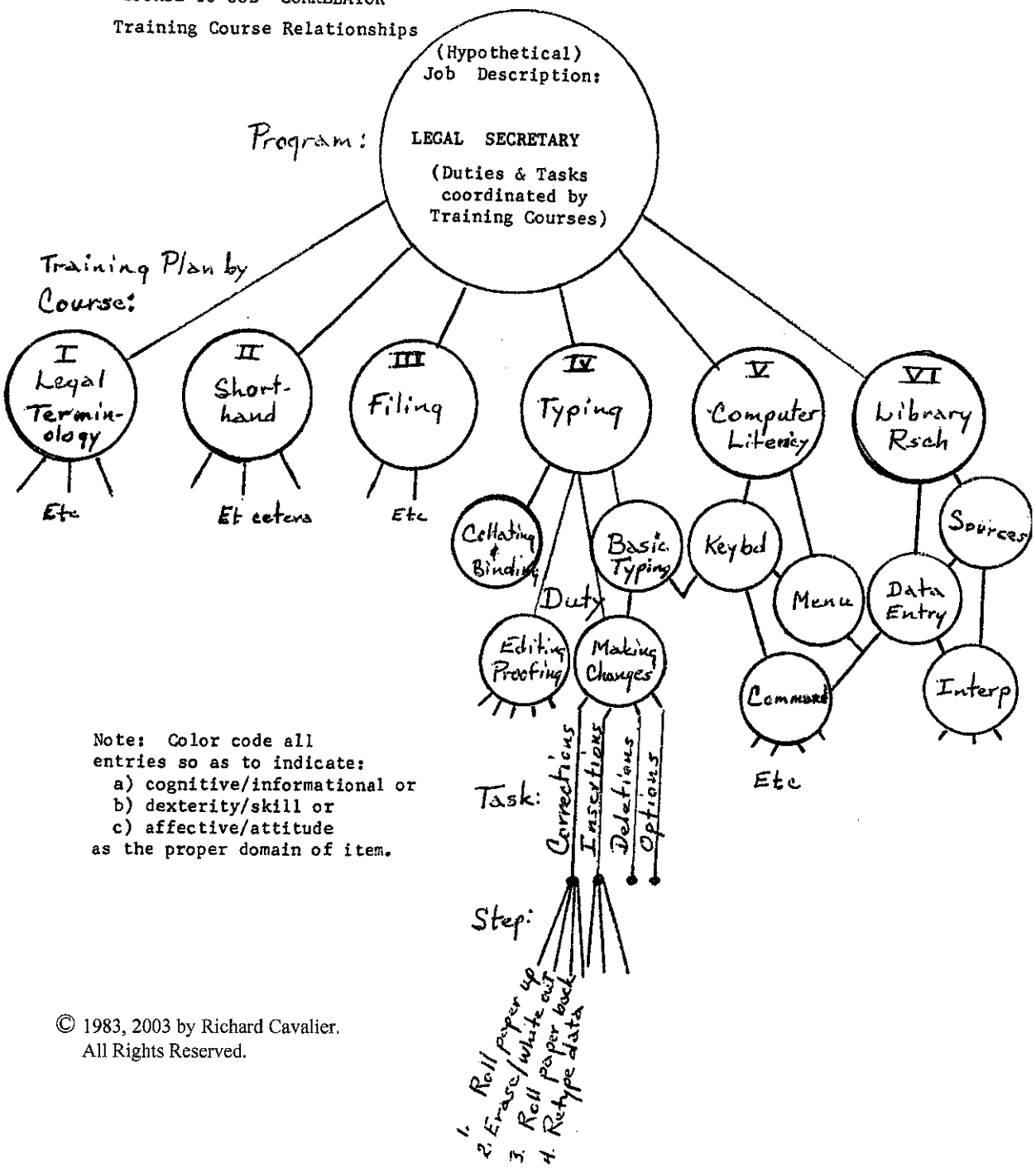
Course: Except in the highly unlikely instance in which major problems are evident (generally reflecting a prior breakdown in your fulfilling the ISD stipulation), it will not be necessary to review all the basic documents. A course audit generally assumes the validity of the materials contained in the Sequenced Hierarchy, the Master Syllabus, and the components of the Curriculum Master Plan (all from Phases II and III). If you're not sure of your early work, then you have to start over again (yourself or through a consultant) until you can be sure!

Personnel: If your prerequisites are correct, you should be able to get valid feedback; if prerequisites are not correct, change them. Beyond that, the personalities and know-how of the instructors and proctors tend to dominate.

CONFIDENTIAL

"COURSE-TO-JOB CORRELATOR"

Training Course Relationships



Note: Color code all entries so as to indicate:
a) cognitive/informational or
b) dexterity/skill or
c) affective/attitude
as the proper domain of item.

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Complete Statement of Objectives--a specific statement of what the learner will be doing under what conditions or constraints and to what level of accomplishment when he demonstrates his competence or new learning. Must be stated in do-able terms. Such subjective or imprecise terms as "more, sooner, faster, better," etc., are unacceptable in the Complete Statement of Objectives without a specific quantifying target number.

As training concepts have evolved over the years, many terms have been used to clarify ideas, and a training jargon has evolved. Often several terms are used interchangeably for the same concept, creating confusion. But understanding, not terminology, is what makes programs great.

So that everyone can express his/her own area of expertise concisely to others, attempt to translate your ideas through the vocabulary provided above and in the practical relationships expressed in the graphics that follow.

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The three forms following the diagrams were created especially to guide the thinking of persons who are interested in exterior programs, essentially Marketing or Community work. The former includes the entire marketing chain or other network, of course, and the latter could include national effort.

In the last analysis, any such program must address your own thinking primarily, but the forms below, in this section, might assist you in making a thorough study of the target area before committing substantial resources in time and money.

Such forms in Appendix AA represent this author's own insights and physical helps that often combine two or more military – type step – forms. These combinations (termed *Correlators*) should ease and simplify your efforts by clarifying relationships.

Richard Cavalier

FOUR PHASES of Education:

I. General education–basic knowledge and skills common to life needs.

II. Pre-employment specialization (college or trade school, etc.).

III. Job-entry level--current knowledge plus OJT and further experience.

IV. Career training, retraining, and continuing education. TRAINING INTENSITY:

1. **Absolute mastery of problem area (no coaching needed; no errors).**
2. **Practical command using references and documents (can solve problem with help).**
3. **Familiarity with topic (others will solve problem).**

LEARNING DOMAINS:

1. **Cognitive or informational (reading, arithmetic, facts and concepts, etc.)**
2. **Dexterity or manipulative skills which must be practiced to be achieved.**
3. **Affective or attitudinal (motivation, encouragement, opinion change, etc.).**

THE CREATION or evaluation of any training program requires that each item in the training syllabus be rated for the intensity of training required; it must also identify the domain in which the training is taking place. The most efficient program assigns exactly the needed amount of time required for the (agreed percentage of) learners to demonstrate proficiency to the stipulated level of intensity. Correlating written and/or dexterity tests with later field performance of individuals provides the ultimate evaluation of the program components and design.

Instructional analysis-- the identification of the essential content to be included in a designated instructional sequence by identifying important and relevant duties, as well as the specific tasks which comprise the duties.

Inventory of tasks--a list of selected and appropriately categorized tasks (cognitive/informational; dexterity/manipulative; or affective/attitudinal) performed in the specified job instruction area. Decisions must be based on observation of skilled performance as well as on theory.

Job description--an overall statement of general functions, responsibilities, assignments, etc., listing specific duties included.

Duty (or division)--a large segment of the job or instruction area; often a cluster of related activities and tasks.

Task--a discrete element of learning having a finite starting and stopping point which can be learned and/or performed within a relatively short time. This is the smallest meaningful or valuable item/skill. Correctly stated, a task description begins with an action verb and a specific description of what is to be done or learned.

Task steps (sub-task or element)--very small specific actions or knowledge items which individually have little value or meaning but in combination form the task under instruction.

Movements or motion studies or mental processes-- the simplest portions of a task/sub-task / step. Not appropriate except where precision is critical.

APPENDIX AA

Author's Aids

The following materials were actually used for the first time in the early 80s with Varian Associates, then of California and now down-sized. In its heyday, and at various sites across the country, Varian manufactured video tubes, hospital scanning equipment, and much of the US military's Distant Early Warning system (The DEW Line), among other products.

To minimize the feeling of threat among managers who were being interviewed for training audit (who were also providing information on actual jobs they did and supervised), we distributed the hand-drawn illustrations noted and following. It worked! Similar drawings were obtained from nearly everyone, although each manager was free to select different illustrative blocks among the three job descriptors and the two calendars when describing the various jobs he/she did or supervised or trained-for.

In addition to the materials here, the coin chart and related "Legal Secretary" diagrams in Phase I were also presented to the Varian people as part of this group. However, ISD uses the *best* placement of learning materials always–and that required placing those diagrams within Phase II, rather than here.

The important point is your recognition that *the groups of related blocks in those diagrams say essentially the same thing in different ways.* Choose one type to become your standard format, if you must, but it's best to present all of our illustrations to your managers and let them choose the styles that are most comfortable for them–each for himself/herself. Purchasers of this book may duplicate these materials intact and distribute them within the organization, if desired, but shall not use them commercially outside the purchasing organization proper.

SYSTEMS APPROACH to the Development of Instructional Materials and Programs (uncategorized ISD):

1. Determine the nature and scope of both problems and program.
2. Identify the learning needs within the job(s) area(s).
3. Develop courses and program by selecting and sequencing training tasks.
4. Develop (re-evaluate) the Performance objectives (What must learner do?)
5. Develop individual lesson and/or session training plans.
6. Identify experts in specific tasks as resources or trainers.
7. Develop the schedule of instruction.
8. Select techniques, strategies, and methods of instruction.
9. Develop instruction sheets and workshop tools~and practice routines.
10. Develop criteria for testing.
11. Conduct a practice/rehearsal session for all newly-created sequences.
12. Implement the (adjusted) training courses/program.

* Measure and evaluate regularly; relate feedback to pertinent step; refine always.

Appendix AA:

Author Aids

These are essential steps in the ISD process, some of which are combined (versus the Military version) on a single sheet. This combination will simplify the tasks and also enhance your sense of the relationships among the processes.

ISD processes must be presented in sequence, but they are intended to be treated in a wholistic manner as you develop your program. Think always about the sense and purpose of your program needs, not the exact formats of any of the forms that you might find in any of the Appendix sections.

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Appdx MP: Media Pool.....169

Appdx C: Costing.....177

Appdx N: Navy.....207

NOTE: Some of the forms contained in this Appendix are difficult to read. The reason is that most "N" forms are photo reproductions of Navy material, which was mimeographed. The author was seeking computer versions just before 9/11. . .after which time the military became preoccupied with national business.

Because they are in the public domain, you may use these military forms exactly *as is* or make your own approximations, as needed. The exact style or content of the forms is not important–your needs are salient–but you MUST provide for the *concept* of each ISD element. Other items are the author's originals, either composed on a computer or reproducing his actual typewritten or drawn forms, as used by clients. They work, too.

In a very few instances, the photo of mimeograph has degraded enough so that this author has provided a duplication page following the original Navy version. What's important in every instance is your understanding of: a) the simplicity of the materials' content; b) the close relativity of the printed items to the training program being designed (actually, derivation); and c) the *lack* of budget spent on "pretty," even though thousands of trainers and hundreds of thousands (or millions) of troops were trained by these methods, using such mimeographed materials. Made clear, they are training-adequate.

Item (c) above exemplifies and is consistent with the finding by HumRRO and Joseph H. Kanner, PhD (of the Army Training and Development Institute at Fort Monroe, VA; 1971 study).

To quote from our 1983 Dow Jones-Irwin book, *Sales Meetings That Work* (now updated and expanded re: Video Conferencing, 2002) and by letter from Dr Kanner himself, as originally quoted there:

> "Complexity and expense of the medium have less bearing on learning results than does the skill with which the medium is used. A workbook which effectively employs the principles of reinforcement, strategic practice, visuals, and text which relate to each other can equal or outperform computers, film, videodiscs, or any other technology which does not employ these principles."

Spend your budget on intelligent content and competent trainers! Success now depends on your own programming skill!

Good meetings to you!

Domains of learning: As already discussed, the specific categorization of training sequences as predominantly cognitive (knowledge) skills or dexterity (manipulative/motor) skills or affective (attitudinal) states or mental sets.

Norm referencing: Comparison of the learner's performance to that of other trainees via a grading system, such as the bell curve, percentages, etc. A major drawback is that the best performer in a poor group could receive high grades that don't compare favorably to the best performer in a good group.

Criterion referencing: Comparison of the learner's performance to an absolute standard, usually the job itself, irrelevant of the performance of other trainees. This is sometimes called performance-based instruction or precision teaching.

Module: Any cohesive, self-contained unit of education or training material(s) fulfilling a stated objective.

Enabling behavior: Contributing subordinate skills indispensable to the achievement of the desired Terminal behavior. You must have (a specified) strength to peddle before learning to ride a bicycle, although peddling might not be not practiced in class.

Entry behavior: Performance characteristics common to training candidates; can be positive (as prerequisites) or negative (undesirable habits requiring retraining or other correction).

Prerequisites: What the trainee must know or be able to do or demonstrate in advance of the training course in order to be successful in the given course.

Instructional analysis: The identification of the essential content to be included in a designated instructional sequence (or course) by identifying important and relevant duties, as well as the specific tasks that comprise those duties.

Needs assessment: The determination, made against the actual job performance, of what must be done in any given program (or course) regarding a specific job.

Audit: The determination, made against the actual job performance, of whether the given program is actually doing what should be done. In the military, an audit is known as the Report of External Evaluation Findings (REEF).

Instructional Systems Development: A methodology for assuring that training requirements are relevant to--by strict derivation from--the job requirements. (Superior methodology!)

Instructional delivery system: Any combination of presentation techniques (including live instruction, classroom materials, audio/visual media, etc.) that help fulfill requirements of the types of learning. In ISD, this is accomplished with the appropriate items among 4 + 12 paired algorithms (provided in Appendix i) of learning task characteristics. These algorithms provide a matrix for pre-selecting logical options or choices for media selection based on job needs and characteristics.

Iterative development: Repeated testing and adjustment or refinement of plans and routines during developmental stages until performance objectives are met. Intrinsic in ISD.

Practice: Repetition or rehearsal of the cognitive or dexterity (motor) skill being learned.

Iterative practice: Repeated practice as a training tool, it leads to over learning, which in turn contributes to facility of performance and long-term memory.

Strategic practice: Placement of the practice sessions exactly where they should occur in the presentation of information; that is, no further information NOT related to the given skill being practiced is allowed to intervene.

Hierarchy: The diagrammatic representation of relationships or enabling behaviors or task elements to the job's terminal behavior.

Jury of Experts (or Content Experts): Competent performers of the existing jobs and tasks under study. Otherwise, experts in the theory/practice areas in which any future job will operate.

Proficiency level: As previously described, the degree of skill proficiency required: absolute mastery or practical command or general familiarization.

Pre-test: Any means of measuring current cognitive, dexterity, or attitudinal/affective state levels prior to any training. Often a confirmation of prerequisite skills needed. Sometimes a true exploratory test to gauge actual skills.

Post-test: The measurement of actual job performance to pre-established criteria on completion of the prescribed training course. Actual demonstrations are preferable to pen-and-paper tests.

Glossary

Adequate: Sufficent for achieving the job at hand. Not a pejorative or dirty word!

Algorithm: A rule or procedure for solving a problem.

Job Description: An overall statement of the job's own aggregate functions, responsibilities, assignments, etc., listing specific duties. List all "must" prequalifications.

On the Job Training (O-J-T): Training while employed at the posting; not group classroom.

Duty: (In education, called a *division.*) A large segment of the job (or educational instruction area); often a cluster of related activities and tasks.

Task: A discrete element of learning, having finite starting and stopping points, that can be learned and/or performed within a relatively short time. *This is the smallest meaningful or valuable skill item.* Correctly stated, a task description begins with an action verb and a specific description of what is to be done/learned. Typing a letter can be a "task." Sub-divisions are called "steps."

Task steps (subtasks or elements): Very small but specific actions or knowledge items which individually have little value or meaning but in combination form the task under instruction. Erasing, winding paper, and centering paper can be some of the task steps under the task of typing.

Motion (movement) studies or mental processes: The simplest portions of a task step/element. Not appropriate for your study except where precision of minute details is critical.

Needs assessment: The determination, made against actual job performance, of what must be done/taught in a given program.

Audit: The determination, made against actual job performance, of whether the program is actually doing what should be done.

Inventory of tasks: A list of selected and appropriately categorized tasks (as cognitive/dexterity/affective state) and as performed in the given job/task instruction area. Decisions must be based on direct observation of skilled performance, not merely on theory. Sometimes called a <u>simple</u> statement of objectives. It is incomplete for training purposes.

Complete statement of objectives: A specific statement of what the learner will be doing, under what conditions or constraints, and to what given proficiency level when he demonstrates his new competence/learning. The proper CSO must be stated in do-able terms, or action verbs. Such unspecific or subjective terms as "more" or "better" or "improved," etc., are NOT acceptable in any proper CSO. What percentage better? And when, than on what date? On class graduation, or in the field after six months? What constitutes/measures "perfect" if required? What level of learning is acceptable if not perfection?

Performance objective: What the trainee must be able to do or demonstrate on completion of training.

Terminal behavior: The desired end result in performance or behavior.

Cavalier, Richard. *Achieving Objectives in Meetings*. New York, Corporate Movement, 1973.

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If changes are indicated, go there. If no changes are indicated, go nowhere until the next cycle is presented. Afterwards, then rethink, re-evaluate, and respond accordingly–forever in the life of that program. No program should ever become static, lest it cease to reflect the real life problem/opportunity that it was meant to address.

If changes should be necessary, go back to the beginning: Phase I. Regardless of whether the current program originated as a new or revised course, your new, related effort is now one of revision. After any length of time during which this program might have been unused, the competitive response or other fundamental market change could call for a totally new approach–with no fault whatsoever to the program that adequately fulfilled the original *givens.*

Just select the "revisions" alternatives in Phase I and proceed accordingly: What is the new need/job? The new trainable task(s)? The new JPMs? The new training and Learning Objectives? The new Complete Statements of Objectives? The new selections for Instructional Delivery Systems? The new needs dictate the type and extensiveness of revisions. Again, you will be aware of the existing course, but do not borrow its answers immediately–it solved a possibly-different (even if related) problem. And it's always there if you need it!

In the community, population and political shifts are S.O.P.; be willing to adjust prior to each new course cycle for best results–the target community's organizations can best tell you whether and how.

By now, you're an experienced analyst and designer/developer of programs. You know how to determine what's needed, and you will become better and faster with each program you prepare. That's not the same as saying that ISD itself will become quick and easy–it won't. It shouldn't. . .because there's no shortcut to guarantee! Throughout the entire process, let common sense rule! If you do that, you're on your way.

IN SUMMARY

The least prepossessing of all the Phases, the Control function is perhaps the most typical of the entire group of phases: its essence is the iterative determination of instructional and programmatic adequacy in relation to the ever-changing real world of job and market performances.

If you honor the dictates of this Phase, you are not likely to find yourself operating an outdated, unworkable old program. You will find, rather, that your program is ever-current. . .a credit to your staff, your organization, and to you, yourself.

When did you last have a better advance guarantee of program success than ISD offers you?

In any case, you organization's other departments will have objectives that are different from the learning/training objectives of the training course itself if considered only from the technical standpoint. Merge both (all) sets of objectives! Then decide whether to do the project. Be sure that the hybrid project will still have true (provable, measurable) value (economic or other) after the end of development time.

An additional hazard of community work is the turnover in leaders and staff as many, including volunteers, become burned-out or bored. Often new people want no part of their predecessors' program, however good. Ego rage! Does any one person now control all outcome? If so, get the support of the entire executive group before proceeding.

Within the community, especially among ethnic groups, changes can come with surprising speed. Needs change in any neighborhood, of course. So do priorities and politicians. How can you assure yourself that your program will continue to have "legs" regardless of personnel changes? If in doubt, become allied with others who have interests compatible with yours. With luck, they will become co-sponsors or the program and contribute to the costs of assessing, designing and developing, development and implementation.

If your thinking proceeds along two tracks (internal and external concepts and audit) then you will surely reach the most workable conclusions in each track. They might or might not be compatible. If not, decide whether to proceed or how to modify.

As you'll recall, all these alternatives were discussed early in the programming process and should already have been reflected in your contingency planning.

How often should you call of external evaluation? As often as the evidence around you suggests that a shift has occurred. Although your training program auditors might conclude that those shifts do not adversely affect the program *as its original documents describe and prescribe it*, nevertheless its far better to evaluate too frequently rather than wish, later, that you had done so sooner. A complex but comprehensive military example of an "External Course Review Checklist" appears in Appendix N.

In any case, the outcome of this task has only two real possibilities: 1) to continue the program *as is*, or 2) to revise. If the latter, proceed directly into Phase V-3, following.

For additional assistance, see 'External Course Review Checklist" in Appendix N.

V-3

Task Three: Revise the Inadequate Program Elements:

If you need or prefer to revise some aspect(s) of the original program, don't feel that the original program has failed: no program stays current forever, and nearly anything can be improved with repetition. So just be sure to distinguish between validity and cosmetics.

A major strength of the ISD process is its ability to integrate the revision and renewal functions into the basic process. That responsiveness to the new data is the hallmark of ISD, and when the data change, the program must also reflect that fact and change.

Where do you go from here?

With both these considerations used together with actual course test result, plus on-the-job results, this information is usually adequate to determine whether the course is functioning according to the original plan: meeting the original objectives. Whenever that's true, no changes are justified until a specific change in circumstances can be identified and endorsed by your own management. But if your program is intended to support the organization's marketing program or a community relations program, then there's more to check out:

Marketing Program: Because the training program was designed to have an impact on the market, that marketplace will be changed in some way by your program. The change might result in simply a greater or lesser demand for the program. Or it can be changed factually by the competitors' modifications of their products/'services or by their imitations of your program. Such changes must be considered and factored into the audit of the operating marketing program.

It should be apparent that the training course could be fulfilling its objectives perfectly on one track and yet be performing in the track-two marketplace in a manner different from original projections. That would not be the fault of the training course itself, but rather of the original needs analysis–not enough looking ahead! As we all know from electronics, a few days is very far ahead–but the rest of the real world doesn't yet operate that fast. At the same time, the spotting of the mismatch and a suggested valuable change would be a direct credit to the auditor.

You might discover that no revision is necessary--congratulations! That's nice but certainly not uncommon with ISD–early success is actually ISD's purpose in life! If revisions are needed for any reason, they might be minor or major. Minor changes usually relate to updating your product/service or data regarding competitive products/service. Major changes can't be foreseen when they are derived from your marketing chain or community.

If confronted with major changes, they could be the result of changes in the marketplace that could make significant (or entire) portions of the program obsolete or unworkable. The culprit might be new products from competitors or the multi-company alliances that lend otherwise unattainable strengths to each ally with surprising suddenness. Again, not a fault of the program, but you can revise to sui, if you choose.

Nevertheless, you must determine how to proceed, based on the current market, the significance of the mismatch, the cost of required changes, the time lapse to effect the changes, and the ease of retraining the instructor corps. If there is a major mismatch, you might want to a) continue with a truncated program if some or much of the original material is still valid; b) begin a major total revision effort; or c) cancel the current program and start again with the new facts and needs as determiners of a new training program. Don't beat a dead horse.

You might even find that all of the marketing objectives have been achieved, and that this portion of the marketing program should be discontinued. If so, Sundown! Retire the program with honors.

Community-based Program: Any community-based program is almost certain to be embedded within your organization's existing functions, such as marketing (see the prior subheading) or public relations or community relations or corporate responsibility. . .whether or not these are the actual titles that you use for those functions. Occasionally the Human Resources (or personnel) Department will sponsor a clerical-training program in order to recruit the best-available graduates–or at least workable prospects.

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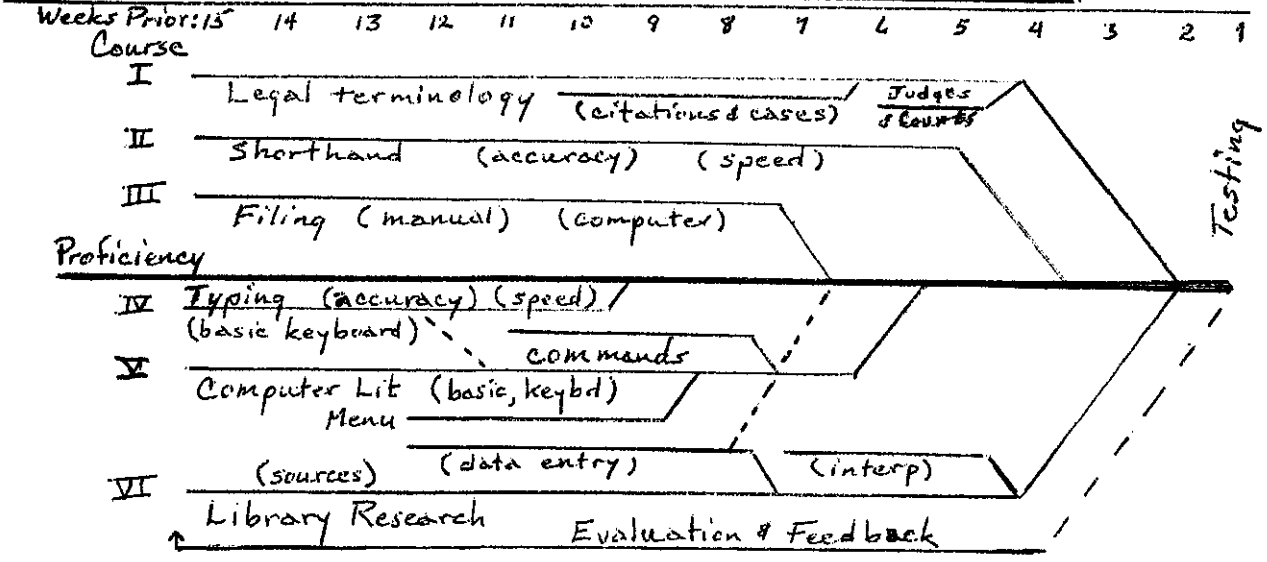
TRAINING CALENDARS: Annual & PERT"

1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
JAN	APR	JUL	OCT
Begin Courses I, II III, IV	Test & Graduate -Open- Evaluate & Refine	Repeat Mar Schedule.	Repeat Feb Schedule
FEB	MAY	AUG	NOV
Begin Courses V, VI. End III	Repeat Jan Schedule	Test & Graduate -Open- Evaluate & Refine	Repeat Mar Schedule.
MAR	JUN	SEP	DEC
Accelerate I, V, VI.	Repeat Feb Schedule	Repeat Jan Schedule	Test & Graduate -Open- Evaluate & Refine



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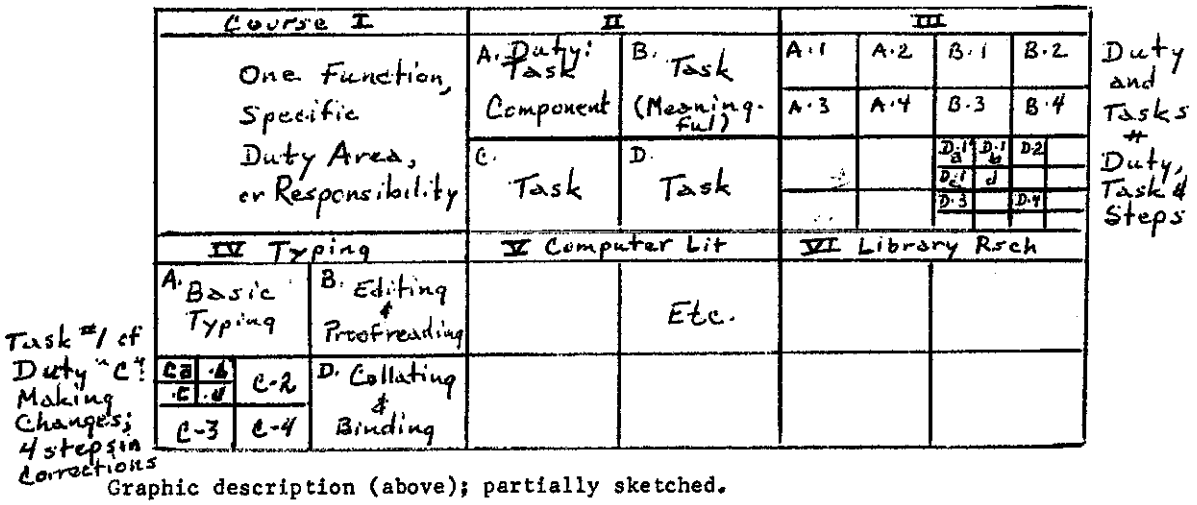
"COURSE-TO-JOB CORRELATOR" Training Syllabus Components



Graphic description (above); partially sketched.

Verbal description (below); partially sketched.

Job Description: LEGAL SECRETARY

Course I: Legal Terminology
A. B.
C. D.

Course II: Shorthand
A. B.
C. D.

Course III: Filing
A. B.
C. D.

Course IV: Typing:
Duty: A. Basic Typing B. Editing & Proofreading
C. Making Changes D. Collating & Binding
Task: 1. corrections
Step: a) roll paper up
b) erase/white out
c) roll paper back
d) retype data
2. insertions, etc
3. deletions, etc
4. options, etc

Course V: Computer Literacy:
A. Keyboard & Concepts
B. Reading Menu
C. Commands
D. Data Entry/Print out

Course VI: Library Research
A. Sources
B. Data Entry
C. Interpretation

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INVENTORY OF INSTRUCTIONAL PROGRAMS

AppdxAA: I-3-1

Date:

Memo to: All Department Heads

From: (Your Name)

RE: Marketing through instructional programs

The Marketing Department is evaluating the possibility and potentials of increasing our marketing reach through instructional programs or seminars for personnel within our distribution network or other areas within our sphere. Our interest could include community or civic affairs.

We would like to inventory (by title only, at this point) every operating instructional program. Anything that improves trainee competence (from maintenance to assembly line to secretarial to sales training) could potentially be useful.

We're interested in all three domains of learning (knowledge skills, dexterity skills, attitude adjustment). However we need only the minimal details asked for here. If a program seems adaptable to our needs, we will call later for the Outline/Syllabus, Complete Statements of Objectives, or controlling verbatim scripts and visuals, as available.

Please apply all of these categories that might apply to each of the four following strictures:

Title	Run Time	Subject Matter	Objective/ Purpose	Trainees Targeted	You can review: outline, CSO;s Script, visuals

1. **The following programs are operating now and might be usable as is, without restrictions:**
2. **The following programs could be usable with substantial editing or revisions:**
3. **The following programs contain proprietary information which must be protected:**
4. **The following programs are somewhat out of date but contain elements of value to trainees:**

Sorry. This department does not operate any programs, but I suggest your contacting (names):

Please return this completed form to (Name) (Department) not later than (Date).

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AA

PRELIMINARY PROJECT ANALYSIS

(Marketing Chain/Distribution Network)

1. **List significant problems related to our marketing/distribution channels as seen from a) our organization's viewpoint, and b) the marketing/distribution viewpoint.**
2. **Sort out complex or interrelated problem areas into rather clear problem groupings, using the Problem Solving guide from Cavalier's *Sales Meetings That Work.***
3. **Note key problem(s) to be further analyzed here (make a separate sheet for each key problem that must be considered before proceeding with the following):**

   Key problem: _____.

   Related Problems:

4. **Likely program approaches to a solution, if evident now:**
5. **Experts on this problem area, if any, who should be consulted: names:**

   __ our organization's staff and line:

   __ marketing/distribution staffs:

   __ proved "outside" sources:

6. **Who (by function) are currently directly affected by this problem?**

   __ our organization's staff and line:

   __ marketing/distribution staffs:

   __ other:

7. **To whom does that function/level report:**

   __in our organization

   __among marketing/distribution staffs

   __other:

8. **Other functions/levels indirectly affected:**

   __ in our organization:

   __ in marketing/distribution channels:

   __ other:

9. **Approximately how many individuals are affected overall?**

   __ in our organization: (directly) (indirectly)

   __ in marketing/distribution channels (directly) (indirectly)

   __ other (stipulate):

10. **What human/efficiency/dollar returns or other values would be realized from finding a solution to this problem?**
11. **Considering our existing Training Department capabilities, could a program that reaches the number of individuals who are now or ultimately affected by this problem be handled inside? (Yes) (No) Why or why not?**
12. **If yes, what time frame would be realistic?**

    __ to train our organization's staff who are affected
    __ to train all staffs who are affected

    __ to amortize or recover program costs (from whom?)

    __ to reach the optimum number of people and levels beyond those directly affected

13. **If no, will the Training Department assist in supervising outside designers and developers?**
14. **Is a solution to this problem so significant that you are wiling to supervise the development of the program personally (using the ISD format of this book)? Do not attempt to finalize your thinking now.**

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PRELIMINARY PROJECT ANALYSIS

(Community- or Social-Service)

Appdx-AA

1. Given our organization's history or program scope and budgets, our (pilot) (operating) (permanent) programs should:

a) be limited to our employees (and families?) only

b) encompass target groups in our office/plant areas

c) encompass general public in our office/plant areas

d) encompass the entire (town) (metro/area) (state) (nation)

2. Windows to be used when viewing the targeted geographical area for service opportunities:

__ ethnic and minority

__ underprivileged

__ language handicapped (educated)

__ literacy handicapped (one or both languages)

__ physical handicapped

__ elderly

__ youth

__ unemployed

__ other:

3. Appropriate approach(es) to selected target groups:

__ supporting their established projects

__ converting our expertise into their programs

__ offering our facilities for group meetings use

__ Adopt-a-School (management as tutors or for cash, good, and services)

__ paid lessons

__ scholarships

__ sports or entertainment facilities

__ arts and crafts

__ other:

4. Estimated numbers of people encountered in each selected window above

5. Value of completed program expressed as an achievement of:

__ marketing department

__ civic affairs department

__ public relations department (for specific objective)

__ general goodwill effort (for non-specific objective)

__ industrial relations department

__ training department

__ Immaterial

__ other:

6. On initial appraisal, it appears that a workable pilot program:

__ can/should be developed within ( ) department

__ at another location (specify):

__ outside personnel to be involved (names):

__ to be determined

8. Staff members with expertise or experience in interest in this project area (names):

9. Ideal time frame to realize marketing objectives via this project:

10. Ideal time frame to realize community-relations objectives via this project.

11. Selected target groups:

__ (Name) Purpose:

__ (Name) Purpose:

__ (Name) Purpose:

Do not attempt to finalize your thinking now.

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(Early Job Assessment)

COMPLETE STATEMENT OF OBJECTIVES

AppdxAA:I-2-1

NOTE: Make one sheet for each significant Task if the Job is too complex to be self-explanatory from descriptions here. Querying all job incumbents (according to the Coin Diagram, etc.) will identify discrepancies in understanding that could be affecting their job performance.

1) Describe the Job as it EXISTS NOW, according to its best job incumbents–or as any new Job SHOULD EXIST in the future, according to present plans:

Task One:

Task Two:

Task Three, etc.:

2) Under what conditions must the Tasks be performed?

Task One:

Task Two:

Task Three, etc.:

3) What specific degree of perfection is an adequate proficiency level for the class graduates?

Task One:

Task Two:

Task Three, etc.:

4) How can/should that proficiency be observed, demonstrated, and measured?

Task One:

Task Two:

Task Three, etc.:

NOTE: Further evaluations ahead: Do(es) the incumbent employee(s)' description of the current job track with the Job Description from the Human Resources or Personnel Dept? Resolve any problems immediately. Which must change? Any changes here will almost surely change the descriptions above. Revise NOW. . .or you risk losing all guarantees that follow via ISD.

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OPPORTUNITIES CORRELATOR

AA: I-3-1

IDENTIFIED NEEDS OR PROBLEMS:	Apparent link with our interests:

1. For the Marketing/Distribution Chain venue:

Marketing or Distribution?	Matching elements:	Program title:	Internal Dept:	Time in Min

2. For the Community or Social Service venue:

Marketing or Distribution?	Matching elements:	Program title:	Internal Dept:	Time in Min

3. Identified needs for which ready resources are not apparent:

4. Potential projects suggested by our Program Inventory lists:

NOTE: Explore the likely matches that are apparent from brief program inventory descriptions; do not expect that every apparent match will materialize on closer study. Therefore do not overlook or rule out any interesting or important topics that can be dealt with only by special effort; you might want to use them. Do not attempt to finalize your thinking now.

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JOB DATA WORKSHEET COLLATOR

AppdxAA:I-2-5

Project title: _____ Project director: _____

Job title: _____ Job expert(s): _____

Duty: _____(letter). Title: _____ Job Documents filed as: _____

Task ___ (number). Consensus reached by __job incumbents: __job supervisors; __ subject area experts.

Task Description of Duty & Task plus key Steps/Elements of both. (List all identified)	Complete the following columns only for your train-for items: Job Conditions	Initiating Cues	Job Perfmc Standards	Priority	Existing Test of Capability: AA:I-5
Duty: ___ Task One: Task Two: Task three, etc:					
Steps/Elements of respective Tasks: 1) 2) 3) 4) 5)					

Transfer train-for steps/elements to Job Performance Measures Worksheet/Collator

* Prioritize entries: Indicate those Tasks for which training seems (E) essential; (D) desirable; or (O) optional. Any unnecessary items should already have been dropped, if not essential to the Program's flow.

Transfer tests to JPM Worksheets

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JOB PERFORMANCE MEASURES WORKSHEET

AppdxAA:I-5

Project title: _____ Project director: _____

Job title: _____ Job experts: _____

Duties and Tasks: (Key exactly to your own corresponding JTI entries.)	Initiating Cues:	Valid tests of Job Perfmc Capability (Opinion):	Verified Predictor (Proof):	Test of Proficiency (Degree*):	Test grading: Norm-ref or Criterion-ref:	How observed, demonstrated, & measured:
Duty A (describe fully): Steps/elements: 1) 2) 3) 4) 5)						

Duty B (describe fully):

Steps/elements, etc.

NOTE: Duty B is shown here same-page for example only. In actuality, do not combine two or more duties on a single page. Use as many sheets as necessary for complete, concise understanding; then it's easy to change small details, if/when necessary.
* Proficiencies can range from Absolute Mastery to Practical (aided/unaided?) Command to General Familiarity. Entries here will later be transferred to the Training Objectives Worksheet, Phase II, preparatory to writing Complete Statements of Objectives (CSO's).

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LEARNING OBJECTIVES ANALYSIS WORKSHEET

AppdxAA:II-2

(Must contain the following information. Format is not important.)

Course name: _____ Course expert(s) _____

Lesson topic: _____ Module #: _____

Type of objective:

A. Terminal (describe):

B. Enabling (describe):

Conditions of performance:

Standards of performance:

Learning Category:

Test items (describe):

Media Selection:

Equipment required for Performance of Objective:

Existing material selected: ___ Yes or ___ No. (If yes, describe or outline):

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SIX TYPES OF STANDARDS FOR LEARNING OBJECTIVES

AppdxAA:II-2

Describe Performance Standards by:	Example of Description as given for a Learning Objective:
1. Referring to a Standard Operating Procedure:	1) In the swimming pool, demonstrate the proper procedures to clear a fouled face mask and to restore the proper flow of oxygen. All steps must be performed in the order established in the Training Manual.
2. Implying a standard of "No Error":	2) Given the length of one leg of a three-sided isosceles pyramid and also the appropriate formulae and also a hand-held calculator, calculate the exact area of all surfaces combined. (Note: The words "without error" are implicit in "exact.")
3. Specifying a minimum level of acceptable performance in arithmetic skills:	3) Using a hand-held calculator, write the square root of 11, carried to two decimal places; then multiply that answer by pi, carried to two decimal places; then divide by 3. Write the answer as carried to four decimal places.
4. Specifying time requirements:	4) From a 300 word rough draft; key into the computer a finished letter without errors at a minimum input rate of 50 words per minute. Computer print-out time is not included in keyboard-input time.
5. Specifying the rate of production:	5) Using patterns, plywood, and tools provided, cut out and sand smooth three sketched objects at a minimum rate of six objects per hour.
6. Specifying qualitative requirements:	6) Given a rocking car engine, check the spark plug points, the gaps, and the distributor; then adjust and replace/restore correct timing and firing.
Copyright © 2003, Richard Cavalier.	Variation on a military format.

EXAMPLES OF LEARNING OBJECTIVES

AppdxAA:II-2

Task/Behavior:	Conditions:	Standards:
Add columns of nine numbers, each having six digits.	Without a calculator.	Within time limits: Total 10 minutes to Complete 5 such problems.
Cut four pieces of picture frame at 45 degree angle on a bed saw to fit snugly for gluing.	Square-end frames are provided. Saw's angle-cut guide is pre-set to a wrong angle. Machine is turned off. Do not glue pieces.	Smooth cut; no chips; no light-leaks in any corners. Observe all safety rules and use all provided safety mechanisms.
Tie a series of knots and hitches: square, clove, sheet bend, bowline, and rolling hitch.	Tied around a concrete pillar, using 5 individual 24" pieces of ½" rope.	Individual hitches must not slip under a 30# pulley.
Don Type "X" clean room protective clothing, including mask, caps, boots, glasses, and gloves.	Use protective clothing as provided. Seal properly according to Training Manual.	No openings in clean room garb; no visible street clothing.

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Variation on military format.

COMPLETE STATEMENT OF OBJECTIVES

AppdxAA:II-2

Describe one actual Job (and/or its multiple Tasks) for which you expect to train-for:

1) Job Title: _____

Task A: (describe)

Task B:

Task C, etc.:

2) Specify the performance/behavior that must be demonstrated in order to demonstrate proficiency. Use only Action verbs (not subjective terms, such as more, better, higher, etc.) Action verbs must be observable, measurable, and verifiable.

Task A:

Task B:

Task C:

3) Specify the conditions for that performance demonstration; specify all givens:

Task A:

Task B:

Task C:

4) Specify the standards (criteria) for that performance demonstration, stating the exact proficiency required:

Task A:

Task B:

Task C:

NOTE: If your CSO's are complete and accurate, you will assure yourself of dependable source materials on which true and deserved success in ISD can be predicated and actually achieved.

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LEARNING OBJECTIVES AND TESTS CORRELATOR

AppdxAA:II-2

Project title: _____ Project director: _____

Job: _____ Job expert(s): _____

Duties & Tasks: (Key exactly to Phase I Job/Task Inventories & JPM Worksheets)	Test/Demo Behavior:	Test/Demo Conditions:	Test/Demo Standards:	Valid test of proficiency* Needed? Yes / No	Description if needed; (nature & format):
Duty ___; title: (Describe): Task ___; title: (Action verb & description) Hierarchy steps & verbs 1) 2) 3) Etc					

NOTE: As always, do not combine two or more tasks on the same sheet. Use as many sheets as necessary.

Complete Statement of Objectives for this Duty, if not clear in Behavior/Conditions/Standards, above.

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TYPES OF HIERARCHICAL OR CHAIN RELATIONSHIPS BETWEEN LEARNING OBJECTIVES

AppdxAA:II-6-1

DEPENDENT	INDEPENDENT	SUPPORTIVE
Skills and knowledge in one learning objective are closely related to those in the other learning objective.	Skills and knowledge in one learning objectives are unrelated to those in the other learning objective.	Skills and knowledge in one learning objective have some relationship to those in the other learning objective.
To master one of the learning objectives, it is first necessary to master the other.	Mastering one of the learning objectives does not simplify mastering the other.	The learning involved in mastery of one learning objective transfers to the other, making learning involved in the mastery of the other easier.
Examples: In math, in order to learn multiplication, one must first learn addition-subtraction. One cannot send messages in Morse Code without first having mastered the codes for each of the letters and numbers. The "sending" skills are totally dependent on the prior learning.	Examples: For a secretary, "type letters from drafts" is independent of "maintain files" skills. For a Technician, "Operate the Type OOO Oscilloscope" is independent of "isolate the malfunction in a representative unit." In both examples, knowing how to do one would not help much with the other.	Examples: "Assemble weapon" (or product) has a supportive relationship to "disassemble weapon" (or product). "Operate a "BrandName" camera; has a supportive relationship to "operate a 4x5 Press camera." In both examples, learning to do one would help considerably in learning how to do the other.
The learning objectives must be arranged in the sequence indicated by the above hierarchy.	In general, the learning objectives can be arranged in any sequence without loss of learning.	The learning objectives should be placed close together in the sequence in order to permit optimum transfer of learning from one learning objective to the other.

Variation on Military sources.

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TYPES OF RELATIONSHIPS AMONG LEARNING OBJECTIVES

AppdxAA:II-6-1

DEPENDENT	INDEPENDENT	SUPPORTIVE
Definition:		
Skills and knowledge in one Learning Objective are closely related to those in another.	Skills and knowledge in one Learning Objective are not related to those in the other.	Skills and knowledge in one Learning Objective have *some* usable relationship to those in the other.
Effect:		
To master one of the Learning Objectives, it is first necessary to master the other.	To master either of the Learning Objectives does *not* simplify mastering the other.	Learning involved in mastering one Learning Objective *does* transfer to the other LO; so mastery of the other is easier.
Example:		
To send a message in Morris Code, one must first master the code for individual letters and numbers.	For beach guards, learning mouth-to-mouth-resuscitation does not help in learning first-aid for sunburn.	Mastering a computer keyboard with function keys is easier for a good typist. Or, if trainee cannot already type, teach "typing" first on the most-needed machine; then teach variations for the other, separately.
Approach:		
Learning objectives must always be arranged with the most elemental step learned first (lowest on the diagram.)	Usually, the Learning Objectives can be arranged in any sequence with no loss of learning. Use as spacers?	Place related Learning Objectives as close in time as possible to each other to gain maximum transfer of learning between the two LOs.

Variation on Military sources.

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LEARNING STRATEGIES FOR KNOWLEDGE OR PERFORMANCE OBJECTIVES

AppdxAA:III-1

Project title: _____ Project Director: _____

Job title: _____ Job expert(s): _____

NOTE: All entries on this form must be consistent with the "Algorithm Correlator" (III-1-1) and the "General Characteristics of Training Delivery Methods & Media" (III-1-3).

Duty (A); title: (Describe): Terminal Task (#1): (Describe): Enabling steps for Task #1: 1) 2) 3)	Category: Knowledge or Perfmc; (Know/use)	Statement of Objectives:	Introduction: (Key Purpose/ Comments)	Core Information: (List)	Examples or Demonstration: (Perfmc Objctv)	Practice: Suitable action/type:	Feedback: (Type & Timing)

Duty (B); title:
(Describe):

NOTE: Duty B is shown on this page for example only. In actuality, do not combine two tasks on the same sheet because the apparent space-saving makes minor changes more difficult forever.

Terminal Task (#2):

Enabling Steps for
Task #2:

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INSTRUCTIONAL DELIVERY SYSTEMS COST WORKSHEET

AppdxAA:III-1-2

Project title: _____ Project director: _____

Job: _____ Job expert(s) _____

Duty "A" (Describe): Use Terminal Tasks if already identified:	Algor for Trng Objtvs Charctrstics (Action verbs, all Phase III)	Algor for InstrDlvy Systems (Stimul/ Setting)	Verify Stimulus/ Setting Charctrstics (Chart)	Alternative candidate systems from N:Algo Instruct Dlvy Syst (Begin with 3 possbl; later select best.)	Verify Practicality (Chart in N:Algo)	Estimated Costs: Basic or Central	Variable or Field/ VidConf	Near/ Long term
Task #1: (Describe):		Stimu Setting		1) 2) 3)				
Task #2: (Describe):		Stimu Setting		1) 2) 3)				
Task #3: (Describe):		Stimu Setting		1) 2) 3)				

NOTE: Exception here! All Tasks of all Duties can be combined on one oversized sheet because the selected Instructional Delivery System(s) selected here must fulfill all requirements for the entire program, even if combinations are necessary. NO system is automatically best for all.

The common denominator medium or media mix above should be tentative.

* If both basic and variable Settings are selected, calculate Near/Long term for both.

ENTER SELECTED SYSTEMS in the appropriate section of Item 3 of the "Program Costing Guide," AppdxAA.

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ALGORITHM CORRELATOR

AppdxAA:III-1-3

Project title: _____ Project director: _____

Job Title: _____ Job expert(s) _____

Duty (A): title: _____
(Describe):

What learner must do/demo in Task: (Specific action verbs; relate to JPM Worksheet (I-5)	Identify Knowledge or Perfmc Objectives: (II-3)	Testing Coordinator: (Remember/ use; [un-]aided) (N:II-3-1)	Testing Coordinator: Best format? (III-1-1)	Algor # for Instr Dlvry Charctrtics: Action verb (III-1-1)	Algor # for Instr Dlvry Systems: Stimu/Setting (III-1-2)	Verify Stimulus Charctrtics: (Chart III-1-3)	Verify Setting practicality: Note any problems. (III-1-4)
Task #1 (title): (Describe): Action verb:							
Task #2 (title): (Describe): Action verb:							

Duty "B" title; etc

Duty "C" title; etc.

NOTE: For example only. Do not combine two or more Duties on the same page. Use as many separate pages as necessary.

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INFORMATION SHEET

AppdxAA:III-1-5

Course/job/task title: _____

Lesson/session number: _____

INTRODUCTION:

(Allow 5-10 spaces here)

REFERENCES:

(Allow 5-10 spaces here)

SPECIAL INFORMATION NEEDED:

(Allow 5-10 spaces here)

REMARKS:

(Allow 5-10 spaces here)

NOTE: Under Remarks, above, write down any particular remarks that should be made to the class (or from you to the instructor/proctor) if those remarks are not already scripted.

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COURSE INSTRUCTIONAL DELIVERY SYSTEM WORKSHEET

AppdxAA:III-1-6

Project title: _____ Project director: _____

Job title: _____ Job expert(s): _____

Task Objectives: (JTI, I-3). Verify against sequenced Hierarchy Chart (Frontispiece & II-6.)	Learning Objectives: (Worksheet, II-2)	Category: Knowledge or Performnc (II-3)	Test Type: (Matrix II-3)	Task Level Instruc Dlvry System: II-3-1 (Algo; III-1)	Task Level Learning Strateg Altvs: (III-1, entire.)	Demo/Lab Simulation Practice: (III-1,entire)	Eqpmt/mtls/ A/V eqpmt (Genl Charct III-, entire)
DUTY 'A' Task 1: Terminal Objective: *A-1-1* Enablg Objtv: *A-1-2* Enablg Objtv: *A-1-3* Enablg Objtv: *A-1-4*, etc Task 2: Terminal Objective: *A-2-1* Enablg Objtv: *A-2-2* Enablg Objtv: *A-2-3* Enablg Objtv: *A-2-4, etc* Task 3, etc: Terminal Objtv: *A-3-1, etc*							

DUTY 'B,' etc

NOTE: If possible, record all information on a single, over-sized control sheet for easy visual reference.

WITH ALL SUMMARY ITEMS CONSIDERED, the best Instructional Delivery System for this overall course/project is: a) group-paced/self-paced/combo; b) supported by demo/lab/simulator practice; c) using product eqpmt/materials/media.

ESTABLISH THESE FOR SUMMARIES: SUMMARY: SUMMARY: SUMMARY: SUMMARY:

–Essential minimum need;
–Common denominator;
–Most practical alternative

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TRAINEE GUIDE

Course/job/task title:

Lesson/session number:

INTRODUCTION:

LESSON TOPIC LEARNING OBJECTIVES:

STUDY ASSIGNMENT:

STUDY QUESTIONS:

Q #1:

Q #2:

Q #3 etc:

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QUICK REFERENCE CONTROL CHART

NOTE: This chart is constructed on a hypothetical calendar that controls four distinct programs operating simultaneously. Each Duty area is viewed as a separate course here, for simplicity.

* *

CALENDAR	
First week:	A-1&2
Second week:	A-3
Third week:	A-4, 5 & 6
Fourth week:	B-1, 2&3
Fifth week:	B-4, 5&6
Sixth week:	C-
Seventh week:	D-
Eighth week:	E-
(Thru "Nth" week)	

I. Job: Director, ISD *
- A. Analyze (ISD Ph I, Duty A)
  - 1. Analyze Reqmts
  - 2.. Analyze Job
  - 3. Develop JTI's
  - 4. Select train-for tasks
  - 5. Determine JPM's
  - 6. Select Tng Setting
- B. Design (ISD Ph II, Duty B)
  - 1. Dvlp Learn Appr & Hier
  - 2. Write Learning Obj
  - 3. Dvlp Test Items
  - 4. Plan for Remediation
  - 5. Verify Entry Level Behav
  - 6. Determine Sequence
- C. Develop (ISD PH III, Duty C)
  - Etc.
- D. Implement
  - Etc
- E. Control
  - Etc

II. Job: Legal Secretary — Etc
- A. Course I (Duty A)
  - 1. Etc
- B. Course II (Duty B)
  - 1. Etc
- C. Etc

III. Job: (Your Project) — Etc
- A.
  - 1.
  - 2.
  - 3,
- B. Etc
- C. Etc

IV. Job: (Your Next Project) — Etc
- A. Etc
- B. Etc
- C. Etc

AppdxAA:IV-1

* Keyed to Master Syllabus for ISD, Phase II, Task Six and Legal Secretary coin diagram, Phase I, Task Two.

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PROCEDURE FOR PROBLEM SOLVING

Appdx - AA

The following "Procedure for Problem Solving" has been excerpted from the author's 1983 book, *Sales Meetings That Work*, newly updated. The procedure is a generic how-to that you might find useful here.

Procedure for problem solving:

Discussion--purposeful talk--is one of two key elements in problem solving. The other is judgment, based on rigorous scrutiny and analysis of facts.

Don't confuse brainstorming with problem solving. Brain- storming is an attempt to produce a quantity of ideas under rules of *suspended* judgment. The idea is to say anything appropriate, no matter how unlikely, in an atmosphere of absolute freedom from criticism in the hope that the list of ideas will include something worthwhile. Sometimes it does, based on later evaluation.

But evaluation is integral to the procedure in problem solving; carelessness or emotional decision making can lead to useless or even damaging "solutions."

Over the years, various think-tanks have studied the concept of problem solving, and the following might be considered a good generic outline of workable technique.

Problem-solving outline:

I. Define the problem (using preceding problem-identifying agenda)

- A. If problem is fully understood now, state explicitly and/or quantitatively
- B. If not fully understood now:
  1. list all untoward or suspicious events/circumstances, which are known to impinge on the problem area(s).
  2. if the main problem seems to be made up of several interrelated problems, break out each on a separate path before continuing.
  3. list other events/circumstances/curious relationships not yet fully explained which might be part of the problem.
  4. condense and/or combine those lists:
     - a. grouping like items;
     - b. seeking new relationships not previously understood.

II. Define the solution:

- A. Stipulate the "solution criteria"; those conditions to be fulfilled before problem is *solved.*
- B. Partial solutions: Acceptable? Under what conditions?
- C. Be certain solution will not create new problems.

III. Begin creative analysis process

- A. Examine each group/related/condensed item
  1. break out each area into logical components.
  2. break out each component into smaller elements continue break-outs until each smallest-practical problem element is identified

B. Examine the break-outs and determine

1. is any of these a clear cause of problem?

2. are any groups likely to be the cause?

3. would any element's resolution result in a partial, useful solutions?

4. if none, seek further relationships.

C. If several possible solutions present themselves simultaneously, list all. (Some choose to brainstorm at this point and within context.)

1. be inventive; reach; what if?

2. accept and do not ridicule *far-fetched* suggestions, but subject them immediately to criteria established.

IV. Recognize solutions (at any point in the process)

A. When any possible solutions pass preliminary critiques, examine fully regarding criteria II A, B, C.

B. If two or more possibilities pass criteria, select the least complex/most practical/most advantageous, according to need

C. Adopt the best and run with it

1. announce new policy/procedures

2. commit: which attitudes/habits/skills are affected? How to re-educate or retrain?

3. create any needed support/tools

V. Plan for re-examination and feedback

A. Is the problem really solved? If not, recycle.

B. Have any new problems been created? If so, recycle.

C. Can further improvements be made after trial period?

That path to problem solving can be used by you alone or by a small group or even by a dozen or more people IF the problem-solving meeting is held to its purpose and agenda. To prevent the meeting from turning into a respectable-looking but ineffective bull session, prepare meticulously.

From Sales Meetings That Work, © 1983 Richard Cavalier

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Appendix C

(Including AA and N items)

COSTING

Find a combination of Author Aids and Navy-style methodology regarding the Costing function, which is used throughout the later process.

Richard Cavalier

APPENDIX C:

Budgets and Cost Effectiveness

A basic tenet of Instructional Systems Development is *adequacy*–the state of being equal to the requirements. Can the person do the given job–yes or no? Training (and therefore all related expenditures) beyond that point of job/task adequacy are usually seen as uneconomic and counter-productive. It is not possible or necessary to create a superstar in every job slot! Even if the individual trainee is being groomed for advancement (and presumable deserves somewhat more), there's a limit to the dollar value of investment in his/her immediate training at hand. Find out those limits from the person who assigned that trainee to you and determine together whose budget get hit with which costs. Otherwise excess expenditure of time and money is only wasteful of your budget.

So cost effectiveness, not cost alone, is integral to the ISD concept. Alternatives and intelligent financial evaluation are imperative. Competent financial analysis of any training program requires the same type and degree of scrutiny that would be applied by your firm to any other investment.

As noted earlier, the budgeting process is more or less continual, beginning with the earliest feasibility studies. Yet the sequence structure of language forces us to treat the topic separately. Cost effectiveness analyses are formally introduced in the selection of Instructional Delivery Systems, in Phase III (systems selections follow in Appendix C), and it recurs through-out the development process, in Phase IV. Audits to determine whether the program has in fact achieved its objectives cannot ignore financial considerations, as faced in Phase V.

The iterative nature of ISD requires that cost-effective analyses be factored into all those phases, even though the costing chore is placed here to honor the ISD rule that independent items not interrupt a series unnecessarily.

See–it works! No matter how often you refer to this segment, you can easily find your way back to your interruption point each time. Imitate what works–that's the root of all training!

As in any other field of cost effectiveness calculations, *cheap* is not necessarily *cost-effective*, depending on what the additional increments might buy in terms of flexibility or even longevity of the program. On the other hand, once you displace the fiction that money alone can improve the results of the program, you're prepared to accept adequacy as the budgeting norm. Forget the meaning of *adequacy?* Try line one of this Appendix. That's the route to sound financial decisions. And measurable success: proof!

What you measure depends on both your program and your company policies. Apart from the overall budget figure, you should probably keep current (and, ultimately, year-prior) figures

on each separate school or field cycle of costs to be charged or amortized after the initial cost of developing the instructional program and its materials.

Log the imputed costs, as well as the direct costs, in order to implement the program; to maintain it throughout its lifetime, including space and personnel; to bug and maintain presentation equipment (media) and other physical properties; to stock and ship consumables and reusable materials and tools; and to travel the instructors and/or program auditors.

Although the basic design-period costs can often ride "free" on the part time efforts of salaried employees, the actual writing and development of the materials and media usually cannot. Media and the professional preparation of A/V materials to media specifications are often the possibly-obstreperous part of a marketing program, given the common use of borrowed space and borrowed salespersons as instructors. Yet, failing to account for "free" time distorts your understanding of true costs. What if the volunteer attendees later fail to participate? Or if the borrowed special meeting room is thereafter committed to something with higher priority?

Your cost-effectiveness studies must be conducted regardless of whether your organization will bear all costs throughout the program's lifetime or whether you will simply crate the master program package and give it off with no further involvement. Of course there are an infinite number of commitment points between. What's import here is that the same types of costs of implementation occur regardless of who will pay. If those costs must be borne by the marketing chain or the general public, in the case of a civic gesture, their willingness or ability to pay the implementation costs will affect their enthusiasm for running it.

Especially in the case of programs designed for ethnic groups or the unemployed, thee might be little money available, beyond operating costs for space plus tutor salaries, that support the repeated rental of equipment and other support materials. Your real choice, therefore, might lie between a) furnishing a basic course that can be augmented by outside (local) groups according to their own resources (resulting in a ragged, uncontrollable format), or b) fielding a complete, self-contained training package that minimizes or eliminates outside (local) dollar obligations but adds to your up-front costs. That's often considered to be the proverbial *Between a rock and a hard place*, and it's best that you get a consensus from top management.

The "best" or best-produced program in either case is the one that maximizes the beneficial results at the most defensible cost levels. A *cheap* package will be no bargain if it sacrifices objectives or is never used; and the beauty of the materials is irrelevant–even irritating to recipients–if it can't be used to produce measurable results. Even if you can't allow them to govern, the recipients' viewpoints must be carefully considered.

After that preamble, the purpose of this Appendix segment is to help you to think your way through the rudiments of assessing the relative costs of the appropriate alternatives in presentation media, as well as the overall Instructional Deliver System itself, within the context of the overall training program.

You should be able to identify and bypass those items which don't apply to your program or are unsuitable on a cost-effective basis, no matter how seductive the supplier sales pitches might be–and in the group communications field, the pitches are terrific! Most of their products and services seem to be less so.

You should be able to appreciate the fine points of program flexibility; the ease and economics of multiplying the effort; the wisdom of renting vs purchasing equipment if available for rental in

all places at all time; and the relative demands made on tutor/instructor time by alternative methods. In short, when you understand the concepts behind the costs–as these pages are intended–you will be able to manage the decision-making process for all elements of your program. . .and make intelligent choices that you're able to live with.

The decisions here fall into two categories–the costs of the Instructional Delivery System alone and the cost of the overall program. So the guidelines will be presented in that way. However, the materials other than those shown here are essentially those of the Navy and so are included under the Appendix N.

PROGRAM COSTING GUIDE

AA: III-1-4(a)–cost

Project title: _____ Project director: _____

SUMMARY: Course Terminal Objective: ___ Basic/central facility ___ Variable/field/video conf	IMMEDIATE BUDGET NEEDS: All costs to develop course, test pilot, initiate program PR, begin operations. Initial Period	In-house Hi Lo	Extenal Hi Lo	ANNUAL (LONG RUN) COSTS Include paid-out expense plus imputed values of all resources used over life Expected Revision	In-house Hi Lo	External Hi Lo
1) Facilities:						
___ Ours:						
a) basic; initial acquisition						
b) basic; operating/maintenance						
c) variable; trainee/position based						
d) variable; operating/maintenance						
e) support needs (office, labs, resource center, etc.						
f) opportunity costs; basic						
g) opportunity costs; variable						
h) administrative/overhead						
i) depreciation/amortization						
___ Theirs						
Describe:						

SUMMARY: Course Terminal Objective: ___ Basic/central facility ___ Variable/field/video conf	IMMEDIATE BUDGET NEEDS: All costs to develop course, test pilot, initiate program PR, begin operations. Initial Period	In-house Hi Lo	Extenal Hi Lo	ANNUAL (LONG RUN) COSTS (b) Include paid-out expense plus imputed values of all resources used over life Expected Revision	In-house Hi Lo	External Hi Lo
2) Equipment; do not duplicate (a) or (c) above: a) tools; basic b) tools; variable, average __ variable high __ variable lo c) replacement intervals/cost: __ basic __ variable d) models/product/ equipment e) maintenance, if any						
3) Instructional Delivery Systems/Materials: a) scripts/lecture outlines b) A/V art, product photography c) slide/video/film format/edit d) A/V equipment (buy)(rent) __ basic __ variable e) duplicate sets, slide/video/film/disk f) program design cost __ consultants, paid-out cost __ in-house, imputed __ production studioj g) trainee workbooks h) trainee guide i) instructor guide j) printed handouts/ring binders k) periodic updates/revisions __ course outlines/content __ A/V & related __ printed course materials						

SUMMARY: Course Terminal Objective: ___ Basic/central facility ___ Variable/field/video conf	IMMEDIATE BUDGET NEEDS: All costs to develop course, test pilot, initiate program PR, begin operations. Initial Period	In-house Hi Lo	Extenal Hi Lo	ANNUAL (LONG RUN) COSTS (c) Include paid-out expense plus imputed values of all resources used over life Expected Revision	In-house Hi Lo	External Hi Lo
4) Personnel: a) instructor ratio; 1: __ (trainees) __ basic __ variable b) salary/benefits/secretarial c) course-related travel/updates d) incidental/discretionary funds e) direct supervision/administration						
5) Consumables/supplies: a) instructor __ basic b) trainee __ basic __ variable c) proctor/lab/resource center __ basic __ variable						
6) Trainees: a) count, annual total/basic b) count, annual total, variable OR c) count, per cycle/ basic d) count, per cycle/variable e) salary, if chargeable to our budget f) video conferencing, HQ g) video conferencing, per site h) hotel/meals/per diem/incidentals i) out-of-town travel/airlines j) local transportation __ basic ___ variable k) course-related field trips __ basic __ variable						

SUMMARY: Course Terminal Objective: ___ Basic/central facility ___ Variable/field/video conf	IMMEDIATE BUDGET NEEDS: All costs to develop course, test pilot, initiate program PR, begin operations. Initial Period	In-house Hi Lo	Extenal Hi Lo	ANNUAL (LONG RUN) COSTS (d) Include paid-out expense plus imputed values of all resources used over life Expected Revision	In-house Hi Lo	External Hi Lo
7) Miscellaneous: a) remedial/recycle rate, __% __ basic __ variable b) awards, prizes, ceremonies c) program PR, announcements d) market chain costs __ review/freebies __ printing __ postage __ hospitality e) community event costs f) g)						
8) Related marketing costs: a) b) c)						
GRAND TOTALS:						

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Appendix N:

NAVY

VERSIONS

. . .of required material. . .whether or not you use these formats.

Appendix MP:

Media Pool

The Algorithms contained in this section are strictly those of the Navy. Because they are in the public domain, you may use them at will.

There are any number of combinations of these basic tool– all of which are–individually–valid media for specific teaching circumstances. However, nothing assures you that an arbitrary choice will work favorably in your instance. Moreover (and regardlesss of what some suppliers might tell you) absolutely none of them is appropriate in every instance. There is no Magic Bullet. Period.

Also located in this section is one additional form created as the author's original *Correlator* so as to make the process of selection more easily controllable. The Correlator is copyrighted; it may be used within the book purchaser's immediate company but may not be reproduced commercially or outside the purchaser's immediate company.

Directly following is a discusssion of the extensive Media Pool that supports the Instructional Delivery System Algorithms. These items work in concert with the "Algorithms for Training Objective Characteristics" that also follow.

Richard Cavalier

Media Pool:

MEDIA POOL DESCRIPTIONS

Appdx N:mp

The following descriptions have two purposes: the first is to describe in adequate detail the type of materials that you might consider when seeking the appropriate Instructional Delivery System for the IDS algorithms that follow these descriptions; and the second is to remind readers that this material is reprinted essentially verbatim from military sources available more than a quarter-century ago; no changes were made other than the correction of a few minor but obvious errors.

The meetings/conventions and training industries have not been overly industrious about making these free, easy aids available to you. *Caveat emptor!* Consider, also, that computer-aided instruction was relatively new and undeveloped and that digital disks were not available then. Therefore you have much more flexibility today in determining how best (or most cost effectively) to present any of the materials mentioned here that can be converted to computer-controlled or -generated anything and sent (via package or wire or satellite) to distant sites. But in the last analysis, computers present only one more alternative in presentation devices. They contribute nothing to the program content! ISD controls the latter! For a more detailed discussion, see especially Chapter 6, "Ear, Eye, and A/V Learning" in Cavalier's *Sales Meetings That Work,* 1983, updated 2001.

PRINT MATERIALS:

Case Study Folder: A folder of detailed background information on a problem requiring a decision or plan of action; to be read by the trainee prior to his 1) making a decision on how to resolve the issue and 2) participating in a critique on various solutions. Various forms of folders are used in support of such methods of instruction as the Case Study, Incident and In-Basket methods of management and leadership training.

Flash Cards: A set of cards designed to be used by an instructor in front of a group of trainees to drill the group in the recall of memory-type information.

Printed Materials–Handouts: Handouts are a class of printed materials issued to a student for his use and retention to augment regular instructional materials. They are usually instructor-prepared, machine-copies materials of one or two pages highlighting specific topics or updating existing materials.

Printed Materials–Performance Aids: Performance aids are a class of printed materials that aid in job performance by providing data that should not [need not] be committed to memory. They include checklist routines, conversion tables, equipment test tolerance matrices and the like.

Printed Materials–Reference Charts: Reference charts are a class of printed material pictorially displaying data used to identify certain facts or for back ground information. Included are data charts, schematic diagrams, topographical maps and the like.

Printed Materials–Self-Scoring Exercises: Self-scoring materials include exercises and quizzes used in conjunction with standard curriculum, or programmed instruction. The class includes electro-graphic or mark sense materials scored by keys or computer, punch mark and other mechanical score indicating equipments, chemically scored materials, etc., that have the capability of providing near immediate student feedback without the use of prolonged scoring procedures.

Printed Material–Workbook: Workbooks are in a class of printed material used to augment or replace instructional texts by providing a max of text information and practice exercises within a single book or manual.

Printed Material–Textbook: Textbooks are a class of printed materials dealing with a subject of study, intended for use at a specified level of instruction and used as a principal source of organized information.

Programmed Text–Branching: A printed text containing frames of information and multiple choice questions concerning the information, organized in such a way that the trainee's choice of response directs him/her to remedial frames or advanced material, as appropriate. The material is carefully sequenced, tested, and revised to ensure that a specific student population will achieve stated behavioral objectives with a predetermined level of success.

Programmed Text–Branching with Adjunct Material/Equipment: A form of program in which additional material such as drawings, catalogues, or equipment are used with the regular linear programmed text.

Study Card Sets: A deck or decks of cards designed to present training information to an individual student.

Simulation–Paper: The representation of selected dynamic characteristics of a system through the use of charts, tables, static photographs, drawings, and lists of performance characteristics under specified conditions. This information is presented in such a way that the trainee can study the initial performance of the system, change inputs to or elements within the system and notes changes in the performance of the system.

AUDIO-ONLY SYSTEMS:

Audio Disc Playback System: An audio system that uses a record player and sound recorded on a disc (record) that may be played back by a listener.

Audio Tape System: An audio system that uses a tape recorder-reproducer to record sound on magnetic tape that may be played back upon request by a listener.

Dial Access Information Retrieval System–Random Audio: Dial access information retrieval is an electronic system for distributing audio (and/or visual) materials and programs which are stored in a location remote from where they are dialed and received. Random audio means that audio materials are retrievable at any time by electronically triggering a tape duplicating machine that makes a student copy from a master tape within the library.

Dial Access Information Retrieval System–Scheduled Audio: Scheduled audio means that audio materials may be dialed at any time, but once a program has begin, subsequent users must join the program in progress.

Language Laboratory–Audio, Active-Compare Mode: An audio presentational device that distributes audio information via a control console to student stations equipped with headsets, microphone for console/instructor-student inter-communication, and a tape recorder. Student may interact with taped instructional material, rewind, and play back or store responses. Student responses may be monitored or recorded at a console.

Language Laboratory–Audio, Passive Mode: An audio presentational device that distributes audio information from a control console to student stations equipped with headsets. Audio source may be a phonograph record a taped recording or a motion picture sound tract.

Psychological Trainer (Hostile Environment) Auditory: A training device designed to place controlled stress on the human hearing system through use of a psychologically and/or psychologically adverse sound environment, to enable a trainee to learn to function in this adverse environment.

Radio System–AM/FM: A passive audio system consisting of a broadcast studio, transmitting station, and student radio receiver. The system uses designated AM/FM frequency bands for information transmission.

Radio System with Responders: A multi-channel two-way radio communication system that operates within UHF or VHF-FM frequency bands limiting broadcast ranges. Network may be open or use encoding/decoding techniques or responders for individual channel privacy.

Telephone Conference System: A telephone system with switching matrix capability that allows multiple station two-way audio communication at two or more remote locations.

VISUAL-ONLY SYSTEMS:

Filmstrip Projection System: A single frame projector or attachment thereto that will accept a filmstrip format and project the film images upon a viewing screen. See: Sound Filmstrip Projection System.

Microform with Information Mapping: Micro-imagery, such as microfilm, used as a medium of instruction with the additional requirement that each block of information be clearly identified as introduction, overview, test, review questions, index, and other discrete titles, and that each type of information be positioned in a standard location within the medium format.

Microform with Information Mapping and Adjunct Equipment: The theoretical configuration of a training system to support individualized instruction composed of micro-imagery in an information map format, a microform reader, and a piece of auxiliary equipment, such as a mock-up, which is the subject of the instruction.

Mock-ups, Panels, and Demonstrators–Dynamic: A visual training aid that allows an instructor to demonstrate manipulative principle, movement in time or space, steps of a procedure, linear effect within systems or changes in condition of equipment or systems through one of more operating phases.

Models and Static Mock-Ups–Small Scale: A three-dimensional training aid built to scale and representing operational equipment. It may be a solid or cutaway model capable of disassembly by which spatial and/or sequential relationships are represented. Also included are layout models, recognition model sets, and terrain or topographical models.

Mock-Ups, Panels, and Demonstrators–Static: A training aid used to demonstrate relative shape, size, composition or function of an object or system by a visual-cognitive process performed by the trainee. Such non-moving, real or "scaled" aids include cutaway models, diagrams, blow-apart hardware displays, etc.

Slide Projector System–2"x2": A class of single frame picture projector that will accept a standard 2"x2" slide and project the contained image upon a viewing screen.

AUDIO-VISUAL SYSTEMS:

Audio Tape with Printed Material: An audio system that uses a tape recorder/reproducer to record sound on magnetic tape that may be played back upon request. Printed materials such as texts, worksheets, programmed instruction, schematics test materials, etc., used with audio tapes offer a variety of training applications.

Carrel–AV Equipped: A small enclosure or alcove incorporating a desk used for individual studies, supplied with audio and visual materials and supporting equipment.

Carrel–Laboratory: A small enclosure or alcove incorporating a desk, to be used by one or two trainees and equipped with a set of special tools and material for carrying out a hand-on learning event. It may include audio-visual systems.

Dial Access Information Retrieval System–Scheduled Audio/Video: Dial access information retrieval is an electronic system for distributing audio and visual materials and program which are stored in a location remote from where they are dialed and received. Scheduled audio/video means that presentation are retrievable at any time except that once a program has begun, subsequent users must join the program in progress.

Filmstrip Projection System with Audio: A sound filmstrip projector represents a family of audio-visual devices using single frame visual filmstrips with sound on magnetic tape or records. Visuals and sound may be manually or automatically synchronized. Commercial equipment options include front or rear screen projection, remote and stop action capability, and cartridge loading models.

Filmstrip Projection System with Audio and Adjunct Equipment: A system for presenting information via a filmstrip projector and synchronized audio tape and special equipment that is the subject of study. The use of adjunct equipment with the AV media provides the capability for a variety of "hands-on" training tasks to be performed.

Instructional Kit with Instructor: A teaching kit designed for specific subject area instructional support. Kit allows the instructor to use a varied or multi-level teaching approach to instruction by including appropriate visual aids, audio tapes models, charts, demonstrators, and reference and test materials.

Instructional Kits for Trainees: A modular package of materials for students that contains all materials required for a segment of instruction. Kit may contain programmed instruction, audio-visual materials, tools, materials, typical samples, reference materials and testing materials as appropriate.

Motion Picture Projection System–Commercial 16mm and 8mm films: A motion picture projection system implying the use of professionally prepared 16mm or S-8mm sound motion picture films for training. Appropriate 16mm or S-8mm projector and projection screen are included.

Microform with Information Mapping and Audio: The theoretical configuration of a training system to support individualized instruction composed of micro-imagery in an information map format, a microform reader, and audio tape in a cassette and an audio cassette playback unit.

Overhead Projection system with Instructor: A system consisting of a horizontal stage projector designed to use a vertical throw for focusing an enlarged transparency image upon a projection screen. An operator is normally required to change the transparency and furnish verbal commentary.

Sound Slide Projection System: A system for presenting information by means of an audio tape and a series of sychronized, projected visual slides.

Student Response System–AV Supported: A student feedback response system using programmed audio and/or visual presentations. It consists of four major components: control console with response readouts, student responders, audio visual devices, and a programmer. Options include paper tape readouts and computer interface terminals.

Teaching Machine–Branching, Still Visual with audio: An individualized instruction system composed of large step multiple choice programmed instructions frames (still) with synchronized sound and a manually controlled device to select, sequence, and display program frames in an order dependent upon the trainee's last response.

Teaching Machine–Branching, Still and Motion Visual with Audio: An individualized instruction system composed of large step multiple choice programmed instruction frames (still and motion) with synchronized sound and a manually controlled device to select, sequence, and display program frames in an order dependent upon the trainee's last response.

Teaching Machine–Linear, Still, Visual with Audio: An individualized instruction system composed of a fixed linear sequence of small step programmed instruction frames (still) with synchronized audio, and a manually controlled device to display the audio and visual information.

Teaching Machine–Branching, with Adjunct Equipment: An individualized instruction system composed of large step multiple choice programmed instruction frames (still or motion with or without audio) with a manually controlled device to select, sequence, and display program frames in an order dependent upon the trainee's last response. Associated with this equipment is a second piece of equipment, such as a mock-up, which is the subject of instruction and is operated according to instructions from the basic teaching machine.

Teaching Machine–Linear, Still Visual with Audio: An individualized instruction system composed of a fixed linear sequence of small step programmed instruction frames (still and motion) with synchronized audio, and manually controlled device to display the audio and visual information.

Teaching Machine–Linear, Still Visual: An individualized instruction system composed of a fixed linear sequence of small step programmed instruction frames (still) and a manually controlled device to display the information.

Teaching Machine–Branching, Still Visual: An individualized instruction system composed of large step multiple choice programmed instruction frames (still) and a manually controlled device to select, sequence, and display program frames in an order dependent upon the trainee's last response.

Teleconference System: A telecommunication system that allows audio and visual two-way communication between two or more remote locations.

Television–Cable (CATV): A hybrid CCTV system offering selective, multiple channel, encoded programming to cable network patrons. A typical system consists of a signal receiving antenna system for the master station and relay of amplified signal channels via area substations to system subscribers. Programming may also be generated and transmitted between substations offering multiple; options for conferencing or training. Programs are encoded for privacy and control of viewing audience.

Television–Cartridge (CTV): A cartridge television system (CTV) consists of packaged video tape programs, video recorder, playback and display units, and control equipment offering high selectivity and availability for individualized programming. Program cartridges may be prerecorded, locally produced, or recorded off-the-air.

Television–Closed Circuit (CCTV) without Feedback: CCTV without feedback is an electronic transmission system for images and sound using a coaxial cable distribution system. System design includes one or more studios or control rooms, a signal distribution center, and signal distribution cables terminating in reception areas equipped with receiver/monitors. Off-the-air, live, or video taped programs may be used.

Television –CCTV with Feedback: CCTV with feedback is the transmission of a live presentation with audio feedback via microphone or telephone in each receiving classroom. Live instructor is required in student-instructor-CCTV loop to activate the feedback mode.

Television–Non-Magnetic Video Disc System: An experimental form of television, similar in function to cartridge television, in which the program is encoded on a thin plastic disc, distributed to users where it is rotated at high revolutions per minutes on a player which reads the data and sends program signal into the antenna terminals of a standard color television receiver. Random access capability.

Television–Open Broadcast: Open broadcast television is the electronic transmission of images with accompanying sound from a single channel VHF and UHF station and shorter range multiple channel 2500 MHZ systems.

Television–Portable Video Tape System: A low cost video type recording and playback system which is self-contained and portable. Typical systems consist of one or two mobile vidicon cameras, a small scan video tape recorder and a monitor receiver. Immediate area programming and open broadcast reception and recording are standard.

Television–Video Disc with Adjunct Equipment: A theoretical configuration of a video disc system in which random access capabilities are used by a trainee in retrieving step-by-step procedures and diagnostic routines as an aid in performing these operations on a piece of equipment.

COMPUTER ASSISTED INSTRUCTION/COMPUTER MANAGED INSTRUCTION:

Computer Assisted Instruction (CAI): A form of individualized instruction that employs digital computer technology to manage and display information to a student, accept student responses, provide knowledge of results, and select subsequent learning event.

Computer Assisted Instruction–Plato IV Basic Configuration: An individualized, computer based teaching system developed by the University of Illinois at Urbana-Champaign, and includes up to 4096 terminals, a communication network, a central computer, and the author language TUTOR.

Computer Assisted Instruction–Plato IV, Basic Configuration with Adjunct Equipment: Includes the basic terminal with externally connected auxiliary equipment.

Computer Assisted Instruction–Plato IV Basic Configuration with Adjunct Equipment and Audio: The basic terminal with externally connected auxiliary equipment including a random access audio playback system.

Computer Assisted Instruction (CAI/CMI) TICCIT: A CAI system designed my Mitre Corporation which allows the student to manage his own instruction.

Computer Managed Instruction (CMI): A student management system in which a computer receives information about student achievement from terminals on-or off-line and directs the student to a sequence of off-line learning modules suited to the student's style of learning and level of achievement.

SIMULATED AND OPERATIONAL SYSTEMS:

Computer Simulation–On-Line: A trainee station equipped with a computer terminal in which the trainee operates in direct interface with the computer as part of the program loop. By his inputs, the trainee determines his allowable performance parameters and discerns the effect of his inputs upon the system being simulated.

Computer Simulation–Off-Line: A trainee station equipped with a computer terminal enabling a trainee to select a computer simulation program, enter his own variables (batch Processing) and run the simulation to determine the performance of the simulated system under a variety of conditions.

Game–Computer Supported Simulation: Any contest, governed by rules, between teams or individuals, where the contest is a dynamic model of some real system and is played without the aid of a computer.

Game–Manual Simulation: Any contest between teams or individual players, governed by rules, where the contest is a dynamic model of some real system and is played without the aid of a computer.

Logic Trainers: A class of trainers that synthetically allow electronic, mechanical, fluid, or gaseous conceptual system logic training without the use of actual hardware.

Game–Computer simulation, Solitaire, with Visual Display: Any contest, governed by rules, between a single player and a computer with visual attachments where the contest is a dynamic model of some real world system or event.

Operational Equipment with Manuals: A unit of operational equipment being used for instructional or training purposes with its supporting technical documentation such as operator's guides, maintenance manuals and parts lists. May be an electric black box, rifle, or truck, etc.

Operational System–Real Environment: An operational system used for training such as an aircraft, ship or track vehicle. Part task, full task, sub-team, team or multi-team training may be conducted in conjunction with or independent of normal operations.

Operational System–Synthetically Stimulated: An operational system that is used for training by interfacing input equipments in the form of tapes, black boxes, or computers. Such input equipments present programmed data to the operational system allowing it to be used for training or evaluative purposes. May be used for part task, full task, sub-team, multi-team training, or combinations thereof.

Psychological Trainer (Hostile Environment), Visual: A training device designed to place controlled stress on the human visual system, through the use of physiologically and/or psychologically adverse or low threshold visuals signals, to enable a trainee to learn to function in this adverse environment.

Procedure Trainer: Training hardware designed for basic training, familiarization, or transition type procedure training for normal, alternate, and emergency operation of operational hardware. Trainer system respond with a lesser degree of fidelity of performance than is required for simulators. May be used for various combinations of part task, full task, sub-team, or multi-team training.

Procedure Trainer–Adjunct Displays and Logic: Training hardware designed for basic training, familiarization or transition type procedure training for normal, alternate, and emergency operation of operational hardware. Trainer systems respond appropriately to trainee inputs but to a lesser degree of fidelity of performance than is required for simulators.

Simulator: Training hardware that is designed specifically for training purposes to simulate operational equipment/systems or portions thereof, and which simulates the operational environment in a training situation. When operated, it becomes a dynamic model of the appearance and performance of selected aspects of the operational equipment/system. May be designed for part task, full task, sub-team, team, multi-team training, or combinations thereof.

Simulator–Adjunct Displays and Logic: Training hardware that is designed specifically for training purposes to simulate operational equipment/systems or portions thereof, and which simulates the operational environment in a training situation. When operated, it becomes a dynamic model of the appearance and performance of selected aspects of the operational equipment/system. May be designed for part task, full task, sub-team, team, multi-team training or combinations thereof. Adjunct displays and logics may include scoring attachments, adaptive control, automatic demonstrations, enhanced displays, automated briefing and debriefing capability, automatic coaching, remedial exercise prescriptions or follow-on assignments.

Simulation–Paper: The representation of selected dynamic characteristics of a system through the use of charts, tables, static photographs, drawings, and lists of performance characteristics under specified conditions. This information is presented in such a way that the trainee can study the initial performance of the system, change inputs to or elements within the system and notes changes in the performance of the system.

SPECIAL AND NON-STANDARD ITEMS:

Automatic Raters–Informal Training: A class of electro mechanical response rating devices used primarily for informal refresher type training. Typically, a gaming approach is used to offer multiple choice type questions to the trainee. Immediate feedback upon answer choice selection is given in the form of right, wrong, or item score as well as cumulative score.

Carrel–Dry: A small enclosure or alcove incorporating a desk, used for individual studies, without audio-visual or laboratory equipment.

Classroom–Traditional: A classroom designed and equipped for an instructor to lecture, lead group discussions, conduct paper and pencil tests, and use instructor controlled audio-visual aids.

Do-It-Yourself Kits: A type of instructional kit containing instructions and materials for fabricating a usable product. Such a kit offers practical "hands-on" training following theoretical training.

Game–Manual Non-Simulation: Any contest between teams of individual players, governed by rules, where the contest is not a dynamic model of some real system, and is played without the aid of a computer.

Specimen Sets: An instructional kit containing samples of similar items, liquids, or materials that may be tested or evaluated for identification, quality, or type. #

At this time, you are ready to select needed equipment and methods. See the following.

APPENDIX N:algo

INSTRUCTIONAL DELIVERY SYSTEMS ALGORITHMS

Here is a quick assessment of how best to apply the four-plus-twelve pages of Algorithms that follow these steps:

Step One: Select the appropriate Training Objective(s). This is the substance of selections made using the "Algorithm for Training Objectives Characteristics" (located in this Appendix) and then summarized on your "Algorithm Correlator," both in Phase III-1-1.

Step Two: Select the three appropriate candidate Instructional Delivery Systems. This is the substance of selections from the "Algorithm for the Appropriate Instructional Delivery System," corresponding to the algorithm named above. This, too, should be summarized on your "Algorithm Correlator." Again, Phase III-1-1.

Step Three: Verify the appropriateness of alternative training methods and media. Examine each of the three candidate systems indicated by the paired algorithms and compare them to the stimuli, feedback modes, and setting charged a "General Characteristics of Training Methods and Media," also in Phase III-1. These, too, should be summarized on the "Algorithm Correlator." If any discrepancies exist, re-examine your *action verbs* and their most appropriate candidate systems.

Step Four: Determine the practicality of various appropriate alternatives. Using the chart entitled "Practical Tests for Instructional Delivery Systems," verify that all decisions made relative to all three prior steps are workable in terms of *what needs doing* versus *what the candidate systems are able to do.*

Step Five: Determine comparative cost of all three practical alternatives among candidate systems. Don't expect that your comparative cost analysis for your media alternatives will be quick and easy because the alternatives are too many, too varied, and too much influenced by conditions outside your or your organization's control–the availability and suppliers.

Because, in the normal course of ISD, you will not have a firm idea of exactly what's needed in what class room time lengths until the actual writing of course materials begins, you will initially be working with ballpark estimates early in the process but will come back to these same types of calculations later, when purchasing actually beings.

Step Six: If possible (we know it's time consuming, although not difficult), complete the costing for three alternatives for each Terminal Objective or module in your entire instructional program. Expect duplicates and flag them, objective to objective, because you will probably select and specify the most common system. To help simplify the task of costing, use the "Instructional Delivery System Cost Worksheet" in Appendix C. It provides for the recommended three alternatives–never commit early and firmly to any single system unless you have evaluated at least one other candidate and preferably two others, or you will loose the ability to choose, now, or to make a quick substitution, if something later goes wrong with your first choice.

Step Seven: Select and specify the one best alternative. Remember that the term *specify* means to complete all the paperwork that's necessary to purchase or otherwise acquire–ultimately, all the POs, loaned-equipment requests, meeting and sleeping room reservations, etc., and justifications to management, if needed. Remember that you previously completed these justifications (Phase I); so they should not be needed separately again but are already available, just in case.

To select from the three most practical systems to be specified and used, simply flag that one IDS system that appears most often down your list of selections, as mentioned in *Step Six* above. If one candidate system should appear on every list of Terminal Objectives (don't expect miracles–just accept them if they occur) then that's undeniably your best and needed system! Congratulations. No more fuss.

If one system appears in only *most* of your task sets, but if *none* will do the entire job, that *most* item might need to be your main choice; but you'll need to augment somehow. Choose that augmentation now on a cost-effective basis. Usually this process requires only two media choices in order to fulfill all requirements. When finished, you'll be ready (on paper) to roll.

To assure yourself of choice–and to fulfill the cost-effectiveness mandate–go back and flag the second-best medium or combination of media. Now compare the costs, the values, the ease of working with the alternatives, the time frame needed to make up and produce the materials, etc. Here, value judgment are inescapable.

Your ultimate choice is the most practical, cost-effective, defensible Instructional Delivery System possible. . .the best and most complete that any reasonable top management could ever need. Specify it! And go with it confidently!

Guidelines for Subjective Judgments:

Cost effectiveness analysis for both the instructional systems (preceding) and the overall program (following) will require your exercising weighted judgments, for which no model is possible. That should not be a cause for concern because you have already undertaken projects at least as complex as ISD for which you did not have the luxury (when you made those other decisions) of all the objective data and criterion references that the ISD process requires and offers.

Consider just two personal events: buying stocks and buying houses. If you are buying one or several stocks among thousands available, do you simply stick a pin in the page of stock quotations for the day? Or research a few firms in one industry that you know well? Or buy a mutual fund so you can "rent" good advisors? Or do you seek the advice of an investment counselor and together determine whether you should be emphasizing liquidity or high yield rather than long-term growth? Would you allow that counselor to decide unilaterally? Is it possible to say that any single method is best for every investor at all times? That's what's at stake if you buy one media system arbitrarily because it's fantastic–or because the manufacturer or A/V producer *claimed* it was. Pick systems to serve your own purposes–that's what makes them fantastic for you!

If you've ever bought a house, you know that all decisions follow from the basic decision of *family home* versus *investment property* for resale or rental. If for family, then the number of bedrooms needed and the proximity to schools are determining factors that could conflict with the budget available. . .which usually means a step down in ambition. How would you resolve a trade-off, say, between local schools and heated garage? How old are the kids? How long do you expect to hold the property? The same thing applies when shopping for A/V. Your eyes might pop, but if it won't serve your needs now, it's not a good buy at any price! Step down. You can't predict its future value. But if you were buying for quick resale, what are the salient features of the house that you believe makes it under-priced and likely to be snapped up by others at a higher price? Guaranteed? Or if it must be held, does its neighborhood command the rental rates that you would need in order to make a profit at purchase price plus maintenance plus carrying costs, less interest and depreciation?

Those are the types of weighted decisions that must be made in costing delivery systems and programs under ISD, too. Compared to all of this, ISD is not really complex! Just demanding of precision.

Obviously you cannot buy a different delivery system for each of the dozens or hundreds of tasks or steps that might be involved in your instructional program. So you should concentrate on the comparatively few Terminal Objectives, since those overall requirements imply all the key Enabling Objectives' requirements. Occasionally a single module of learning might itself require more than one system, but that's a rare event. Probably never will you be confronted with a dictated medium for which there is no less expensive substitute. So relax.

If you already own any given type of A/V equipment, that's a strong argument for staying with that system, if it's appropriate or when the numbers are favorable. That is, if every field office already owns the equipment, and if that equipment is adequate alone or with inexpensive augmentation, it would be wasteful to buy a parallel system that offers no *major* gain in benefits received. Conversely, don't saddle the entire field with the new purchase of marginally useful equipment simply because headquarters owns one or a few pieces of its type.

As you work to complete your "Instructional Delivery System Cost Worksheet," keep in mind that the cost of the equipment is only part of the consideration: the expense of making up the A/V presentation is the other part. Important considerations include the possibility of shooting a demonstration live onto video tape versus still photos for a workbook or slide presentation. Slides are quick and cheap to work with if you need only one or a few sets; but if you will need more than twenty sets, filmstrip format becomes cheaper while delivering safety from mixup. But the videotape will show motion, while the other still formats can't. So do you really need fancy, or can you succeed with a home-made tape that's rough but adequate? Does your organization already have the computer programming know-how and equipment to control the program by electronics and then ship on floppy disks or CD? Everyone can print their own these days if you make it possible!

There is virtually no way for you to obtain a close quote on the A/V presentation itself until you have a good idea of its content. In this case, a *good idea* could be reflected in either your Master Syllabus (if you are seeking a verbatim script) or your related Lesson Topic Plans. A competent A/V consultant can give you a ballpark quote from either. However, it's a rule of thumb in the A/V industry that presentations cost over $1,000 per running minute if art and professional narration are included in the sound-slide or -film strip formats. Video or film presentations, when motion is required, tend to cost at least triple. Are you sure you can't shoot it yourself?

Video, if shot in-house can provide significant savings over film, even if you must hire a professional media specialist to oversee the camera work. The savings narrow if you must work in the producer's studio or on locations, because labor costs mount quickly. Whatever your restrictions, observe the cardinal rule of ISD: the Instructional Delivery System(s) selected *must do the entire job* stipulated by your Learning Objectives via the paired Algorithms. You are *obligated* to provide for every requirement of those Algorithms, even if you must trade down in sophistication in order to afford the adequate media. Rarely is it absolutely necessary to trade up.

Treat any group of components as a single system if all those pieces are needed to do the whole job. If a media mix is essential, it's proper, even though a primary piece plus a minor augmentation item (at each site) should do the job.

As discussed at length in our companion books, *Managing Through Training* and *Sales Meetings That Work*, The Human Resources and Research Organization (HumRRO) has determined that the skill of programming can count for more than the expense of the medium when used in the classroom, depending on the skill with which each is used; expense is no guarantee of superior performance; illustrations printed in a workbook are comparable in effect in the class room to more costly A/V formats. It really doesn't matter which supplier claims what–the proofs lie with HumRRO!

Because you have nearly a hundred media alternatives, as the "Media Pool" in this Appendix demonstrates. When adequacy, not ego, is your criterion, you'll find your costs to meet requirements far lower than the purveyors of maxi-media spectaculars would lead you to believe.

The last consideration, then relates to the anticipated life of the overall program. Will it be used once or twice in each location (when quick and effective demonstrations might be adequate, and development time and expense, not justified). Or will it be repeated in countless cycles in many locations (in which case quality will be important). Even so, the likelihood of frequent revisions could conceivably turn a long-term projection into a series of short-term variations on a single theme. When you spend for long-term advantages, try relatively certain that there really is a long term. If in doubt, hedge: use the cheaper form initially and convert later, if there is a later.#

Richard Cavalier

Estimating Overall Costs of the Training Program:

Aided by the "Instructional Delivery Systems Cost Worksheet," you've done some elaborate calculations in order to arrive at one vital component of the training program and its budget. Yet, that's only one component among dozens.

Enter the selected Instructional Delivery System costs in the appropriate lines and column under Item 3 (Instructional Delivery Systems) of the following "Program Costing Guide." Then complete all the appropriate entries through the Guide.

Apart from the methods and media of the Instructional Delivery System–contents new to most non-trainers–virtually all other components entered on the "Program Costing Guide" are familiar to any executive who has ever prepared a departmental budget. Even though how-to will not be a factor, we will offer some tips on the best way to avoid problems with highly variable entries.

Guidelines for Budget Areas:

Facilities: Will your program begin small with intent to grow? If you begin by borrowing space, at what calendar or traffic point will your group become unwelcome? If you will work with variable student carrels that must be equipped by you, how few locations will serve your needs adequately? At what volume of trainee traffic must you trigger if using in-house facilities. If outside, are facilities provided gratis by the community marketing chain? Or must you rent at any number of field locations? Hotel or motel halls? School labs? Auditoriums? If specially equipped, see the next section.

Equipment: If product equipment is needed, can it be obtained on short notice, anywhere, or must it be entered into the purchase order pipeline? If tools used as standard equipment must be ordered, what is the lead time? Minimum count of sets needed? If installation is needed, what additional costs are incurred? Time frame? If one tool set is provided to each of many trainees to carry away, is it cheaper to buy in quantity for inventory or to purchase class-sized lots for just-in-time delivery? Remember, don't buy too far ahead, and preferably not in quantity until after the program has proved itself. If a model must be built, who will build it? Lead time? How many? Subject to damage?

Instructional Delivery System (generically): Distinguish between the product/tool equipment above and the demonstration and/or audiovisual equipment envisioned here to teach. Everything used in the classroom/lab/workshop belongs here if used by the instructors/proctors in order to assist the students. What is the cost to prepare the master copy? How many copies (with safety) for central or regional facilities? If variable students/positions, what minimum order? Will needed quantities of workbooks, tests, etc., be ordered in bulk for inventory or reprinted in smaller (but higher priced) batches? Will regular updates be necessary? Frequency? Cost? Are design and development costs imputed to salaried workers, or will paid-out costs predominate? Can some materials be borrowed? At shared or imputed costs? How will remedial work or attrition be handled? If recycled, will trainees incur 100% new costs?

Personnel: What instructor-to-trainee ratio will you maintain? Steady or unpredictable trainee flow? Charges for design/development/evaluation time? Secretarial support? Administration? Travel, maintenance and incidentals?

Consumable Supplies: Virtually anything needed that cannot be reused belong here, whether pencils for the class room, lumber for a woodworking class, or gasoline for a driver-training course. Distinguish between the instructors' needs (low volume) and the trainee needs (potentially high volume). Whether this is a high or low cost category depends on program content; but never attempt to save by making most trainees watch somebody else practice, exclusively. Vicarious practice (by watching) is valid reinforcement, but it is no substitute whatsoever for actually doing the step, task, or job. So don't scrimp on workshops!

Student Costs: Do you choose to account for expenses as actually paid out per-person or by estimated annual cost imputed to the projected total numbers of trainees. That decision will affect your budgeting approach, whether or not the actual costs vary. Either way, what happens if the numbers of trainees is significantly higher or lower than projections? Will the trainees be paid a salary while in the course? On whose budget? By whom if the marketing chain is involved?

Miscellaneous: Everything not directly related to the course proper belongs here: the ceremonial programs, prizes, certificates, mailings, hospitality for observers or prospects, if any. All costs for advertising or public relations releases, etc., to announce or "sell" the program? If substantial costs could be incurred on the outside marketing aspects, it's best to add a separate category. . .are these program costs yours, or your organization's, or outside interests'?

Be alert at all times to costs which, even though unavoidable, might be chargeable to other budgets or might willingly be shared by other departments. The total cost is the same for the organization, of course, but there will be substantially less skewing of true cost assignments in the future for other programs.

TWELVE TYPES OF LEARNING ALGORITHMS WITH THE
CHARACTERISTICS OF TRAINING OBJECTIVES THEY SUPPORT
(See TAEG Report 23 for actual algorithms)

NAMES OF LEARNING ALGORITHMS	CHARACTERISTICS OF TRAINING OBJECTIVES THAT CAN BE ACHIEVED WITH SPECIFIC ALGORITHMS		
	ACTION VERBS	BEHAVIORAL ATTRIBUTES	EXAMPLES
1. RECALLING BODIES OF KNOWLEDGE	Answer Define Express Inform Select	1. Concerns verbal or symbolic learning. 2. Concerns acquisition and long-term maintenance of knowledge so that it can be recalled.	1. Recalling equipment nomenclature or functions. 2. Recalling system functions, such as the complex relations between system input and output. 3. Recalling physical laws, such as Ohm's law. 4. Recalling specific radio frequencies and other discrete facts.
2. USING VERBAL INFORMATION	Apply Arrange Choose Compare Determine	1. Concerns the practical application of information. 2. Generally follows the initial learning of information through the use of the guidelines for Recalling Bodies of Knowledge. 3. Limited uncertainty of outcome. 4. Usually little thought of other alternatives.	1. Based on academic knowledge, determine which equipment to use for a specific real world task. 2. Based on an academic knowledge of the system, compare alternative modes of operation of a piece of equipment and determine the appropriate mode for a specific real world situation. 3. Based on memorized knowledge of radio frequencies, choose the correct frequency in a specific real world situation.
3. RULE LEARNING AND USING	Choose Conclude Deduce Predict Propose Select Specify	1. Choosing a course of action based on applying known rules. 2. Frequently involves "If...Then" situations. 3. The rules are not questioned, the decision focuses on whether the correct rule is being applied.	1. Apply the "rules of the road." 2. Solve mathematical equations (both choosing correct equation and the mechanics of solving the equation). 3. Carrying out military protocol. 4. Selection of proper tire extinguisher for different type fires. 5. Using correct grammar in novel situations, covered by rules.
4. MAKING DECISIONS	Choose Design Diagnose Develop Evaluate Forecast Formulate Organize Select	1. Choosing a course of action when alternatives are unspecified or unknown. 2. A successful course of action is not readily apparent. 3. The penalties for unsuccessful courses of action are not readily apparent. 4. The relative value of possible decisions must be considered - including possible trade-offs. 5. Frequently involves forced decisions made in a short period of time with soft information.	1. Choosing frequencies to search in an ECM search plan. 2. Choosing torpedo settings during a torpedo attack. 3. Threat evaluation and weapon assignment. 4. Choice of tactics in combat - wide range of options. 5. Choosing a diagnostic strategy in dealing with a malfunction in a complex piece of equipment. 6. Choosing to abort or commit oneself to land upon reaching the critical point in the glidepath.

TWELVE TYPES OF LEARNING ALGORITHMS WITH THE CHARACTERISTICS OF TRAINING OBJECTIVES THEY SUPPORT (continued)
(See TAEG Report 23 for actual algorithms)

NAMES OF LEARNING ALGORITHMS	CHARACTERISTICS OF TRAINING OBJECTIVES THAT CAN BE ACHIEVED WITH SPECIFIC ALGORITHMS		
	ACTION VERBS	BEHAVIORAL ATTRIBUTES	EXAMPLES
5. DETECTING	Detect Distinguish Monitor	1. Vigilance - detect a few cues embedded in a large block of time. 2. Low threshold cues; signal to noise ratio may be very low; early awareness of small cues. 3. Scan for a wide range of cues for a given "target" and for different types of "targets."	1. Early sonar detection of a submarine target. 2. Visually detecting the periscope of a snorkeling submarine during daytime operations in a sea state of three. 3. Detect, through a slight change in sound, a bearing starting to burn out in a power generator.
6. CLASSIFYING	Identify Recognize Differentiate Classify	1. Pattern recognition approach of identification - not problem solving. 2. Classification by non-verbal characteristics. 3. Status determination - ready to start. 4. Object to be classified can be viewed from many perspectives or in many forms.	1. Classify a sonar target as "sub" or "non-sub." 2. Visual classification of flying aircraft as "friend" or "enemy" or as an "F-4." 3. Determining that an identified noise is a wheel bearing failure, not a water pump failure by rating the quality of the noise - not by the problem solving approach.
7. IDENTIFYING SYMBOLS	Identify Read Transcribe	1. Involves the recognition of symbols. 2. Symbols to be identified typically are of low meaningfulness to untrained persons. 3. Identification, not interpretation, is emphasized. 4. Involves storing queues of symbolic information and related meanings.	1. Reading electronic symbols on a schematic drawing. 2. Identifying map symbols. 3. Reading and transcribing symbols on a tactical status board. 4. Identifying symbols on a weather map.
8. VOICE COMMUNICATING	Advise Answer Communicate Converse Direct Express Instruct Interview Listed Order Report Speak	1. Speaking and listening in specialized languages. 2. Often involves the use of a specific message model. Standard vocabulary and format. 3. Also concerns clarity of voice, enunciation, speed. 4. Timing of verbalization is usually critical - when to pass information. 5. Typically characterized by redundancy in terms of information content. 6. Involves extensive use of previously overlearned verbal skills, or overcoming overlearned interfering patterns. 7. Task may be difficult due to presence of background noise.	1. Officer giving oral orders and receiving reports. 2. Sonar operator passing oral information over communication net. 3. Instructions by GCA operator to pilot in landing aircraft.

TWELVE TYPES OF LEARNING ALGORITHMS WITH THE CHARACTERISTICS OF TRAINING OBJECTIVES THEY SUPPORT (continued)
(See TAEG Report 23 for actual algorithms)

NAMES OF LEARNING ALGORITHMS	CHARACTERISTICS OF TRAINING OBJECTIVES THAT CAN BE ACHIEVED WITH SPECIFIC ALGORITHMS		
	ACTION VERBS	BEHAVIORAL ATTRIBUTES	EXAMPLES
9. RECALLING PROCEDURES, POSITIONING MOVEMENT	Activate Adjust Align Assemble Calibrate Disassemble Inspect Operate Service	1. Concerns the chaining or sequencing of events. 2. Includes both the cognitive and motor aspects of equipment set-up and operating procedures. 3. Procedural check lists are frequently used as job aids.	1. Recalling equipment assembly and disassembly procedures. 2. Recalling the operation and check out procedures for a piece of equipment (cockpit check lists). 3. Following equipment turn-on procedures - emphasis on motor behavior.
10. STEERING AND GUIDING - CONTINUOUS MOVEMENT	Control Guide Maneuver Regulate Steer Track	1. Tracking, dynamic control: a perceptual-motor skill involving continuous pursuit of a target or keeping dials at a certain reading such as maintaining constant turn rates, etc. 2. Compensatory movements based on feedback from displays. 3. Skill in tracking requires smooth muscle coordination patterns - lack of overcontrol. 4. Involves estimating changes in positions, velocities, accelerations, etc. 5. Involves knowledge of display-control relationships.	1. Submarine bow and stern plane operators maintaining a constant course, or making changes in course or depth. 2. Tank driver following a road. 3. Sonar operator keeping the cursor on a sonar target. 4. Air-to-air gunnery - target tracking. 5. Aircraft piloting such as: visually following a ground path. 6. Helmsman holding a course with gyro or magnetic compass.
11. PERFORMING GROSS MOTOR SKILLS	Cut Draft Draw March Mix Run Sew Sharpen Splice Swim Weld Write	1. Perceptual-motor behavior-emphasis on motor. Premium on manual dexterity, occasionally strength and endurance. 2. Repetitive mechanical skill. 3. Standardized behavior, little room for variation or innovation. 4. Automatic behavior - low level of attention is required in skilled operator. Kinesthetic cues dominate control of behavior. 5. Fatigue or boredom may become a factor when skill is performed over an extended period of time or at a rapid rate. 6. Fine tolerances. 7. Often a component of a larger task.	1. Use of hand tools such as hammer, saw, wrench, or power tools such as lathes or grinders. 2. Running a drill press in an assembly line. 3. Loading ammunition into artillery pieces or 5" guns. 4. Drafting - use of drafting instruments. 5. Painting - house painting or preserving ship hull, etc. 6. Marching - close order drill.

TWELVE TYPES OF LEARNING ALGORITHMS WITH THE CHARACTERISTICS OF TRAINING OBJECTIVES THEY SUPPORT (continued)
(See TAEG Report 23 for actual algorithms)

NAMES OF LEARNING ALGORITHMS	CHARACTERISTICS OF TRAINING OBJECTIVES THAT CAN BE ACHIEVED WITH SPECIFIC ALGORITHMS		
	ACTION VERBS	BEHAVIORAL ATTRIBUTES	EXAMPLES
12. ATTITUDE LEARNING	Abide Accept Approve Comply Testify	1. Concerns exhibiting a pattern of behavior consistent with an attitude or value. 2. Concerns willingness to perform according to a standard as opposed to skill to perform according to that standard. (Note: A person can have a high level of skill but choose not to perform in a skillful manner.) 3. Concerns integrating or organizing a value or attitude into a pattern of behavior.	1. Complying with known safety standards while performing a maintenance procedure on a high voltage supply in a radar set. 2. Conforming to the standard of keeping one's bunk area neat and clean when the opportunity exists to do otherwise. 3. Abiding by security regulations when handling classified information. 4. Accepting the need to take risks when necessary to protect the lives of teammates. 5. Complying with a request to repair a malfunctioning radio circuit with greater than normal speed when a quick response is required.

If you have found the one numbered description (among the twelve descriptions on the preceding four pages) that best describes your train-for task, then find its counterpart number/title diagram among the twelve pages following.

Reading down the first column, find the best description of your program constraints; read across to find the x's that indicate those equipments that can best meet your constraints. Select the best three for further consideration. Later, specify the very best for your needs, given all considerations, including cost and capability.

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

RECALLING BODIES OF KNOWLEDGE

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems								
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm					Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm			
		CAI	Teaching Machine - Branching	Microfiche with Self-Scoring Tests	Programmed Text - Branching with Self-Scoring Tests	Audio Visual Carrel with Program Texts, AV Modules and Self-Scoring Tests	Traditional Classroom with Instructor, Overhead Projector, Texts, and Paper and Pencil Tests	Independent Study Using Textbooks, Handbooks, Tests and Workbooks	Instructional Television Broadcast or CCTV Without Feedback, Tests	Programmed Text - Linear with Instructor Scored Criterion Test
Stimulus Criteria										
● Visual Movement										
Limited		X	X			X			X	
Full		X				X			X	
● Visual Spectrum										
Full Color		X	X	X		X	X	X	X	
● Audio										
Voice Sound Range		X	X			X	X		X	
Full Sound Range						X				
Training Setting Criteria										
● Individual Trainees at Fixed Location		X	X	X	X	X	X		X	X
● Individual Trainees with Simultaneous Instruction at Many Locations									X	
● Individual Trainees with Independent Instruction at Any Location				X	X			X		X
● Small Group							X		X	
● Large Group at a Single Location							X		X	
● Team Setting										
Administrative Criteria										
● Site of Courseware and Special Hardware Development										
Local				X	X	X	X	X		X
Central		X	X	X	X	X		X	X	X
● Magnitude of Acquisition Cost										
Low				X	X		X	X		X
High		X	X			X			X	

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

USING VERBAL INFORMATION

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

	Alternative Instructional Delivery Systems								
	Delivery Approaches Permitting the Application of ALL Learning Guidelines and Algorithm						Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm		
	Computer Assisted Instruction with Adjunct Equipment and Materials	Programmed Text - Branching	Programmed Text - Branching with Paper Simulation	Teaching Machine - Branching Still Visual	Microfiche with Self-Scoring Tests	Tutor with Diagnostic Tests and Instructor's Guide with Student Exercises	Traditional Classroom	On-the-Job Training	
Stimulus Criteria									
● Visual Movement									
Limited	X			X			X	X	
Full	X						X	X	
● Visual Spectrum									
Full Color	X		X	X	X		X	X	
● Audio									
Voice Sound Range	X			X		X	X	X	
Full Sound Range								X	
Training Setting Criteria									
● Individual Trainees at Fixed Location	X	X	X	X	X	X		X	
● Individual Trainees with Independent Instruction at Any Location		X	X		X				
● Small Group							X		
● Large group at a single location							X		
● Team Setting								X	
Administrative Criteria									
● Site of Courseware and Special Hardware Development									
Local		X	X		X	X	X	X	
Central	X	X	X	X	X	X			
● Magnitude of Acquisition Cost									
Low		X	X		X	X	X	X	
High	X			X					

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

RULE LEARNING AND USING

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

	Alternative Instructional Delivery Systems									
	Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm							Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm		
	Operational Equipment with Instructor and Instructor Handbook	Simulator with Instructor and Instructor Handbook	Procedure Trainer with Instructor and Instructor Handbook	Computer Assisted Instruction	Teaching Machine, Branching	Programmed Text, Branching	Microfiche with Self-Scoring Tests	Traditional Classroom	Programmed Instruction - Linear	
Stimulus Criteria										
● Visual Form										
Pictorial, Plane				X	X	X	X	X	X	
Line Construction, Plane				X	X	X	X	X	X	
Object, Solid	X	X	X					X		
Environment	X	X	X							
● Visual Movement										
Limited		X	X	X	X			X		
Full	X	X	X	X						
● Visual Spectrum										
Gray Scale				X	X	X	X	X	X	
Color	X	X	X	X	X		X	X		
● Audio										
Voice Sound Range	X	X	X	X	X			X		
Full Sound Range	X	X	X							
Ambient Sounds	X	X								
● Other										
Tactile Cues	X	X	X							
Internal Stimulus Motion Cues	X	X	X							
External Stimulus Motion Cues	X	X								
Instructional Setting Criteria										
● Individual Trainee at Fixed Location	X	X	X	X	X	X	X	X	X	
● Individual Trainee with Independent Instruction at Any Location						X	X		X	
● Small Group								X		
● Large Group at a Single Location								X		
Administrative Criteria										
● Site of Courseware and Special Hardware Development										
Local						X	X	X	X	
Central	X	X	X	X	X	X	X		X	
● Magnitude of Acquisition Cost										
Low			X		X	X	X	X	X	
High	X	X	X	X	X					

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

MAKING DECISIONS

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

	Alternative Instructional Delivery Systems									
	Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm						Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm			
	Simulator Diagnostic Tests with Instructor	Manual Simulation Game with Diagnostic Tests and Instructor	CAI with Adjunct Equipment and Materials	Teaching machine - Branching	Microfiche with Self-Scoring Tests	Programmed Text - Branching with Self-Scoring Tests	Operational System with Tutor	Case Study Materials w/wo Instructor	Role Playing Materials with Instructor	
Stimulus Criteria										
● Visual Form										
Alphanumerics		X	X	X	X	X		X	X	
Pictorial, Plain		X	X	X	X	X		X	X	
Object, Solid	X						X		X	
● Visual Movement										
Still		X	X	X	X	X		X		
Full Movement	X		X				X			
● Audio										
Voice Sound Range	X	X	X	X			X		X	
Full Sound Range	X						X			
● Other										
Tactile Cues	X						X			
External Stimuli Motion Cues	X						X			
Training Setting Criteria										
● Individual Trainee at Fixed Location	X	X	X	X	X	X	X	X		
● Independent Trainee with Independent Instruction at Any Location					X	X				
● Small Group							X	X	X	
● Team Setting	X	X					X		X	
Administrative Criteria										
● Site of Courseware and Special Hardware Development										
Local		X			X	X		X	X	
Central	X	X	X	X	X	X	X	X	X	
● Magnitude of Acquisition Cost										
Low		X			X	X		X	X	
High	X		X	X			X			

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

DETECTING

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems							
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm					Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm		
		Operational System with Stimulated Signals, and an Instructor with Instructor Handbook	Simulator with Instructor and Instructor Handbook	Simulator with Adjunct Displays and Logic	Procedure Trainer, with Instructor and Instructor Handbook	Procedure Trainer with Adjunct Displays and Logic	Operational System with Instructor	Informal On-the-Job Training on Operational System	
Stimulus Criteria									
● Full Visual Environment		X					X	X	
● Full Ambient Sounds		X	X	X			X	X	
● External Stimulus Motion Cues		X	X	X			X	X	
Training Setting Criteria									
● Individual Trainee at Fixed Location (School)		X	X	X	X	X	X		
● Individual Trainee On-the-Job		X					X	X	
Administrative Criteria									
● Site of Courseware and Special Hardware Development									
Local							X	X	
Central		X	X	X	X	X			
● Magnitude of Acquisition Cost									
Low								X	
High		X	X	X	X	X	X		

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

CLASSIFYING

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

	Alternative Instructional Delivery Systems										
	Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm					Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm					
	CAI w/Adjunct Equipment and Materials	Study Card Sets	Microfiche	Teaching Machine - Branching	Simulator with Adjunct Displays or Instructor	Slide Sets with Instructor	Traditional Classroom with AV Materials	Audio Recorders - Disc or Tape	Specimen Set	Sound Slide/Film Strip Program	
Stimulus Criteria											
● Visual Form											
Alphanumeric	X	X	X	X	X	X	X			X	
Pictorial, Plane	X	X	X	X		X	X			X	
Line Construction, Plane	X	X	X	X		X	X			X	
Object, Solid					X				X		
Environment					X						
● Visual Movement											
Still	X	X	X	X		X	X		X	X	
Limited	X			X			X			X	
Full					X		X				
● Scale											
Exact Scale					X				X		
● Audio											
Voice Sound Range	X			X	X	X	X	X		X	
Full Sound Range					X			X			
Ambient Sounds					X						
Other Tactile Cues					X				X		
Internal Stimulus Motion Cues					X						
External Stimulus Motion Cues					X						
Training Setting Criteria											
● Individual Trainee at a Fixed Location	X	X	X	X	X	X		X	X	X	
● Individual Trainee with Independent Instruction at Any Location		X	X					X		X	
● Small Group						X	X	X		X	
● Large Group at Single Location						X	X	X		X	
Administrative Criteria											
● Site of Courseware and Special Hardware Development											
Local		X	X	X		X	X	X	X	X	
Central	X	X	X	X	X	X	X	X	X	X	
● Magnitude of Acquisition Cost											
Low		X	X			X	X	X	X	X	
High	X			X	X						

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

IDENTIFYING GRAPHIC SYMBOLS

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems									
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm					Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm				
		CAI (with visual display)	Teaching Machine - Branching	Programmed Text - Branching	Microfiche with Self-Scoring Tests	Study-Card Sets with Self-Scoring Tests	Traditional Classroom	Textbook	Chart	Automatic Rater	
Training Setting Criteria											
● Individual Trainee at a Fixed Location		X	X	X	X	X		X	X	X	
● Individual Trainee with Independent Instruction at Any Location				X	X	X		X	X		
Administrative Criteria											
● Site of Courseware and Special Hardware Development											
Local				X	X	X	X	X	X	X	
Central		X	X	X	X	X		X	X	X	
● Magnitude of Acquisition Cost											
Low				X	X	X	X	X	X	X	
High		X	X								

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

VOICE COMMUNICATING

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems							
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm			Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm				
		Simulator with Instructor, Instructor Handbook, and Diagnostic Tests	Procedure Trainer with Instructor, Instructor Handbook and Diagnostic Tests	Language Laboratory, Audio, Active-Compare Mode, with Manual Simulation Game and Instructor	Language Laboratory, Audio, Active-Compare Mode, with Printed Materials	Performance Aid	Traditional Classroom	Operational Equipment in Real Environment with Instructor	
Stimulus Criteria									
● Visual Form									
Pictorial, Plane				X	X	X	X		
Solid Object		X	X					X	
● Visual Movement									
Still				X	X	X	X		
Full Movement		X	X					X	
● Audio									
Voice Sound Range		X	X	X	X		X	X	
Ambient Sounds		X	X	X	X			X	
Training Setting Criteria									
● Individual Trainee at a Fixed Location		X	X	X	X		X	X	
● Individual Trainee with Independent Instruction at Any Location						X			
● Team Setting		X	X	X		X		X	
Administrative Criteria									
● Site of Courseware and Special Hardware Development									
Local						X	X	X	
Central		X	X	X	X	X			
● Magnitude of Acquisition Cost									
Low				X	X	X	X		
High		X	X					X	

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGOR

RECALLING PROCEDURES AND POSITIONING MOVEMENT

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

	Alternative Instructional Delivery Systems											
	Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm								Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm			
	Operational System in Laboratory with Tutor	Simulator with Tutor and Tests	Procedures Trainer with Tutor and Tests	Logic Trainer with Tutor	CAI with Photo or Operable Mockup	Teaching Machine with Photo or Operable Mockup	Microfiche w/wo Photo or Operable Mockup	Programmed Text - Branching	Laboratory Carrel with Equipment and Linear Instructional Materials	Operational System in Real Environment with Tutor	Texts, Lectures and Demonstrations	
Complexity Criteria												
● Difficult Motor Acts	X	X	X	X					X	X		
● Smooth Motor Performance at End of Training	X	X	X						X	X		
Stimulus Criteria												
● Visual Form												
Alpha-Numeric	X	X	X	X	X	X	X	X	X		X	
Pictorial, Plane				X	X	X	X	X	X		X	
Object, Solid	X	X	X	X			X		X	X	X	
● Visual Movement												
Still				X	X	X	X	X	X		X	
Full Movement	X	X	X	X	X				X	X		
● Audio												
Voice Sound Range	X	X	X		X				X	X	X	
Full Sound Range	X	X	X						X	X		
Ambient Sounds	X	X	X							X		
● Other												
Tactile Cues	X	X	X						X	X		
Internal Stimulus Motion Cues	X	X	X						X	X		
Training Setting Criteria												
● Individual Trainee at Fixed Location	X	X	X	X	X	X	X	X	X	X	X	
● Individual Trainee with Independent Instruction at Any Location							X	X				
● Small Group				X							X	
● Large Group at Single Location											X	
● Team Setting	X	X	X	X						X		
Administrative Criteria												
● Site of Courseware and Special Hardware Development												
Local							X	X	X	X	X	
Central	X	X	X	X	X	X	X	X	X	X		
● Magnitude of Acquisition Cost												
Low	X						X	X	X		X	
High	X	X	X	X	X	X			X	X		

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

STEERING & GUIDING — CONTINUOUS MOVEMENT

Directions:

To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems					
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm				Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm	
		Operational System, Real Environment with Instructor and Instructor Handbook	Simulator with Motion Platform and Full Visual Field, Instructor and Instructor Handbook	Simulator (Without Motion Platform and Full Visual Field) Instructor and Instructor Handbook	Procedure Traiper, Instructor and Instructor Handbook	Operational System, Real Environment Without Instructor	
Stimulus Criteria							
Full Visual Environment		X	X			X	
External Stimulus Motion Cues		X	X			X	
Fine Movement Manipulative Acts		X	X	X		X	
Broad Movement Manipulative Acts		X	X	X	X	X	
Training Setting Criteria							
Individual or Team Training at a Fixed Location		X	X	X	X	X	
Individual or Team Training with Independent Instruction at Many Locations		X				X	
Administrative Criteria							
Site of Courseware and Special Hardware Development							
Local		X				X	
Central		X	X	X	X	X	

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

PERFORMING GROSS MOTOR SKILLS

Directions:

To choose a delivery system:

1. Place a "/" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (columns) that have an "X" in each row designated by a "/". These are the candidate delivery systems.

Criteria for Selecting Instructional Delivery Systems

		Alternative Instructional Delivery Systems				
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm		Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm		
		Tutor in a Job-Like Setting with Equipment, if required, an Instructor Handbook and Student Diagnostic Tests	Tutor in a Job-Like Setting with equipment, if required, an Instructor Handbook, Student Diagnostic Tests, and Portable TV with a Record/Playback Capability and a Series of Taped Demonstrations	Programmed Text - Branching and a Series of Film Loops with Equipment, if required, and a Part-Time Instructor with Criterion Tests	Supervisor Managed Informal On-The-Job Training	
Training Setting Criteria						
● Individual Trainee at a Fixed Location		X	X	X		
● Individual Trainee with Independent Instruction at Many Locations				X	X	
● Small Group					X	
● Team Setting		X	X		X	
Administrative Criteria						
● Site of Courseware Development						
Local		X	X	X	X	
Central		X	X	X		

INSTRUCTIONAL DELIVERY SYSTEM CHART FOR THE ALGORITHM

This chart is useful in selecting an instructional delivery system for the affective and behavioral components of attitude learning. For achieving the cognition component use instructional delivery systems suggested for recalling bodies of knowledge

ATTITUDE LEARNING

Directions:

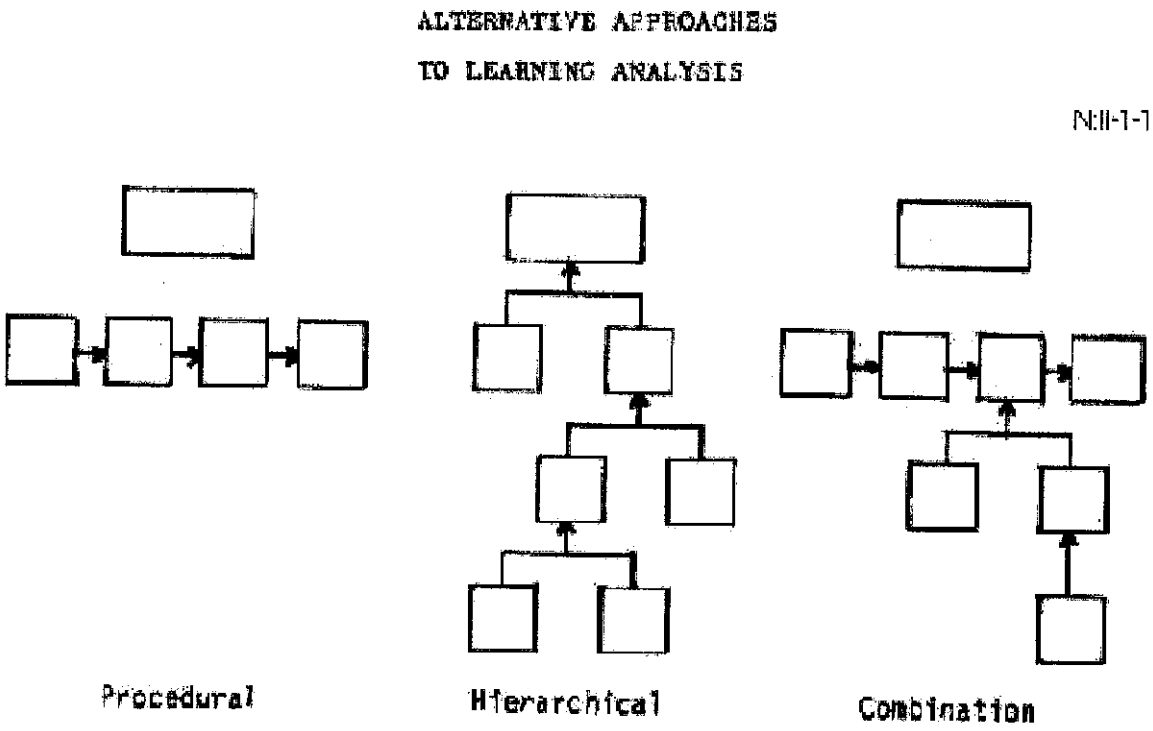
To choose a delivery system:

1. Place a "√" (light pencil) in boxes representing criteria (rows) that must be met.

2. Select the delivery systems (column) that have an "X" in each row designated by a "√". These are the candidate delivery systems.

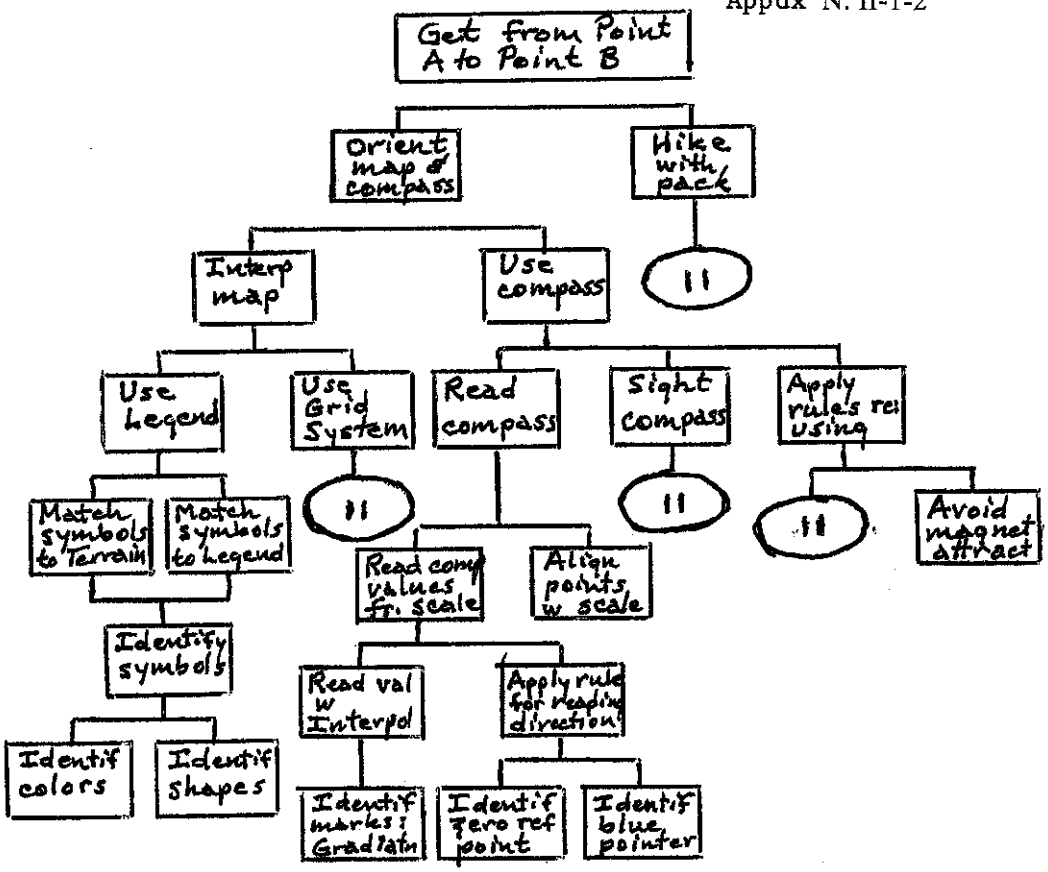
Criteria for Selecting Instructional Delivery Systems		Alternative Instructional Delivery Systems						
		Delivery Approaches Permitting the Application of All Learning Guidelines and Algorithm		Delivery Approaches NOT Permitting Complete Application of Learning Guidelines and Algorithm				
		Operational Job Setting with Instructor and Instructor Handbook with Diagnostic Attitude Tests	Simulated Job Setting with Instructor and Instructor Handbook with Diagnostic Attitude Tests	Roll Playing	Case Studies	On-The-Job Training by Supervisors	Lectures, Seminars, etc.	
Training Setting Criteria								
● Individual Trainee at Fixed Location		X	X		X			
● Individual Trainee with Independent Instruction at Many Locations						X	X	
● Small Group		X	X	X	X	X	X	
● Team Setting		X	X	X	X	X	X	
Administrative Criteria								
● Site of Courseware Development								
Local		X		X	X	X	X	
Central		X	X	X	X			
● Magnitude of Acquisition Cost								
Low				X	X	X	X	
High		X	X					

Appendix N


ALTERNATIVE APPROACHES
TO LEARNING ANALYSIS
N:II-1-1
Procedural
Hierarchical
Combination

Learning Hierarchy: Field Hike

Appdx N: II-1-2



NOTE: Ovals represent "plug-ins," which might be prerequisites or other existing modules or courses. HOWEVER, never use plug-ins that have not already been subjected to the identical ISD procedures that govern your overall program.

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LEARNING OBJECTIVE ANALYSIS WORKSHEET N:II-2

COURSE		UNIT/MODULE	LESSON TOPIC	TASK I.D. NUMBER	PAGE
Interior Comm "A"		6	6.2	TCE-01	
FILL ONE FOR EACH OBJECTIVE	☒ TERMINAL	TERMINAL OBJECTIVE NO. 29.0	PERFORMANCE STANDARD 29.0A	ENABLING OBJECTIVE NOS. THAT SUPPORT THIS TERMINAL OBJECTIVE 29.1, 29.2, 29.3, 29.4, 29.5	
	☐ ENABLING	ENABLING OBJECTIVE NO.	TERMINAL OBJECTIVE NO. THE ENABLING OBJECTIVE SUPPORTS		

ENABLING OBJECTIVE ACTION STATEMENT

Troubleshoot the alarm, safety and warning system

CONDITIONS

given an alarm switchboard (TC/S), associated contact makes, audible alarms, and a system schematic

STANDARDS

isolating single faults to the circuit and component level

LEARNING CATEGORY

Problem Solving

TEST ITEMS

29.0A Your instructor has prefaulted one or more faults into the alarm, safety, and warning system. Troubleshoot the system following the Navy 6-step troubleshooting procedures, isolating single faults to the circuit and component level. Your instructor will watch and evaluate your performance according to evaluation checklist #1-1.

MEDIA SELECTION

Video Tape -- 8144TDN "Navy Six-step Troubleshooting Procedures"

EQUIPMENT REQUIRED FOR PERFORMANCE OF OBJECTIVE

Alarm switchboard (TC/S)
Associated contact makes
Audible alarms.
System schematic

CRITICAL MATERIALS SELECTED

☒ YES ☐ NO IF YES, write below

Figure II-10.—A Learning Objective Analysis Worksheet Filled in for a Terminal Objective.

N: III-1-5.

OUTLINE OF INSTRUCTION * INSTRUCTOR ACTIVITY GUIDE

I. Introduction

A Establish rapport

B State lesson objectives

B. C Make-ready:

1) **motivate (What's in it for me?–WIIFMe)**

2) **lesson overview**

II. Presentation of lessons*

A First topic

B Second topic

1)

2)

a)

b) **etc.**

C. Third topic, etc.

III. Lesson summary

A.

B.

C.

IV. Practical application (lab/workshop/demo)

A. First-type demonstration; show & tell normally

1) **Repeat demo; show & tell slowly**

2) **Trainees practice individually**

3) **Trainees demonstrate ability (to norm)**

B. Second-type demonstration, etc.

V. Testing and evaluation (to CSO quality?)

VI. Assignment for next session

*** NOTE: this structure is keyed to the Master Syllabus located in Phase II-6-3.**

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LESSON TOPIC GUIDE

N: III-5-2

OUTLINE OF INSTRUCTION
INSTRUCTOR ACTIVITY GUIDE
(Develop from your Master Syllabus)

I. INTRODUCTION

A. Establish Contact

Introduce yourself and tell topic for this lesson

Write your name and topic on chalkboard.

B. Paraphrase lesson objectives briefly:

1. **Terminal Objective: You will be expected to write the following:**
   a. **a)**
   b. **b)**
   c. **etc.**
2. **Enabling Objectives:**
   a) **define** _____
   b) **identify** _____
   c) **etc.**

C. Establish their readiness

1. **Motivating statements**
   a. **Prepare students to learn:**
   b. **Motivate trainees by relating stories**
   c. **make motivating statement and problems relating to (topic) and**
   d. **explain incentives and future value how these are related to (topic) andto other lessons in course.**
2. **Lesson overview**

   Emphasize the needs for, and value of, all the material being presented in this and future lessons.

   In the following lesson, we will look at (topic) and discuss some of the terminology used

(Lessen Topic Guide/Instr.Cont'd)

II. PRESENTATION

A. Definition of terms

State according to Objective (name); show any visuals,

1. **key term**
2. **additional term**
3. **3. additional term(s) if any**

although restricted to key definition; show others as needed

B. Class questions

Ask specific questions of specific trainees if no volunteers.

1. **what is the purpose?**
2. **what is the type/scope/value, etc.?**

Do not depend on, "Are there any questions?" Get or provide proper answers to all questions, including theirs.

C. Principles of operation of (topic)

1. basic components

State according to Enabling Objective.

a)

b)

c) etc.

2. basic whatever

State according to Enabling Objective.

3. etc.

D. Etc.

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N: III-52

LESSON TOPIC GUIDE

CURRICULUM OVERVIEW **Instructor Administrative Guide**

I. Introduction to course:

A. Establish contact:

Introduce yourself and tell the topic to be covered in this lesson/session

Write your name, telephone #, and available hours on chalkboard.

_____.

B. Summarize the lesson objectives

1. **Terminal Objectives: Write Terminal Objective(s)**

   Ultimately, you will be able to do this:

   a)

   b)

   c)

2. **Enabling Objectives: Write Enabling Objectives**

   We will accomplish the above in steps:

   b)

   c)

   d)

   e)

   f)

3. **Establish trainee readiness: Try to make them ready; discuss**

   a) **Motivating statements:**

   b) **motivation and incentives**

   c) **Motivate trainees by relating relevant events, stories, problems, etc.**

B. Lesson overview:

In this lesson, we are going to look at: _____and discuss some of the terminology.

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ADD TO III-6-A.

TRAINEE GUIDE

Course/job/task title:

Lesson/session number:

INTRODUCTION:

(Allow 5-10 spaces)

LESSON TOPIC LEARNING OBJECTIVES:

(Allow 5-10 spaces)

STUDY ASSIGNMENT:

(Allow 5-10 spaces)

STUDY QUESTIONS:

(Allow all needed spaces)

Q 1:

Q 2:

Q 3: etc

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ADD TO III-6 -B (?).

INFORMATION SHEET

Course/job/task title:

Lesson/session number:

INTRODUCTION:

(Allow 5-10 spaces)

REFERENCES:

(Allow 5-10 spaces)

INFORMATION:

(Allow 5-10 spaces)

REMARKS: Note any particular remarks that should be made to the class (or from you to the instructor/proctor) that are not already scripted.

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ADD TO III-6-c.

TRAINEE LAB/WORKSHOP SESSION REPORT

Course/Job/Task title:
Lesson/Session number:
Related to (skill):

INTRODUCTION:

(Allow 5-10 spaces)

LESSON TOPIC LEARNING OBJECTIVES:
Terminal Objective:

(List specific, related item.)

Enabling Objectives:

(List all clearly-related items)

Specific Objective for today:

REFERENCES FOR INSTRUCTOR, IF ANY:
REFERENCES FOR TRAINEES, IF ANY:
EQUIPMENT AND MATERIALS NEEDED:

JOB STEPS:
(Any precautions?)
(Any preparation?)

Step 1:
Step 2.
Step 3.
Step 4. etc.

INSTRUCTOR VERIFICATION of STEPS TAUGHT: Initials: _____
Date: _____

SELF-TEST ITEMS FOR TRAINEES, IF ANY:

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OUTLINE OF INSTRUCTION (Developed from Master Syllabus)	INSTRUCTOR ACTIVITY GUIDE
I. INTRODUCTION	
A. Establish Contact	
Introduce yourself, your rate, and give the topic for this lesson: Fundamentals of Hydraulics and Pneumatics.	Write name, rate, and topic—Fundamentals of Hydraulics and Pneumatics—on the board.
B. Paraphrase Lesson Objectives	
1. Terminal Objective: You will be expected to write:	
a. The basic principles of operation of Fluid power systems. b. The major components of Fluid power systems. c. The fluids used in Fluid power systems. d. . . . . e.	
2. Enabling Objectives	
a. Define terms unique to Fluid power systems. b. Identify components of Fluid power systems. c. . . . . d.	
C. Establish Readiness	
1. Motivating Statements	Get students ready to learn:
Motivate students by relating sea stories, real or imaginary, to help them see what Fluid power systems involve. Explain how this lesson ties in with other lessons.	1. Trainee motivation. 2. Learning incentives.
2. Lesson Overview	Bring out the need and value of the material being presented.
In the following lesson we are going to look at Fluid power systems and discuss some of the terminology or buzz words used when talking about these systems. We will discuss the principles of both hydraulic and . . .	

OUTLINE OF INSTRUCTION	INSTRUCTOR ACTIVITY GUIDE
II. PRESENTATION	
A. Definition of terms.	Objective 6.15.1
1. Fluid power	Show transparency #1, "Definition of Terms." Show only the definition of Fluid power. Keep other definitions covered.
a. Defined as power created by pumped or compressed fluids used to push, pull, rotate, regulate, or drive mechanical devices.	
b.	Uncover definition of Hydraulic.
c.	
2. Hydraulic	
a. Defined as . . .	
b.	
c.	
	Ask given questions.
Q.1 What is the purpose of Fluid power systems?	A.1. To convert energy to useful work.
Q.2 What type of Fluid power system would use liquids as its fluid?	A.2. Hydraulic System.
B. Principles of operation of Fluid power systems	
1. Basic components . . .	
a.	Objective 6.15.2
b.	
(1)	

COMPREHENSIVE CURRICULUM OVERVIEW

AppdxN:III-2-3

Master Course Schedule

Operational hours: __:__ to __:__
Length of Period: ___ minutes

Week # ___
Topic_name:
Topic # ___

Type:	Period:	Topic:	Ratio; Student:Teacher:
First day:			
Class	1	Course Overview	10:1
Class	2	Anatomy and Physiology, Diving	10:1
Class	3	Ditto	10:1
Class	4	Diving Disorders, Primary Effects	10:1
	5		
	6		
	7		
	8		
Second day:			
Class	9	Diving Disorders, Secondary Effects	10:1
	10		
	11		
	12		
	13	Introduction to Recompression Chamber	10:1
Lab	14	Recompression Chamber Operations	10:1
	15		
	16		
Third day:			
Lab	17	Recompression Chamber Operations, cont'd	2:1
	18		
	19		
Class	20	Hyperbaric Treatment Tables	10:1
Class	21	Neurological Examination	2.1
	22		
Fourth day:			
Class	23	Oxygen Toxicity	10:1
Class	24	Near Drowning	10:1
Class	25	Examination	10:1
Fifth day:	Holiday		

NOTE: Example of a Master Course Schedule for a Curriculum Outline.
Variation on a military example.

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LESSON TOPIC SUMMARY

(Curriculum Overview)

III-2-3-

Lesson Topic (name and/or number): Types of Faults and Their Causes

Contact periods: Classroom – 2.6 hours

Media used: Lecture with transparencies for stills; video tape for motion sequences.

Terminal Objective: 29.0

Job Task Inventory Number: TCB-01

29.0: Given alarm switchboard (IC/S), associated contract makers, audible alarms and a system schematic, the student will be able to troubleshoot the alarm, safety, and warning system by following the Navy 6-step troubleshooting procedures and isolating single faults to the circuit and components level. (JTI Task No. TCB-01.)

Enabling Objectives: Completely supported by the following lesson topics:

29.3: Given a schematic of the alarm system and a set of statements, identify the types of faults that can occur in the supervisory circuit, alarm circuit, and trouble buzzer circuit.

29.4: Given a set of symptoms, a system schematic, and a set of statements identifying probable causes of a malfunction in the alarm, safety, and warning system.

29.4.1: Given a list of visual and audible indicators and a set of statements, identify a trouble, alarm, or normal condition.

AUTHOR'S NOTE: Based on direct use of a military format. Enabling Objectives No. 29.1 and 29.2 obviously exist, but (whatever they might be) they do not support JTI No. TCB-01 and so are not listed above. Military Sequence Numbers provide easy control in a complex library of programs, but sequence numbers are not necessarily useful for you. You decide.

LESSON TOPIC GUIDE

AppdxN:III-5-2

(Curriculum Overview)

CURRICULUM OVERVIEW	INSTRUCTOR ADMINISTRATIVE GUIDE
I. INTRODUCTION TO COURSE:	
A. Introduce yourself and tell the topic to be covered In this lesson/session	Write your name, telephone #, and available hours on the chalkboard.
B. Summarize the lesson objectives:	
1) Terminal Objectives: "Ultimately, you will be able to do this: a) b) c) etc."	Write Terminal Objective(s).
2) Enabling Objective(s): "We will accomplish the above in steps: a) b) c) etc."	Write Enabling Objective(s).
3) Establish trainee readiness:	
a) make motivating statements; motivate trainees by relating relevant events, stories, problems, etc.	Try to make them ready; discuss motivation and incentives.
b) present a lesson overview: "In this lesson, we are going to look at: _____ and discuss some of the terminology.	Stress need for, and value of, all material being presented today and in entire course.
II. Presentation:	
A. Definition of terms involved: 1. scientific, if any, plus 2. customer-used-terms, if any 3. Etc	Show any brief, relevant A/V material.
B. First establishing question	Do not continue without correct responses
C. Second & subsequent establishing questions	unless nobody really knows; then re-explain.
D. Answer all questions in order and explain significance to them and this course.	
E. Begin presentation of the course content.	
F. Conclude: 1) quick summary 2) forward assignments 3. provide for remedial work if required in general or in specific cases	"So here's what we're going to learn today: (Go to script or the Master Syllabus outline and textbook materials.)"
III. Review	Quick summary of main points.
IV. Look ahead	Quick summary of look ahead.

NOTE: Administrative procedure is presented here in brief. In actuality, treat each of the Terminal Objectives on separate sheets, together with all of the (probably multiple) Enabling Objectives of each, following each. . .for easier changes.

Variation on military material.

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MODULE TITLE MODULE NUMBER LESSON TOPIC NUMBER

LEARNING OBJECTIVES FOR LESSON TOPIC NUMBER _____

1. _____

2. _____

3. (etc)

MODULE TEST ITEMS TEST #1	TEST #2	TEST #3	Lesson Topic Learning Objective Number	ACHIEVEMENT MEASURED BY: Knowledge Test Item Number	Performance Test Item Number	Progress Check Item Number	INSTRUCTIONAL MATERIAL (MEDIA): Lesson Topic Summary Page	Lesson Topic Programmed Instr. Pages - Frames	Lesson Topic Narrative Pages	Sound/Slide Program	Super-8 Movie Film	Job Program (Job Sheet)	Other	ENRICHMENT MATERIALS: Textbooks	Navy Publications	Technical Publications

LEARNING CENTER INSTRUCTOR'S NOTES:

TRAINEE FEEDBACK FORM

AppdxN:III-7

Name (optional): _____ Date: _____

Social Security # as ID: _____ Lesson topic: _____

Please choose the ***best answer*** for each of the questions below and comment where you feel that comments are appropriate:

1. Where the objectives of this module stated clearly at the beginning of the lesson: (Yes) (Somewhat) (No).
   Comments:

2. How well did each module actually *teach* the objectives stated? (Very well) (About average) (Very poorly).
   Comments:

3. How ***difficult to understand*** was the subject matter of this lesson? (Not very difficult) (Fairly difficult) (Very difficult).
   Comments:

4. The visual aids (paper, film, and/or computer generated) helped me to understand the Learning Objectives of this lesson: (Helped very much) (Helped some) (Helped very little).
   Comments:

5. Were the current prerequisites for this class (if any were specified) actually adequate for your preparation for your learning via this lesson?

6. In your opinion, how can this lesson be improved?

Variation on a military source.

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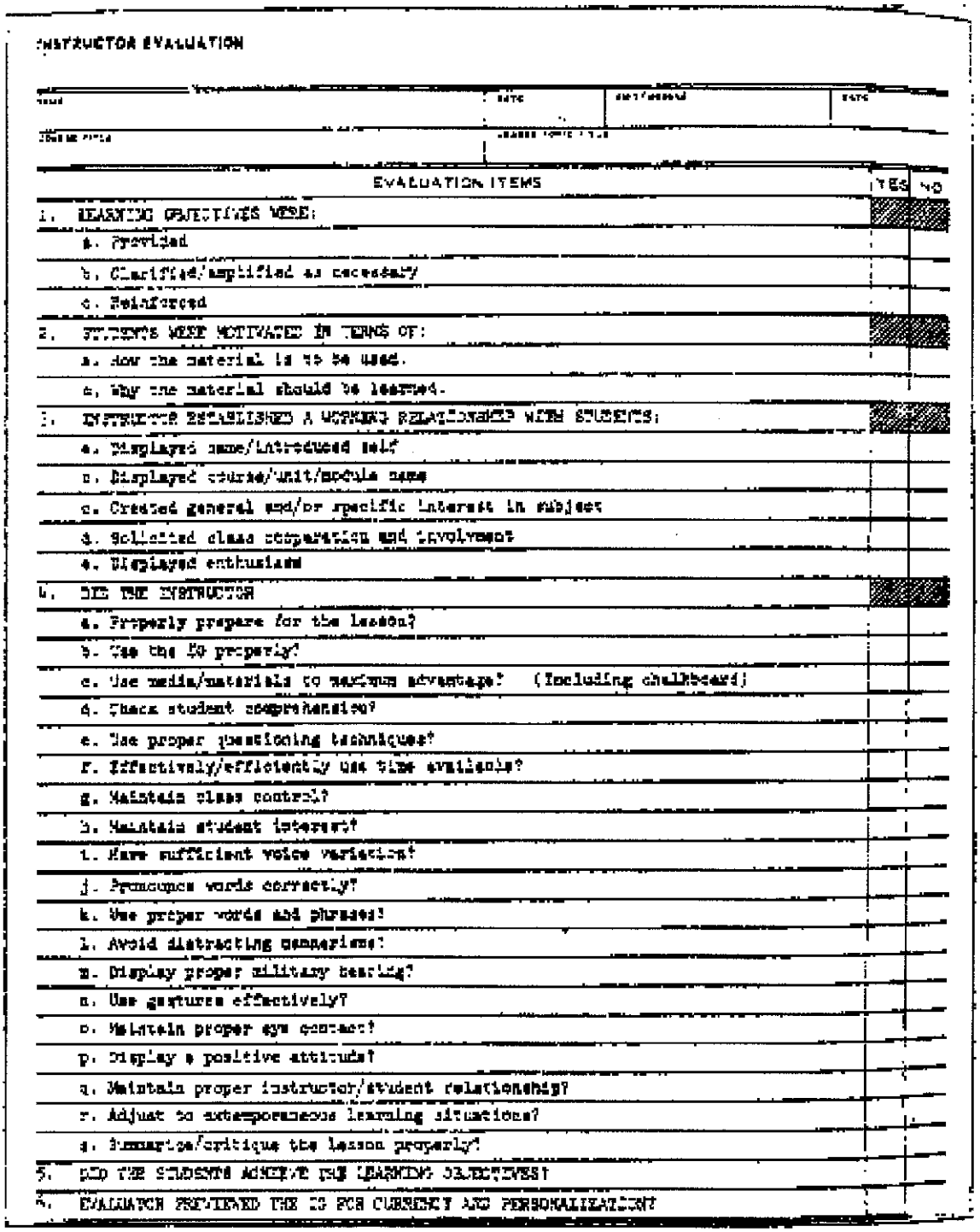
NOTE:

Although of quite poor photographic value, the following forms are presented for their conviction value--with any transcription, if needed, located on the facing page. So expect bad/good; bad/good, etc.

That alternating seems to make more sense than confronting you with multiple poor copies that you might waste time in trying to study before noting their following transcriptions. That, too, is an ISD-type of solution to a problem of placement. ISD is sensible! You should try to be, too.

N: IV-1-a



INSTRUCTOR EVALUATION

EVALUATION ITEMS	YES	NO
1. LEARNING OBJECTIVES WERE:		
a. Provided		
b. Clarified/amplified as necessary		
c. Reinforced		
2. STUDENTS WERE MOTIVATED IN TERMS OF:		
a. How the material is to be used.		
b. Why the material should be learned.		
3. INSTRUCTOR ESTABLISHED A WORKING RELATIONSHIP WITH STUDENTS:		
a. Displayed name/introduced self		
b. Displayed course/unit/module name		
c. Created general and/or specific interest in subject		
d. Solicited class cooperation and involvement		
e. Displayed enthusiasm		
4. DID THE INSTRUCTOR		
a. Properly prepare for the lesson?		
b. Use the IG properly?		
c. Use media/materials to maximum advantage? (Including chalkboard)		
d. Check student comprehension?		
e. Use proper questioning techniques?		
f. Effectively/efficiently use time available?		
g. Maintain class control?		
h. Maintain student interest?		
i. Have sufficient voice variation?		
j. Pronounce words correctly?		
k. Use proper words and phrases?		
l. Avoid distracting mannerisms?		
m. Display proper military bearing?		
n. Use gestures effectively?		
o. Maintain proper eye contact?		
p. Display a positive attitude?		
q. Maintain proper instructor/student relationship?		
r. Adjust to extemporaneous learning situations?		
s. Summarize/critique the lesson properly?		
5. DID THE STUDENTS ACHIEVE THE LEARNING OBJECTIVES?		
6. EVALUATION PREVIEWED THE IG FOR CURRENCY AND PERSONALIZATION?		

INSTRUCTOR EVALUATION

N: IV-1-a Duplicate

Name/date/other identifying course numbers

1. LEARNING OBJECTIVES WERE:
   a) Provided.
   b) Clarified/amplified as necessary.
   c) Reinforced.

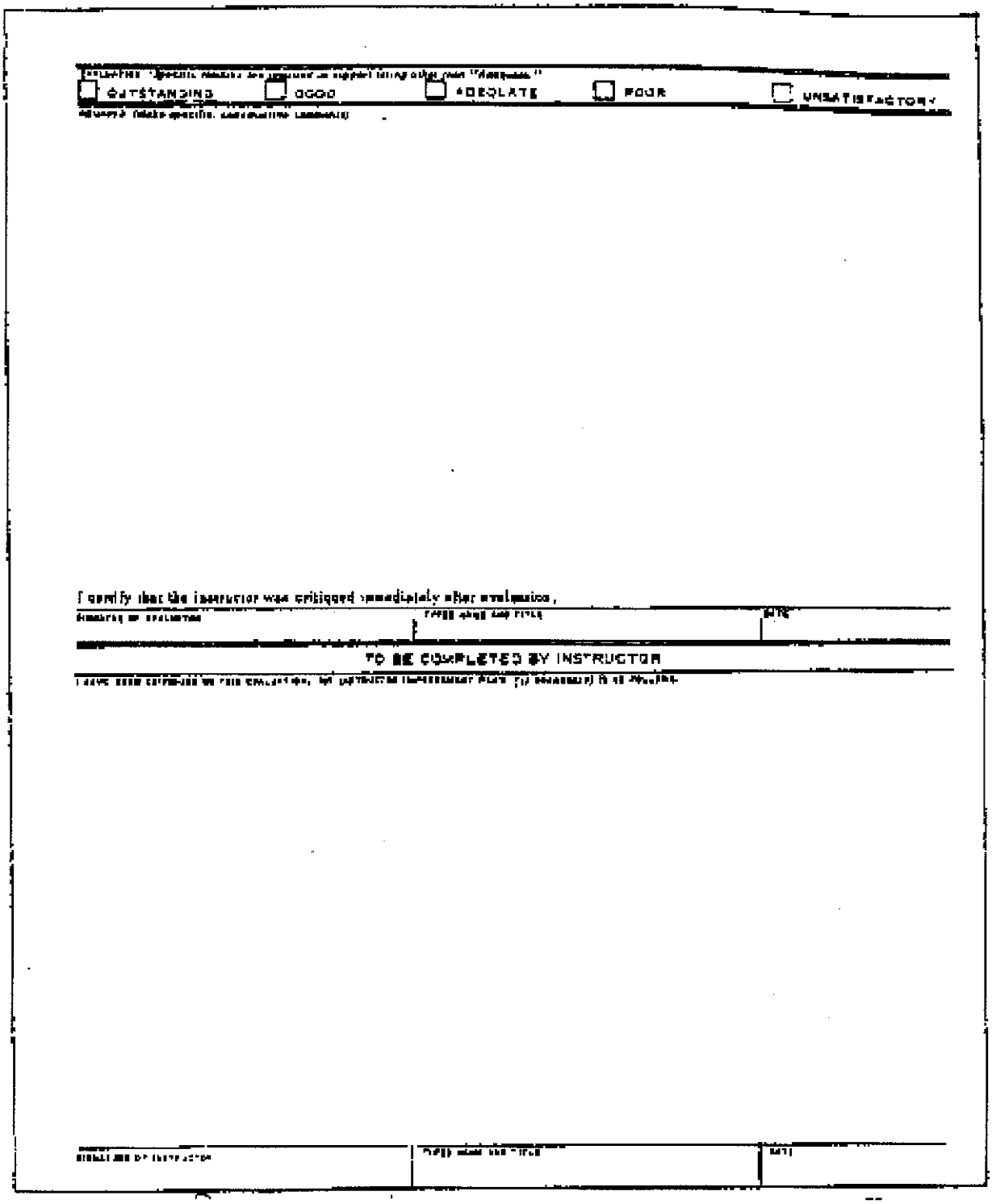
2. STUDENTS WERE MOTIVATED IN TERMS OF:
   a) How the material is to be used.
   b) Why the material should be learned.

3. INSTRUCTOR ESTABLISHED A WORKING RELATIONSHIP WITH STUDENTS:
   a) Displayed name/introduced self.
   b) Displayed course/unit/model name.
   c) Created general and/or specific interest in subject.
   d) Solicited class cooperation and involvement.
   e) Displayed enthusiasm.

4. DID THE INSTRUCTOR:
   a) Properly prepare for the lesson?
   b) Use the LO properly?
   c) Use media/materials to maximum advantage? (Including chalkboard)?
   d) Check student comprehension?
   e) Use proper questioning techniques?
   f) Effectively/efficiently use time available?
   g) Maintain class control?
   h) Maintain student interest?
   i) Have sufficient voice variations?
   j) Pronounce words correctly?
   k) Use proper words and phrases?
   l) Avoid distracting mannerisms?
   m) Display proper military bearing?
   n) Use gestures effectively?
   o) Maintain proper eye contact?
   p) Display a positive attitude?
   q) Maintain proper instructor/student relationship?
   r) Adjust to extemporaneous learning situations?
   s) Summarize/critique the lesson properly?

5. DID THE STUDENTS ACHIEVE THE LEARNING OBJECTIVES?
6. EVALUATOR PREVIEWED THE (??) FOR CURRENT (??) PERSONALIZATION?

N: IV-1-b


OUTSTANDING
GOOD
ADEQUATE
POOR
UNSATISFACTORY
I certify that the instructor was critiqued immediately after evaluation.
TO BE COMPLETED BY INSTRUCTOR

INSTRUCTOR EVALUATION, cont'd

N: IV-1-b Duplicate

___ Outstanding; ___ Good ___ Adequate; ___ Poor; ___ Unsatisfactory
(Notes/remarks:)

I certify that the Instructor was critiqued immediately after evaluation.
Evaluator sig: Title: Date:

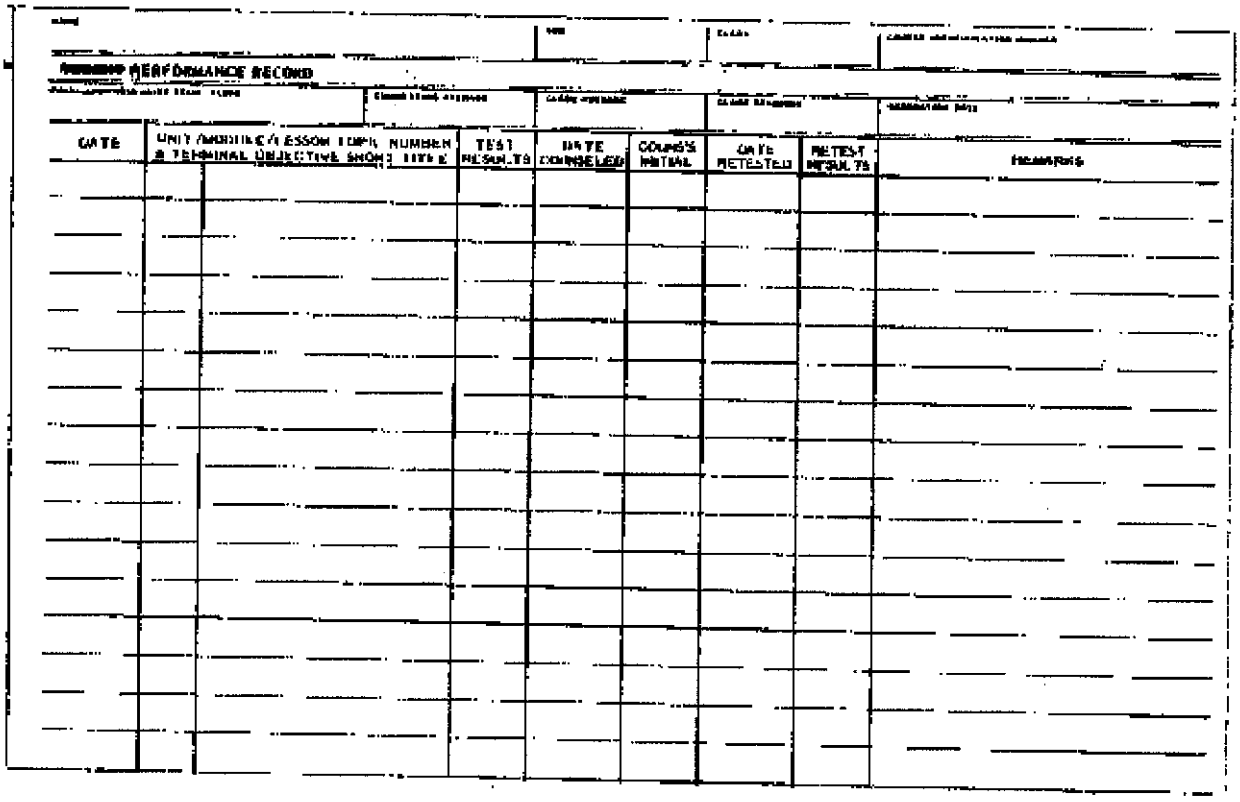
TO BE COMPLETED BY INSTRUCTOR:
(Notes/remarks:)

I certify that I have been evaluated and critiqued, etc:

Instructor sig: Title: Date:

Trainee Performance Record

N: IV-1-c



DATE	UNIT/MODULE/LESSON TOPIC NUMBER & TERMINAL OBJECTIVE SHORT TITLE	TEST RESULTS	DATE COUNSELED	COURSE'S INITIAL	DATE RETESTED	RETEST RESULTS	REMARKS

TRAINEE PERFORMANCE RECORD, cont'd

N: IV-1-c Duplicate

Trainee Name/date/etc:

Course identification:

Date:	Unit/module/lesson/steps; Number & Terminal Objective; show title	Test Results	Date Counsld	Course Mtls	Date Retest	Retest Results	Remarks

COURSE REVIEW CHECKLIST

AppdxN:V-1

COURSE REVIEW CHECKLIST

INSTRUCTIONS: Review the checklist and determine the training adequacy for each review element. Assign one rating code per item as applicable. Include comments concerning any additional areas reviewed in the 'Remarks' section. Asterisked (*) blocks are essential areas and must not be rated NA.

RATING CODES: A – Adequate (requirements being met) GA – Generally adequate (minor attention needed) I – Inadequate (major attention needed)

COURSE TITLE	CIN	SCM REVIEW DATE

	PART 1. COURSE CONTROL DOCUMENTS	RATING				
	REVIEW ELEMENTS	A	GA	I	YES	NO
PROJECT PLAN	* On file (current and accurate)					
	* Approved					
JTI	* On file (current and accurate)					
	* Approved					
CURRICULUM OUTLINE	* On file (current and accurate)					
	* Approved					
	* Front matter					
	* Learning objectives clear and contain behavior, conditions, standards					
	* Reference list					
	* Training equipment list					
	* Training materials list					
	* Skills profile					
	* Master course schedule					
INSTRUCTIONAL MANAGEMENT PLAN	* On file (current and accurate)					
	* Approved					
	* Student Flow Management Plan					
	* Instructor Qualification Plan					

REMARKS

NOTE: Shaded areas indicate inappropriate types of answers. Ratings Key: A = Adequate; GA = Generally Adequate except for minor points; I = Inadequate in major ways.

"Marketing Through Sales Training"

COURSE REVIEW CHECKLIST, continued

PART 2. TESTING

REVIEW ELEMENT	RATING				
	A	GA	I	YES	NO
* Is criterion testing being conducted?					
* Is there at least one test item for each objective?					
Do alternate test series/items for the same objective have an equal degree of difficulty?					
* Are item-by-item test statistics kept to identify areas where instruction is weak or test item is flawed?					
* Are test results used to provide feedback to students?					
Procedures for test critiques					
Time allotted for testing					
Procedures to prevent test compromise					
* Procedures for updating and revising tests in accordance with changes in learning objectives					
Students having difficulty achieving the learning objectives are identified early and are provided necessary remedial assistance.					
* Do test records include the number of the terminal or enabling objective to which the test item is related?					
* Are individual test results for each graduate retained for comparison with external appraisal findings?					

REMARKS

PART 4. INSTRUCTIONAL MATERIALS

	REVIEW ELEMENTS	RATING				
		A	QA	I	YES	NO
INSTRUCTIONAL MODULES (Self-paced)	Learning objectives are explained to students in non-technical terms.					
	Student materials contain statement of material to be learned for each objective examples for performance objectives, practice items (consistent with test items) for each objective.					
	Lesson Topic Summaries					
	Lesson Topic Narratives with exercises					
	Lesson Topic Progress checks.					
	Audiovisual material					
	Enrichment material					
LRNG CTR INSTN GUIDE (Self-paced)	Front matter					
	Learning Center Instructor remediation guides					
INSTR. GUIDE (Group-paced)	Front matter					
	Lesson Topic Guides					
STUDENT GUIDE	Front Matter					
	Learning objectives are explained to students in non-technical terms.					
	Student material contains statement of material to be learned for each objective, examples for performance objectives, practice items (consistent with test items) for each objective.					
	Information sheets, Assignment sheets, note-taking sheets, and job sheets (as appropriate)					
	Enrichment material					
TRAINING AIDS/ DEV	Classroom/learning center					
	Laboratory/shop					
FACIL-ITIES	Classroom/learning center					
	Laboratory/Shop					

Review Elements	A	GA	I	Yes	No

Instructional Modules (Self-paced)
- Learning objectives are explained to students in non-technical terms.
- Student materials contain statement of material to be learned for each objective example for performance objective, practice items (consistent with test items) for each objective.
- Lesson Topic Summaries
- Lesson Topic Narratives with exercises
- Lesson Topic Progress checks
- Audiovisual material
- Enrichment material.

Learning Center Instructor's Guide (Self-paced)
- Front matter
- Learning Center Instructor remediation guides

Instructor's Guide (Group-paced)
- Front matter
- Lesson topic guide

Student Guide
- Front matter
- Learning objectives are explained to students in non-technical terms
- Student material contains statement of material to be learned for each objective, examples for performance objectives, practice items (consistent with test items) for each objective.

Training aids/development
- Classroom/learning center
- Laboratory/shop

Facilities
- Classroom/learning center
- Laboratory/shop

Remarks:

CNET-GEN 1540/8 (Rev. 6-81) (Continued)
S/N 0107-LF-055781

PART 5. COURSE PLANS AND DATA

REVIEW ELEMENTS	RATING	
	YES	NO
Instructional support materials are adequately stockpiled and supplied.		
Student input quotas are compatible with course instructional capability.		
Entry students meet established course prerequisites.		
Monitoring of course is conducted to identify developing problems and deficiencies.		
External evaluation data is utilized for course improvement.		
Records maintained for command inspections.		

REMARKS

Page 3

COURSE TITLE | CIN | REVIEW DATE

PART B. SUMMARY

COURSE CONTROL DOCUMENT	DATE OF DOCUMENT	ON FILE		APPROVED	
		YES	NO	YES	NO
Project Plan					
Job Task Inventory					
Curriculum Outline					
Instructional Management Plan					

REMARKS

SIGNATURE OF REVIEWER | SIGNATURE OF COMMANDING OFFICER

TYPED NAME AND TITLE | TYPED NAME AND TITLE

Page 5

Review Elements	RATING Yes	No
Instruction support materials are adequately stockpiled and supplied.		
Student input quotas are compatible with course instructional capability.		
Entry students meet established course prerequisites.		
Monitoring of course is conducted to identify developing problems and deficiencies.		
External evaluation data is utilized for course improvement.		
Records maintained for command inspections.		

Remarks:

COURSE REVIEW CHECKLIST, contd 6: Summary N:V-1-f Duplicate

Course Control Document	Date of Document	On file Yes	On file No	Approved Yes	Approved No
Project Plan					
Job Task Inventory					
Curriculum Outline					
Instructional Management Plan					

Remarks:

Signature of Reviewed Instructor

Printed name and title; date

Signature of Reviewer

Printed name and title; date

Appendix N-helps:

NAVY

VERSIONS

(Optional formats)

These items are probably adequately described as functions in the text but are presented as graphics here in case they might help you to visualize the needs.

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LEARNING OBJECTIVE ANALYSIS WORKSHEET Appdx N:helpsII-2-b

COURSE	UNIT/MODULE	LESSON TOPIC	TASK I.D. NUMBER	PAGE NO.
Interior Comm "A"	6	6.2	TCB-01	

Fill out one section only.		TERMINAL OBJECTIVE NO.	TEST ITEM NUMBER	ENABLING OBJECTIVE NOS. THAT SUPPORT THE TERMINAL OBJECTIVE
	☐ TERMINAL		29.5A	29.0
✓	☒ ENABLING	ENABLING OBJECTIVE NO. 29.5	TERMINAL OBJECTIVE NO. THE ENABLING OBJECTIVE SUPPORTS	

LEARNING OBJECTIVE ACTION STATEMENT

List the sequence of steps required to isolate a fault in the alarm, safety and warning system

CONDITION

from memory, aids

STANDARD

all steps must be present and in the correct order as given in the "Navy Six-step Troubleshooting Procedure".

LEARNING CATEGORY

Recall

TEST ITEMS

29.5A The following symptoms indicate a fault in the alarm, safety and warning system. List the correct sequence of steps required to isolate the fault to the circuit and component level. All steps must be in the correct order.

MEDIA SELECTION

EQUIPMENT REQUIRED FOR PERFORMANCE OF OBJECTIVE

not required.

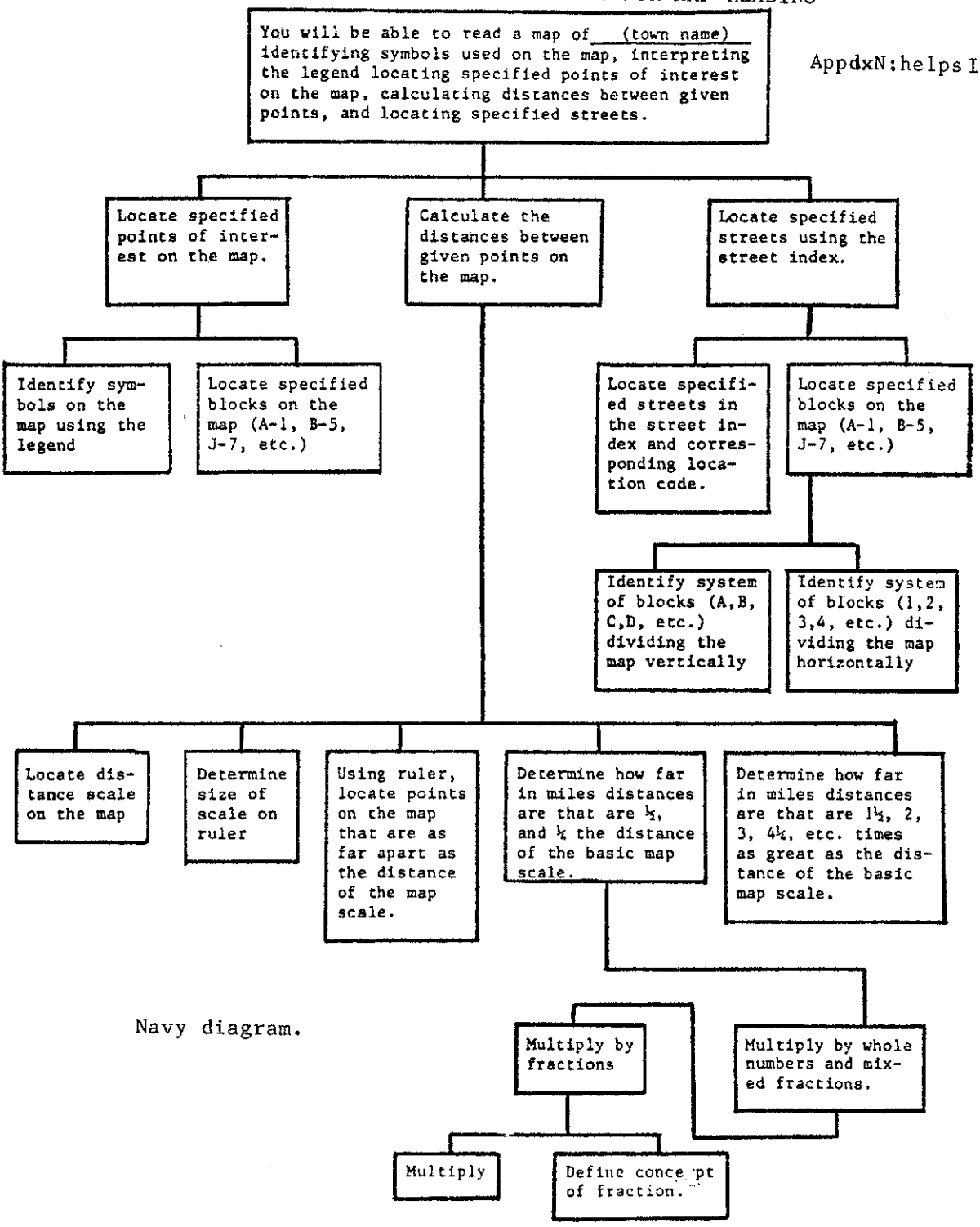
EXISTING MATERIALS SELECTED

☒ YES ☐ NO *If YES, outline below.*

Figure II-11.--A Learning Objective Analysis Worksheet Filled in for an Enabling Objective

LEARNING HIERARCHY FOR MAP READING

AppdxN:helps II-3



Navy diagram.

A Learning Hierarchy Developed Using the Hierarchical Approach

ALGORITHM FOR TESTING/CORRELATOR

(Task Level) AppdxN:II-3-1

If this is the nature of your Task. . .

TASK LEVEL:	FACT:	CATEGORY:	PROCEDURE:	RULE:	PRINCIPLE:
REMEMBER:	Recall or recognize names, parts, dates, places, and/or vocabulary definitions, etc.	Remember the characteristics of each category and the guidelines for classification.	Remember the steps of the procedure.	Remember the formula or the steps of the rule.	Remember the cause-and-effect relationships or the statement of the principle.
USE/AIDED		Classify or categorize objects, events, idea, etc, according to their characteristics; no memory aids.	Apply the steps of the procedures in a single situation or on a single pieces of equipment; no memory aid.	Apply the formula or rule to a variety of problems or situations; no memory aid.	Use the principle to explain, predict, or diagnose why or how things happened or will happen; no memory aid.
USE/UNAIDED		Given category characteristics and guidelines, categorize objects, events, ideas, etc, according to characteristics.	Given steps of the procedure, apply the procedure in a single situation, or on a single piece of equipment.	Given the formula or rule steps, apply the formula or rule of to variety of problems or situations.	Given a statement of the principle, explain, predict, or diagnose why or how things happened or will happen.

NOTE: The classification scheme above pertains to TASK LEVEL type and each must be paired with its respective, identical format below.

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ALGORITHM FOR TESTING/CORRELATOR

(Content type/format level) AppdxN:II-3-1

. . .then these are the respective, appropriate test formats:

TASK LEVEL:	FACT:	CATEGORY:	PROCEDURE	:RULE:	PRINCIPLE:
REMEMBER	For Recognition: matching, true/false, multiple choice; For Recall: short answer fill-in listing	Short answer, fill-in, listing	Short answer, fill-in, listing	Short answer, fill-in, listing	Short answer, fill-in, listing
USE/AIDED		Performance, matching, true/false, multiple choice, short answer, fill-in	Performance (only)	Performance, true/false, multiple choice, short answer, fill-in	Performance, true/false, multiple choice, short answer, fill-in
USE/UNAIDED		Performance, matching, true/false, multiple choice, short answer, fill-in	Performance (only)	Performance, true/false, multiple choice, short answer, fill-in	Performance, true/false, multiple choice, short answer, fill-in

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OUTLINE OF INSTRUCTION * **INSTRUCTOR ACTIVITY GUIDE**

N:III-2-3

I. Introduction
- **A. Establish rapport**
- **B. State lesson objectives**
- **C. Make-ready:**
  - **1) motivate (What's in it for me?–WIIFMe)**
  - **2) lesson overview**

II. Presentation of lessons*
- **A. First topic**
- **B. Second topic**
  - **1)**
  - **2)**
    - **a)**
    - **b) etc.**
- **C. Third topic, etc.**

III. Lesson summary
- **A.**
- **B.**
- **C.**

IV. Practical application (lab/workshop/demo)
- **A. First-type demonstration; show & tell normally**
  - **1. Repeat demo; show & tell slowly**
  - **2. Trainees practice individually**
  - **3. Trainees demonstrate ability (to norm)**
- **B. Second-type demonstration, etc.**

V. Testing and evaluation (to CSO quality?)

VI. Assignment for next session

*** NOTE: this structure is keyed to the Master Syllabus located in Phase II-6-3.**

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LESSON TOPIC SUMMARY

Appdx N:helps III-2-3

CURRICULUM OVERVIEW

Lesson Topic (Name or Number): *Types of Faults and Their Causes.*

Contact periods: *Classroom–2.6 hours.*

Media used: *Lecture with transparencies for stills; video tape for motion sequences.*

Terminal Objective: *#29.0.*

Job Task Inventory: *Number TCB 02.*

> *29.0: Given an alarm switchboard (#__), associated contact makers, audible alarms and a system schematic, the student must be able to troubleshoot the alarm, safety, and warning systems by following the Navy 6-step troubleshooting procedures and isolating single faults to the circuit and components level. (JTI Task No. TCB-01.*

Enabling Objectives: *Completely supported by the following lesson topics:*

> *29.3: Given a schematic of the alarm system and a set of statements, identifying the types of faults that can occur in the supervisory circuit, alarm circuit, and trouble buzzer circuit.*
>
> *29.4: Given a set of symptoms, a system schematic, and a set of statements identifying probable causes of a malfunction in the alarm, safety, and warning system.*
>
> *29.4.1: Given a list of visual and audible indicators and a set of statements, identify a trouble, alarm, or warning system as specified.*

NOTE: Based on a direct use of a military format. Italics represent material that would be entered on the underlying form by the Program Designer or Instructor, as appropriate. If Enabling Objective # 29.1 and 29.2 were not entered, then obviously they do not directly support the Terminal Objective stated; they could be plug-ins or prerequisites identified but not trained-for. The numbers used are needed by the Military to control countless numbers of courses and units; however, it is unlikely that you will need to control similar numbers. Therefore, any system that provides control for you is a candidate control mechanism if it meets ISD information specifications.

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MODULE SYNOPSIS

AppdxN:III-2-3

(Curriculum Overview)

Module 6: *Alarm, Safety, and Warning*

Contact periods: *Classroom: 4.6 hours; Laboratory: 1.0 hours*

Media: *Lecture with video type*

Equipment: *Video type player; all needed equipment for troubleshooting.*

Terminal Objective #: *29.0*

JTI Task Number: *TCB-01*

Completely supported by this module:

> *29.0. Given alarm switchboard (#00). Associated contact makers, audible alarms and a system schematic, the student will be able to troubleshoot the alarm, safety, and warning system by following the Navy 6-step troubleshooting procedures and isolating single faults to the circuit and components level. (JTI Task No. TCB-01).*

NOTE: Italics represent information that the Program Designer or Instructor must enter on the underlying form.

Direct rendering, based on a Military format.

LESSON TOPIC SUMMARY

Appdx N:helps III-2-3

CURRICULUM OVERVIEW

Lesson Topic (Name or Number): *Types of Faults and Their Causes.*

Contact periods: *Classroom–2.6 hours.*

Media used: *Lecture with transparencies for stills; video tape for motion sequences.*

Terminal Objective: #*29.0.*

Job Task Inventory: *Number TCB 02.*

> *29.0: Given an alarm switchboard (#__), associated contact makers, audible alarms and a system schematic, the student must be able to troubleshoot the alarm, safety, and warning systems by following the Navy 6-step troubleshooting procedures and isolating single faults to the circuit and components level. (JTI Task No. TCB-01.*

Enabling Objectives: *Completely supported by the following lesson topics:*

> *29.3: Given a schematic of the alarm system and a set of statements, identifying the types of faults that can occur in the supervisory circuit, alarm circuit, and trouble buzzer circuit.*
>
> *29.4: Given a set of symptoms, a system schematic, and a set of statements identifying probable causes of a malfunction in the alarm, safety, and warning system.*
>
> *29.4.1: Given a list of visual and audible indicators and a set of statements, identify a trouble, alarm, or warning system as specified.*

NOTE: Based on a direct use of a military format. Italics represent material that would be entered on the underlying form by the Program Designer or Instructor, as appropriate. Compare directly to the Module Synopsis (Curriculum Overview; AppdxN:III-2-3). If Enabling Objective # 29.1 and 29.2 were not entered, then obviously they do not directly support the Terminal Objective stated; they could be plug-ins or prerequisites identified but not trained-for. The numbers used are needed by the Military to control countless numbers of courses and units; however, it is unlikely that you will need to control similar numbers. Therefore, any system that provides control for you is a candidate control mechanism if it meets ISD information specifications.

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LESSON TOPIC GUIDE

AppdxAA:III-5-2

OUTLINE OF INSTRUCTION:

I. Introduction:
   - A. Establish rapport
   - B. State lesson objectives
   - C. Make-ready:
     - 1) motivate (What's in it for me?: WIIFMe!)
     - 2) lesson overview

II. Presentation of lessons*
   - A. First topic
   - B. Second topic
     - 1)
     - 2)
       - a)
       - b) etc
   - C. Third topic, etc

III. Lesson summary:
   - A.
   - B.
   - C.

IV. Practical application (lab/workshop/demo)
   - A. First-type; first time demonstration; show and tell normally:
     1. Repeat demo; show and tell slowly
     2. Trainees now practice individually
     3. Trainees demonstrate ability to norm or Job criterion or other measure
   - B. Second-type; first time demo; show & tell, etc
   - C. Etc

V. Testing and evaluation to (Complete Standard of Objectives quality or other specific, appropriate standard.)

VI. Assignment for the next session.

NOTE: * This structure is keyed to the Master Syllabus that's located in the Frontispiece and also in II-6-3.

INSTRUCTOR ACTIVITY GUIDE:

(Note: Either the Program Designer or the Instructor must make specific action-verb comments here, according to program need. See adjacent "Lesson Topic Guide" materials for hints.

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TRAINEE LAB/WORKSHOP SESSION REPORT

AppdxN:helps III-6

Trainee Name: Date:

Course/Job/Task title:

Lesson/Session number:

Related to (specific skill):

Introduction (comment):

Terminal Objective of today's class (list specific, related item):

Enabling Objectives of today's class (list all clearly-related items):

Specific (announced) Objective for today's class; did you reach it?

References used/needed; actually found?
- by Instructor
- by Trainees

Equipment needed (A/V or other); actually provided?

Job Steps (are precautions needed?)
- Step 1
- Step 2
- Step 3, etc

Remarks:

INSTRUCTOR'S VERIFICATION of steps actually taught: Initials: _____; Date: _____

SELF-TEST ITEMS for trainees, if any; specify: How to verify whether completed?

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TRAINEE LAB/WORKSHOP SESSION REPORT

AppdxN:helps III-7

Trainee Name: Date:

Course/Job/Task title:

Lesson/Session number:

Related to (specific skill):

Introduction (comment):

Terminal Objective of today's class (list specific, related item):

Enabling Objectives of today's class (list all clearly-related items):

Specific (announced) Objective for today's class; did you reach it?

References used/needed; actually found?
- by Instructor
- by Trainees

Equipment needed (A/V or other); actually provided?

Job Steps (are precautions needed?)
- Step 1
- Step 2
- Step 3, etc

Remarks:

INSTRUCTOR'S VERIFICATION of steps actually taught: Initials: _____; Date: _____

SELF-TEST ITEMS for trainees, if any; specify: How to verify whether completed?

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TRAINEE PERFORMANCE RECORD

AppdxN:IV-1helps

INSTRUCTIONAL EVALUATION (by a Tutor or other Superior)

Date	Unit title or number	Terminal Objective	Enabling Objective	Date Counseled	Test Date/ Score	Re-test Date/ Score	Remarks

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TRAINEE'S FEEDBACK FORM

AppdxN:helpsV-1

Name (optional): _____ Date: _____

Social Security Number (as ID) _____ Unit/Module: _____

Please choose the *best* answer for each of the questions below and comment on specifics where you feel that it is appropriate:

1. The *objectives* of this unit/module were made clear at the beginning of the lesson: (Yes) (Somewhat) (No).
   Remarks:

2. How well did the unit/module *teach* the objectives? (Very well) (About average) (Very poorly).
   Remarks:

3. How *hard to understand* was the subject matter in this lesson? (Not so hard) (Fairly hard) (Very hard).
   Remarks:

4. How much did the *slides, transparencies, movies* and/or *class exercises* help you to understand the learning objectives of this lesson? (Helped very much) (Helped some) (Helped very little).
   Remarks:

5. The *lecture* helped me to understand the learning objectives of this lesson: (Very much) (Somewhat)j(Very little).
   Remarks:

6. The amount of *practice* or *drill* in this lesson was (Too much) (About right) (Too little).
   Remarks:

7. How was the *pace* of this lesson? (Too fast) (About right) (Too slow).
   Remarks:

8. Where did you *first* learn the material in this lesson? (Before joining the Navgy) (During Recruit Training) (During this class) (None of the above: explain:)

   Remarks:

9. Do you have any *general comments* about the overall lesson? How could it be made a better course?
   Remarks:

Direct use of a Military format.

INSTRUCTOR EVALUATION (by a Superior)

AppdxN:helps V-1

Name: _____ Evaluator: _____

Course title: _____ Course #: _____ Date: _____

1. Learning Objectives were:
   a) Provided
   b) Clarified/amplified as necessary
   c) Reinforced

2. Were students motivated in term of:
   a) How the material is to be used?
   b) Why the material should be learned?

3. Did the Instructor establish a working relationship with students by:
   a) Displaying name and also introduced self?
   b) Displaying the course/unit/module name?
   c) Creating general and/or specific interest in the subject/topic?
   d) Soliciting class cooperation and involvement?
   e) Displaying personal enthusiasm?

4. Did the Instructor:
   a) Prepare properly for the lesson?
   b) Use the source materials properly?
   c) Use the media/materials to maximum advantage?
   d) Check student comprehension?
   e) Use the proper questioning technique?
   f) Effective/efficiently use time and honor the established schedule?
   g) Maintain class control?
   h) Use sufficient voice variation?
   i) Maintain student interest?
   j) Pronounce words correctly?
   k) Use the proper words and phrases?
   l) Avoid using distracting mannerisms?
   m) Deport himself/herself appropriately?
   n) Use gestures properly?
   o) Maintain proper eye contact?
   p) Display a positive attitude?
   q) Maintain proper Instructor/Student relationships?
   r) Adjust to extemporaneous learning situations and opportunities?
   s) Summarize the lesson properly?

5. Did the students accept the learning objectives presented?

6. Was each student's evaluation report collected and reviewed by this Instructor for feedback and improvement?

7. Has this Instructor shown improvement over time?

8. Overall performance: (Outstanding) (Good) (Adequate) (Poor) (Unsatisfactory)

9. I hereby certify that this Instructor was critiqued immediately after his/her reading this evaluation.

Variation on a military source. Evaluator's signature _____

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TRAINEE EVALUATION OF COURSE AND INSTRUCTOR

AppdxN:V-1

Unit/Module (Name or Number); Date:

Class: Instructor:

UNIT/MODULE EVALUATION: YES NO N/A

1. Were the course Learning Objectives fully explained at the beginning of the unit/module? If not, what different or additional information do you feel you needed?
2. Did the instruction, student guide and practice items (if applicable) adequately prepare you for the tests on those Learning Objectives?
3. Were the training aids/equipment adequate? If not, state why not.
4. Was there sufficient time for practice prior to the practical examination?
5. Did the examination test all of the lesson topic objectives for this unit/module? If not, what is lacking?
6. Were the grading criteria fully explained at the beginning of the unit/module?
7. Was the classroom instruction sufficient to enable you to perform the required practical application(s)?
8. Was the unit/module material organized in a clear and logical manner?
9. If there were any materials/subject matters that were difficult to learn located in this unit/module, list and tell why. Write on the reverse side, if necessary.

FACILITY EVALUATION YES NO

1. Were the physical conditions of the classroom/laboratory satisfactory?
   Remarks:
2. In your opinion, how could this unit/module be improved? Be specific.

INSTRUCTOR EVALUATION YES NO

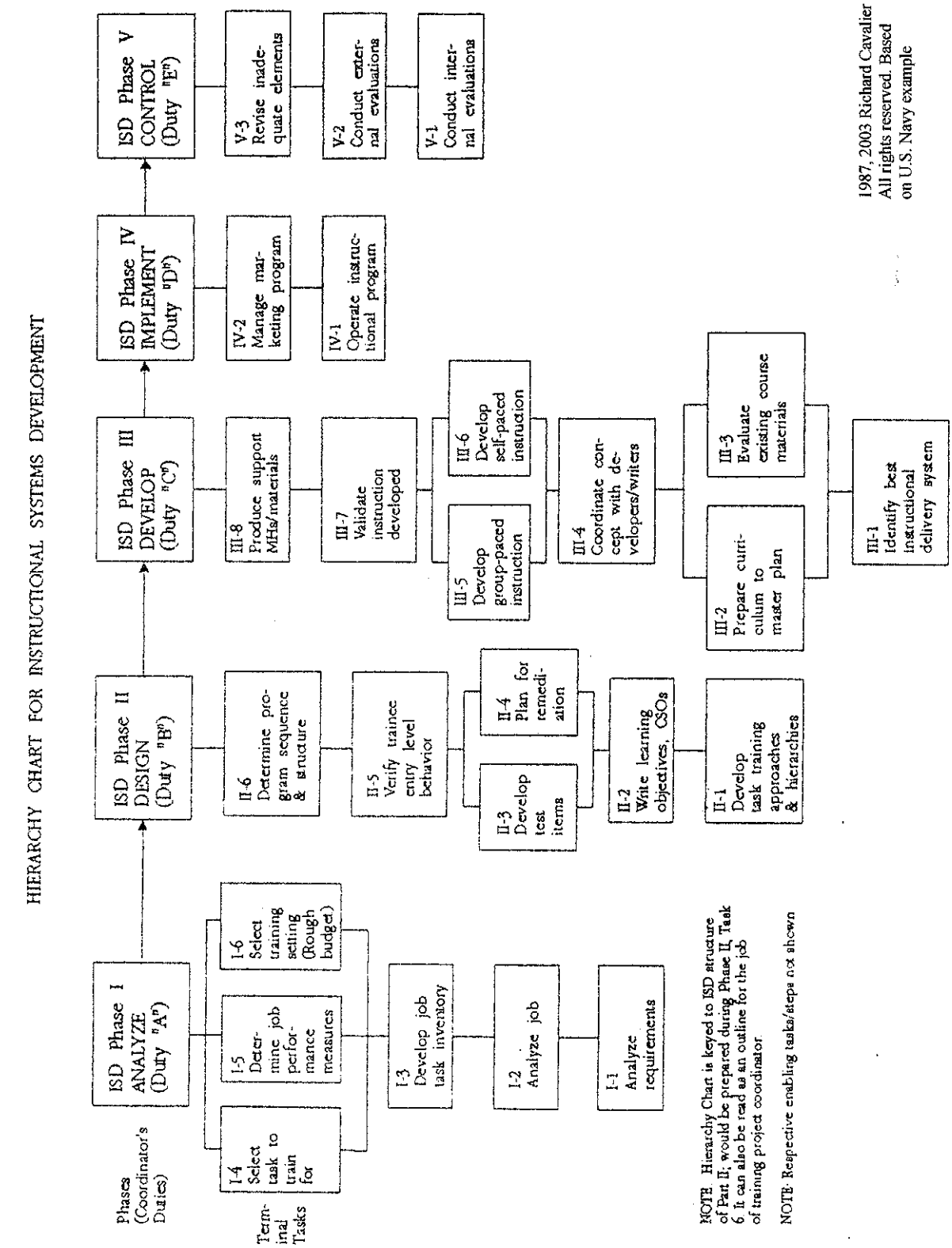
1. Was/were the instructor(s) prepared for the lesson(s)?
2. Did the instructor(s) make the explanations clear?
3. Did the instructor(s) invite questions?
4. Did the instructor(s) answer questions adequately and promptly?
5. Was the level of instruction such that it was understood by all students? (That is, the instructor did not teach either "over the heads" nor "beneath" the students.)
6. Were the instructor(s) available to students outside of class?
7. Were the instructor(s) enthusiastic about the subject?
8. Did the instructor(s) make the best use of the time available for classroom instruction? Practice?
9. Did the instructor(s) use the chalkboard and other training aids and material effectively?

From a Navy example.

NOTE:

Read the following two pages as a pair.

Mastering this non-indexed, diagram Index
will speed your comprehension of the ISD process
and so result in the cohesion of your intended
ideas sooner.


HIERARCHY CHART FOR INSTRUCTIONAL SYSTEMS DEVELOPMENT
Phases (Coordinator's Duties)
Termi-nal Tasks
ISD Phase I ANALYZE (Duty "A")
ISD Phase II DESIGN (Duty "B")
ISD Phase III DEVELOP (Duty "C")
ISD Phase IV IMPLEMENT (Duty "D")
ISD Phase V CONTROL (Duty "E")
I-1 Analyze requirements
I-2 Analyze job
I-3 Develop job task inventory
I-4 Select task to train for
I-5 Determine job performance measures
I-6 Select training setting (Rough budget)
II-1 Develop task training approaches & hierarchies
II-2 Write learning objectives, CSOs
II-3 Develop test items
II-4 Plan for remediation
II-5 Verify trainee entry level behavior
II-6 Determine program sequence & structure
III-1 Identify best instructional delivery system
III-2 Prepare curriculum to master plan
III-3 Evaluate existing course materials
III-4 Coordinate concept with developers/writers
III-5 Develop group-paced instruction
III-6 Develop self-paced instruction
III-7 Validate instruction developed
III-8 Produce support MHs/materials
IV-1 Operate instructional program
IV-2 Manage marketing program
V-1 Conduct internal evaluations
V-2 Conduct external evaluations
V-3 Revise inadequate elements
NOTE: Hierarchy Chart is keyed to ISD structure of Part II, would be prepared during Phase II, Task 6. It can also be read as an outline for the job of training project coordinator
NOTE: Respective enabling tasks/steps not shown
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Index to the Book

Because of its unique text-numbering system, intrinsic to the text, and because most of the key terms occur repeatedly and in different contexts, this book does not present traditional, alphabetized word entries.

It is most helpful to the reader to know that the particular context at the moment can be spotted on the "Hierarchy Chart for Instructional Systems Development," which is located at the front of the book, also. The Hierarchy Chart can be considered a visualized, correlative Table of Contents and Index, together. It is both easier and more efficient to search the context of the moment than to trace multiple listings that might have no bearing on needs. The key numbers will guide you to the appropriate text, which can be further sub-divided.

All related segments of the section chosen will be numbered in the military fashion of an initial Roman Numeral plus Arabic integers (mixed). If you can count, you won't have a problem. Numbering consistently with the military has the additional advantage of assisting any military-trained trainers to communicate with their older, non-skilled or seat-of-the-pants supervisors. . .and so to help content to win out over show biz.

When essential to the process, the related Specifically-Referenced Forms are named in the text and numbered identically in a separate section at the end of the book's text. Each form bears the same type of text- identifying Roman/Arabic key number. Potentially-Useful Forms are also included, in still-another special section, to provide helps (for those who might choose to have the help) regarding some unusual applications. For a complete review of everything available, contact the United States Government Printing Office, Washington.

As stated in the Bibliography: The author is indebted to all of the United States military organizations, from whose many specific works in Instructional Systems Development this work is derived. All essentials of the military versions are preserved here, especially those of the award-winning Navy version. The process segments numbered intrinsically here now match the military's and my previously-numbered sections of the "Hierarchy Chart for Instructional Systems Development"; this intrinsic text-numbering of essentials coded in one book is the author's own contribution to the greater user-friendliness of the system, as are the "translations" of much military jargon into English and of many valid applications into more-useful corporate needs, in both style and substance.

END of INDEX

About the Author

A consultant in group communications since 1960, Cavalier has designed, written, produced, and/or run countless meetings and conventions of every size, type, and complexity for both corporations and associations on a national and international level.

In the early 1960's he began to use techniques then considered innovative and advanced: closed-circuit TV, multimedia, sociodrama in the meeting room, and exhibit games. His sales promotion and sales training techniques have included live central meetings, semi-packaged regional formats for managers, and semi- or fully-packaged meetings for individuals' field use.

For over five years (beginnig in 1970), his regular column for *Advertising and Sales Promotion* and *Sales & Marketing Management* magazines created a new awareness of business standards and communications principles in what has been a complacent, glamour-oriented field. Much of the methodology that he introduced to the meetings field is now standard practice. His other books include *Achieving Objectives in Meetings*; *Sales Meetings That Work*; and *Managing Through Training*; as well as the ESL text *Practical Word Power*. For information and press comments, see his web site: www.meetingsCavalier.com.

CPSIA information can be obtained
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Although training has often been considered a separate business category, Richard Cavalier has discovered, as a trainer/consultant, that training meetings respond, as do any other business meetings, because they are essentially the same, even if curiously structured. Therefore training is best seen as an aspect of group communications and subject to the same laws of learning and psychology. The U.S. military developed the first and best complete system for ISD, and this book is a precise interpretation in business language of that best system.

In addition to the step-by-step presentation of the basic development text (as is common to ISD) the author has included actual examples of military forms that indicate both (a) what type of action should be taken in specific instances and (b) the validity of materials prepared by military personnel who practice the Instructional Systems Development system as described here. And most military practitioners of ISD learned ISD in the military by applying its sound principles . . . as you yourself can. ISD is remarkably doable.

Expensive versions of ISD are available through consultants and via disk (about $1,000 and up, up) – if you know what you need. If not, *Common Sense ISD* will tell you exactly what you need and show you how ISD can help you to achieve the results you seek . . . guaranteed!

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