

Selecting the Right Blend of Delivery Options



by

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Summary

How do you measure the impact of eLearning on your organization? You must have heard by now that eLearning provides just-in-time access to training material when and where it is needed. Moreover, it reduces travel costs and in some cases time required to complete the training. On the other hand, questions on the effectiveness of this delivery medium are being raised. Some claim that eLearning is boring and as a result individuals are not completing the courses, and it is more difficult to motivate people to take online courses. So how do you balance effectiveness and cost, and determine which eLearning method [computer based training (CBT), web based training (WBT), electronic performance support systems (EPSS), Internet virtual classroom, etc.] should be used? What about off-the-shelf solutions, is one available? Would a combination of delivery options be more effective and economical than a single method? How much is it going to cost? And is it worth it? This paper presents a practical model (theory behind the Media Selection and ROI Tool – ADVISOR Online) for making sound eLearning decisions.

ADVISOR Online – A Media Selection and ROI Tool

ADVISOR is a decision support tool designed by BNH Expert Software. ADVISOR analyzes a training course to determine the most economical blend of delivery methods including instructor-led, print, tapes, computer based training, web based training, electronic performance support tools, audio/computer/video conferencing and Internet that will meet your training needs. A demo copy of ADVISOR Online can be requested by clicking on the Try It option at <http://www.bnhadvisor.com>.

Biography

Dr. J. (Jay) Bahlis obtained his Bachelor in Engineering from Technical University of Nova Scotia and Ph.D. from McGill University. Since 1987, Dr. Bahlis assisted hundreds of organizations in evaluating their training programs, developing learning strategies and aligning learning with business goals. Moreover, Dr. Bahlis, evaluated a wide range of learning technologies, directed research projects on the application of adult learning theories in CBT/WBT courseware, and managed the design and development of needs assessment, media selection and return on investment (ROI) tools, learning investment management, authoring and testing systems as well as over 70 CBT/WBT courseware and electronic performance support systems (EPSS).

Introduction

There are two primary reasons for considering alternate options for the delivery training:

- a) First, accomplish the same objectives at lower costs. The costs of a training program can be divided into 6 main categories, namely:

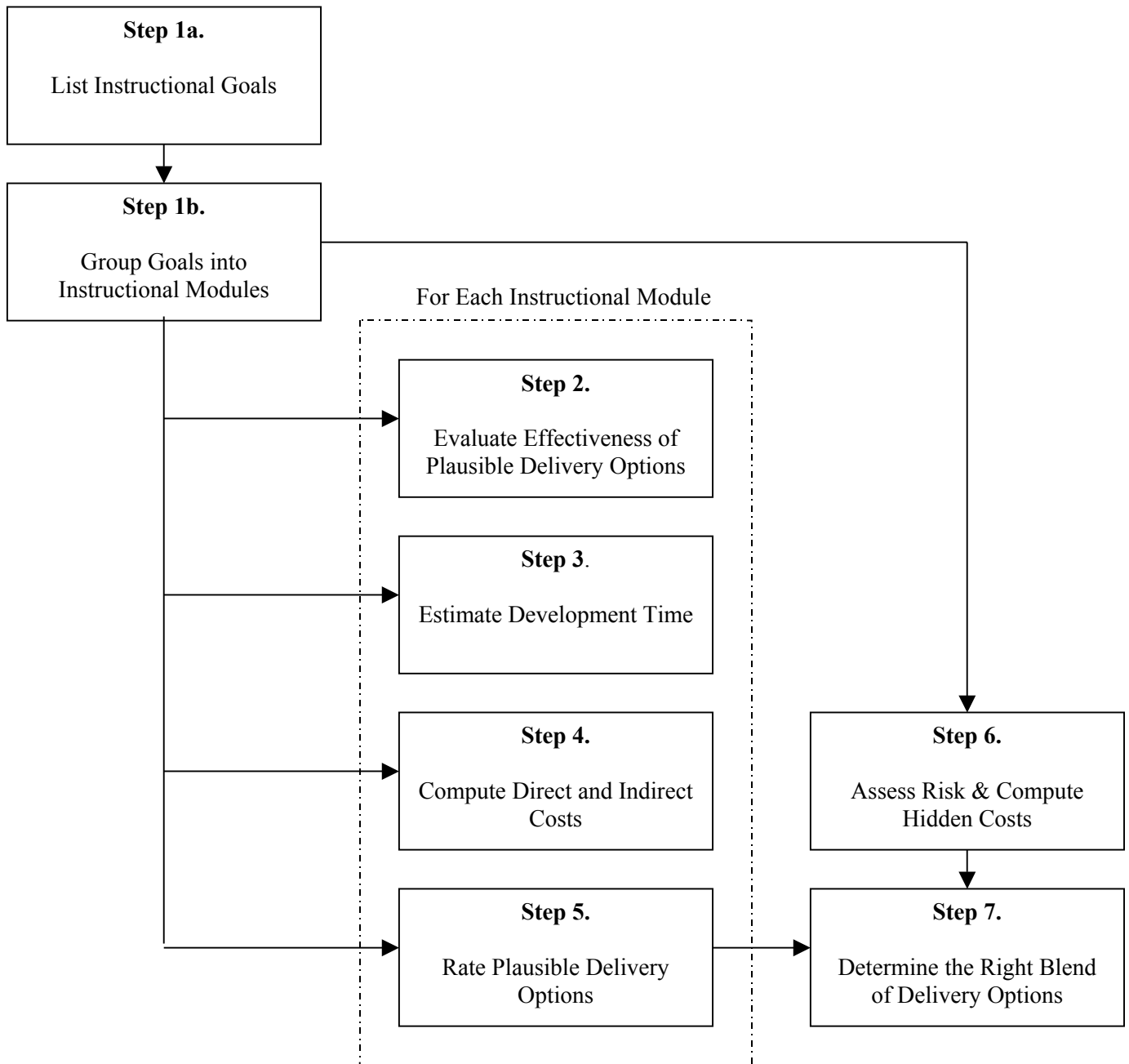
Development	Includes purchase or licensing of off-the-shelf courses.
Hardware	Required for the delivery of training.
Administrative	Includes effort required to register students, collect data, etc.
Management	Includes effort required to coordinate design, development, delivery, maintenance and support of a training program.
Delivery	Includes instructor fees, trainees time, travel costs, long distance charges and facilities rental.
Support	Includes technical support as well as course and hardware maintenance costs.

By computing and comparing the cost of alternate delivery options over the life of the course, the impact of the decision on budget and resources can be determined.

- b) Second, improve employees' performance/productivity. If an eLearning course, for example, meets organizational, learning and learners' needs, and is based on sound instructional design principles, then employees' performance can be directly linked to time, as illustrated below:

Reduce Training Time	If eLearning allow individuals to complete the training in a shorter period of time (2 days instead of 3, for example), then each trainee gains one day of productivity.
Reduce Time To Competency	If eLearning allow the organization to develop critical competencies in a shorter period of time, (six months instead of a year, for example), then this may lead to a significant impact o the organization's bottom line – i.e., reduction in costs or increase in market share, for example.

Selecting the right blend of delivery options is not a simple task. Hundreds of factors can impact the results – whether we are dealing with performance or cost issues. Moreover, eLearning is not the answer to all our training needs. In many cases, instructor-led, print, tapes and conferencing may provide a more effective and economical alternative. This paper presents the process used by ADVISOR for analyzing a course to determine the most economical blend of delivery methods that meet your training needs. A schematic diagram of the process and a brief description of each step are presented below.



Step 1. Divide Course into Modules [Instructional Goals]

In many cases, the most cost-effective way to deliver courses with multiple learning outcomes/objectives such as CPR or operating a piece of machinery is by using a combination of methods (web based training and instructor-led, for example). Therefore, as a first step we should:

- a) Clearly identify the instructional goals in the course.
- b) Classify the instructional goals according to the learning outcome/objective. For simplicity, the goals can be classified into five main categories, namely Software Skills, Knowledge Skills, Problem-Solving Skills, Psychomotor Skills and Affective Skills.

A course can be divided into modules, by following the rules below:

1st Rule: A module should have only one primary learning objective/outcome. For simplicity, the learning objectives/outcomes are divided into five primary categories (based on Benjamin Bloom, 1964, Taxonomy of Educational Objectives).

Learning Outcome	Definition
Knowledge, Comprehension and Application	<p>This is a broad category that covers knowledge, comprehension and application. It refers to the individual's ability to recall and recognize information; understand, translate and interpret information; as well as use learned material in specific instances.</p> <p><u>Example</u></p> <ul style="list-style-type: none"> ➤ Personnel will be able to explain and describe the rules and procedures for filing a complaint within the department.
Problem Solving (Analysis)	<p>Refers to the ability of individuals to compare, contrast and break down a problem in order to arrive at a solution.</p> <p><u>Examples</u></p> <ul style="list-style-type: none"> ➤ Personnel will be able to trouble shoot a piece of equipment. ➤ Personnel will be able to analyze clients' financial objectives and propose an investment plan.
Psychomotor Skills	<p>Are learned capabilities whose outcomes are demonstrated through speed, accuracy and quality of the performed task. In other words, psychomotor skills refer to a person's ability to perform a physical task; a task that requires physical exertion or manipulation of an object; the ability to do something.</p> <p><u>Examples</u></p> <ul style="list-style-type: none"> ➤ Personnel will be able to climb a telephone pole. ➤ Personnel will be able to repair a flat tire.
Affective/Attitude	<p>Refers to an individual's personal beliefs and/or preferences towards an object, situation or person.</p> <p><u>Examples</u></p> <ul style="list-style-type: none"> ➤ Personnel will demonstrate positive attitudes and behaviors towards new work procedures. ➤ Personnel will be more sensitive to colleagues with varied cultural backgrounds.

Learning Outcome	Definition
Software Skills	<p>Refers to the ability of an individual to use a software application, an operating system, a legacy system or an information management system effectively and efficiently. Learning a software application requires the use of both cognitive and psychomotor skills.</p> <p><u>Examples</u></p> <ul style="list-style-type: none"> ➤ Personnel will be able to type and format a letter. ➤ Personnel will be able to import charts into an MS Word document.

This requirement is critical because some delivery options are not suited for the development of certain skills. For example, driving rules (knowledge and comprehension) may be learned using a variety of delivery options. However, driving a car (psychomotor skills) can only be acquired through practice on a real or a simulated car.

2nd Rule: A module should be self-contained and of sufficient length. That is, it can be presented as a separate module independent from the rest of the course.

In some cases, to develop a self-contained module, it may be necessary to combine instructional goals with two learning objectives/outcomes. In this case, the module's learning objective/outcome should follow either:

- The dominant learning objective/outcome; or
- The higher order learning objective/outcome – if both groups are of equal importance. In this case, the hierarchy levels, beginning from the simple and building to the most difficult are: Knowledge/Comprehension, Software Skills and Problem Solving (Bloom 1964, Reiser & Gagné 1983, Gagné 1985). Although Affective and Psychomotor Skills are categorized under different domains, for the purposes of selecting a delivery option, both Affective and Psychomotor Skills impose greater restrictions on delivery options, and as a result should dictate module's learning objective/outcome.

For example, if a course includes a lab experiment with instructions on operating a piece of equipment, the instructions can be grouped with the hands-on exercises and classified as psychomotor skills.

To simplify the analysis, instructional goals that belong to the same category can be analyzed as a group by following the instructions in Steps 2 to 5.

Step 2. Evaluate the Effectiveness of Plausible Delivery Options [Feasibility Analysis]

The primary objective of this step is to determine the ability of alternate delivery options in meeting organizational (including time and budget limitation), content (including learning objectives, activities and instructional design strategies) and learners’ (including skills, motivation and attitudes) requirements. Options that do not meet critical requirements are eliminated, and the effectiveness of remaining options are reduced whenever a requirement is not fully met. Whenever possible, supplements that may enhance the effectiveness of delivery options are proposed.

Guiding Principles

Since studies in adult learning theory (Bullen, 1998; Cross, 1981; Fisher, 1999; Gagné 1985; Tough, 1978; Sheckley, 1985) suggest that instructional design strategies (i.e., stimulate learner, support learning process, use effective instructional strategies, include real world problems, etc.) as well as the environment have a great impact on the effectiveness of the learning, we can conclude that as long as the delivery method can accommodate the instructional design strategies and the learning environment is adequate, the delivery method’s impact on learning outcome will be minimal. This conclusion has been recently confirmed by Russell (1999) of North Carolina State University in his book “The No Significant Difference Phenomenon”. In it, Russell challenges the criticism of traditional educators that distance learning is inferior to classroom study. Through 355 research reports, papers, and summaries (from 1982 to 1998), Russell disproves this criticism and demonstrates that technology-based distance education generates similar outcomes as the classroom experience. Some of these reports, including studies published after Russell’s book, are available online from the New Brunswick TeleEducation at <http://teleeducation.nb.ca/nosignificantdifference> as well as other studies that claim that technology based training results in better outcomes <http://teleeducation.nb.ca/significantdifference>.

Based on the above conclusion, as well as review of models, books and papers related to the media selection process (Air Force 1998; Bahlis 1994 & 1998; Dick and Carey 1996; Driscoll 2001; Gery 1987 & 1991; Fitz-Eng 1994; Marx 1999; Miller 1990, Sawyer 1985; US Dept of Defense 1999; US Dept of Navy 1990; Weinstein 1987), the following rules may be used to evaluate the effectiveness of alternate delivery options:

1st Rule: All delivery options should be considered unless they are not supported by the organization.

2nd Rule: Plausible delivery options should meet all critical requirements. In other words, eliminate options that do not meet the critical requirements. This can be accomplished by considering the content (learning objectives, activities and instructional design strategies), audience (skills, motivation and attitudes) as well as the environment (organizational requirements, time and budget limitation). A number of conditions are presented for illustration:

Requirement	Impact
Content / Learning Objectives Reason for Course	While Electronic Performance Support Systems may provide effective means for upgrading the knowledge of employees, they are not suited for initial training, for example.
Audio	If the course deals with language, music or radio communications, for example, then methods that do not provide realistic representation of audio may not be suited for the delivery of training.

Requirement	Impact
Content / Learning Objectives	
Full Motion Video	If the course deals with surgical procedures, for example, then methods that do not provide realistic representation of events may not be suited for the delivery of training.
Stability of Course	If a large segment of the course changes each year, then it may not be feasible to use Multimedia CBT or WBT, for example, for the delivery of training.
Guided Discussions	If the objective of the course is to change the behavior and attitudes of employees, then methods that limit the exchange and sharing of views may not be suited for the delivery of training.
Teaming Exercises	If trainees work as a team when applying knowledge and skill acquired in the course, then methods that limit simulation of the working environment may not be suited for the delivery of training.
Hands on Exercises	If hands on exercises are required for developing psychomotor skills, for example; then delivery methods cannot simulate the working environment may not be adequate.
Personal Safety	If it is dangerous for beginners to practice learned concepts (how to regulate a high voltage panel, for example); then methods that do not minimize the risk may not be suited for the delivery of training.
Equipment/Data Integrity	If it is potentially destructive for beginners to practice learned concepts (damage equipment or valuable data, for example); then methods that cannot simulate these activities may not be suited for the delivery of training.

Requirement	Impact
Audience/Learners	
Reading Ability	If trainees reading ability is limited, then it may not be feasible to use print or simple CBT, for example, for the delivery of training.
Ability to Travel	If trainees are widely scattered and their ability to travel is limited, then instructor-led classroom training in a central location, for example, may not be feasible.
Access to Technology	If trainees have limited access to a computer, multimedia PC, video conferencing or the Internet, then it is not feasible to use methods that rely on these technologies for the delivery of training.

Requirement	Impact
Environment	
Development/Revision Time	Some methods (Multimedia CBT or WBT, for example) may have to be eliminated if the development time is critically short and the consequences of missing the deadline are high.
Delivery Time	It may not be feasible to use instructor-led classroom training, for example, if the delivery time is critically short and the consequences of missing the deadline are high.
Testing Requirements	Self-directed methods (print, CBT and WBT, for example) are not adequate for performance-based evaluation.
Classification	Some methods (Internet, for example) may not suitable for the distribution of classified information.
Trainers/SME Availability	It may not be feasible to use the instructor-led classroom method, for example, if the number of subject matter experts is critically short and the number of trainees is high.
Team Work	If trainees work as a team when applying acquired skills, then delivery methods that limit the simulation of the working environment may not be adequate.
Consistency	If the number of qualified instructors is limited and trainees are widely scattered, it may not be feasible to use the instructor-led classroom method, for example to deliver high quality training.

3rd Rule: Reduce the rating of plausible delivery options that do not meet the non-critical or desirable requirements. Starting from 100% (perfect match), the rating of each delivery option is reduced to reflect the number and importance of the requirements that have not been met. Whenever possible, supplements that address these shortcomings are proposed. A number of conditions are presented for illustration:

Requirement	Impact
Content / Learning Objectives	
Course Content	If course deals with policies, procedures or large body of knowledge, and is referred to regularly, a hypertext or hypermedia system may improve employees' productivity.
Reference Material Availability	If trainees require access to library or reference material but access is limited, then Internet or a hypertext system may resolve the problem.
Urgency of Making Changes	If course material changes regularly, then the Internet may allow for immediate update and distribution of the course.
Expected Life of Course	If a course has a short life span, then using delivery methods with a lengthy development cycle may not be economical.

Requirement	Impact
Audience/Learners Trainees Motivation	If trainees’ motivation to learn is low, then highly interactive delivery methods may be better suited for the delivery of training.
Trainees Skill/Proficiency	If trainees have diverse knowledge and skill, then self-directed methods that allow trainees to advance at their own pace may be better suited for the delivery of training.
Resistance to Change	If trainees are resistant to technology, then a communication plan that highlights the benefits of the proposed approach may alleviate concerns.
Value of Trainees Time	If the value of trainees’ time is high, then self-directed delivery methods may be better suited for the delivery of training.

Factor	Impact
Environment Scheduling	If the number of subject matter experts is limited or taking employees off the job is time or cost prohibitive, then self-directed methods or distance learning technologies may better meet the organization’s needs.
Data Collection	If collecting scores and surveys is required, then a computer based testing system with a learning management system may provide effective and economical means for the delivery of training.
Apply Knowledge	If the material is complex or critical to the success of the organization, then a performance support system that supports employees on the job may enhance performance.

4th Rule: ADVISOR is a decision support rule. The reasoning behind the recommendations is available to the user on demand. User may override systems’ recommendations.

Step 3. Estimate the Development Time [Development Hours]

The time required to design and develop the content for each delivery option is estimated based on the complexity of course, available technology, experience of design and management team as well as the quality of existing material (Air Force 1998; Bahlis 1995, Gery 1987; Hall 1990; and White 1996). The following factors can greatly impact the development of technology based training courses:

Factors	Impact
Learning Objective	<p>What is the expected outcome of the course? Is the primary objective to acquire knowledge on a product or a process, or learn a new skill – use a software program, operate or troubleshoot a piece of equipment? Higher order learning outcomes/objectives require more sophisticated instructional design strategies and in-turn longer the development time.</p> <p>Learning how to fix (troubleshoot) an engine, for example, is more difficult than maintaining the engine which is more difficult than operating the engine.</p>

Factors	Impact
Course Content	<p>Is the course material complex – difficult to explain, and does it require graphics, animation, simulation, audio and video. The greater the complexity of the material and the more media it requires, the longer the development time.</p> <p>Creating and incorporating 10 minutes of non-continuous audio and video clips, for example, can drastically increase the development effort.</p>
Testing Required	<p>Is testing required? If so, how will the learners be evaluated, what types of feedback will they receive, and how will the data be collected, compiled, and reported? Complex questions with multiple paths require longer development time.</p> <p>Evaluating the steps followed, equipment used and time required by a mechanic to diagnose and repair an engine, for example, requires drastically more effort to develop than multiple choice or fill-in-the-blanks questions.</p>
Quality of Existing Material	<p>Needless to say, the starting point can also have a significant impact on the development effort. If needs, learners, job, environment and content analysis have already been conducted, then the development time will be reduced. Similarly, if standards, guidelines or templates for user interface, presentation and interaction exist, the development effort will be reduced accordingly.</p> <p>Converting an existing instructor-led training course requires less effort than the development of a new course, for example.</p>
Clients Expectations	<p>The expectations of the client (project sponsor, learners, etc.) can also impact the development effort. Hiring professional narrators and actors, for example, will drastically increase the development time and cost.</p>
Experience	<p>A number of individuals with complementary skills may be involved in a large-scale project (such as project managers, subject matter experts, instructional designers, graphic artists, multimedia developers, etc.) As a result, the experience of both management and development team can have a significant impact on the development time.</p> <p>Development teams with limited experience, for example, should expect a longer development time.</p>
Supported Hardware	<p>Developed courses should run adequately on existing hardware platforms – i.e., computers with various operating systems, memory, hard disk space, screen resolutions, bandwidth, etc. Courses that are required to adequately run on a wide range of hardware platforms will require longer development effort.</p> <p>A CBT course designed to run on an IBM compatible PC, Mac and Unix would require significantly more time to develop than a course designed for a single platform, for example.</p>

Factors	Impact
Available Technology	<p>A number of tools may be required to develop, test and evaluate a technology based training course (such as authoring, graphics, animation, simulation, audio and video production tools, learning management system, etc.) In general, the closer the match between available tools and course requirements, the shorter the development effort.</p> <p>A simple authoring system with limited capabilities, for example, will require considerable programming time to produce complex simulations and animation. The reverse is also true. Using a programming language to produce a course with simple interactions and limited branching will unnecessarily complicate the project.</p>

The development ratios for various delivery options can vary as follows:

Delivery Method	Minimum Development Hours per Hour	Maximum Development Hours per Hour
Instructor-led	10	150
Print	20	200
Audio Tapes	20	200
Video Tapes	50	500
CBT/EPSS/WBT	50	700
Audio/Computer/Video Conferencing	10	250
Simulation/Virtual Reality	200	2,000
Internet – Simulated Classroom	50	250

Step 4. Compute Direct and Indirect Costs [Cost Analysis]

In general, training costs can be divided into six main groups, regardless of the option used for the delivery of training (Allen 1996; Bahlis 1995 & 1998; Barksdale & Lund 1996; Brandit 1987; Foreman 1994; Hall 1995 & 2001; Head 1987 and Phillips 1997). Costs that impact your budget – such as travel, hotel, meals, consulting fees, etc. – are classified as Direct, while others that impact productivity or the budget of others – such as time employees spend in training, lost opportunity, administrative time, etc. – are classified as Indirect. The costs can be further divided into two main categories – one time (start-up) or recurring (annual) costs. A brief description of items included in each group is presented below.

Group	Description	Classification
Development	<ul style="list-style-type: none"> ➤ Analyze/Design/Develop Training Material ➤ Purchase/License Off-the-Shelf Courses ➤ Formative Evaluation (Pilot) 	Start-up
Hardware	<ul style="list-style-type: none"> ➤ Purchase Hardware ➤ Set-up/Install Hardware 	Start-up
Administrative	<ul style="list-style-type: none"> ➤ Staff (register trainees, book rooms, arrange for equipment, etc.) 	Annual

Group	Description	Classification
Management	➤ Staff (coordinate course analysis, design, development, delivery and evaluation)	Annual
Delivery	➤ Trainees Time (lost productivity) ➤ Trainees Lost Opportunity (lost revenue/productivity) ➤ Trainees Per Diem (hotel, meals, incidentals) ➤ Trainees Travel ➤ Instructor Fees (salaries and/or consulting fees) ➤ Instructor Lost Opportunity (lost revenue/productivity) ➤ Instructor Per Diem (hotel, meals, incidentals) ➤ Instructors Travel ➤ Facility Rental ➤ Facility Maintenance (lease, mortgage, utilities, security, maintenance, etc.) ➤ Audio/Video Transmission Costs ➤ Internet Connecting Fees	Annual
Support	➤ Consumable Materials ➤ Course Updating ➤ Hardware Maintenance ➤ Staff (installing course, resolving software and hardware problems, etc.)	Annual

Before getting started, the primary objective of the cost analysis should be clearly established, since it will impact which costs should be included. Three objectives are presented below that may lead to a different results/recommendations:

- Reduce own budget. In this case you would only need to track direct costs such as development, travel, hotel, meals, consulting fees, consumable materials, etc., that impacts your budget.
- Determine the most economical delivery option for the organization. In this case, both direct costs (that impacts your budget) as well as indirect costs (that impacts resources or the budget of others) should be taken into consideration.
- Demonstrate the benefits of your solution to clients. In this case, only indirect costs related to your client (such as reduction in leaning time and gained productivity) should be tracked.

The impact will be illustrated by the following example, in which three delivery options meet organizational, learning and learners’ needs.

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Customized CBT	95%	\$200,000	\$ 50,000	\$250,000
Instructor-led	90%	\$100,000	\$200,000	\$300,000
Internet Virtual Classroom	85%	\$150,000	\$ 75,000	\$225,000

1st Objective: Reduce costs related to your training budget. In this case, all indirect costs can be discarded. As a result, Instructor-led will be our 1st choice since it has the lowest direct costs – although it has the highest overall costs.

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Instructor-led	90%	\$100,000	\$0	\$200,000
Internet Virtual Classroom	85%	\$150,000	\$0	\$150,000
Customized CBT	95%	\$200,000	\$0	\$200,000

2nd Objective: Determine the most economical option for the organization. In this case, both direct and indirect costs should be taken into consideration. As a result, Internet Simulated Classroom will be our 1st choice since it has the lowest overall costs – although it requires more money from your budget (\$150,000 versus \$100,000 for Instructor-led).

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Internet Virtual Classroom	85%	\$150,000	\$ 75,000	\$225,000
Customized CBT	95%	\$200,000	\$ 50,000	\$250,000
Instructor-led	90%	\$100,000	\$200,000	\$300,000

3rd Objective: Demonstrate the benefits of your training solution to clients. In this case, only indirect costs related to the client should be taken into consideration. Assuming that the above indirect costs impacts trainees learning time and lost productivity, Customized CBT will be our 1st choice since it has the least impact on the client’s productivity – although it requires substantially more money from your budget (\$200,000 versus \$100,000 for Instructor-led).

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Customized CBT	95%	\$0	\$ 50,000	\$ 50,000
Internet Virtual Classroom	85%	\$0	\$ 75,000	\$ 75,000
Instructor-led	90%	\$0	\$200,000	\$200,000

Step 5. Making the Decision [Module Summary]

Two approaches may be used for rating plausible delivery options.

1st Criterion: Most economical delivery option that meets your needs. This approach assumes that all options that meet the minimal requirements (minimum recommended score) in the Feasibility Analysis can adequately deliver the training. In this case, plausible delivery options are rated from least to most expensive. The Feasibility Analysis is only used to eliminate delivery options that do not meet organizational, learning and learner's needs.

2nd Criterion: Best dollar per point value. This approach assumes that options that better meet organizational, learning and learners' needs (with higher rating) in Feasibility Analysis will provide a more effective learning environment – i.e., superior knowledge/skill transfer, longer retention, etc. In this case, plausible delivery options are rated from least to most expensive dollar per point value. The dollar per point ratio is computed as follows:
Adjusted Total Costs / Feasibility Analysis Rating

The impact of each criterion on the recommendations will be illustrated through an example. Let us assume that the following three delivery options meet organizational, learning and learners' needs:

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Customized CBT	95%	\$200,000	\$ 50,000	\$250,000
Instructor-led	90%	\$100,000	\$200,000	\$300,000
Internet Virtual Classroom	85%	\$150,000	\$ 75,000	\$225,000

1st Criterion recommendations are presented below. Although Internet Virtual Classroom has the lowest rating under Feasibility Analysis, it is our 1st choice since it is assumed that all options can adequately deliver the training.

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost
Internet Virtual Classroom	85%	\$150,000	\$ 75,000	\$225,000
Customized CBT	95%	\$200,000	\$ 50,000	\$250,000
Instructor-led	90%	\$100,000	\$200,000	\$300,000

2nd Criterion recommendations are presented below. Although Internet Virtual Classroom has the lowest cost, Customized CBT is our 1st choice since it has a higher rating in Feasibility Analysis, and as a result a better dollar per point ratio.

Delivery Option	Rating	Direct Cost	Indirect Cost	Total Cost	Dollar per Point
Customized CBT	95%	\$200,000	\$ 50,000	\$250,000	\$2,631
Internet Virtual Classroom	85%	\$150,000	\$ 75,000	\$225,000	\$2,647
Instructor-led	90%	\$100,000	\$200,000	\$300,000	\$3,333

Step 6. Assess the Risk of New Technology [Risk Analysis]

In general, the introduction of new technology in an organization changes the dynamics of the workplace. Consider, for example, the Word Processor. Although its primary purpose was to replace the typewriter, it had a much broader impact in the workplace. Typing pools within organizations are no longer required – since most individuals can type their own letters. The shift in responsibility generated demand for new skills – typing as well as word processing – for new groups of users. Both technical (how to) as well as hardware support are now required to support users. And so on.

Similarly, introducing a new learning technology may also impact roles and responsibilities, demand for new skills, policies and processes as well as support (Bahlis 1995; Broadbent 2001; Chapnick 2000; Hall 2001). A brief description of potential problems and recommended actions are presented below:

Potential Problems	Possible Action
Development and delivery personnel lack knowledge and skill to make effective use of new learning technology.	<ul style="list-style-type: none"> ➤ Train development and delivery personnel on the effective use of new training technology. ➤ Hire new personnel with the necessary skills.
Learners lack basic computer and/or Internet navigation skills.	<ul style="list-style-type: none"> ➤ Develop introductory training course on basic computer and/or Internet skills
Existing policies and procedures do not support new learning technology. These may include course development, delivery, distribution, maintenance and update as well as learners’ registration and evaluation, training time and place, etc.	<ul style="list-style-type: none"> ➤ Modify or develop policies and procedures to address the needs, promote and facilitate the introduction of new learning technology.
No mechanism in place to support new learning technology.	<ul style="list-style-type: none"> ➤ Modify or develop a system for supporting users of the new learning technology.
Technical personnel lack knowledge and skill to support new learning technology.	<ul style="list-style-type: none"> ➤ Train support personnel on the new system. ➤ Hire new personnel with the necessary skills.
Learners, trainers, administrators, supervisors or managers resistant to the introduction of new learning technology.	<ul style="list-style-type: none"> ➤ Develop a communication plan to promote the benefits and use of the new learning technology for each group.
Roles and responsibilities are not clearly defined for new learning technology.	<ul style="list-style-type: none"> ➤ Develop an implementation plan, which may include setting up new divisions, redefining roles and responsibilities, etc.
New learning technology (LMS, for example) will be phased in. As a result, organization or division will be required to support two systems.	<ul style="list-style-type: none"> ➤ Develop a change management plan to facilitate the transition from existing to new system.

Organization’s experience, readiness and attitude towards learning technology can impact the effectiveness as well as the costs of implementing a delivery option. A successful implementation of a new learning technology may require retraining of development, delivery and support staff, changes to policies, procedures, support system, infrastructure and daily operation as well as the development of a communication and a change management plans. The impact of these changes – often referred to as hidden costs – is taken into consideration in this section.

Step 7. Determine the Right Blend of Delivery Options [Course Summary]

The costs of plausible delivery options for each instructional module are combined with the hidden costs associated with various delivery options to determine the most economical blend that meets your needs.

You can gain a better insight into the process and factors that can impact your decision by reviewing ADVISOR Online – a media selection and return on investment (ROI) tool developed by BNH <http://www.bnhadvisor.com>.

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