

## Forecasting Methodology that Maximizes Training Efficiency

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One of easiest venues for improving training efficiency is to uncover the most economical way to develop, deliver, administer, manage, maintain and support training programs. For example, if instructor-led, web based and Internet virtual classroom can be used for IT training, then which option is the most economical – taking into account the complexity of the training material, stability of the content, course length, trainees throughput, trainee to instructor ratios, individuals that travel, and so forth. Similarly, if real equipment, trainers/simulators and virtual reality can be used for training pilots and maintainers, then which option should you choose? If the upfront and recurring costs of plausible delivery options can be easily and accurately forecasted – then savings would follow.

Training efficiencies are of course not limited to training media, but extend to other decisions as well including who develops, delivers, administers and supports the training material. For example, are internal developers more efficient than external contractors in developing core competencies? If the organization has multiple training units, which unit develops training most efficiently and why? If training/project managers engage multiple contractors, which contractor produces the most effective and economical instructor-led or web based training programs. If the development time and costs of similar training programs can be easily shared and compared – then once again, savings would follow.

Although overall historical values are adequate for forecasting training costs of similar courses, to similar audiences using the same development team and delivery option; additional details and analysis are needed to accurately forecast and compare the costs of plausible delivery options, identify the most efficient development team, as well as uncover other venues for improving training efficiencies. For example, assuming that the costs for an 8-hour project management course for 60 individuals are as follows:

<b>1<sup>st</sup> year - Instructor-led</b>	
<b>8 hours – 60 individuals</b>	
Development Costs	\$10,000
Delivery Costs	\$24,000
Travel Costs	\$ 6,000
<b>Total Costs</b>	<b>\$40,000</b>

If we ignore inflation and assume that 10% of the content requires updating, the cost of training an additional 90 individuals in the following year can easily estimated as follows:

<b>2<sup>nd</sup> year - Instructor-led</b>		<b>Comments</b>
<b>8 hours – 90 individuals</b>		
Development Costs	\$ 1,000	= \$10,000 x 10%
Delivery Costs	\$36,000	= \$24,000 x 90 / 60
Travel Costs	\$ 9,000	= \$ 6,000 x 90 / 60
<b>Total Costs</b>	<b>\$46,000</b>	

The above computations, however, do not provide any insight on the costs and potential savings that may result from using alternate delivery options. To forecast the costs of an equivalent web based or Internet virtual classroom course, the cost breakdown of each component is needed.

### Development Costs

To accurately forecast the development costs, the number of hours needed to develop one hour of training as well as the average hourly rate of the developer is needed. Assuming that 80 hours was logged by the development team for the 8-hour project management course, then:

	<b>Instructor-led Course</b>	<b>Comments</b>
Development Hour per Hour	10	= 80 hours / 8 hours
Hourly Cost of Developer	\$125	= \$10,000 / 80 hours

Based on industry averages, the effort needed to develop the project management course can be categorized as “low” and the corresponding development hours per hour for an equivalent web based course is 50 and Internet virtual classroom course is 20. Moreover, the average time needed to complete the web-based course can be compressed by 30% to 5.6 hours (8 hours x 70%). With this data in hand and assuming that the hourly rate of the web based and Internet virtual classroom development teams is similar to the instructor-led (i.e., \$125 per hour), we can accurately estimate the development costs of the equivalent web based and Internet virtual classroom courses as follows:

	<b>Development Costs</b>	<b>Comments</b>
<b>Web Based Training</b>	\$35,000	= 5.6 hours x 50 x \$125
<b>Internet Virtual Class</b>	\$20,000	= 8.0 hours x 20 x \$125

Since 10% of the content requires updating, the development costs for the web based course and Internet virtual class for the second year is \$3,500 (\$35,000 x 10%) and \$2,000 (\$20,000 x 10%) respectively. As a result, the total development costs over the two year period are:

	<b>Instructor-led</b>	<b>Web Based</b>	<b>Virtual Class</b>
1 <sup>st</sup> year Development Costs	\$10,000	\$35,000	\$20,000
2 <sup>nd</sup> year Development Costs	\$ 1,000	\$ 3,500	\$ 2,000
<b>Total Development Costs</b>	<b>\$11,000</b>	<b>\$38,500</b>	<b>\$22,000</b>

## Delivery Costs

For synchronous delivery options, such as instructor-led and Internet virtual classroom, instructor, administrative and facility costs are highly dependent on the frequency of the course. In other words, the more classes you run the higher the costs. The frequency of the course is in-turn dependent on the number trainees per class. For example, if the average number of trainees per class is 10, then:

	<b>Instructor-led Course</b>	<b>Comments</b>
Course Frequency in 1 <sup>st</sup> year	6	= 60 individuals / 10 student per class
Cost per Class	\$4,000	= \$24,000 / 6

Assuming that the delivery costs are attributed primarily to instructors, if the asynchronous web based course does not require instructors/facilitators, then the delivery costs are zero. If the number of trainees per class for Internet virtual classroom can be increased to 15 (since it is easier to join from any location), then the frequency of course for the 1<sup>st</sup> and 2<sup>nd</sup> year is reduced to 4 (60/15) and 6 (90/15) respectively. Moreover, if the Internet virtual classroom requires similar effort to the instructor-led format (i.e., \$4,000 per class), then the delivery costs over the two year period are:

	<b>Instructor-led</b>	<b>Web Based</b>	<b>Virtual Class</b>
1 <sup>st</sup> year Delivery Costs	\$24,000 (6 x \$4,000)	\$0	\$16,000 (4 x \$4,000)
2 <sup>nd</sup> year Delivery Costs	\$36,000 (9 x \$4,000)	\$0	\$24,000 (6 x \$4,000)
<b>Total Delivery Costs</b>	<b>\$60,000</b>	<b>\$0</b>	<b>\$40,000</b>

## Travel Costs

Since web based and Internet virtual classroom do not require individuals to travel, the travel costs in both cases are \$0. Assuming that 20% of trainees in the instructor-led course have to travel, then the number of individuals that travel in 1<sup>st</sup> and 2<sup>nd</sup> year is 12 (60 x 20%) and 18 (90 x 20%) respectively, and the average travel cost per individual is \$500 (\$6,000 / 12). Based on this, the travel costs over the two year period are:

	<b>Instructor-led</b>	<b>Web Based</b>	<b>Virtual Class</b>
1 <sup>st</sup> year Travel Costs	\$6,000 (12 x \$500)	\$0	\$0
2 <sup>nd</sup> year Delivery Costs	\$9,000 (18 x \$500)	\$0	\$0
<b>Total Delivery Costs</b>	<b>\$15,000</b>	<b>\$0</b>	<b>\$0</b>

## Total Costs

By adding and comparing the costs of the three plausible delivery options over the two year period, it is easy to foresee how a web based delivery option (in this case) can increase training efficiency by \$47,500 (\$86,000 - \$38,500).

	<b>Instructor-led (1<sup>st</sup> + 2<sup>nd</sup> year)</b>	<b>Web Based (1<sup>st</sup> + 2<sup>nd</sup> year)</b>	<b>Virtual Class (1<sup>st</sup> + 2<sup>nd</sup> year)</b>
Development Costs	\$11,000	\$38,500	\$22,000
Delivery Costs	\$60,000	\$0	\$40,000
Travel Costs	\$15,000	\$0	\$0
<b>Total Costs</b>	<b>\$86,000</b>	<b>\$38,500</b>	<b>\$62,000</b>

### Added Benefits

In addition to identifying the most economical delivery option, capturing the unit costs of the development, delivery, management and support teams, and using a standard technique for computing training costs, can greatly simplify sharing, compiling and comparing of data among project/training managers, and in-turn the identification and duplication of programs that are running efficiently (i.e., centers of excellence) and the correction of problem areas.

Moreover, the proposed technique facilitates carrying out what if scenarios and the discovery of new venues for improving efficiency. For example, if the number of trainees is limited to 60 (30 in the 1<sup>st</sup> year and 30 in the 2<sup>nd</sup> year), would the web based training approach be viable? By utilizing the hourly development costs and ratios, delivery cost per class as well as travel cost per individual computed above, the Internet virtual classroom will in this case provide a slightly more economical alternative than web based training with savings up to \$3,000 (\$41,000 - \$38,000) over the two year period – and the added benefit of lower upfront development costs.

	<b>Instructor-led (1<sup>st</sup> + 2<sup>nd</sup> year)</b>	<b>Web Based (1<sup>st</sup> + 2<sup>nd</sup> year)</b>	<b>Virtual Class (1<sup>st</sup> + 2<sup>nd</sup> year)</b>	<b>Comments</b>
Development	\$11,000	\$38,500	\$22,000	= \$125 x Course Length x Development Hours per Hour + 10% update in 2 <sup>nd</sup> year
Delivery	\$24,000	\$0	\$16,000	= \$4,000 x Frequency
Travel	\$ 6,000	\$0	\$0	= \$500 x # Individuals that Travel
<b>Total</b>	<b>\$41,000</b>	<b>\$38,500</b>	<b>\$38,000</b>	

### Conclusion

Of course, your development and compression ratios may be different than industry averages and other factors can influence the results as well. The key point however is: by utilizing common measures such as hourly rates of developers, instructors, administrators, managers and support staff; average time needed to develop, administer, manage and support courses with different levels of complexity, average trainee's per diem and travel costs; daily equipment and facility costs; and so on; you can significantly improve training efficiency by easily and accurately forecasting the costs of plausible delivery options for any training program; identify and duplicate programs that are running efficiently; correct problem areas as well as carry out multiple what if scenarios to help you uncover other venues for improving training efficiency. And if you are overwhelmed by this level of detail, don't despair tools such as ADVISOR Enterprise (<http://www.bnhexpertsoft.com/english/products/advent/overview.htm>) are available to help you.

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### Appendix A: Factors that Impact Training Costs

<b>Course Variables</b>	<ul style="list-style-type: none"> <li>Life of Course [in years]</li> <li>Number of Trainees [over life]</li> <li>Length of Course [hours]</li> <li>Number of Trainees [per class]</li> <li>Number of Instructors [per class]</li> <li>Attrition Rate [%]</li> <li>Class Time Compression Rate [%] [for various media]</li> </ul>
<b>Development Costs</b>	<ul style="list-style-type: none"> <li>Development Hours [per hour]</li> <li>Average Hourly Cost for Developers</li> <li>Evaluation Costs [per course]</li> <li>% of Content that Changes [per year]</li> </ul>
<b>Hardware Costs</b>	<ul style="list-style-type: none"> <li># of Units</li> <li>Cost per Unit</li> <li>Setup Costs</li> <li>Course Allocation [%]</li> <li>Cost of Equipment Operation [per hour]</li> </ul>
<b>Management Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly Cost for Managers</li> <li>Days [per class]</li> </ul>
<b>Administrative Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly Cost for Administrators</li> <li>Days [per class]</li> </ul>
<b>Instructor Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly Cost for Instructors</li> <li>Instructor Preparation Time [hours per hour]</li> </ul>
<b>Facilities Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly/Daily Cost</li> </ul>
<b>Transmission Costs</b>	<ul style="list-style-type: none"> <li>Average Long Distance Charges per Line per Hour</li> </ul>
<b>Support Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly Cost for Support Staff</li> <li>Days per Class/Individual</li> </ul>
<b>Trainees Costs</b>	<ul style="list-style-type: none"> <li>Average Hourly Salary for Trainees</li> </ul>
<b>Travel Costs</b>	<ul style="list-style-type: none"> <li>Average Per Diem Cost [per individual]</li> <li>Average Travel Cost [per individual]</li> <li>% of Individuals that Travel</li> <li>Average Number of Travel Days</li> </ul>