

THE PROS AND CONS OF ONLINE VALUE ENGINEERING COURSES

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BIOGRAPHIES



Jim Thomas works with S/D Engineers, Inc., an engineering consulting firm that provides professional services for a variety of industrial projects. He graduated from Valparaiso University with a BSME and is a Professional Engineer based in Pittsburgh, Pennsylvania. He currently works in the energy, chemical, and steel industries, but his background also includes coal preparation, material handling, machine design and municipal development projects. Jim is fairly new to the SAVE International organization, but recognizes the importance of the decision-making process for the proper design selection on capital projects.



Tony Centore also works with S/D Engineers, Inc. as the Manager of Electrical and Control Systems. He holds a BS in Physics and in Electrical Engineering, and a Masters in Business Administration. Tony's background includes design and manufacturing of electrical and automation equipment, as well as installation engineering services. He also has twenty years experience serving in our country's Armed Forces. Tony is new to the SAVE International organization and brings a mix of industrial and military management practices to the Value Engineering world.

ABSTRACT

Since the conception of the Value Engineering process, it has been essential to educate business leaders and engineers in the practices of Value Engineering. Today's information technology infrastructure has opened a new avenue for learning the basic principals of Value Engineering through the internet. Online courses offer access to knowledge for those individuals who want to understand the VE concepts of functional analysis, life cycle costing, and weighted evaluations.

Evaluating online VE courses serves two purposes. The primary purpose is to decide whether the online VE course suits the individual's or company's needs. The secondary purpose is to obtain ideas on how to enhance current online VE course features and curriculum. To determine if an online course suits the individual, one must compare other alternatives of advanced learning methods. The Value Engineering systematic approach, complete with functional analysis and weighted evaluations, presents the "value" of online VE courses by comparing its' features with

other leaning methods. The weighted evaluations consider criteria such as cost, time, content, presentation, and location within the decision-making process. Several weighted evaluations depict different education decision outcomes for learning methods such as VE online courses, college courses, conference seminars, and local workshops based on the individual's or company's preference criteria.

To determine ways of enhancing online courses, it is necessary to understand the existing features. The online VE course curriculum includes online lessons, books, homework, exams, CVS instructor, website discussions, and handout materials (such as VE definitions and examples of VE studies). The "pros and cons" regarding these aspects of learning Value Engineering online are scrutinized and minimum course essentials are suggested.

INTRODUCTION

Online education is a growing industry. The technical capabilities of the computer industry and the World Wide Web have developed significantly over the past several years in order for organizations to utilize information systems to their advantage. Value Engineering has entered the online education process to reach those individuals and organizations that would benefit from this distance learning program (DLP). Individuals are electing to achieve a higher education from the convenience of their own home; for themselves and for their children. For example, "Home Schooling" of our children is continuing to increase as an alternative to the traditional education. Many of these "Home Schooling" programs are based on standard practices/materials available over the internet to moms and dads across the country/world.

This paper evaluates the online Value Engineering curriculum against other methods of Value Engineering education utilizing the Value Engineering job plan format, which is proven to be effective for determining the best "value".

INFORMATION STEP

The basic function of any educational system is to educate people. The educational process requires effective communication techniques to enhance an individual's knowledge concerning Value Engineering.

The Value Engineering instruction objectives for a Module I curriculum are to achieve the following goals:

- Introduce the topic of Value Engineering and its History
- Develop team building skills
- Stimulate creative thinking skills
- Prepare function analysis charts and diagrams
- Develop criteria for decision making
- Learn Value Engineering Procedures
- Review Value Engineering Case Studies
- Understand Life Cycle Costing

Table 1 outlines the features of several different learning methods that utilize a variety of communication techniques to stimulate the learning process for achieving the objectives stated above:

TABLE 1 - VALUE ENGINEERING MODULE I CIRRICULUM				
FEATURES	METHODS OF LEARNING			
TOPICS OF INTEREST	ONLINE COURSE	SEMINAR	COLLEGE COURSE	LOCAL CVS INSTRUCTION
Instructor	CVS Instructor	CVS Instructor	College Instructor	CVS Instructor
Length of Course	9 week course, varies to suit needs	3 day - 1 week course	9 week term course, meet once a week - evening	3 day course - 9 week course
Materials	Textbook	Books, papers	Textbook	Books, papers
Supplemental Materials	Video materials	Video materials	Video materials	Video materials
Location	Internet Accessible	Conference Center	College classroom	Company's conference room
Type of setting	Individual or Group	Group	Group	Group
Type of communication	Website, e-mail, phone and mail	One-on-one interaction with instructor and classmates	One-on-one interaction with instructor and classmates	One-on-one interaction with instructor and classmates
Discussion activity	Online Support	Instructor follow-up	Instructor follow-up	Instructor follow-up
Accreditation	SAVE accredited	SAVE accredited	SAVE accredited	SAVE accredited
Course Cost	Required	Required	Required	Required
Room and Board Costs	None	Required	Required if not local	None since local
Travel Costs	None	Required	required if not local	None since local
Individual and Company Time Costs	Minimal for company	Salary of individual	Minimal for company	Salary of individual
Computer and Internet Access	Required	Not required	Required	Not required

It is necessary to distinguish between the primary functions, required secondary functions and nonessential secondary functions for the purposes of this evaluation. The primary function is to educate people by transferring knowledge and experience. The required secondary functions are to spend time and spend money on curriculum. The nonessential secondary functions are to spend time and spend money on travel, room, board and salaries. The different learning methods for

accomplishing these functions are further described in the Evaluation & Development sections of this paper.

IDEA GENERATION STEP

Existing avenues of learning include online courses, seminars, college classes and local instruction through both private and public institutions. Although the purpose of this paper is to compare current Value Engineering educational programs, the features of state-of-the-art learning methods are mentioned to ascertain if any key features can be logically incorporated into any of the current Value Engineering learning methods. Creative learning methods of educating people are continually surfacing based on changes within the industry and our society. Learning methods that have grown over the years include Distance Learning Programs (DLP), home schooling, teleconferencing, and CD/DVD interactive learning.

IDEA EVALUATION STEP

The online learning method presents the "primary function" of educating people by transferring knowledge and experience differently than more traditional methods. The instructor is not present during the viewing of the website course lessons. A presentation is accessed by the student through the internet, who reviews the slides at his own pace and develops an understanding based on his own learning capabilities. References are made to chapters within the course textbook for additional explanation on the topics. Questions can be asked through the course discussion group chat page or e-mail to the instructor. The traditional learning methods have an instructor to explain the course lesson as it is presented. The textbook and other handout material are normally referenced during the instructor's learning session.

The online learning method presents the "required secondary functions" of time and curriculum costs differently than more traditional methods. The time schedule for completing the online course is generally 9 weeks, but can be flexible depending on the student's availability. Other learning methods vary from 3 days for an intense workshop to once a week for 12 weeks in the college course. The time flexibility of the online learning course is a distinct advantage for those individuals with a lifestyle who cannot commit to a scheduled seminar time or weeknight course. Generally the individual's personal time must be altered to complete the online course as opposed to the company's time, depending on the company's policies for continuing education programs. Personnel salaries and opportunity losses would generally cost the company more money when selecting the more traditional seminar style methods. The curriculum costs for online learning is equivalent to the other methods. Online course tuition costs range from \$400 to \$600 depending on the discounts offered. Traditional methods range between \$300 and \$1200 depending on the groups involved and the location.

The online learning method negates the need for "secondary functions" such as travel, room and board costs. Since there are no costs associated with these secondary functions, this illustrates the value of this learning method. There are no costs associated with zero worth functions. It is assumed that the computer and internet access required for online courses are already available to the individual. Therefore no extra costs are incurred for this feature.

IDEA DEVELOPMENT STEP

The educational requirements and client preferences are key to selecting a VE learning method. This section outlines the decision making process for selecting the proper educational method for individuals with differing preference criteria. The input models and weighted evaluation models are shown herein to demonstrate that the selection of differing educational methods depends on the individual's/company's preference.

Value Engineering Input Models

Cost (Total Expense) Model Ranking: Online - 5, College - 4, Local CVS - 3, Seminar - 2

This cost model ranking is based on the online course being the least expensive to cover only tuition/book costs. The Seminar is the most expensive costs due to required travel and lodging.

Time (Flexibility) Model Ranking: Online - 5, Local CVS - 4, Seminar - 3, College - 2

This time model ranking is based on the online course being the most flexible in terms of when the course is offered and how long it takes to complete. The college course is only offered occasionally and within a particular time frame/semester.

Content (Curriculum) Model Ranking: Local CVS - 5, College - 4, Seminar - 4, Online - 3

This content model ranking is based on the Local CVS being able to tailor the course to the individual's or company's needs. The online course cannot be altered to focus individual's needs.

Presentation (Features) Model Ranking: Local CVS - 5, College - 4, Seminar - 4, Online - 2

This presentation model ranking is based on the local CVS instructor's ability to dynamically and interactively present the topics of interest. The online course does not dynamically present the course and interaction is limited.

Location (Convenience) Model Ranking: Online - 5, Local CVS - 4, College - 3, Seminar - 2

This location model ranking is based on the online course being the most convenient to the individual because one can access the course from the home or office. The Seminar requires you to be at a specific location that is not always convenient.

The ranking values for these models are purely subjective. Individuals with a different perspective may rank the learning methods in a different order, thereby varying the results of the study. For instance, this author has ranked location as a 5 for online courses, because of the convenience of studying Value Engineering at home or at work. Another individual may rank seminars as a 5 for convenient location, because it is important to them to exclusively study Value Engineering away from home and work.

Weighted Evaluation Models

Online Course Selection

The following weighted evaluation and analysis matrix displays that this author would select the online course as the proper education method based on the importance of preferred features offered by the different learning methods. Some characteristics of the type of person that would select online courses may be; professional, travels for their job, busy lifestyle, comfortable with computers/computer literate, work policies or personal preferences favor educational improvements after hours, and a self motivator.

Table 3 - Weighted Evaluation For Online Course
Project: Value Engineering Course Selection - Online Benefit Criteria

Criteria Scoring Matrix		<i>How Important:</i>					
		4 - Major Preference 3 - Above Average Preference 2 - Average Preference 1 - Slight Preference -Letter / Letter No Preference Each Scored One Point					
A. Cost (Total Expense)		A - 4					
B. Time (Flexibility)		A - 2					
C. Content (Curriculum)		B - 2 A - 4					
D. Presentation (Features)		C / D B / E					
E. Location (Convenience)		E - 3 C - 3					
		E	D	C	B	A	
Analysis Matrix Alternatives	Raw Score	4	1	4	5	14	
	Weight of Importance (0 - 10)	6	1	6	7	10	
1. Online Course		30	2	18	35	50	Total
		5	2	3	5	5	
2. Seminar		12	4	24	21	20	
		2	4	4	3	2	
3. College Course		18	4	24	14	40	100
		3	4	4	2	4	
4. Local CVS Instructor		24	5	30	28	30	117
		4	5	5	4	3	

* Selected based on weighted evaluation

5 - Excellent 4 - Very Good 3 - Good 2 - Fair 1 - Poor

It is important to note that the online course ranks higher than any other learning method due to the individual's preference for total cost, time flexibility and convenient location; rather than content and presentation.

Seminar Selection

The following weighted evaluation and analysis matrix displays that this author would not select a seminar as the preferred education method. If the criteria model rankings were modified by an individual whose perspective is to learn from world renowned experts in a particular setting, then the results would be significantly different. The criteria model ranking would also be altered if the individual planned a necessary business trip in conjunction with the seminar. Some characteristics of the type of person that would select seminars may be; professional, likes to travel, busy lifestyle, prefers learning with others, work policies encourage active participation in professional societies, etc.

Table 4 - Weighted Evaluation For Seminar
Project: Value Engineering Course Selection - Seminar Benefit Criteria

Criteria Scoring Matrix		<i>How Important:</i>				
		E	D	C	B	A
A. Cost (Total Cost)						
B. Time (Flexibility)						
C. Content (Curriculum)						
D. Presentation (Features)						
E. Location (Convenience)						
Analysis Matrix Alternatives	Raw Score	3	11	9	1	1
	Weight of Importance (0 - 10)	3	10	9	1	1
1. Online Course		15	20	27	5	5
2. Seminar		6	40	36	3	2
3. College Course		9	40	36	2	4
4. Local CVS Instructor		12	50	45	4	3
	Total					

*** Seminar would not be selected based on this weighted evaluation
 5 -Excellent 4 -Very Good 3 -Good 2 -Fair 1 -Poor

It is important to note that a seminar ranks higher than the online course due to the individual's preference for content and presentation; rather than total cost, time flexibility or convenient location.

College Course Selection

The following weighted evaluation and analysis matrix displays that this author would not select a college course as the preferred education method. If the criteria model rankings were modified from a fulltime student's perspective rather than from a fulltime working individual's perspective, then the results would be significantly different. Some characteristics of the type of person that would select college courses may be; professional acquiring an advanced degree at a local institution, a college student, regular weekly schedule, work policies or personal preferences favor educational improvements at institutes for higher learning, and has time available for the duration of a normal college semester.

Table 5 - Weighted Evaluation For College Course
Project: Value Engineering Course Selection-College Course Benefit Criteria

Criteria Scoring Matrix		<i>How Important:</i>					Total
		E	D	C	B	A	
A. Cost (Total Expense)							
B. Time (Flexibility)							
C. Content (Curriculum)							
D. Presentation (Features)							
E. Location (Convenience)							
Analysis Matrix Alternatives	Raw Score	1	6	9	1	3	
	Weight of Importance (0 - 10)	1	6	10	1	3	
1. Online Course		5	12	30	5	15	67
2. Seminar		2	24	40	3	6	75
3. College Course		3	24	40	2	12	81***
4. Local CVS Instructor		4	30	50	4	9	97

*** College course would not be selected based on this weighted evaluation
5-Excellent 4-Very Good 3-Good 2-Fair 1-Poor

It is important to note that a college course ranks higher than the online course due to the individual's preference for content and presentation; rather than total cost, time flexibility or convenient location.

Local CVS Instructor Selection

The following weighted evaluation and analysis matrix displays that this author would select the local CVS instructor as the proper education method based on the importance of preferred features offered by the different learning methods. Some characteristics of the type of person that would select a local CVS instructor may be; professional, normal day is at the office, corporate culture/policy provides for group educational opportunities, others in the office will perform similar duties, and work for a company that tends to look at the long term value.

Table 6 - Weighted Evaluation For Local CVS Instruction
Project: Value Engineering Course Selection-Local CVS Instructor Criteria

Criteria Scoring Matrix		<i>How Important:</i>						
		<i>4 - Major Preference</i> <i>3 - Above Average Preference</i> <i>2 - Average Preference</i> <i>1 - Slight Preference</i> <i>- Letter / Letter</i> <i>No Preference</i> <i>Each Scored One Point</i>						
A. Cost (Total Expense)								
B. Time (Flexibility)								
C. Content (Curriculum)								
D. Presentation (Features)								
E. Location (Convenience)								
Analysis Matrix Alternatives		Raw Score	2	6	9	3	0	
		Weight of Importance (0 - 10)	2	6	10	3	1	Total
1. Online Course		10	12	30	15	5	72	
2. Seminar		4	24	40	9	2	79	
3. College Course		6	24	40	6	4	80	
4. Local CVS Instructor		8	30	50	12	3	103*	

* Selected based on weighted evaluation
 5 - Excellent 4 - Very Good 3 - Good 2 - Fair 1 - Poor

It is important to note that a local CVS instructor ranks higher than the online course due to the individual's preference for content and presentation; rather than total cost, time flexibility or convenient location.

POTENTIAL IMPROVEMENTS TO LEARNING METHODS

Any course can be presented in either a dynamically exciting way or in a dull uninteresting way. It becomes an issue of the preparation time and the creativity of the instructor. The subject matter must be presented in a way that makes the student want more. Any course material that is presented in a dynamic fashion becomes retainable, and the applicable material will be learned. The following paragraphs describe state-of-the-art educational and communication tools utilized in the industry to enhance the quality of business practices.

Teleconferencing is becoming more prominent for business ventures. The interactive feature of one-on-one interaction with video and audio communication is necessary for many business and educational activities. The teleconferencing feature eliminates the need for travel and allows flexibility in an individual's schedule.

Interactive CD training is becoming popular for learning computer programs. Help features allow individuals to focus on topics they need to learn, and skip over topics that they have already mastered.

Video tapes and DVD's are common tools for experts to transfer their knowledge to individuals. Tapes/DVD's can be distributed to anyone, anywhere at anytime. This gives the individual their choices of when, where and which expert they want to learn from.

Library resources, informational databases and news channels are accessed over the internet to learn about the past, the present, and speculate about the future.

E-mails and chat lines are becoming very popular to inform others of recent events, as well as, ask others about their ideas on certain topics. This form of communication is normally written, but pictures and videos can be attached to enhance the communication process.

SUMMARY

This paper illustrates that selecting the right learning method for Value Engineering is dependent upon the individual's/companies preferences. In order to improve Value Engineering education, state-of-the-art educational/communication tools must be implemented to enhance the individual's learning experience. Learning methods must minimize nonessential secondary functions by implementing new educational tools. Online Value Engineering courses must offer additional curriculum/content and improve the presentation features in order to suit more individual's personal preferences and quality standards. Online Value Engineering courses are a low cost learning method with the advantages of time flexibility and convenient location.

REFERENCES

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