

A PROPOSAL FOR VALUE ENGINEERING COLLEGE COURSE TRAINING

Michael N. Zabych PE, CVS, FSAVE

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Theodore C. Fowler, CVS, Fellow, SAVE

Michael N. Zabych offers Value Engineering (VE) Consultant Services from Alexandria, VA. He is a graduate of Pennsylvania State University, the Army War College, and Industrial College of the Armed Forces. Over a 23 year period, Mike was a VE Program Manager, Staff Value Engineer, and part-time instructor with the Federal Government. During the past seven years, he has been the VE Program Director at VSE, Inc., a VE Project Coordinator for Smith, Hinchman & Grylls Associates, Inc., Value Management (VM) Division and a private consultant. He has taught VE in Germany, Italy, Australia, Kuwait, and the United Arab Emirates. He has taught VM at Catholic University of America since 1988.

ABSTRACT

This paper presents a plan to improve the probability of having VE/Value Analysis (VA)/VM accepted more readily by the academic community. It also details the format and content of a three credit graduate course taught at the Catholic University of America since 1977. With the exception of minor variations, the course is similar to the *VE Theory Instructor's Guide and Text*, by Donald E. Parker, PE, CVS, FSAVE.

BACKGROUND

The idea of using the college campus as a forum for value training is neither new nor a unique initiative. Ample evidence exists to show that value specialists have been teaching some form of value courses in the United States and several foreign countries since at least the decade of the 1970s. As a matter of fact, a review of the *1971 SAVE Proceedings* indicates that Ken Cruise, who at that time was the National Director of College Relations, pointed out that a method of conveying information on the value disciplines to college faculty is through the University Extension Division¹. Under the aegis of the Los Angeles Chapter of SAVE and Past National SAVE President Anthony R. Tocco, the UCLA Extension Division offered a course, leading to a Professional Designation in VA.

At the same time, Carlos Fallon, also a Past National SAVE President, was teaching a VA course at the Camden, NJ campus of Rutgers University and an advanced course in Value Improvement at the University of Tennessee Space Institute. A year later, in 1972, the present SAVE National Vice President — Education, David DeMarle, began teaching a four credit graduate engineering VA course, and is still teaching Value Measurement, Engineering and Management at Rochester Institute of Technology, Rochester, NY². A basic 40-hour workshop was introduced to George Washington University in 1973 by Rudy Kempter, CVS, FSAVE.

Unfortunately, some of these early VA/VE/VM college courses have been discontinued as their primary instructors or sponsors have moved on to bigger and more profitable pursuits, passed away, or just plain lost interest. Yet, enough of the courses have survived, and new courses initiated to give the impression that all is not lost, as long as we have a foot in the door of academia.

In addition to the Rochester Institute of Technology graduate engineering course, Donald E. Parker developed a *VE Theory Instructor's Guide and Text* in 1977. His course was accepted by the faculty of the Catholic University of America, Department of Civil Engineering, as a three credit graduate level technical elective course for students working toward a Masters Degree in Construction Management. Initially, the course included class exercises related to the specific subject being taught during the class session, and a small individual VE project for study. As currently taught, the course includes application of value methodology on a construction project selected by the students. Both live and previously constructed facilities are permitted, but are subject to

approval by the instructor prior to commencement of work. Use of previously constructed projects for study is permitted because designers are reluctant to wait 15 weeks to obtain the results of a VE study done by the students. This is not to slight the student effort, but the time frame is too long, when compared with the rapid response that is possible from the basic workshop. The course permits students to use 10 hours of class time to work on their project application, and requires a minimum of 10 hours outside of class to complete the VE workbook, study, and final report.

The course outline that follows is the one I have used since 1988. Based on the quality of studies performed and the reports prepared by the students, I am convinced that the outline is adequate and serves as a satisfactory alternative for the Module I workshop;

THE CATHOLIC UNIVERSITY OF AMERICA,
WASHINGTON, DC

VALUE MANAGEMENT—CE-583
14 WEDNESDAYS, 5:10—7:50 PM

TEXT: VE THEORY BY D.E. PARKER

Session #1 *Introduction to Value Concepts and Theory*

Origin and Development of VE (History)
Terms and Conditions
Value Concepts
Problem Solving Techniques
The VE Job Plan (Overview)
The Information Phase

2. *Function, Cost, Worth*

Quiz — Homework Critique
Identify, Define, Classify
Evaluate Function
Value Index
Concept of Worth
Class exercise — Define Function

3. *Conducting a Value Study*

Quiz — Homework Critique
Planning & Timing the study
Team Structure — Multi-Discipline
Study Procedure, Workbook Content
Group Dynamics — Human Relations
Inhibitors & Roadblocks
Job Plan Comparison
Assignment of Teams
Class exercise — Project Selection

4. *FAST Diagramming*

- Quiz — Homework Critique
Student Project Description
Levels of Indenture
Ladder of Abstraction
How — Why Logic
FAST Uses
Diagramming Procedure
Technical/Customer FAST
Management Applications
Student Project Time
5. *Creativity*
- Quiz — Homework Critique
Creativity Defined
Problem Solving Techniques
Analytic/Creative
The Creative Process
Blast/Create/Refine
Student Project Time
6. *Judging Ideas Analysis*
- Quiz — Homework Critique
Feasibility Ranking
Idea Screening
Evaluation by Comparison
Weighted Evaluation Matrix
Student Project Time
7. *Mid-Term Examination*
- (Sessions 1 — 6)
8. *VE & Complementary Disciplines*
- Mid-Term Examination
Critique
Economic Analysis
Accounting/Manufacturing
Engineering/Purchasing
Zero Based Budgeting
Systems Analysis
Design-to-Cost
Trade-off Analysis
Life Cycle Costing
Student Project Time
9. *Cost Control Theory*
- Quiz — Homework Critique
Estimating Accuracy
Estimating Types
Project Scope
Standard Building Cost Model
Graphic Cost Model
Uniformat/Mastercost
Student Project Time
10. *Life Cycle Cost Theory*
- Quiz — Homework Critique
Economic Analysis Concept
LCC/VE Relationship
LCC Elements
Life Span/Discount Rate
Escalation
Present Worth/Annualized Methods
Student Project Time
11. *Development & Implementation Strategies*
- Gaining Proposal Acceptance
Minimize Change & Risk
Magnitudes
Maximize Opportunity
Break-Even Analysis/Return on Investment
Investment
Student Project Time
12. *Presentation*

Student Oral Presentation
Student Written Proposal Submittal

13. FINAL EXAMINATION

14. *Organizing for & Performing Value Work*

Critique Final Examination
Management Commitment
Substantive Investment
Systematic Application
Value Engineer Qualities
Program Requirements
VE Policy — Budgeting
Training — SAVE
Principles of Application

LESSONS LEARNED

At the same time that Don Parker began teaching the VM course at Catholic University of America, he initiated a Value Foundation effort to expand the value discipline to other colleges and universities by providing course materials to educators on a complimentary basis, providing that they requested the Instructor Guide and Text on university stationery. In addition, Don developed an instructor's seminar for college educators at the SAVE International Conference. The basic intent of the Value Foundation Program, as explained by Don, was to have the VE Theory course taught by college professors, even if they were not Certified Value Specialists (CVS). This initiative resulted in seminar attendance by as many as thirty educators, several of whom began teaching value courses at their colleges or universities. Two of these courses are still being taught at the University of Florida at Gainesville and at Georgia Institute of Technology at Atlanta.

RECENT INITIATIVES

During the last half of 1993, Dave DeMarle has reported on three different surveys to determine the extent of value training in colleges and universities in the United States. In 1989, Tom Snodgrass, CVS, FSAVE, Director of the Center for Value Education at the University of Wisconsin at Madison, contacted 325 universities and colleges listed as having engineering schools and continuing education departments. His survey showed that only 13 schools offered credit courses and an additional 23 schools offered value training through a continuing education program. Only 8 of the latter schools offered a traditional 40-hour basic workshop course³.

In November, 1992, Fred Sherwin, CVS, FSAVE reported through *Interactions* that only six colleges offered credit courses in VE/VA/VM, although this later survey may not have been as extensive as that conducted by Tom Snodgrass.

In a more recent survey by Dave DeMarle and Art Mudge and reported in the November, 1993 *Interactions*, it appears that some form of value training is conducted at 43 colleges and universities⁴. How many of the 43 schools are offering undergraduate or graduate credit courses is unknown, but apparently some form of value training is happening at these schools. What is unknown also, is whether any of the credit courses and continuing education courses have been approved as a substitute for the basic Module I workshop by the Certification Board.

Dave DeMarle unveiled a plan in the July, 1993 issue of *Interactions* to expand value training at U.S. colleges and universities. His plan includes:

1. Creation of an ad hoc academic committee of professionals to "network and partner with SAVE members who wish to serve as adjunct VA/VE/VM faculty members."
2. In states having universities that offer value credit courses, the plan calls for:
 - a. Expanding VA/VE/VM training where it is taught in one department to other departments within the same college.

- b. Introducing value training into other colleges within the state by partnering current faculty with SAVE members interested in teaching VA/VE/VM.

SAVE — COLLEGE TRAINING PROBLEMS

Dave DeMarle's efforts to expand value training in New York State are commendable, and should serve as an example for other SAVE chapters throughout the country to follow. Similarly, Past National President Fred Sherwin is in the forefront, leading the efforts of the Miles Value Foundation to expand the teaching of value courses on the college campus. Their initiatives are steps in the right direction and should be supported by all SAVE chapters; however, I submit that we need more commitment from the SAVE National Board, in general, and by the Certification Board, in particular.

Without fear of contradiction, I believe that SAVE is, or at least, should be in the business of making change happen on purpose. The very nature of the value discipline is based on this premise. Yet, when it comes to making change within the SAVE organization or certification criteria, our reluctance to change anything is only exceeded by the perceived higher order functions to "Make Money" or "Protect Turf." To illustrate my point, the Module I basic value workshop, consisting of 20 hours of instruction and 20 hours of live project application, has undergone only minor change since the certification program was initiated in 1973. Perhaps the only significant change was the addition of several variations of FAST diagramming, and the addition of the Module II Advanced Seminar as a basis of CVS Certification.

Many of the long term value practitioners question the value and content of Module II as a basis for meeting certification requirements. Approval of the course is granted to a "Principle CVS", not to an organization. Presumably, this means that each CVS must have his own Module I and Module II course approved by the Certification Board. Since the Board, during the past year, raised the fee for course approval from \$75 to \$125 (a whopping 66% during a recession), is there any wonder that the perceived higher order function of the Certification Board is to: "Make Money" and "Protect Turf"? If ever we should approve Dave DeMarle's Rochester Institute of Technology course, or Don Parker's Catholic University of America course as an equivalent to Module I, does it mean that each time one of the courses of instruction is adopted at a new college or university that the faculty instructor must submit the course for Board approval — and send their \$125 in the process? Heaven forbid that the course should be taught by a college professor and not a CVS!

Contrast the preceding requirements with those necessary for Engineer in Training and Professional Engineer registration. For Engineer in Training — a person who has completed eight semesters of an engineering or engineering technology curriculum, or eight years in an engineering field, and after having passed the fundamentals of engineering examination, shall be issued a certificate as an Engineer in Training (EIT). For professional Engineer — in addition to the requirements for EIT, a license and specialty certification, or an additional specialty certification shall be issued to a person who, after graduation, completes active practice in engineering work satisfactory to the Board, the last two of which certification is sought, and having attained a passing score, set examination testing the principles and practices of engineering in the specialty certification sought.

Obviously, the emphasis seems to be on passing examinations and obtaining experience rather than on a specific course of study, or the Professional Engineer qualifications of the college professor. Granted a fee is charged for each examination, but not for course approval, nor are college professors required to have professional engineering license, prior to teaching a course.

A common business practice by publishers of college text books is to provide complimentary copies to educators in other than the author's college, presumably to encourage more widespread sales and use of the text. As previously noted, Don Parker and the Miles Value Foundation provided complimentary copies of their VE Theory Instructor's Guide to educators, under the original intent of introducing a value course that could be taught by a college professor, rather than a CVS. Today, the SAVE National Business Office and the Miles Value Foundation are in a money-making posture. A potential college educator who wishes to introduce a VA/VE/VM course on their campus can procure the Instructor's

Guide for \$100 as a non-SAVE member, or for \$90 if they are SAVE members.

To make matters worse, the course, which has been taught to graduate students for 17 years, has not been approved by the Certification Board as an equivalent Module I basic workshop course, and if taught by other than a CVS, albeit even a college professor, would doom the course as a basis for AVS/VPM/CSV qualification. Apparently the only benefit a college graduate student may derive from taking a three or four credit VA/VE/VM course under current certification rules is to provide them with the opportunity to join SAVE and to take the Module I basic workshop under the tutelage of a CVS. Whoopie!! Do we really want colleges and universities to offer more credit courses in VE/VA/VM?

A GET WELL PROPOSAL FOR COLLEGE VALUE TRAINING

If the objective of SAVE is to "Attract Educators and Students," and "Expand Value Training" on the college campus, we have a strange way of showing our interest in fulfilling these objectives. Long term acceptance by the academic community and perpetuation of our existence as a society demand that we get serious and provide a few basic incentives to drum up interest by ensuring that existing or newly developed college course credit courses are fully recognized as meeting the educational requirements for AVS certification. Rather than placing major emphasis on whether a potential AVS learned the value discipline by taking a Module I basic workshop, or by taking a VA/VE/VM three or four credit college course, our emphasis should be placed on the successful completion of a written value theory examination. If the student can pass the examination, we really should not care how they learned about value techniques.

There is a wealth of course materials available among value specialists and in universities to develop undergraduate and graduate courses in the value discipline. Whether the course of instruction takes the form of Dave DeMarle's "Value Measurement, Engineering and Management" at Rochester Institute of Technology, or Don Parker's "Value Engineering Theory" at the Catholic University, or some other form, such as Hank Wales' McGill University Value Analysis course is irrelevant. What matters is that the value gospel is being preached and students are learning how to apply the methodology. These students are potential members of SAVE, and should be encouraged to become value specialists by society acknowledgement that the value training they have received is at least equivalent to the basic 40-hour workshop.

In addition to the three or four credit technical elective value course, there is a real need to provide an orientation course to students in engineering and architecture. Undergraduates in these disciplines must first know that there is such a thing as VE. The course can be a one credit Freshman course (15 hours) that includes such subjects as: What is VE?, The Functional Approach, FAST, Creativity, History of VE application in Industry and Government, The VE Job Plan, and Examples of VE application. If we are unsuccessful in getting this type of course introduced into the already crowded, undergraduate curriculum, we can, as a minimum, prepare a one or two hour VE lecture for inclusion into the general engineering or architecture orientation courses that already exist for freshman college students, and furnish the lecture materials free of charge to any college faculty member.

If we continue to insist that only a qualified CVS can teach value courses, we are making our task of introducing or expanding these courses on the college campus difficult. To make the basic assumption that only a CVS can teach VA/VE/VM is equivalent to the requirement that only a registered professional engineer can teach a college engineering course, and we know that the latter requirement does not exist. Instead, the SAVE Certification Board should offer a Certified Value Instructor (CVI) certificate, providing that the educator has taken a course on how to teach the value discipline. The course may be given during the annual International SAVE Conference by an academically cognizant individual or group, or on a college campus by a nearby SAVE Chapter team.

We must come to the realization that we are in a "request," not a "demand" mode vis-a-vis the academic community and need to reorient our thinking accordingly. We cannot set up a wall of superficial requirements for the aspiring student and prospective college professor to negotiate if we are to make serious inroads into the college campus. The society must be willing to bend to the needs of the college or university, and minimize the negative impact that inflexible certification educational requirements imply.

The college student who completes a three or four credit VA/VE/VM course is also a potential member of SAVE. We cannot ignore the fact that, in spite of our past actions, society membership is flat. Our membership rosters have varied between 1200 to 1500 members over the past 25 years. During the next ten years, we can expect that there will be a mass exodus from SAVE, as large numbers of members reach retirement from full-time employment. SAVE needs an infusion of young engineers and architects if it is to remain a viable organization. As society membership increases, so will our revenue and recognition, and we need not be concerned with self-serving interests. Let's resolve to make change happen on purpose.

REFERENCES

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