contents:

Will Synergy Survive? (Editorial)  1
Roger B Sperling, CVS-Life

The Impact of National Culture on Collaboration  2
Allan Bird, Ph.D.

An Interdisciplinary Studio: A Collaboration of Architecture and Construction Science  7
Anat Geva, Ph.D., and Charles W. Graham, Ph.D.

JCMS Workshop: Introducing Value Cost Management  11
James W. Hudson, CVS, FSAVE,
Stephen P. Hudson, AVS, and
Waller S. Poage, NCARB, AIA, CSI

VM: The Collaborative Team Model  14
Roger B Sperling, CVS-Life

Early Value Analysis Revisited (Miles on Value Analysis)  17

Love at First Sight (My Value Career)  20
Scot McClintock, PE, CVS-Life
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WYNDHAM HOTEL
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Will Synergy Survive?

EDITORIAL

Roger B Sperling, CVS-Life

Several articles in this issue of Value World focus on collaboration as embodied in value management (VM) teams. The authors help us understand the importance of cultural diversity in collaborative teams. Some fine examples are given of ways the team leader can facilitate collaboration and ways the collaborative environment stimulates higher results.

Collaboration, the elusive element that fosters synergistic behavior, is the prize that team leaders seek when leading problem-solving teams. Synergy is a combined action that produces results which are not possible by a person acting alone—and it does not happen automatically. Achieving synergy takes skilled leadership. Because synergy can appear hard to achieve, can we expect it to remain underutilized—perhaps even disappear? Is synergy, in our technological age, slipping away?

I had a recent experience with computer problems that required several days of telephone consultations with technical experts. Sounds like a problem that a collaborative team could solve quickly, correct? But it was quite the contrary. The experience was the complete antithesis of the synergistic problem-solving approach. Let me explain.

My one-month-old computer with new software and new Internet access began acting up after I returned from a short vacation. What had been a satisfying experience of sending and receiving e-mail to and from family and friends suddenly became a nightmare of unresolved difficulties and a disabled system that stretched into a week before the situation finally was resolved. I called the Internet service provider who referred me to the software maker, who then referred me to the computer hardware/software supplier. Before I was done, I spoke with 15 technical representatives in the hardware/software camp and 10 others in the Internet camp. The back-and-forth and cut-and-try process (probably familiar to most readers) was time-consuming and frustrating. Each person I talked with on the telephone seemed to have a different possible solution, even though comprehensive notes were kept by all parties.

Eventually the problem was resolved—although there is lack of consensus to this day as to what the actual problem was. The many days it took to bring the computer back to satisfactory operation is a lesson in the value of synergistic teams—and raises the question: Where has synergy gone?

The computer troubleshooting (CT) team—25 people at the other end of telephone connections—failed to produce a timely, synergistic approach to solving the problem for several reasons:
1. The CT team was scattered throughout many cities thousands of miles apart (in contrast, a VM team is together in one room).
2. The CT team worked sequentially, each person taking independent turns trying to find a solution (a VM team works together in parallel, interacting and energizing one another).
3. The CT team had no central leadership, relying on notes typed on computer screens to provide some continuity of thought (the VM team relies on a facilitator to document ideas).

Thus the CT team—if indeed it could be called a team—suffered from fragmentation, disconnection, and disorganization. It was the antithesis of a VM team, which is cohesive, connected and organized. It is a minor miracle that the problem was solved at all. How I wish that I could have brought together eight of the best and brightest of those 25 technical consultants made available to me, put them in one room, and led them through a VM-style problem-solving session. Think what they could accomplish in a truly synergistic setting.

Modern technology now requires the fragmented, disconnected and disorganized approach to help the most people in a global marketplace. But lack of synergy may be too high a price to pay. Harvard Professor Robert Putman says, "Technology, by erasing distance, is erasing also our sense of place. Face-to-face connections are very important in many ways, including physical and psychological health" (The Los Angeles Times, October 29, 2000). Thus VM teams are not only more effective "problem-solving machines," but they also are "face-to-face connections" that offer healthier ways to do business.

The value methodology could bring cohesiveness to technology’s fragmented team approach. VM serves us well; we become strong advocates of synergistic, collaborative teamwork. I believe synergy will survive as long as we faithfully apply the value methodology that has been entrusted to us.
The Impact of National Culture on Collaboration

Allan Bird, Ph.D.

This article is taken from a manuscript prepared in conjunction with the conference, “Collaborating Across Professional Boundaries: From Education to Practice,” held November 2–3, 2000, in Chicago, Illinois, and sponsored by the Illinois Institute of Technology. Preparation of the original manuscript was supported by the Park Li Group and by the Eiichi Shibusawa-Seigo Arai Professorship.

INTRODUCTION

A few years back, several French and German managers met to discuss a possible joint venture between their two companies. After a productive morning spent identifying possible synergies, as well as delineating key issues and concerns, the managers developed an agenda to guide further discussions before adjourning for lunch. During lunch, one of the French managers commented on the beautiful weather and suggested that the group take the rest of the afternoon off and head out to a local soccer match. The Germans declined, so they all returned to the office to continue discussions. But the accomplishments of the morning soon disappeared as the French managers raised one concern after another. By the end of the day, little progress had been made, and both groups left with serious doubts about whether a joint venture would be possible.

In subsequent interviews, German managers expressed confusion and frustration with the slow rate of progress. They could not understand why the French were being so difficult. The French said they just couldn't seem to develop a good rapport with the Germans and felt reluctant to move things forward until they did. Both sides knew there was a problem, but neither could point to anything specific.

The source of their difficulties points to the challenges of working across national cultures, providing two significant insights into national culture’s influence on collaborative effort. French managers often seek to establish relationships of trust through participation in “illicit” acts that serve to bind participants together in a shared transgression. The suggestion during lunch to take the afternoon off was an offer to engage in such an act. Called complicité, participation in such an act signals to all involved a willingness to share a secret indiscretion, thereby tying them together. The French interpreted the German’s rejection of the offer as a sign that the Germans were not committed to the relationship. However, the Germans were committed to the relationship, something they signaled by indicating a desire to go back to the office and resume discussions.

OBSERVABLES TO COLLABORATION

The need to establish trust in order to develop a stable relationship is universal. The means by which trust is established, however, varies across cultures. The development of trust is just one of several problems that a community of people must resolve in order to sustain itself (Hampden-Turner & Trompenaars, 1993; Kluckholm & Strodtbeck, 1961). Other issues include how to organize relationships, how to distribute power, how to divide up work, and so forth. Societies answer these issues differently. Culture is, in part, the sum of answering all of these issues. When people from different cultures interact or come together as a group, conflict about how to answer universal questions in the context of the new group is likely to arise.

Insight One: Cultures differ distinctively in the ways they seek to resolve universal problems. These differences can create obstacles to smooth collaboration.

If sources of conflicts can be identified, then usually it is possible to work through and resolve the conflicts. Once the German and French managers in the introduction above understood the nature of the problem and their different approaches to establishing and signaling trust, they were able to reduce their levels of frustration and establish trusting and committed relationships. These relationships became the foundation for successful negotiations and the eventual establishment of a joint venture.

SCHEMAS AND SCRIPTS

It often can be difficult to identify the source of conflict in cross-cultural interactions. The distinctive answers that a particular society works out in response to universal questions become deeply embedded in beliefs, attitudes, and norms that are inculcated in members of the society by a process that G. Hofstede (1984) refers to as the “collective programming of the mind.” Individual experience within the culture gives rise to sensemaking behavior: Individuals notice events and interpret or assign meaning to what they notice. Based on the sense they make of the situation, they construct a response. Sensemaking is encoded into cognitive structures that are referred to as “schemas,” and the behavioral responses are called “scripts” (Sims & Gioia, 1986). When people come across a situation they perceive as familiar—negotiating a business deal, for example—they match it to past experience and call up the appropriate schema and script. This process may operate on apparent “autopilot” as people negotiate the normal routines of life.
Over time, schemas and scripts become so deeply embedded that they might be applied unthinkingly to situations that don’t fit with past experience: the German managers treat their negotiations with the French as though the French are no different from German managers they had negotiated with in the past, and vice versa. When scripts and schemas are incorrectly applied, subsequent events might be viewed as bad, and the behavior of others as wrong simply because they violate the expectations and norms associated with the script and schema. However, expectations and norms are difficult to recognize because they are built into cultural sensemaking assumptions about how the world works. In other words, when people search for the source of the problem in cross-cultural conflicts, cultural assumptions often fall below the perception radar.

**Insight Two:** Identifying sources of cultural conflict is difficult because the source of conflict often is embedded in fundamental assumptions that influence our thinking about how the world works.

The development of effective collaboration in cross-cultural settings must respond to the two insights listed above—something that can be achieved by focusing on the acquisition and application of two types of knowledge:

- Knowledge of cultural differences
- Knowledge of processes for surfacing and then resolving cultural conflicts

**KNOWLEDGE OF CULTURAL DIFFERENCES**

One cannot acquire knowledge of cultural differences without first understanding what culture is. Although the word “culture” is used widely to describe variations among people from different nations or ethnic backgrounds, there is no single, accepted definition. There is, however, a commonly used set of characteristics that help identify the word:

- Culture includes systems of values.
- Culture is learned, not innate.
- Culture distinguishes one group from another.
- Culture influences beliefs, attitudes, perception and behavior in somewhat uniform and predictable ways.

The last characteristic is perhaps the most problematic because other influences also shape beliefs, attitudes, perceptions, and behaviors. Individual personality is one strong influence; the specifics of a given situation are another. For example, in times of natural disaster, Americans, more than those of any other culture, have a well-earned reputation for voluntary cooperation and assistance (Osland & Bird, 2000).

Several frameworks have been developed for making comparisons across cultures (Hall, 1960; Hampden-Turner & Trompenaars, 1993; Kluckholn & Strodtbeck, 1961). In managerial settings, one of the most widely used frameworks is Hofstede’s (1984) work-related values (see box above, right). Developed through extensive questionnaire survey research within IBM, Hofstede’s initial dataset covered more than 116,000 respondents from 50 countries and three regions. Its attractiveness to management practitioners and academics rests on its focus on
values as they apply in the workplace. These work-related values are well suited to our focus on collaborative efforts.

Hofstede used his survey data to locate countries along each of the four dimensions, thereby allowing for relatively straightforward comparisons. For example, Japan gets a ranking of moderate on PDI, high on UAI, low on IND, and high on MAS. This contrasts with the USA, which gets a ranking of moderate on PDI, low on UAI, high on IND, and moderate on MAS. A knowledge of these differences can help us anticipate potential conflict or problem areas when Japanese and Americans interact (see Figure 1). The high UAI scores for Japan contrast with the low UAI scores for the USA. Consequently, it should not be surprising that American managers are sometimes put off by the formality and structure of business relationships in Japan, or that Japanese managers at times view their American counterparts as rude and disrespectful.

It is important to remember, however, that “culture” is a simple term used to describe a highly complex concept, and that etic frameworks for comparing values are very coarse tools for identifying fine-grained differences. Noncautious use of the framework may lead us to erroneous conclusions. For example, Japan is high on UAI and MAS. Therefore, we might expect Japanese workers to seek highly defined work roles, but they don’t. We also might expect them to seek big money rewards for high performance, but they don’t. How can we explain these apparent inconsistencies? The Japanese are a collectivist culture and score low on IND. Everyone takes on whatever role is required when necessary, and individuals try not to stand out within the group. In other words, low IND moderates the influence of high UAI and MAS.

In the context of cross-cultural collaboration, an awareness of value differences can help us anticipate potential problem areas. For instance, G. L. Harrison and associates (2000) found that managers from collectivist (low IND), high PDI cultures (specifically Chinese cultures) experienced greater difficulty in adapting to fluid work groups and teams with a changing leadership than did managers from high IND, moderate PDI (specifically Anglo-American) cultures.

### KNOWING PROCESSES FOR RESOLVING CULTURAL CONFLICTS

Collaborating with people from other cultures involves sensemaking, a process of assigning and deriving meaning to situations and their outcomes. The process of sensemaking across cultures differs little from sensemaking in a purely home culture context. Where culture does have an impact is in the ease in which the process is accomplished. In a home culture setting, the structure of situations and the patterns of interaction are so well established and so well learned that little thought is required to apply them accurately.

**A Model Of Cultural Sensemaking**

To make sense of cultural differences in a collaborative setting and to convey a holistic understanding of culture, a model of cultural sensemaking is useful. Cultural sensemaking is an ongoing process involving an iterative cycle of sequential events: framing the situation, making attributions, and selecting a script, all which are undergirded by constellations of cultural values and cultural history (Osland & Bird, 2000).

- **Framing the situation.** The process begins when an individual identifies a context and then engages in indexing behavior, which involves noticing or attending to stimuli that provide cues about the situation. In determining what to give attention to and what to ignore, an individual “frames the situation.”
- **Making attributions.** The next step is attribution, a process in which contextual cues are analyzed in order to match the context with appropriate schema. The matching process is moderated or influenced by one’s social identity (e.g., ethnic or religious background, gender, social class, or organizational affiliation) and one’s history (e.g., experiences and chronology).
- **Selecting a script.** Schemas are cultural scripts, “a pattern of social interaction that is characteristic of a particular cultural group” (Triandis et al., 1984). They are accepted and appropriate ways of behaving, specifying certain patterns of interaction. From personal or vicarious experience, we learn how to select schemas. We learn appropriate vocabulary and gestures, which then elicit a fairly predictable response from others.
- **The influence of cultural values.** Schemas reflect an underlying hierarchy of cultural values. For example, Chinese subordinates working for U.S. managers who have a relaxed and casual style and who openly share information and provide opportunities to make independent decisions will learn specific scripts for managing in this fashion. At some point, however, these same U.S. managers may withhold information about a sensitive personnel situation because privacy, fairness, and legal concerns would trump honesty and equality in this context.
- **The influence of cultural history.** When decoding schemas, we also may find vestiges of cultural history and tradition. Mindsets inherited from previous generations explain how history is remembered (Fisher, 1997).

Let’s take a look at how the process works by returning to our opening example. When French managers consider developing a relationship with a new company (framing the situation), they (e.g., managers making attributions) opt for acts of complicité (selecting schemas). The dominant value underlying the schema is fraternité (cultural value). In this context, fraternité is manifested as a belief that those entering into an “illicit” act are joined together and share something in common; thus, they should rely upon and trust one another. Fraternité trumps moderate PDI in this context.

An additional consideration is that many French like to take a slower approach to entering into new partnerships, using the additional time to develop a rapport with their new partners. This may be the case with potential German partners in particular, given the historical relationship between the two countries (cultural history). Germans often are characterized as being more
serious and less flexible, but the problem in this situation is not that the Germans can’t be flexible. Rather, it is that the Germans have framed the situation differently, have made different attributions, and have selected a different script.

Often, the knowledge about different cultures stays at the factual level and doesn’t approximate or move to the conceptual or attributional level.

A Taxonomy of Cultural Knowledge
In the evolution from novice to expert, people pay attention to different stimuli and develop different types of knowledge. For example, understanding the control mechanisms within a culture requires the acquisition of attributional knowledge, the awareness of contextually appropriate behavior (Bird, et al., 1993). This contrasts with factual knowledge and conceptual knowledge.

Factual knowledge consists of descriptions of behaviors and attitudes. For example, it is a fact that Japanese use small groups extensively in the workplace. Conceptual knowledge consists of a culture’s views and values about central concerns. Books on culture often focus primarily on the realm of conceptual knowledge. This category of knowledge is an organizing tool, but it is not sufficient for true cultural understanding. Knowing that the Japanese are a communal society (conceptual knowledge) does not explain the noncommunal activities that exist in Japanese organizations or knowing when the Japanese will or will not be communal. For example, why are quality control circles used in some work settings and not in others? Factual and conceptual knowledge about Japanese culture cannot answer that question; only attributional knowledge can.

Often, the knowledge about different cultures stays at the factual level and doesn’t approximate or move to the conceptual or attributional level. So we may know, for example, that the population of China is 4 billion and the population of Thailand is 60 million, but that provides no insight into cultural differences between the two countries, or how the Chinese and Thai might work together. One reason that some managers do not progress far beyond the novice stage is that their cultural learning, like language learning, plateaus before complete understanding is achieved.

Collaborating from a Sensemaking Approach
The acquisition of cultural knowledge takes a good deal of time and energy, something many collaborative endeavors are lacking. So there are some trade-offs to developing attributional knowledge. Also, it is unreasonable to expect collaborators who frequently work with people from various cultures to master each culture. Nevertheless, organizing the knowledge they acquire as context-specific schemas can speed up cultural learning and prevent confusion and errors. The sensemaking model has clear implications:

Framing the Situation
• Clearly identify expectations and analyze their basis. Because past experiences influence expectations, a conscious effort to identify expectations and their bases can lead collaborators to consider ways in which the cross-cultural situation differs from past experiences and, therefore, requires different expectations.
• Scan for cues that challenge expectations. When individuals enter a new situation, they scan for cues that are consistent with past experiences and confirm their expectations. Effective collaborators in cross-cultural situations do the opposite. They search for cues that challenge expectations.
• Build tentative frames and be prepared to modify. We establish frames around situations in order to simplify and make responding easier. But if the frame doesn’t fit, then the response won’t either. One key difference between managers who were identified by their fellow MBA students as the “most internationally effective” and the “least internationally effective” is that the former group changed their stereotypes of other nationalities as they interacted with them while the latter group did not (Ratiu, 1983).

Perhaps one of the best basic lessons of cross-cultural interaction is that tolerance and effectiveness result from better understanding of another culture. Making sense of a culture’s internal logic and decoding culture is easiest with the aid of a willing and knowledgeable informant.

Making Attributions
• Examine your attitude and mood. The emotional state or the mood that one carries into a cross-cultural interaction can have a powerful effect over the attributions that are made about the situation or persons involved. Fear or confusion can lead to attributions such as feelings of danger and mistrust about the other person.
• Focus on the individual. Cross-cultural collaborative efforts do not require one to work with an entire culture, but only with one or several people from that culture. Individual personality also plays a large role in social interactions. To be accurate, attributions about others must take into consideration more information than simply what culture they belong to.
• Build your knowledge and experience base so that you make more accurate attributions. This recommendation builds on the logic of the one above. The more you learn about different types of situations and the different ways that people from a particular culture respond to them, the more you increase your ability to make accurate attributions.
• Share your attributions with others and seek feedback. An essential element of effective communication in any setting, feedback is particularly important in cross-cultural collaboration, where surfacing assumptions of the various members is problematic. Explaining one’s own attributions also can foster a greater willingness by others to share theirs.

Selecting a Script
• Make script selection explicit. Explain to yourself and to others in the collaborative effort why you are doing things in a particular way—i.e., what your interpretation of the situation is and why the response you have chosen is appropriate.

• Seek common scripts. In nearly any situation, there is a range of appropriate scripts. For example, bowing is a common custom in many Asian cultures. However, shaking hands is also quite common within the Asian business community. In response to the frequent confusion about whether to bow or shake hands, a script common to many Asian and non-Asian cultures is the merged slight bow and soft handshake. This script, or portion of a script, fits easily even though it might not be the ideal choice.

• Build your repertoire of scripts through exploratory and reflective activities. Knowing how to act appropriately in specific cross-cultural settings results in self-confidence and effectiveness. One cannot memorize all of the rules of another culture, but understanding the values that underlie most schemas often can prevent us from making serious mistakes.

ONE LAST RECOMMENDATION
Seek out cultural mentors and people who possess attributional knowledge about cultures. Perhaps one of the best basic lessons of cross-cultural interaction is that tolerance and effectiveness result from better understanding of another culture. Making sense of a culture’s internal logic and decoding culture is easiest with the aid of a willing and knowledgeable informant. This can be done effectively within collaborative teams by paying careful attention to team composition and including one or more members known for their prior accomplishments in successfully navigating cross-cultural issues. Beyond this, team members should be encouraged to seek out mentors who can counsel them about specific aspects of the other culture that may influence the collaborative endeavor.

REFERENCES

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An Interdisciplinary Studio: A Collaboration of Architecture and Construction Science

Anat Geva, Ph.D., and Charles W. Graham, Ph.D.

This article is taken from a manuscript prepared in conjunction with the “Collaborating Across Professional Boundaries: From Education to Practice” conference held Nov. 2-3, 2000, in Chicago, Illinois, and sponsored by the Illinois Institute of Technology.

INTRODUCTION

The Special Report by the Carnegie Foundation for the Advancement of Teaching—the Boyer Report (1996)—on the future of architecture education and practice lists among its seven goals the need for a “full exploitation of the interdisciplinary potential for architectural education and practice” and “interdisciplinary connections to better serve society’s needs.” In response to the above recommendations, and as a reflection of the authors’ search for a teaching environment that better represents the realities of contemporary architectural and construction project delivery methods, a joint design-build project was initiated.

The design-build project delivery method is a system of construction project delivery in which one entity forges a single contract with the owner to provide for architecture/engineering design and construction services (Dorsey, 1997). In this project, architecture and construction science students were teamed together in a studio experience to learn how to prepare a single source contract package for an owner. This package includes a design proposal, a conceptual project cost estimate, a conceptual project construction schedule, a cost-revenue curve, and value engineering analysis. Note that the processes and outcomes of this studio differ from other educational endeavors (also labeled as design-build) that focus on actual construction of the projects in the course and should be referred to as design-construct (Deamer, 1999).

DESIGN-BUILD STUDIO

In contemporary terms, a design-build studio simulates the professional practice where design-build becomes an important and viable construction project delivery option. The demand for a single source of responsibility that provides a seamless work environment between the design and construction teams, and the need for faster schedule delivery of the project, contribute to the increased usage of design-build today. These economical prospects demonstrate that design-build is becoming one of the significant trends in design and construction (Dorsey, 1997; Tulacz 1999, a&b).

Furthermore, the link between today’s design-build firms and the master builders of the Middle Ages—and of periods even before—demonstrates the importance of this system through historical precedent (Dorsey, 1997, p 88). The master builder—part architect, part engineer, and part constructor—supervised the design and construction of important public/religion buildings throughout history. This one source of responsibility dominated building construction until the Industrial Revolution, when specialization of different professions such as architects, engineers, and constructors changed construction project delivery practices. In contemporary practice of design-build, the master builder is replaced by a team of specialists (architect, engineers and constructors) who provide professional services to the owner under one “master” contract. Teaching an interdisciplinary studio, which collaborates architecture and construction science in a design-build delivery project, enhances students’ understanding of today’s realization of design-build values in the light of history.

THE INTERDISCIPLINARY STUDIO PROJECT

A joint project of design-build was conducted in an interdisciplinary studio in the College of Architecture at Texas A&M University during the 1999 fall semester. “Interdisciplinary” in this instance refers to the collaboration of architectural design and construction science students in one educational studio setting. The collaborative effort of an upper-level six-credit-hour Architectural Design, and an upper-level three-credit-hour Alternate Construction Delivery Systems (a class in an interdisciplinary studio) addressed the following preliminary objectives:

• Understand the process of design, construction, and design-build by both disciplines
• Create a realistic environment for collaborative projects (simulating the professional practice)
• Develop students’ skills in working in interdisciplinary teams

Architectural Design Studio (Architecture)

The main theme of the third-year architectural design studio—architecture in an international context—was expressed by assigning the architecture students to design an International Services Building (ISB) on the campus of Texas A&M University. The purpose of this 10,000-square-foot building was to serve the growing number of international students and faculty in Texas A&M and would represent the international spirit of the university that appeals to all nations and cultures. The project was conducted in three phases.

First, the architecture class was divided into four teams of four students each. Teams were required to research and analyze the different programmatic functions of such a facility and the local cultural and environmental background. The results of this first stage were presented as conclusions and design guidelines...
that included the project concept (policy statement), its operational objectives, and its programmatic requirements.

In the second phase, the architecture students worked in teams of two to develop their preliminary designs. The factors that influenced their building designs were their conclusions and design guidelines from the first stage, the programmatic requirements, and preliminary discussions of constructability with the construction science students.

In the third phase, students finalized designs based on comments and criticism of their preliminary composition and the joint work with the construction science students. Final delivery of the design-build project of the ISB included a summary of the research, the design proposal, and an analysis prepared by the construction science students. The project was submitted to authors in a hard-copy booklet and presented in PowerPoint to a panel of reviewers.

**Alternative Construction Project Delivery Systems**

The construction science students of the Alternative Construction Delivery Systems class were given three assignments.

The first assignment required that the construction science students work with the architecture students to prepare: a conceptual cost estimate; a preliminary schedule analysis; a site logistics plan; a VE analysis of the foundation, structure, building envelope, roof system, and selected equipment; a bid package; and a cost-revenue curve analysis. The results of these assignments completed by the construction science students were delivered together with the architecture students' designs as part of the final presentation of the project proposal.

Teams composed of two construction science students prepared conceptual cost estimates for the preliminary architectural designs using a "square-foot cost" multiplier to give the architecture students an idea of the cost of their proposed facilities. In addition to the conceptual cost estimate, the students prepared a preliminary schedule analysis.

The second assignment required the construction science students to analyze the architectural designs and to make suggestions about the proposed site plan and building materials and systems to satisfy the objective of value engineering. Therefore, the students evaluated all parts of their team project, arriving at the best value commensurate with lowest life-cycle cost. The site plan was accompanied by a site logistics plan, which indicated the layout of materials, equipment, travel, and other activities during the construction period.

Following refinement of the architectural design, each team of construction science students, from the third assignment, prepared a bid package listing all of the trades and activities required to build the design. This bid package was based on the outline found in Dorsey (1997, p 200). In addition, the construction science students analyzed the cash flow of the designers' projects from start to completion. This analysis resulted in a chart showing the cost and income cash flows for each project during its construction life cycle.

**Joint Project Procedure**

Team members from architecture and construction science were introduced to each other in a joint meeting of the two classes held at the beginning of the design-build project. Additional joint meetings were scheduled when the architecture students presented their research about the ISB, when the architecture students presented their preliminary designs, and when the final presentations were made in front of a jury.

**Project Background.** During the first phase, the architecture students researched the project's background, including the history of Texas A&M University, the climate of College Station, Texas, local building design practices, availability of materials, typical needs of this type of client, and related architectural programming matters. The architecture students also had to conduct research of similar facilities built at other universities throughout the world. The construction science students did not take part in this stage of the project. They prepared a mission statement to be signed by all members of each team.

**Preliminary Design and Project Cost.** In the second stage, the architecture students developed their preliminary conceptual designs for a critique by the architecture and construction science faculty members. The construction science students prepared a conceptual cost estimate and a preliminary construction schedule.

While the building program was not constrained by a fixed budget, the bid package prepared by the construction science students translated the conceptual design of the architectural students into a sequence of construction and cost. Providing this information to the design students (the architect) and to the instructors (the client) at an early stage of the project helped in decision-making when the direction of the project was established.

**Refine Design.** The third stage of the project followed review of the preliminary architectural designs and the construction cost estimates. The architecture students had to refine their designs and the construction science students had to refine their bid packages for the project. The construction science students consulted with their design colleagues and assisted them with value engineering and cost-revenue curve analyses. These analyses were submitted to the architecture students as a written statement of performance guidelines. Once a consensus was reached, some of the construction recommendations were incorporated into the final architectural designs, helping refine the projects' estimated cost.

Students of both disciplines learned the importance of collaborative teamwork and building technology during early stages of building design, assisting the designer and the client in decision-making.

**Delivery of Project.** The final stage was delivery of the completed joint project. The architecture and construction science students prepared a digital presentation for a panel of reviewers that represented the client. In addition to this joint presentation, the students submitted a booklet that included all the final design and construction information for this design-build joint project.

The student projects demonstrated the effectiveness of collaborations between the architecture and the construction
science students early in the decision-making process. The specific examples discussed here illustrate typical variations in team collaboration and the factors that influenced the design and construction decision-making processes. The collaborative project exemplifies an integrative mode where the team worked as a cohesive and coordinated unit, seriously engaged in collaborative exchanges of information throughout the entire design process. The independent project is the output of a team whose members (designers and construction) worked independently (in parallel) throughout the process, trying to consolidate the product at the final phase of the process.

COLLABORATIVE PROJECT RESULTS

The collaborative project team included two students from architecture and two from construction science.1 The policy statement (architectural concept) of their design was: "...to provide a distinguishable and efficient on-campus facility for international students and faculty services." All four team members prepared design objectives to achieve this policy statement through joint discussions and agreement at the outset of the project. These objectives included the issues of the building's function (to design office spaces and student activities) and the image of the facility (to include modern and high-tech features and to provide a user-friendly atmosphere).

The site plan emphasizes the site circulation as a factor that impacts the building orientation as well as the relationship between the building and its exterior spaces. The building layout was divided into three areas:
- Common/public area, centrally located
- Student services wing, located on the left side of the central area (entrance)
- Faculty services wing, located on the right side of the entrance

This proposed ISB represents a contemporary design with an inviting image and clear orientation in and around the building. This image called for a specific structural system and construction and finish materials. The construction science students examined various options by VE analysis and helped the designers with the decision-making process. Eventually, the total area of the ISB was 9,980 square feet, and its estimated cost was $1,200,000 including security, overhead, and profit. The construction duration of the project was estimated from 10 to 11 months.

These impressive estimated figures—and the unit cost of $120.27/square foot—were the result of the collaborative studio and the early use of value engineering. Following analyses, evaluations, and discussions, the designers incorporated the construction science students' value engineering analyses and recommendations early in the design process. This helped the team produce a cost-effective design. In addition, the estimated preliminary cost calculated by the construction science students became the reality framework for the designers who modified their work accordingly. For example, this team's design solution provided shorter sidewalks and preserved almost all existing trees on site—a cost-effective decision. Also, the building was divided into major functional areas, making it more energy conscious and secure (each zone is supported by its own mechanical system).

INDEPENDENT PROJECT RESULTS

A joint team of two students from architecture and two from construction science conducted the independent design-build project.2 This team was challenged to use their architectural concept in creating a unique international icon at Texas A&M University by combining architectural elements common to the university campus with contemporary dynamic features.

The site plan, section, and details of landscape features such as planters, water formations, and path pavements were not discussed with the construction science students beforehand; therefore, the first conceptual cost of site work was much higher than expected. The building design expressed the team's architectural statement and incorporated a dynamic shape using contemporary materials such as steel, concrete, and glass. The materials chosen by the designers to express a particular architectural image dictated certain structural systems and construction methods. The construction science students prepared value engineering analyses that evaluated the suggested construction/finish materials, systems, and methods. These analyses considered: design characteristics (fitness to neighborhood, accessibility, functions); construction issues (safety, speed, cost); and operation factors (energy efficiency, maintenance, durability).

However, the discussion about the result of the value engineering analysis took place only toward the end of the design process. Since the joint effort started later in the design process, the results of the value engineering analysis showed that the suggested materials were not rated as best value for the owner. This result provoked an important and constructive discussion about the process of finding the balance between the project's image and its cost. It also triggered discussion of the best time to involve the builder during the project's life cycle.

The total area of this solution was 10,000 square feet with an estimated cost of $1,800,000 including security, overhead, and profit ($181.62/square foot). The project's construction duration was estimated at 10 to 11 months.

CONCLUSION

The comparison of the collaborative and independent projects' size, total cost, unit cost, and construction time is shown in Table 1 (page 10). Early value engineering and team collaboration were factors in improving the unit cost of the collaborative project over the independent project.

Students of both disciplines responded to an evaluation questionnaire on the joint design-build project. Their responses indicated that they were excited about a joint studio project. They identified the utility of exploiting the potential of interdisciplinary education, both in the discussions and in the final presentations that

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1 Architecture students: Hobart Chan and Lillian Lin; Construction Science students: Brent Pilgrim and Greg Griffin.
2 Architecture students: Matias E. Garza and Lucian Neslin; Construction Science students: Caroline Mire and Micah Wheeler.
represented the joint effort of the design-build project.

Students’ major conclusions supported the authors’ ideas that led to this attempt to bring together architecture and construction science students to work on a joint studio experience incorporating the design-build project delivery method. The students indicated that more time should be allocated for joint meetings.

| Table 1 |
| Comparison of Collaborative and Independent Projects |
| International Service Building, Texas A&M University |

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Collaborative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area</td>
<td>9,980 Sq. Ft.</td>
<td>10,000 Sq. Ft.</td>
</tr>
<tr>
<td>Total cost</td>
<td>$1,200,374</td>
<td>$1,816,171</td>
</tr>
<tr>
<td>Unit cost</td>
<td>$120.27/Sq. Ft.</td>
<td>$181.62/Sq. Ft.</td>
</tr>
<tr>
<td>Construction time</td>
<td>10-11 months</td>
<td>10-11 months</td>
</tr>
<tr>
<td>Value engineering</td>
<td>Early in design</td>
<td>Late in design</td>
</tr>
</tbody>
</table>

One activity that should be undertaken in future joint projects is a team-building exercise. An outside facilitator should lead this meeting to demonstrate the partnering workshop process to the students (Ronco and Ronco, 1996). To encourage a full team collaboration throughout the process, collaboration with graduate students of a “design-build” graduate seminar should be considered. These students would simulate the role of project construction managers—the team leaders. Therefore, they would be responsible for creating a team environment and for coordinating the work of the members of each team.

Figure 1 diagrams the scheduled activities that should be undertaken in an interdisciplinary studio where architecture and construction science students are given a joint design-build project. In addition to these activities, collaboration with other classes, such as structural/mechanical engineering and landscape architecture, would further enrich the experience of teamwork and better prepare the students for collaboration efforts in their professional career.

In summary, the design-build project just discussed was very important to students, demonstrating reality in the interdisciplinary studio. The architecture students were made more aware of building materials, construction technology, and cost, while the construction science students better understood the process of design and the importance of architectural forms and images.

Collaboration between the two disciplines should continue in this mode of joint projects and should be supported by institutionalized syllabi and class schedules. Such coordination will help improve students’ educational experience and better prepare them for the new realities of practice.

REFERENCES


Anat Geva, Ph.D., is an assistant professor at the Department of Architecture, Texas A&M University, where she teaches architectural design studios and undergraduate and graduate classes in the history of building technology. She is a research fellow at the Historic Resources Imaging Laboratory in Texas A&M University and serves as the book review editor for the APT Bulletin (the Journal for Preservation Technology). Charles W. Graham, Ph.D., is the Mitchell Endowed Professor of Housing Research in the Department of Construction Science at Texas A&M University. He is a registered architect and interior designer in Texas.
PROLOGUE
Value Cost Management (VCM) introduces a closer collaboration between the cost estimator (CE) and the certified value specialist (CVS). The synergism created by this collaboration will optimize the talents and performance of the CE and CVS, improve the accuracy of the cost estimate, and concurrently identify value alternatives to maximize the worth of the project. VCM can almost eradicate the twin fears of every owner: change orders and busted bids.

For some time we have recognized the need to improve the interface between the CE and the CVS. It was one of the prime reasons for the formation of the Joint Cost Management Societies (JCMS). We can more accurately predict the probable cost, while simultaneously providing the owner with design alternatives that can result in optimal value. This will give us more confidence in getting the bid within the budget. This combination of talents makes the effort proactive as opposed to the usual cost estimate that is a passive assessment of costs for review and action by others in the search to optimize value.

There is need for a change in procedure. For example, a recent school bid in Virginia came in at 27 percent over the estimate and budget. The school board must consider emergency measures to cope with this dilemma. Do they redesign, rebid, or change their academic program to fit whatever compromise solution they can work out with the low bidder? Any of these alternatives are problematic. There is a better way: to assure performance and control the cost, VCM is the answer.

CERTIFIED VALUE SPECIALIST
The CVS is required on many projects to seek optimal value for any given procurement, activity, or capital outlay. Like the CE, the owner feels more comfortable having a third-party team of design professionals evaluate the plans and specifications for errors, omissions, and the design approach. A frequent format is one or more interventions at various stages of planning or design. The CVS assembles a team composed of one or more multidiscipline professionals well versed in critical aspects of the design. The CVS leads them through a series of the logical steps of value management (VM), the most efficient way to lead a disparate team to a consensus conclusion in a tightly prescribed time frame.

PREWORKSHOP PREPARATION
The CE and CVS plan their approach to the request for proposal (RFP) or request for qualifications (RFQ) with the assumption that professional services will provide VCM. When the selection is made, the successful CE and CVS plan the details of the VCM workshop. Before VCM, cost estimators were very good at interpreting plans and specifications, but they were not infallible. Many phone calls, e-mails, faxes, and an occasional visit to the designer's office resolved most issues; the resulting overall estimate was probably within reasonable tolerances.

VCM gives the CE another form of assistance in interpreting plans and specifications: the CVS and a team of design professionals. Between the two teams, problem areas are identified, and the design intent is determined, giving the CE a much better understanding of the present design in order to estimate the probable costs more accurately.

And just as surely, the CE can assist the CVS in expressing costs in functional terms. For example, the cost of a circular addition to an otherwise rectangular footprint, as a part of a larger renovation, will be of interest to the CVS, for the transition from one shape to another usually is more expensive. In situations like this, before VCM, the CVS would modify the cost estimate to identify VE targets. Then the entire VE team adjusted the estimate during the workshop. Some systems, such as HVAC, electrical, and structural, often were difficult to separate precisely. This
The CE, working with the CVS, can identify areas of anomaly. Normally the CVS and CE begin by identifying critical qualifications of the owner and conditions relating to the cost model. This can be a powerful member of the team — and can feel more useful — if the CE can be a creative member of the team — and can feel more useful — than the expressions of the cost estimate. The CE can clarify the identification of cost by using techniques that increase the cost. The CE obviously can help enormously at arriving at rough costs and at narrowing the list of ideas. Obviously the CE can help enormously by arranging the list of ideas, and the CVS and CE are working closely with the present design, giving the CE a better understanding of the design details and allowing for the refinement of the cost estimate. The CE interprets the present design, giving the CE a better understanding of the design details and allowing for the refinement of the cost estimate. Initially we are trying to separate the likely ideas from the less likely, and speed is of the essence. Later in the process, we strive to narrow our list to the potentially better solutions. The CE obviously can help enormously at arriving at rough costs and at narrowing the list of ideas. The CE and CVS provide more accurate information concerning the various ideas. During this and all phases of the study the CE can be a creative member of the team — and can feel more useful — than the expressions of the cost estimate.
EVALUATION OF THE VCM PROPOSALS BY THE STAKEHOLDERS

After the workshop, the owner, users, and designers review the VCM proposals. The designer is obliged to reply in writing to each VCM proposal whether to accept, reject, or accept with modifications. This is a crucial stage. Inviting a strong VCM team to the implementation meeting is the best way for the owner to have sound professional refutation of any negative response.

The CE can help reach the owner to make this happen, for the cost estimate is always a key issue. In normal VE, the CE remains in the loop long after the VE team is finished with its scope of work. But in VCM, the CE and CVS stay on the owner's team until the end of the project. This is a distinct and powerful benefit to the owner. The efforts of the CE and CVS are not necessarily continuous, but they are a resource to the owner.

IMPLEMENTATION OF ACCEPTED PROPOSALS

Even after VCM proposals are accepted "as is" or modified, they must be incorporated into the design. The best way for the owner to achieve the maximum savings is to have the VCM team monitor the design and report on the state of the implementation. The CE can adjust the cost estimate to reflect the changes, and the owner is kept abreast of the current state of the project. This is a tremendous benefit as the project nears the bidding stage. It is costly and embarrassing to put it out to bid when the timing is not correct or the estimate indicates it does not have an acceptable margin between the probable costs and the budget.

The VCM team, as a third-party professional, can assist the owner in evaluating important influences on the bid. They take a different view from the designer or construction manager (CM). It is a unique opportunity for the owner to have an unbiased opinion to help make crucial decisions. The VCM team can give their collective opinion of critical factors such as the status of the construction market, the clarity of the bidding documents, access to the site, delivery of construction materials, etc. The owner will be gaining the viewpoints of the designer and CM; the VCM team is a great added resource.

FOLLOW-UP TO ASSURE OPTIMUM VALUE

Finally, the owner should verify the real value of the VCM workshop. This vindicates the expenditure and allows a more realistic evaluation for future projects. Whether or not the accepted proposals actually make it in the final facility should be verified as a guide to future projects.

Often, as a peripheral value of VCM, the owner and user gain a greater understanding of the details of the design. This affects how they plan for occupancy and may instigate modifications in the facility or the user's program to reflect the true conditions they will have in the completed facility. The CE and CVS can prepare a follow-up report discussing how the project was managed and how to approach the next project. Unlike the typical VE intervention, VCM stays with the owner all the way.

SUMMARY

- VCM is a significant improvement in cost estimating and value engineering that utilizes the talents of both CE and CVS professionals in a combined effort to:
  - Define the cost of the present design.
  - Find alternatives that are the lowest possible cost.
  - Perform the needed functions.
  - Assist the owner in evaluating the proposals.
  - Assure the integration of the accepted proposals into the design.
  - Assist in the decision of when to bid.
  - Support the owner in implementation.

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INTRODUCTION
The use of a psychological construct for human conflict resolution is a new way to understand the dynamics of value methodology (VM) teams. A collaborative team, one that directs its members to exercise their own expertise while satisfying the goals of the owner, is the objective of all project teams, but collaboration is uniquely realized in VM teams. How VM teams serve as a model for collaborative team behavior is explored below, and ways a team leader can foster collaborative team behavior are suggested.

CONFLICT RESOLUTION THEORY
Thomas and Kilmann and others have established the theory of human conflict resolution over the past 20 years. The Thomas-Kilmann Conflict Mode Instrument (TKI) is one of several tools used to help teams recognize their conflict styles and how that affects performance (1974).

The TKI is useful in understanding an individual’s style for handling conflict and in revealing how different styles vary within a group of people. This assessment tool often is used in partnering sessions to help members of a project team learn how their individual styles of behavior differ from other members of the group. Being aware of these differences allows members to be more sensitive to potential conflicts that might arise among project team members. Answers to standardized questions yield scores for each of five modes for each individual. There are no right answers. The scores are interpreted to show the mix of behaviors individuals use in different situations.

The TKI construct recognizes five modes of conflict resolution: avoiding, competing, accommodating, compromising, and collaborating. These modes are derived from degrees of assertiveness (striving for our own rights and interests) and cooperation (striving for the rights and interests of others), as diagrammed in Figure 1.

According to this concept, when we emphasize cooperation alone, we tend toward accommodating behavior (the horizontal arrow); when we emphasize only assertiveness, we tend toward competing behavior (vertical arrow). But when we combine high assertiveness with high cooperation, we enter the collaborating mode (long diagonal arrow). The opposite of collaborating is avoiding, which occurs when we fail to be both assertive and cooperative. Halfway efforts of cooperation with assertiveness result in compromising behavior (short diagonal arrow).

COLLABORATIVE BEHAVIOR
While the TKI is designed to describe individual behaviors, it can serve to describe team behavior as a whole. Collaborating, one of the five modes, is described as having the following uses:
• Finding integrative solutions
• Testing assumptions, understanding the views of others
• Merging insights from people with different perspectives
• Gaining commitment with consensual decisions
• Working through hard feelings interfering with relationships

These descriptors of collaborating behavior are a good definition of the ideal team asked to solve a problem. They describe the positive attributes of a high-performance team. And VM teams often are high-performance, collaborative teams.

The term collaboration is used to describe both individual and group behavior. Glenn Parker (1984) lists four types of effective team players in cross-functional teams:
• Contributor: task-oriented, supplies technical data
• Collaborator: goal-oriented, open to new ideas
• Communicator: process-oriented, consensus builder
• Challenger: questions goals and methods, encourages risk taking

Each of these types is a valuable resource to the team; diversity is useful. Michael Schrage (1990) gives emphasis to the concept of collaboration: “Collaboration is the process of shared creation...of value creation that our traditional structures of communication and teamwork can’t achieve.”

Thus, the collaborative style can be seen as the highest ideal of team behavior. Every team leader and every owner strive to achieve this ideal team performance. The ultimate objective of all teams is to balance the assertiveness and cooperation of the assembled team to achieve collaboration. This team model is a
simultaneous striving for the individual team member's goals (assertive behavior) and for the owner's goals (cooperative behavior).

**TEAM STYLES**

VM is designed to assemble a heterogeneous group of experts to assess the value improvement options for a product, process or project. The members have the goal of participating full time and asserting their knowledge into the problem at hand. The owner has an interest in achieving improved value by receiving the maximum cooperation from the team. There are four strikingly different styles of team behavior derived from the TKI construct:

- **If the team strongly asserts its interests (for personal recognition) and also strongly cooperates (on behalf of the owner) new collaborating solutions evolve from the VM session (the long diagonal arrow of Figure 1).**
- **If the team is extremely cooperative with the owner but fails to assert its expertise, the alternatives may seem merely accommodating and of little value (horizontal arrow).**
- **If the team is mildly assertive and mildly cooperative their ideas may be compromising and elicit only moderate interest from the owner (the diagonal arrow reaching only the center of the box).**

With no effort to be assertive and no effort to cooperate, the extreme avoiding team may produce no useful work.

The best VM studies combine highly assertive and cooperative teams that strive with high energy to collaborative solutions. Neither the mostly competing team nor the mostly accommodating team serves the owner as well; and halfway efforts yield only compromising solutions. The greatest VM team performance comes from the assertive/cooperative team—the collaborative team.

**TEAM PERFORMANCE**

Examples of VM team performance serve to illustrate the five behavioral styles outlined earlier, with suggestions for team leadership skills to enhance team performance:

- **Collaborating Team:** When the value team is a group of experts in their respective technical fields, the potential for assertive performance is high. To become a collaborative team the team leader must elicit from the members a high degree of cooperation. Demonstrating a positive attitude toward the owner and keeping the owner apprised of the value team's progress during the study exhibit cooperation. The team leader also can serve as a model of collaboration by participating fully in the VM Job Plan, including preparing the alternative documentation.

- **Competing Team:** With strong members who exhibit assertive behavior, but who resist all attempts by the team leader to cooperate, the result is a competing team. The team leader may need to excuse team members who do not understand their role. Sometimes one member of the team can "poison the process." For example a design manager who is part of the team may quickly criticize (evaluate) each new idea offered by other team members. This display of assertiveness—with no cooperation—can have the possible effect of destroying the team dynamic. The final results can be so disappointing that the owner may need to request a repeat of the whole study. Team leaders may need to exercise the right to excuse an uncooperative team member if appeals for changed behavior are not effective.

- **Accommodating Team:** A highly cooperative team can be at a distinct disadvantage if there is no assertiveness. In a case where the team members are mostly in-house staff, new to the organization, they may not want to challenge the original design concepts or standards. This team can be too sympathetic to the owner's design; they are an accommodating team. The study results can be disappointing both in quality and quantity of alternatives presented—as well as in the low rate of implementation. A technique the team leader can use to arouse some assertiveness in the team is to say that the value methodology "gives them permission" to challenge the original concept. Adding a more assertive team member—even in the middle of the study—may raise the performance of the team.

- **Compromising Team:** When a VM team halfheartedly exhibits assertive and cooperative behaviors, it stops short of the ideal collaborative team and becomes merely a compromising team. The team leader can encourage this low-energy group to do better, but the final output—while meeting the owner's needs—may not exceed the owner's expectations. Perhaps different team members, more time, or even a different project will result in a more collaborative team. The team leader must meet with the owner prior to the study to ensure the selection of skilled, motivated team members.

- **Avoiding Team:** A team with members who fail to attend the first session or vacate the study before it is finished can be labeled as an avoiding team. This lack of assertiveness and cooperation is rare, fortunately; but when it does occur, the team leader must exercise control of the situation and postpone or cancel the study. It is better to recognize impending failure early than to struggle with an unprepared or disinterested team.

**TEAM LEADERSHIP**

The importance of the team leader becomes clear in nurturing a collaborative team. Two key elements are trust and enthusiasm. As Larson and LaFasto (1989) say, based on their research of team effectiveness, "The extent to which a collaborative climate is present [in a team] is very much influenced by the team leader.... Members tend to mirror the collaborative style of the leader." They further suggest that trust is an essential attribute of collaborative teams: "Trust improves the quality of collaborative efforts... [because] people are willing to try something...rather than remain inactive because of the fear of failure." The team leader can engender trust in the team by encouraging open and honest communication so the team members can stay focused on the common goal of the VM study.

Further, the team leader must infuse the team with interest...
and enthusiasm for their assignment, as suggested by a senior scientist: "To know about science isn’t so important. To be interested in science is more important, and to generate interest in what science is doing." So said Edward Teller, nuclear physicist, when, at the age of 93, he delivered his "sermon to science" to a high school teachers’ symposium. Teller, who collaborated early in his career with the world’s preeminent scientists to develop nuclear weapons, is saying that interest and enthusiasm for the teacher’s subject is essential. This applies to value teams. Like teachers, the team leader has the duty to generate enthusiasm to facilitate the creativity that is needed to find innovative solutions. Without enthusiasm and trust, there may be no collaboration.

SUMMARY
Applying the TKI conflict resolution model illuminates VM team performance. The collaborative team is the model against which all others are compared. While the compromising team can achieve some results on behalf of the owner, its performance needs to be raised to the collaborating level. The competing team, the accommodating team, and the avoiding team are much less desirable modes of team behavior and should be recognized early in the study in order to make necessary changes to improve performance. The team leader carries the responsibility for monitoring team performance, modeling desirable team member behavior, and taking corrective action when needed.

Because VM teams operate under a well-defined protocol—a Job Plan with specific steps—they have the best chance of achieving the best results of any work teams. More often than not, they are the models for team behavior as they achieve that prized high-level performance of the collaborative team.

REFERENCES
Editor's Note: Recently I had the occasion to read some old articles written by Larry Miles, “father of value analysis,” and I would like to share a couple of them with Value World readers. The first one is reprinted from the Purchasing World Reprint Library, 1986, with permission of Adams Business Media and Eleanor Miles Walker, widow of Larry Miles. The full texts of all 51 columns written by Miles for Purchasing World are available online from the Larry D. Miles Value Engineering Papers Collection, University of Wisconsin. Contact: www.wisc.edu/wendt/miles/miles.html.

The second article is an overview I have prepared of an original Miles article, “Cutting Costs by Analyzing Values.” Permission to reprint these selected excerpts in Value World was granted by the National Association of Purchasing Management and Eleanor Miles Walker.

—Roger B Sperling

Time May Have Function, Which Has Value

Larry D. Miles

Is the buyer a public relations person, obliged to see everyone who comes? If we answer affirmatively, hours of potentially productive time are wastefully blanked from his achievement schedule. If the answer is a negative one, he is open to great criticism from many sources. A stockholder protests, “I have something that you need, but your purchasing operation is so restrictive that I can’t get an appointment to tell a buyer.” Other comments heard are, “They’re not democratic; they show preferences,” and “The buyer thinks he’s God; it’s too hard to get in to see him.”

Often a compromise seems the best answer—limiting hours. “Buyers are available to all, from 11 a.m. to 12 noon, and from 3 p.m. until 4 p.m.” This policy produces waiting, crowding, and hurrying.

Finding a Solution

There is a better answer, a better way. Ask a VA-trained buyer. He’s not only results-oriented, he’s trained in specific procedures that get the results. He knows the function is what’s important. He thinks function, he talks function, he buys function. He thinks in terms of function when the situation is considered. What function is each supplier’s representative in the waiting line trying to achieve? What function is the buyer trying to achieve as he receives each one? The realities can be communicated by use of an example.

The buyer’s company used large amounts of cement on a continuing basis in its manufacturing process. He contracted for it. The sales manager of the cement company called on the buyer about once each 60 days. A very good rapport existed. The buyer was reluctant to spare the time which he needed for pressing work, even to be polite to this well-liked sales manager, so he leveled with him. The buyer said, “We have some new purchasing approaches. They are based on the value analysis principle that by thinking and knowing functions we can benefit the company. Let’s try it. Exactly what is the function of your visit? We’re buying your material by contract. Your deliveries are good. Your quality is good. We are having no problems with your materials. What function does your visit serve?”

The sales manager answered that his company liked the business, wanted to take good care of it, wanted to be the first to know if there were any problems or dissatisfaction with the product or personnel of the company, and found it worthwhile to keep warm personal relationships with its customers. The buyer acknowledged the sound and understandable functions, then proceeded to develop his own.

“Exactly what function am I trying to achieve by assigning time to your regular visits?” he asked. Some of the buyer’s thinking is listed below.

Function Comes First

“With productive work I can’t get to, I should have some functional purpose I’m trying to achieve—some possible benefit to my company. His function in making the call benefits him, but not my company. If I had any problems with cement, I’d get to him at once. He knows a lot about cement—its variations, its deviations, its properties. He might tell us how to better use it, or how to achieve our functions, while using less, or about a lower cost material. He might give us an idea on how to accelerate our manufacturing process, or how to save cost in handling.”

The buyer then told the sales manager, “I have a function to accomplish by seeing you. You know the cement business through and through. You know how it’s made, how it’s packaged, how it’s shipped, how it’s delivered, how it’s received, how it’s handled, and how it’s used. You know different grades and types of cement. You know different properties and costs. You know different ways of using it. My function in seeing you is to reduce the cost of settled cement in our product by benefiting from your knowledge. You like a challenge. I’m giving you one. Next time you visit me, and every time after that, bring me some knowledge that might increase the values in our cement.”
Time passed. The sales manager came in again. He said, "There are different marketing arrangements universally used for selling and providing cement to different industries. I have investigated and found you qualify for a different price schedule. Beginning with shipments after today, your cement will be billed at a lower price." Several thousands of dollars per year were added to earnings because the buyer expected each hour of his time to be achieving some function for his employer, and he used what would have otherwise been unproductive time to achieve it.

**BENEFITS TO BUSINESS**

In another example, the buyer of materials for porcelain manufacture was visited by one of his suppliers, from whom he purchased five basic ingredients. They were all pulverized material. Some came in bulk carloads, others came in barrels. The buyer told him, "I'm giving you a lot of business, and you are handling it well. You have so much knowledge of the types of materials we use and their markets; however, I feel you could help me more." He told the supplier about the system of expecting each visit to achieve some function. "Next time you come, I want you to bring me some information that will benefit the earnings of our business," the buyer told him.

When the salesman came for his next call, he said, "I have it, but I'm not sure it's to our interests to do so. But you asked for it, and here it is." He named one of the five materials that was bought by the barrel. He said, "We don't make that. We don't have other customers for it. We buy it, warehouse it, and ship it to you. We add our mark-up for our handling and management. I took it up with our management. We don't make anything on it. We would like to have you buy it direct and save 20 percent, but the supplier is our competitor on other items, and by getting you acquainted with them, we may strengthen your ties with the competition. How can you protect us so that we won't lose business as a result of the assistance we gave you?"

The buyer assured him of the extra consideration he had earned by his helpfulness. He placed future orders for the one material at 20 percent lower cost.

Time is a valuable resource. Function is the language of the value methodology still practiced half a century later.

**SCOPE OF THE BOOKLET**

The preface introduces value analysis from the perspective of the purchasing agent in a company striving to save money and improve competitiveness. The "value-conscious buyer" is urged to apply value analysis to achieve value improvements that would not result in any other department of a company, but would be aided by that department's assistance. The effective value-based program must involve:

- Training to teach value consciousness
- Exact methods to develop "value-ability"
- Organized management review to effect all possible savings

The introduction begins the teaching of the study of functions. "Every purchase order buys a function," such as surface protection, instead of just buying paint. Value, then, is defined as "the amount of a necessary service or function...with which the dollar has bought. The job of value analysis is to make certain that every element of cost...contributes proportionately to function." The intended use of the booklet as a self-training manual is outlined.

Thirteen "major classes of benefit" to be achieved by value analysis training are listed next. These start with "better value through better purchasing" and include standardization, traffic operations, and 10 others. Specific examples of value analysis studies are listed for each of these major classes.

A tabulation of 16 "business and industry groups concerned" follows, providing a matrix showing, for example, that textile manufacturers will have an interest in all 13 classes of benefits, whereas hospitals and similar institutions will find half of them pertinent to their operations.

The 13 example studies included in the booklet are three to six pages long, starting with opening comments introducing the study, followed by questions for discussion, and examples of better value. The following excerpts from one of the 13 studies serve to illustrate the content and style of this training manual.

**BETTER VALUE THROUGH BETTER MANUFACTURING METHODS**

Comments: To the buyer, manufacturing methods are of great concern. Only through a thorough knowledge of these methods can he do a satisfactory job of procurement. He must be familiar with the processes to which the materials he purchases are subjected. He must know how the equipment he buys will be put to use. Only by studying the methods can he be of service both to his vendors and to his own company.

"Getting good value in manufacturing requires perfection in teamwork. New processes, new machines, and new manufacturing resources normally come first to the buyer or can be found first by him. Is he an immediate 'conductor' of these ideas to his manufacturing people?

"It is the purchasing man's opportunity to open the doors of the entire outside world to those in the plant whose job is manufacturing."
Questions for Discussion: (Excerpts from four of 16 questions follow.)
1. How much do we know about the manufacturing methods and processes our company uses?
   a. Why should we know more about the manufacturing processes, equipment, facilities, etc., used on each of our products?
   b. To what extent have we made it our business to know considerable details of each of these?
   c. How can we learn more about them?
2. Do we in purchasing feel responsible for each nonfunctional dollar that is spent because of inadequate facilities?
   a. To what extent does our management want us to search for more suitable and lower-cost manufacturing equipment and processes?
6. Are we performing operations by hand which could be handled by modern equipment using modern techniques?
16. Have we given power metallurgy an opportunity to develop its best opportunities?

Examples of “Better Value Through Better Manufacturing Methods”: (Selected excerpts follow from a total of 17 in the original.)

Prepaint Process for Metals Saves $2,200 a Month. A manufacturer changed from a multistep system of preparing steel stamping for painting to a simplified method that combines both cleaning and phosphating in simultaneous operation. Changeover eliminated several steps and provided superior paint adhesion. Savings of $2,200 per month over the cost of the former methods were shown.

Four Machine Setups Instead of 45. Plants producing gun mounts report that mounts are now produced in four machine setups instead of 45 by the use of a rotary table operated by five sets of double enveloping gears ranging up to 96 inches diameter.

Adding an Operation Reduces Cost. The cost of processing a gear was cut by a tractor manufacturer from $5.66 per C to $4.14 per C by using two operations instead of one. Formerly, the gear was hobbed with a single thread hob. Now it is hobbed and then shaved on an underpass gear finisher.

Electronic Brain Slashes Rejects 35 Percent. An electronic brain, or classifying gauge, that gauges and sorts refrigerator compressor systems slashed rejects 35 percent. It makes possible a more liberal work tolerance for machining operations.

SUMMARY AND CONCLUSIONS
Reading through “Cutting Costs by Analyzing Values” reveals seminal value analysis work and early applications of the value methodology still used today. The reader is encouraged to dig deeper into this early value analysis publication to glean insights about how Larry Miles and others envisioned the application of the value process. This 50-year old document has stood the test of time: it gives concrete examples of how value analysis was successfully used and encourages the enthusiastic application of this methodology today.

REFERENCES
Larry D. Miles Value Engineering Papers Collection, University of Wisconsin. Contact: www.wisc.edu/wendt/miles/miles.html.
INTRODUCTION TO VE
I first heard the words “value engineering” in 1982. A state regulator told me the wastewater plant I was designing would have to be value engineered at the preliminary design stage, as instructed by the USEPA. My boss called the head of VE at the Port Authority of New York/New Jersey, whom he had met at a conference, and asked for a recommendation. That's how Jim Hudson and a band of Virginians found themselves in Liverpool, New York. My boss assigned me to attend the workshop full time and said, “Don’t let them change our design!” When I saw how the VE process developed an improved site plan—after we had considered 16 of them—I was hooked. I talked my boss into having Hudson teach a 40-hour training workshop the next week where, by the way, the trainees took the value improvements even further. With an 18 percent savings and an improved project, it was love at first sight.

VE IMMERSION
Shortly after the above project design was completed, wastewater funding began to dry up, along with the market. Too naive to know it was a long shot, I convinced Hudson to go after a VE contract with our firm for the Sacramento District Corps of Engineers. We got the contract, which led to 13 studies during two years. At that time, our firm was working with design review for the massive Fort Drum project in northern New York. At the urging of some of our VE team members who also were doing design reviews, we prepared a gratis VE report for one of the Fort Drum projects. This led to a meeting with the base’s general and a contract for 19 studies. I was in a sea of VE, and I loved it. I joined SAVE International at Hudson’s suggestion, and in 1984 I attended my first SAVE International conference in Sacramento, California.

VE—A ROAD TO MANAGEMENT
With success in VE and certification as a CVS, I was promoted to managing engineer. My job encompassed the role of QA/QC coordinator. As the TQM wave washed over the firm, I incorporated VE into the project management scheme. Although this scheme was adopted by the firm’s management, it was poorly implemented—a fate of many expensive TQM programs in a number of firms at that time. My boss liked VE for profit, but never believed in it for in-house use. To this day, it is a source of amazement and frustration to me that this powerful set of tools known as VE is so underappreciated. My becoming environmental division manager and part owner of the firm made it increasingly difficult to break away for VE studies.

WATERSHED MOMENTS IN MY CAREER
Starting in 1995, VE-related work became my full-time gig. I never knew I didn’t like what I was doing until I didn’t have to do it anymore. It is a blessing to love your work. In 18 years of this work, and 16 years in SAVE International, I have encountered several VE-specific watershed moments:

• First, the 1989 Indianapolis SAVE International conference, where I learned mind-mapping and became acquainted with two other relative newcomers. We led an impromptu brainstorming session on how to improve SAVE International using mind maps to record the ideas. In a conference where it was argued, “If you don’t use FAST, it’s not VE,” it was a fun and exciting session.

• Second, at the 1992 SAVE International conference, Charles Bytheway presented a paper stating that he never finished a FAST diagram—a reminder to us all that function is what matters and there are many tools and many approaches. We, as value engineers, should embrace that flexibility.

• Third, an evening in a Chicago Irish pub in 1996 with Martyn Phillips and S.S. Venkataramanan (and a little Guinness) led to an international outlook and, in time, the Team Focus Group.

I am reminded every day that the value methodology is still evolving and we must be more adaptable in unleashing its power to the world around us.

Scot McClintock, PE, CVS-Life, is principal in the Team Focus Group and is a licensed professional engineer. His VM/VE expertise has been built on 18 years of experience in military, pharmaceutical, medical, correctional, environmental, educational, highway, and rail projects worldwide. He is an adjunct professor of value management at Syracuse University in New York; president, Mid New York State Chapter of SAVE; SAVE director-construction, Northeast; and has been speaker at six SAVE International conferences.
Annual Index

ARTICLES
An Untapped Market: Energizing VM Use Via Six Sigma Methodology. Cook, Michael J. *Value World* 23 (3): 2-6 (Fall 2000).
VM as a Thought Experiment. Sperling, Roger B. *Value World* 23 (3): 18 (Fall 2000).

AUTHORS
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