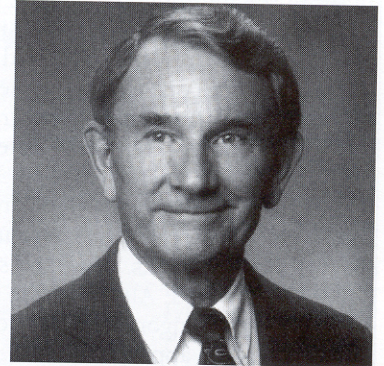


Essential Element for Viability of IS Education: Improving Our Creativity

ABSTRACT: The halcyon years of IS education are gone. IS educational units are now faced not only with issues of declining students and resources but with the question of survival. Entirely new approaches must be developed to ensure the viability of IS academia. A framework for improvement is the 4-Ps model of creativity (person, process, product and press). For aid in process, research has shown that the use of creativity enhancement techniques has produced substantive improvements in IS organizations. Those same techniques need to be applied to the field of IS education. A proven methodology is available: creative problem solving. Twenty creativity techniques have been transported over from other disciplines to the IS field. Five of these techniques are illustrated on the problem of ensuring the viability of IS Education. The CPS methodology, taught within the framework of the 4-Ps model, should be provided to IS students as well, to enable them to meet the continuing challenges of the IS profession.



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Editor's Note: In his presentation as recipient of the award for Distinguished Educator of the Year, Dr. Couger volunteered to prepare an article that elaborated the key points of his talk. The following material provides the expanded coverage of the topic of his talk. At EDSIG's upcoming Information Systems Educator's Conference, to be held June 12-15 in suburban Denver, Dr. Couger will be keynote speaker, chair and moderator of the Creativity track, and presenter of a workshop on instructional implementation of these ideas.

INTRODUCTION

Until the most recent five years, the IS field has been entirely one of growth — both for the profession and for education related to the profession. Our principal job as educators was to try to keep pace with the rapid changes in the field.

Now, the growth has stabilized for most of the country; moreover, in some areas of the country there is a reduction in demand for IS students. The central IS groups in industry are under siege and are downsizing. For a viable future, IS academia must be much more creative than it has in the past.

Before reviewing the challenges of the future, it is useful to summarize the factors

that led to our present situation. With this background we have a more focussed approach for analyzing necessary actions for ensuring the viability of IS education in the future.

The Past

In the early days of the field of Information Systems, the principal task of IS educators was to define the field and design a curriculum that properly prepared practitioners. Unfortunately, we were faced with a constantly moving target because of the dynamic characteristic of the computer field — necessitating continuous curriculum changes. Although these activities were foremost among our priorities, we also had other high-order concerns. We sometimes had to convince our faculty peers in other parts of the University that ours was a true discipline. Computer scientists pointed to numerical analysis as the heart of their discipline. They challenged us to demonstrate that the IS field had core constructs as rigorous as theirs.

Also, because of the immaturity of the discipline, we sometimes had difficulty getting support for our young faculty in the promotion/tenure process. Our journals were new and not well known or recognized by our peers in other academic units. Likewise, IS Ph.D. programs were new and had not yet demonstrated the rigorous content

demand by the promotion and tenure process in most universities.

There was one area, however, that required little attention. We had no difficulty finding students. We rarely had to do any marketing to attract students. Our problem — minuscule beside present day problems — was to organize resources to handle the large demand for our services.

The era was exciting — trying to carve out a legitimate niche in the academic arena, trying to make sure our curricula was substantive yet flexible in order to meet the rapidly changing needs of the industry.

The Present

Approximately five years ago, we began to see a leveling of demand for our students — and in some schools, a decline. The first year we experienced a decline at our school, I thought it was a blip on the curve, an irregularity. Then, in year two when the decline continued, I began to contact my colleagues across the country to see if the problem was occurring only in our region of the country.

I found we were not alone — that similar results were occurring in schools all around the country. In some areas the demand continued, but overall there began to be a decline in the number of students selecting the field as their major. It began first in Computer Science but was soon followed

by IS.

Part of the cause is generic, not specific to the computer field. National demographics reveal a decline in the numbers of students graduating from high school. Also, potential college students are starting to question the long-held belief that universities provide the type of education and training essential for successful career pursuits. Junior colleges, private technical schools and industry training programs are seen to meet the educational needs by many high school graduates.

But there has also been a declining infatuation with a career in the computer field among college students. Fewer are selecting the computer field. Although the surveys on causes are not rigorously conducted, the principal reasons appear to be:

1. The tightening job market — international competition causing US firms to reduce hiring of fresh college grads.
2. Publicity in the business/trade journals on the dissatisfaction of companies with performance of the IS organization.
3. Questions about the viability of the central IS organization. Users are taking over activities previously performed by central IS. Large sets of functions are being outsourced.
4. Parents no longer urging their children to choose the field. Many of those parents work in companies where the harried IS organization is struggling to meet expectations. Parents see IS personnel working long hours without a lot of positive feedback from users. They hesitate to suggest the field to their children in an era where quality of life is taking precedence in career decisions.

The overall decline of entering college students and the resulting tightening of budgets has diminished the quality of the academic life. Previously we fought for recognition as a legitimate discipline, now we are fighting to stay in existence. High quality technical schools are springing up and making inroads on the availability of students. Companies are starting to teach full fledged specialty programs competing directly with IS programs.

Several well known and quality IS academic departments have been eliminated. Others have been submerged under other, more political adept disciplines such as Accounting. The latter occurrence represents a full cycle of evolution. Many IS academic units began as a subdivision of the Accounting department. Now some are being subsumed by the same department.

For the first time, academic IS departments are having to get serious about marketing their programs. It isn't our preferred work — it takes time away from present students, from research, and extra income-producing activities. These latter activities are becoming increasingly important in an era where faculty compensation is declining.

Also, for the first time we are having to deal with the problem of less qualified students. Many schools, in trying to maintain credit hour totals, are lowering admission standards.

Another fallout is the tightening of the granting of tenure. During the past year, more than a dozen assistant IS professors were denied tenure. This situation represents both the tightening of tenure university-wide and the increased level of scrutiny of IS in particular.

The Future

I've painted a bleak picture. Yet, I've just been citing the facts. Our academic discipline is under greater pressure than it has ever experienced. We've got to do something different than we've done in the past, in order to cope with these pressures. Perhaps — just perhaps — we can do more than cope. Perhaps the discipline can become even more challenging than it was in its heyday.

I'm not talking about whether we view the glass as half empty or half full, about changing our orientation to view problems as opportunities. I'm suggesting that the challenges ahead might make the job even more interesting than it was in the past, despite the pressures of declining enrollments and resources. BUT — we are going to have to use some new approaches. We are going to have to be more imaginative, more innovative than we've been previously. Yes, we are going to have to be MUCH more creative.

Creativity has been my principal research focus for the past five years. I obtained funding from industry to initiate a Center for Research on Creativity and Innovation. Some of my colleagues warned me that the topic of creativity was too soft for recognition as a legitimate academic discipline. That view has been disproved by the acceptance of all 19 of our center's reports in refereed journals and proceedings. We proved the academic respectability of the subject. Simultaneously we set out to prove the cost-effectiveness of creativity improvement programs for IS. We helped a number of IS organizations establish cre-

ativity improvement programs. We carefully measured cost-effectiveness. The ROI has been spectacular — a factor of two through six, that is 200% through 600% ROI. We've proved the value of creativity, both the academic respectability of the topic and its cost-effectiveness in IS organizations.

CREATIVE PROBLEM SOLVING/OPPORTUNITY FINDING

I suggest that we apply creativity principles and techniques to our dilemma in IS education. A framework for this activity is the 4-*Ps* model: person, process, product and press (environment). We need to consider all four aspects in approaching this challenge. There is a methodology appropriate for enhancement of the creative process, referred to as CPS (creative problem solving). The methodology is shown in Figure 1. CPS has been around since the 1950s and has proven quite effective. It evolved from the scientific method, so has a solid academic foundation.

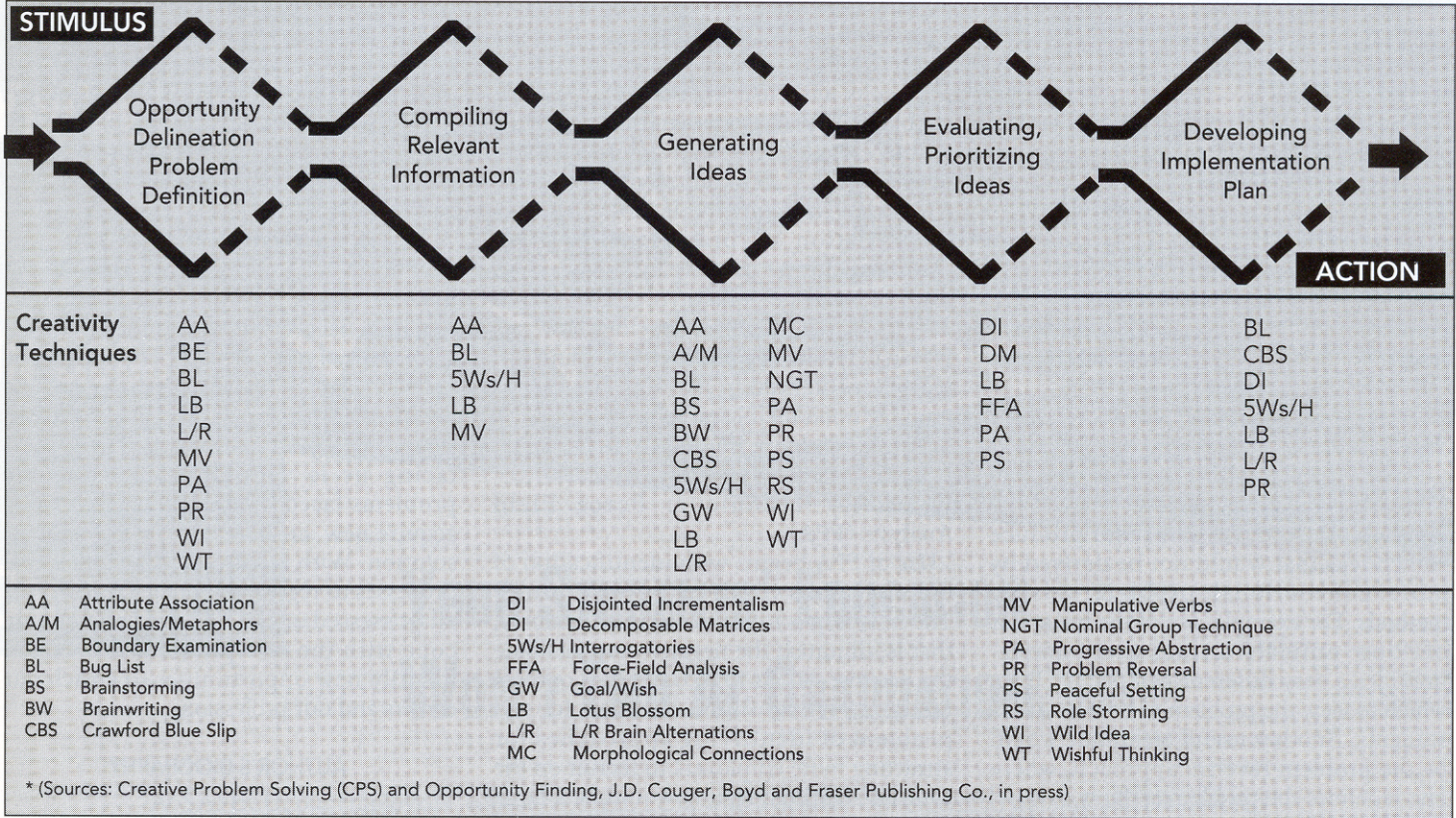
My variant of the model adds three features:

1. I've found that the five steps work equally well for opportunity delineation as they do for problem solving.
2. I've identified 20 creativity techniques proven successful in other disciplines and have transported them over to the IS field.
3. I've shown that some of these techniques can be used in each of the five steps of the CPS process, not just in step 3, idea generation. I've identified the techniques appropriate for each step.

UCCS has required a course on creativity of all IS majors for the past two years. According to the end of the semester evaluations, students find the course entertaining, provocative and most of all, highly beneficial to their careers. We point out a common deficiency for TQM, SMT, BPR, GDSS and JAD. They all rely on one creativity technique, brainstorming. The research shows that brainstorming is the least effective creativity technique. The 20 techniques transported over from other disciplines enable a much richer creativity enhancement process. With the foundation of the creativity course, students in the systems course select from the array of creativity techniques to enhance the effectiveness of each of the methodologies of TQM, JAD, etc.

The 4-*Ps*/CPS approach is the heart of the creativity improvement programs designed

Figure 1: COUGER VARIANT OF THE CREATIVE PROBLEM SOLVING METHODOLOGY



for IS organizations. This approach applies equally well to IS academic units. We are going to have to use processes like this to solve the problems and identify the opportunities to assure the future of the IS discipline. To solve the IS education dilemma, however, academicians we need to increase their personal creativity. All of us were creative at age five. But the educational process stifles rather than supports the innate creativity that we all possessed before entering school. The creativity we demonstrated at age five has been submerged. We need processes and techniques to help us resurface that God-given creativity. Granted, IS academicians have been somewhat creative or they would not have reached their present level accomplishments. However, all of us need a huge leap in creativity to meet the challenges of the next decade.

USE OF CREATIVITY TECHNIQUES FOR FIELD OF IS EDUCATION

The December, 1993, issue of *MIS Quarterly* contains my article describing the 20 creativity techniques and descriptions of their application in IS organizations. I'll now illustrate how creativity techniques are

useful to meet some of the challenges facing IS academia. Five examples will be provided.

1. Marketing the IS Program More Effectively

One of the simplest, yet very powerful creativity techniques is the Interrogatories technique, which uses the 5Ws/H (who, where, why, when, what and how). By asking these six questions about the marketing task, we are forced to take a broad perspective that reveals new possibilities for consideration.

WHO do we market to? High school seniors? Answer: Yes, but in addition we need to reach to the counselors in the high schools.

The Interrogatory set of questions focuses our creative process on how to reach that source of students. We always begin with the Why question:

WHY approach high school counselors? Answer: They advise students on programs to consider for college.

HOW do we approach them? Brochures? Personal letters? Personal contacts?

WHEN is the best time of the year to make the contact? In the fall before most seniors seek counseling? At the start of the

spring term where seniors are starting to fill out applications for college?

WHAT should be our approach? Success stories of our students? Support letters from employers of our students?

WHERE are they best convinced? In their office, or a visit to our campus, etc.?

After answering each question (I only took space to answer two in the above example), a second round of the 5Ws/H questions would be developed. My experience is that three rounds of the 5Ws/H questions and answers produces a imaginative and comprehensive set of information that is an excellent start to solving problems or identifying opportunities. An example of the Who question to start Round 2 is:

WHO should approach them? Faculty? Our recent alums who graduated from their school, etc.?

2. Raising Outside Funds to Support the IS Program

Creativity Technique: Nominal Group Technique (NGT)

NGT ensures that all participants are actively generating ideas. The technique utilizes the positive features of both Brainstorming and Brainwriting. The

process is as follows: 1. Silent generation of ideas in writing; 2. Round-robin recording of ideas; 3. Serial discussion for clarification; and 4. Then, subsequent rounds of writing.

Using this approach, the inhibiting factors of both Brainstorming and Brainwriting are reduced, while retaining public sharing of ideas to stimulate new ideas.

Use of NGT would be even more productive in source of outside funds issue if the group were also comprised of IS alumni, employers and interested businesspersons.

3. Revitalizing the Curriculum to Attract Prospective Students.

Creativity Technique: Analogy/Metaphor Technique

Use of a metaphor or analogy distant from the field of the problem helps expand the perspective of participants and produce some ideas that would not be derived by more conventional problem solving methods. For example, use of the metaphor of "how animals attract their mates" provides a very different perspective from which to view the problem of how to attract students. Another useful technique would be the problem reversal approach, where one redefines the problem as "how to repel students." My experience is that use of the problem reversal technique picks up an additional 20-25 percent of ideas after a NGT session on how to solve a problem or to identify opportunities.

4. Helping the IS Department Become More Politically Astute

To be more successful in fighting for a fair share of the budget, for promotions/tenure for faculty and ensuring that IS will not be gobbled up by other academic departments, we can enhance our creative output by use of techniques such as role storming.

Creativity Technique: Role Storming

A variation of brainstorming, this technique forces participants to play the roles of other persons involved in crucial decisions affecting IS. It provides new and wider perspectives on the factors and the people influential in matters that highly impinge upon the IS academic unit.

5. Attracting More Employers to Recruit our Students.

Creativity Technique: Force Field Analysis (FFA)

Use of FFA begins with identification of optimal results versus catastrophe results. The next step is to list the factors that force, that is, diminish the negative and facilitate the positive actions to move toward optimal results. FFA would be effective for the problem of identifying approaches for attracting more employers to recruit on the campus. Optimal results would be a large variety of employers from many sectors of the economy while the catastrophe is inability to attract any employers. The factors that attract employers would be listed, then those that repel employers would be listed. Then forces that would move us from our present level of recruitment would be identified. The final step would be selection of specific actions to produce more campus visits by recruiters.

CONCLUSION

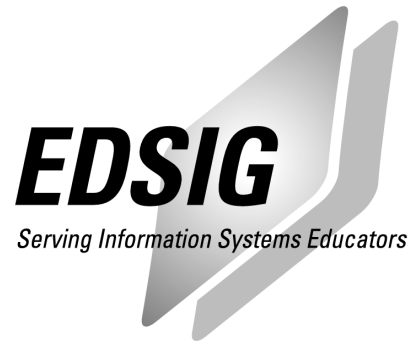
These five examples illustrate how creativity techniques can be used to lead to new insights on preparing for the next era of IS education. The CPS methodology, taught within the framework of the 4-Ps model, should be taught to IS students as well, to enable them to meet the continuing challenges of the IS profession.

Granted that the past five years have been tough for IS educators, compared to the prior 25 years. Nevertheless, there is no reason to believe that we cannot replace the challenges of our halcyon years with a new set of challenges that are just as interesting and engaging.

However, just as the set of problems facing us is very different from the problems faced in our heydays, we must acquire new, creative approaches for their solution. With the use of these innovative processes to regain the innate creativity we all possessed at age five, we can not only cope with the new problem-set, we can identify new opportunities to enrich our careers and our profession.

AUTHOR'S BIOGRAPHY

Dr. Couger holds the title Distinguished Professor of Information Systems and Management Science at the University of Colorado, Colorado Springs, Colorado, USA. He has lectured in more than 50 countries on six continents. He is the author of 17 books and more than 160 papers. He has spoken at the U.S. National Computer Conference more than any other person—11 times. Prior to his academic appointment he served as a manager in the computer field. He has been selected as the DPMA Computer Science Man-of-the-Year and is a Fellow of the Decision Sciences Institute. His new book, Creative Problem Solving (CPS) and Opportunity Finding, will be published by Boyd and Fraser in mid-1994.



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