CREATIVITY FOR THE NEW MARITIME COMMUNITY: MARITIME TRAINING IN THE TWENTY-FIRST CENTURY

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Abstract. Creativity is the knack of inventing something new and useful. It cannot be taught, but it can be fostered. No matter what our purview in education, we need creativity ourselves, and we need to nurture it in the students under our guidance and care. The importance of creativity has been noted by business author Daniel L. Pink and globalization expert Thomas L. Friedman, as well as surveys of US employers. While the creative process is normally divided into five stages – preparation, concentration, incubation, illumination, and verification – our focus here will be on techniques to aid in the three middle stages: how to invite the flow state and foster intuition (that "gut feeling" on which so many successful businessmen rely), how to invent by creating combinations ("Janus thinking"), and how to encourage group creativity by avoiding toxic structures and providing supportive ones. All of these techniques are taught in a creativity class at Cal State Maritime, USA.

THE IMPORTANCE OF CREATIVITY

Thomas L. Friedman [1] notes the importance of creativity in the new globalized world:

If Americans and Europeans want to benefit from the flattening of the world and the interconnecting of all the markets and knowledge centers, they will all have to run at least as fast as the fastest lion – and I suspect that lion will be China, and I suspect that will be pretty darn fast.

Friedman calls our new world "flat" because technology has connected us and eliminated many hierarchies. Multinational corporations are competing all over the world, but one entrepreneur with a computer and an idea can compete as well. Friedman says that since the demolition of the Berlin Wall on November 9, 1989, and the mid-nineties proliferation of the Windows PC, followed by the explosion of the World Wide Web, we are all in competition with one another, and the best ideas will win.

Because of this new "flat world," we will have to learn to use our human resources wisely. How can we all compete in the new global economy?

Peter D. Hart Research Associates [2] asked this question of US employers. In 2006 the firm interviewed 305 employers with a staff of at least 25 and conducted focus groups with executives in Milwaukee, Wisconsin; Fairfax, Virginia; and Atlanta, Georgia. Overwhelmingly, these employers said that they wanted to hire new workers who had the "soft skills" provided by a liberal education: among them, teamwork (76 %), oral and written communication skills (73 %), critical thinking and analytical skills (70 %), **the ability to be innovative and think creatively (70 %)**, and the ability to solve complex problems (64 %). In addition, employers felt that colleges did not place enough emphasis on these skills: teamwork (76 %), oral and written communication skills (73 %), critical thinking and analytical skills (73 %), **the ability to be innovative and think creatively (70 %)**, and the ability to solve complex problems (64 %) [Emphasis mine].

Here's what Daniel Pink [3] has to say about the thinking required in this new world and the need for Western culture to change its exclusively left-brained focus:

For nearly a century, Western society in general, and American society in particular, has been dominated by a form of thinking and an approach to life that is narrowly reductive and deeply analytical. . . . But that is changing. We are entering a new age. . . . [While] "left-brain" capabilities powered the Information Age. . . the capabilities we once thought of as frivolous – the "right-brain" qualities of inventiveness, empathy, joyfulness, and meaning –increasingly will determine who flourishes and who flounders.

Isaacson [4] says that in this new global economy, "A society's competitive advantage will come not from how well its schools teach the multiplication and periodic table, but from how well they stimulated imagination and creativity."

THE FIVE STAGES OF THE CREATIVE PROCESS

Though pundits have divided the creative process into as few as four or as many as seven stages, what follows is a common description.

Preparation. The creator becomes immersed in the formulas and rules of the craft. Often quoted [5] is Pasteur's dictum: "Chance favors the prepared mind." Weisberg's [6] often-cited "ten-year rule" is that a successful artist must practice the craft at least ten years before success.

Concentration. The creator becomes obsessed. According to Stross [7], Edison spent days in his lab without going home; and Isaacson [8] says that Einstein was the "icon" of the "absent-minded professor." On a journey, he sometimes forgot some of his clothes or even his suitcase.

Incubation. A problem interrupts the process. The creator takes a break, and unconscious processes work on the solution. Poincaré [9], a mathematician, said, "Often when one is working at a hard question, nothing good is accomplished at the first attack. Then one takes a rest, shorter or longer, and sets down anew to the work."

Illumination. The Eureka moment arrives. Poincaré called it "a manifestation of long, unconscious prior work." Nobel-prize-winner Barbara McClintock called it "integration." She claimed that although the solution came suddenly, it was not a lightning bolt of intuition but, in the words of her biographer Nathaniel Comfort [10], a sudden "synthesis of many bits of knowledge." Comfort believes that this sort of thinking is common in math and physics: "The most famous integrator of all was Albert Einstein." His Eureka moments came in pictures, such as when he conceived the relativity theory by imagining himself riding a beam of light. McClintock's illuminations came too fast for pictures.

Verification. Csikzentmihaly [11] stresses that the creator must test the work to identify its usefulness in the field: "all the individuals who act as gatekeepers." An engineer, according to Petroski [12], considers this phase crucial. Stross [13] relates that verification was a problem for Edison, creative in the realm of ideas yet unable to grasp the pragmatics of marketing. He insisted that his phonograph should be used for office dictation rather than for music. He took an adamant stand against movie projection systems in favor of kinetoscopes into which people stooped to stare. His friend Henry Ford called Edison "the world's greatest inventor and world's worst businessman."

INTUITION AS CONCENTRATION AND ILLUMINATION: ACCESSING THE "FLOW STATE"

After our students have prepared by learning the maritime "rules of the roa", the secrets of supply-chain management, or any other principles of their field, they are ready to concentrate and invite the flow of creative intuition.

Flow. The research of Mihaly Csikzentmihaly [14] has defined what characterizes this inspired state. He first asked subjects from all walks of life to wear a buzzer; then he buzzed them at random times to ask what they were doing and how they were feeling. He discovered that those involved in passive activities, such as television watching, were mildly depressed; but that those engaged in challenging tasks were the happiest. He named the state they were enjoying "Flow". During "flow" we are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that we will do it even at great cost, for the sheer sake of doing it." Here are some of his thoughts about "flow":

- It creates happiness.
- It is achieved by focusing our attention on some task and staying in the present, without regard for future rewards. We have learned "to focus attention at will, to be oblivious to distractions, to concentrate for as long as it takes to achieve a goal, and not longer".
- The enjoyment created by "flow" occurs when
  - the task is likely to be completed;
  - we are concentrating;
  - the task "has clear goals and provides immediate feedback";
  - we are immersed in the task and removed from "the worries and frustrations of everyday life";
  - we have a sense of control;
  - "concern for the self disappears, yet paradoxically the sense of self emerges stronger" afterward;
  - "duration of time is altered".

During flow we have the sense of operating at the peak of our powers. Abraham Maslow [15] might say we are having a peak experience: a blissful, joyous moment in which we feel most alive. Creative people in all fields experience such moments as the heights of inspiration and intuition, a time when subject merges with object, the dancer becomes the dance, and problems dissolve into solutions.

So how can we access flow or encourage it in our students?

The Task. Set a task that is challenging, at the limit of the student's powers but not beyond. To discover how professors at Cal State Maritime create this situation in their simulator classes, see the section on Bridge Resource Management.

Replication. Ask them when they created flow before. If they can identify the conditions, such as being out at sea and pondering the vastness of waves and sky, they can create flow again, by imagining that situation and remembering how it felt.

Visualization. According to Hanks and Parry [16], the brain perceives visualization as action. They cite an experiment published in *Scientific Research Quarterly*:

- Students were divided into three groups.
- The first group practiced "basketball free throws every day for 20 days".
- The second group didn't practice.
- The third group practiced "mentally only".
- The first group "improved by 24 %".
- The second group "didn't improve at all".
- The third group "improved by 23 %".
- "The researchers concluded that practicing mentally is virtually as effective as actual physical practice."

Here is the explanation by Dr. John C. Eccles and Sir Charles Sherrington, experts in brain physiology: "When you learn anything, a pattern of neurons forming a chain is set up in your brain tissue. This chain, or electrical pattern, is your brain's method of remembering. So since the subconscious cannot distinguish a real from an imagined experience, perfect mental practice can change, or correct, imperfect electrical patterns grooved there". Robert and Michelle Root-Bernstein [17] note "significant correlations between the aptitude for visual imaging and career success in engineering" and "a statistically significant correlation between professional success and visual thinking among scientists as well as inventors".

A senior Marine transportation student at Cal Maritime [18] testifies to the value of this practice:

Based on the teachings and advice from our Creativity class, I am finding that a brief moment of meditation before a job really benefits me in my ability to execute the job. In my meditation, I am

focusing on the givens or constants that come with the job. I visualize the ship at the dock. I mentally place myself behind the controls. I try to feel the tug vibrating as the propellers begin to cavitate as I am backing into the tug line. I imagine what commands the ship pilot will call out to me and I then mentally execute the commands. I try to predict the movement of the tug as my hands steer the powerful engines. I try to relax and try to maintain a level of intense concentration. My meditation usually last about ten minutes. In this time, I have run through an entire job. . . . I awake with a sense of accomplishment and I am now ready to take on the responsibilities of operating a ship assist tugboat.

Another cadet [19] also attests to visualization as powerful:Visualizing is one of the most important right brain methods for creativity and innovation. This helps me with many things such as exercising, tying knots, making plans, and studying. Any person working around dangerous equipment or in potentially harmful situations like we will in the industry can testify that it is important to visualize how the lines will react under strain, or how goggles will be important, or how will coworkers react to your methods of work.

Mindfulness. Encourage the students to practice mindfulness: to be fully in the present, in the here and now, paying close attention to the task at hand. Langer [20] says, "Mindlessness limits our control by preventing us from making intelligent choices." How many industrial catastrophes or maritime collisions have resulted from workers who were not aware, not concentrating – impaired by sleep loss, substance abuse, medication, or distraction? Famous examples include the *Titanic* and the *Exxon Valdez*. More recently, in 2007, the *Cosco Busan* collided with a pillar of the Golden Gate Bridge and spilled 53,000 gallons of oil into San Francisco Bay, an accident for which pilot John Cota was held largely responsible. According to Henry Lee [21], "The [investigative] board blasted the Coast Guard for not having revoked Cota's pilot's license despite his history of accidents, alcohol abuse, a sleep disorder and the use of medications known to impair judgment." By contrast, U.S. Captain Phillips used creativity and mindfulness when his ship was attacked by pirates off Somalia. First he surrendered himself to save his crew. Then watched and waited for three days. At last his guards became inattentive, and he dived into the sea. The pirates started shooting at him, so Phillips, still clear-headed and mindful, swam back to surrender again. Shortly thereafter, in another case of preparedness and mindfulness, U.S. Navy Seal sharpshooters took down three pirates with three shots. The story is narrated by Pittman and Jakes [22].

It is hard to be mindful all the time; Buddhist monks spend a lifetime attempting to learn how. But we can at least train our students, whether in a simulator or at sea, to keep their minds returning to the task, to be aware of other ships, weather conditions, instrument readings, and communications onboard. We can keep asking them to monitor where their minds are. With mindfulness they will be able to use their creativity and critical thinking should problems arise.

Questioning. The next step is to ask questions and await an intuitive response. Donald Walters [23] says, "Clarity begins with asking the right questions. It comes with knowing exactly what the problem is, and then, offering that problem up into the creative flow, in the full expectation of receiving a solution." If we are mindful, calm, and immersed in flow, the right answers may come. Nobel prize winners Watson and Crick [24] codified the exact structure of DNA after asking, "What are genes made of? How are they copied exactly? And how do they control, or at least influence, the synthesis of proteins?" According to Ray and Myers [25], the inventor of McDonald's asked, *"Where can I get a consistent hamburger on the road?"* Ray and Myers comment, "Implicitly or explicitly, creativity always begins with a question." And often, we should also look at more than one perspective.

JANUS THINKING AS CONCENTRATION AND ILLUMINATION

Albert Rothenberg [26] says creativity involves "Janus thinking": being able to look two ways at once, like Janus, the Roman god of the doorways. (See Fig. 1).

Isaacson [27] says Einstein had this "ability to hold two thoughts in his mind simultaneously, to be puzzled when they conflicted, and to marvel when he could smell an underlying unity."

Fig. 1: Janus, the Roman God of the Doorways

Janus Thinking. Various techniques help students practice this type of synthesis.

- Give examples of inventions that have been created from combinations. For example, von Oech [28] mentions that Gutenberg connected the pressure of the wine press and penetration of the coin punch to invent the printing press; Hanks and Parry [29] explain that Bill Bowerman looked at his wife's waffle iron one morning and decided to use its pattern on the bottom of an athletic shoe, thus creating the Nike.
- Have students create analogies. Robert and Michele Root-Bernstein [30] explain, "Many scientists rate analogizing as one of their most important mental skills". Especially useful are "analogies to nature". "Surgical staples" were inspired by the way primitive tribes closed wounds with biting ants. Velcro was inspired by burrs.
- Practice Edward deBono's [31] idea of random stimulation, which entails combining things that seem to have no connection or that come from different fields. For instance, try this exercise:
  - Provide ordinary objects chosen at random, such as a spoon, a rock, a corkscrew.
  - Have students think of a problem needing a creative answer, then select an object.
  - Ask students, how does this object suggest approaches to solving your problem? Free associate; let your mind go wild.
  - Tell them to jot down their ideas, then share with the class.

Because the mind wants to create patterns and make sense of things, the mind will generate an association or connection that may lead to an "aha".

- Have students combine insights from different fields of study. Roger von Oech [32] says, Every culture, industry, discipline, department, and organization has its own way of dealing with problems, its own metaphors, models, and methodologies. But often the best ideas come from cutting across disciplinary boundaries and looking into other fields for new ideas and questions. Many significant advances in art, business, technology, or science have come about through a cross-fertilization of ideas.

He explains: "An aerospace manager . . . took up the habit of designing and constructing backyard waterfalls for himself and his friends. 'I don't know why,' he said, 'but designing waterfalls has made me a better manager. It has brought me a lot closer in touch with ideas such as flow, movement, and vibration which are difficult to put into words, but which are important in the communication between two people".

Hanks and Parry [33] explain, "Since combination is often the essence of creative ideas, the walls we construct restrict the associations we can make. And we end up with fewer combinations".

On interdisciplinary connections, a senior MT student [34] at Cal Maritime had this to say:

> Interdisciplinary thinking is something new to the maritime industry. In years past, you were either deck side or an engineer. Before you could start your academy experience, you had to decide on

whether you wanted to take the red pill or the blue pill. Your path would be narrow with few exits, much like a bowling alley with the inflatable bumpers installed. But times change and with them come paradigm shifts. The transportation industry has changed concurrently with the changes in technology and communications. The maritime industry is now more closely knit. The success of any one ship or company relies heavily on both ship and shore personnel.

Another cadet [35] identifies the three above three techniques – "Mindfulness, Visualization and combining unlike items" – as his most important tools in creativity.

TOXIC AND SUPPORTIVE SYSTEMS

Toxic Systems. Unfortunately, toxic structures that inhibit creativity abound in business, education, and government. In fact, the assumption of the Total Quality Movement (TQM) is that workers want to do their jobs well but are prevented from doing so by a dysfunctional system. I quote from an earlier article of mine [36] with an amusing example, "the bead game", as explained by Chaffee and Sher [37]:

A large bowl contains 1,600 white beads and 400 colored beads. Colored beads are defects. Employees are equipped with a paddle containing 50 bead-sized indentations. They scoop the paddle into the bowl, and it comes out containing 50 beads. The beads are hot, so workers cannot touch the beads or container.

The goal is to have no more than five defects for each immersion of the paddle. The flaw in the process soon becomes evident: the beads are scooped out randomly, and nothing the players do can make a difference. By sheer chance, some workers scoop out more than five flawed beads.

People who play the Bead Game soon recognize both its parallels with actual work situations – setting goals, trying hard, motivating, warning – and its hopelessness. Ultimately, the best and perhaps the only way to obtain lower defect rates is lowering the proportion of colored beads in the bowl. But the workers cannot lower the proportion, for they are dippers, not process designers, purchasers, or managers.

Hence, for TQM, "The primary job of administration is to remove the barriers that prevent people from achieving quality work processes".

One of these barriers is the ego-driven, truculent bully boss. He can poison a whole system by leaving in his wake dispirited, disempowered victims. Robert I. Sutton [38] claims that we can identify one by his or her "persistent pattern" of leaving "one 'target' after another feeling belittled, put down, humiliated, disrespected, oppressed, deenergized, and generally worse about themselves".

Bolman and Deal [39] categorize the assumptions of such a manager as Theory X, explained by Professor Douglas McGregor: "subordinates are passive and lazy, have little ambition, prefer to be led, and resist change." The creativity of employees shuts down in the face of a managerial stance devaluing their motives and contributions.

For example, say Bolman and Deal, morale and productivity were down in a factory where women painted dolls. Each woman took a doll from a tray, painted it, and put it on a passing hook. The women received an hourly rate, a group bonus, and a learning bonus. Although management expected little difficulty with the new system, production was disappointing and morale worse. Workers complained that the room was too hot and the hooks moved too fast.

Reluctantly, the foreman followed a consultant's advice and met face to face with the employees. After hearing the women's complaints, the foreman agreed to bring in fans.

Despite the expectations of the foreman and "industrial engineer who designed the new manufacturing process," morale improved significantly. Then "after several [more] meetings, the employees came up with a radical suggestion: let them control the belt's speed".

Now, this example of creativity is modest: scarcely the "Creativity with a capital C" of Tolstoy or Dostoevsky. Nevertheless, it is creativity. Workers were encouraged to "think outside the box," to devise suggestions undreamt of by management. And the one they devised worked splendidly. "The employees developed a complicated production schedule: start slow at the beginning of the day, increase the speed once they had warmed up, slow it down before lunch, and so on." The foreman had been dubious about this plan; the engineer had argued adamantly against it. Nevertheless, Results of this inadvertent experiment in participation were stunning. Morale skyrocketed. Production increased far beyond the engineer's most optimistic calculations. The women's bonuses escalated so much that they were earning more than many workers with significantly higher levels of skill and experience.

So guess what happened?

The women's production and high pay became a problem because higher-skilled workers in the rest of the plant protested. To restore harmony, management reverted to the engineer's earlier recommendation: a fixed speed for the belt. Production plunged morale plummeted, and most of the women quit.

Ironically, such organizations work to destroy the initiative and creativity of their workers and then complain about the unproductive, listless workforce they themselves have created – employees who are simply putting in a day's work to collect their paychecks because they are discouraged from reaching their potential.

In contrast, say Bolman and Deal, is Theory Y, Professor McGregor's notion that workers seek to satisfy inherent needs. McGregor draws on Abraham Maslow's famous hierarchy to stress that after biological and safety needs are met, human beings want to satisfy needs for belonging, esteem, and self-actualization. In other words, as human beings we are hard wired to make the most of our potential, to be all that we can be. Following are examples of such supportive systems.

Supportive System: Bridge Resource Management. If you have taught a simulator course, you will not be surprised by the next section. I, however, was surprised to learn that simulator training encourages flow and, hence, creative decision making.

In the ship simulator at Cal State Maritime, student teams operate a bridge simulator, a virtual reality machine with a wraparound view of a harbor. The professor's job is to create problems that require fast decision-making.

Professor Messer-Bookman [40] says that stress is the greatest catalyst for creative and critical thinking in simulator teams. "If there's no urgency to the situation, the groups don't seem to gel as fast". She says that she is willing to be "the enemy" to provide that stress. She'll tell one team member to simulate a heart attack. She'll send a note to the brightest, most outgoing member of the team to say, "The captain wants you in her quarters now". She may tell the smart student, "I want you to give very wrong information". In essence, she creates the conditions for flow – a challenge just at the limit of the students' abilities.

She also stresses the importance of team synergy in helping the students deal with sudden crises. Those outside the industry may think that the maritime world is all about following orders in a rigid chain of command, but Professor Messer-Bookman says that nothing could be further from the truth.

She explains that teaching teamwork in simulator entails "Bridge Resource Management, an internationally accepted practice required at the senior level of management." The concept comes from the US Navy, which originally used "hierarchical management": says Professor Messer-Bookman, "You wouldn't address the captain even if you had a hunch something was wrong".

The rigid hierarchy had had the effect of "chilling information": "maybe the cook has an acute sense of smell and smells land!" She cites a possibly apocryphal anecdote: "Everyone on the bridge had a gut feeling something was wrong" but had "no direct evidence". As a result the ship went aground. Hence a new concept became operative: "Sir, I recommend . . .". Anyone can say it.

As a result, since the 1980's, the organizational chart of the modern merchant ship is "not a pyramid but a circle". Everybody is on the bridge "so everybody is in the loop, on the same page". "Also you have a synergy developing; when a problem does evolve everybody's on the same page. It only works if everybody is at same level of situational awareness".

With "Bridge Team Management", she says, "Just because you're senior you're not the best necessarily to handle the problem". When a problem develops and the crew members on bridge call the captain, they don't just step back and relinquish responsibility. "The Captain [enters] into the circle, which accommodates an additional brain. Everybody is contributing information into the pot". The crew will know more about how the problem developed and may be able to provide crucial information. (See Fig. 2).

Bolman and Deal [41] would call this structure not a Circle but an All-Channel Network or Star. Everyone in the group has access to everyone else, and information can flow freely from any one person to any other. In a Circle, as they define it, information passes only from one person to the next and never jumps to another part of the curve.

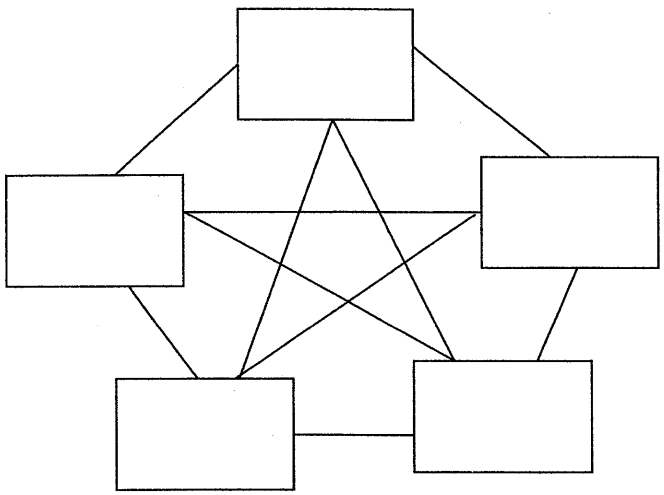

Fig. 2. All-Channel Network or Star

Professor Messer-Bookman trains her students that "Everybody must be cross checking everybody else". The motto is, "Trust but verify". What is optimum is "a circular flow of energy, almost like a magnetic field, [while] everybody's cross checking." Bolman and Deal say that in the Circle, as they conceive it, "the weakest link" can kill the information flow. In Professor Messer-Bookman's version of the All-Channel model, "The saying 'You are only as strong as your weakest link' is not true." Others will "take up the slack". "The four [members of the simulator team] working together are more effective than each working independently; [that] means we have a little room if one isn't as strong in an area".

One problem noted by Professor Peter Hayes [42], who also teaches the course, is that teams can exhibit "a lot of groupthink, where the team is swayed by one assertive personality". Professor Messer-Bookman says, "If we have a personality type that shuts someone down, we'll talk about that during the brief" (a post-mortem that follows the experiential session).

Personality types matter. Professor Jim Buckley [43], who also teaches the course, notes that an intelligent Asian female may defer to the males even if they have the wrong solution. Women tend to use creative problem-solving techniques that are based on talk, whereas the men plunge in to action, then act again to correct their mistakes. For example, in one scenario, "the ship was on a collision course with another vessel. The men automatically turned, which correctly avoided the situation. After they made the turn they realized that they were going toward a shoal, and that was a separate problem. They turned to

miss the shoal, but then that put them in the shallows. They looked at what they were going to do with the shoal and they were headed toward the ship again. They then made a third decision, which was to slow down". This action-reaction pattern took seventeen minutes.

In contrast, the women spent time discussing their options and then took a single action: to slow down. "They looked at the big picture and they looked at all the options and they considered everything before they ultimately made a decision". At the seventeen-minute point they slowed down. "The men made two or three different decisions to get to the exact same place the women made in one". In this instance Professor Buckley was monitoring stress levels by "finger pulse and blood pressure". Understandably, the men's stress level went up when the women were in charge, and vice versa.

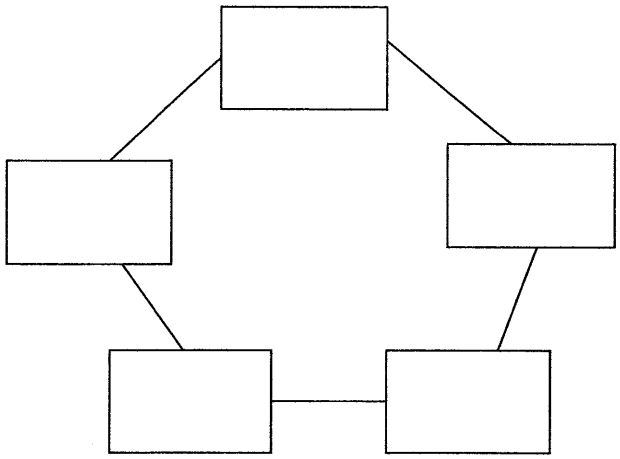

Fig. 3. Circle

The "ship-to-shoal" scenario demonstrates that with creative thinking, more than one solution may be possible. Hence the optimum group is one in which all channels in the "All-Star-Network" are operative. For simulator training Professor Bookman-Messer prefers a "random group", in which students are assigned to course sections, rather than a system of choice, which often puts high-performing friends in the same team together and leaves the weaker students to flounder by themselves. Diversity can also help to stop the "groupthink".

And does Bridge Resource Management work in the real maritime industry? Yes. The professor said she witnessed this system during a cargo transfer and was amazed at the collaborative synergy: "Licensed and unlicensed together, all discussed what was going to happen and who was responsible for what, everyone from deckhand to captain involved, [a system] unheard of 20 years ago".

Another supportive system: "The Best Damn Ship in the Navy". That's what Captain D. Michael Abrashoff [44] called the *USS Benfold* under his command. Abrashoff knew that it was his job to get out of his crew's way and encourage their creativity and autonomy. He says, "It's funny how often the problem is you".

Often, he claims, leaders operate out of their own "fears, ego needs, and unproductive habits". However, "My experience has shown that helping people reach their full potential can lead to attaining goals that would be impossible to reach under command-and-control". The title of his book, a "watchword" he often repeated to the crew, gave them ownership of their workplace: *It's your Ship.*

He endorsed fun and play, such as allowing the crew to rig a giant outdoor theater on deck. He also espoused the philosophy attributed to Cosimo de Medici by James M.Saslow [45]: "One of the things that Cosimo understood is that you get better work out of people when people are happy".

Abrashoff also invited ideas: "I began with the idea that there is always a better way to do things, and that, contrary to tradition, the crew's insights might be more profound than even the captain's. . . I asked everyone, 'Is there a better way to do what you do?' Time after time, the answer was yes, and many of the answers were revelations to me".

The *Benfold* system paid off. Here are a few of the results.

First, the crew and ship kept winning all manner of awards. In all naval contests, "Time after time, *Benfold* outperformed *Lake Champlain*", a ship with which it had "a strong case of sibling rivalry". Abrashoff gloats, "Actually, I didn't consider it rivalry; I didn't have any rivals. I was in competition only with myself, to have the best ship we possibly could".

A Theory Y manager, he encouraged self-actualization.

He arranged for his crew to take college entrance exams and "college courses via CD-ROM". He says, To my surprise, it spurred my sailors to keep taking other tests – Navy advancement tests – and *Benfold* soon had a promotion rate two and a half times the Navy average. By upgrading their skills, the crew accomplished all sorts of things. We challenged their minds, which made shipboard life more fun. They boosted their chances of getting good jobs in the civilian economy, removing the specter of flipping burgers from their futures. And they clearly enriched the ship's skills pool, which in turn improved readiness.

He adds, for my mid-level managers, my officers and chief petty officers, I set up clear and concise guidelines as to what I expected from them. I told them that I expected them to be experts in their own fields and that I would check on whether or not they were. Furthermore, they were expected to take on a project or two that would improve the ship's quality of life, or a military process that affected the entire organization. . . If you want to climb the ladder, you have to do more than your own specific job; you have to do things that affect the lives of others in the organization.

He then says, in language reminiscent of Bridge Resource Management, History records countless incidents in which ship captains or organization managers permitted a climate of intimidation to pervade the workplace, silencing the subordinates whose warnings could have prevented disaster. Even when the reluctance to speak up stems from admiration for the commanding officer's skill and experience, a climate to question decisions must be created in order to foster cross-checking.

He urges, "Make your people feel they can speak freely, no matter what they want to say". Sample phrases are as follows: "Captain, have you thought of this?" or "Captain, I'm worried about something", or even "Captain, I think you're dead wrong, and here's why. Yes-people are a cancer in any organization, and dangerous to boot".

He sums up his management style:

I worked hard to create a climate that encouraged quixotic pursuits and celebrated the freedom to fail. I never once reprimanded a sailor for attempting to solve a problem or reach a goal. I wanted my people to feel empowered, so they could think autonomously.

He also pushed the envelope on navy procedure more than once.

A higher-up in the US Navy (who wishes to remain anonymous) says that Abrashoff often defied the rules of the system and adds, "I'm glad I didn't have to relieve him".

"Idea Spaces" and Open Systems. Why did the VHS format conquer the superior Betamax? Why do we have video recorders, televisions, and airplanes? According to Keith Sawyer [46], the reason is the same. All of these successful innovations arose from shared ideas.

Sawyer remarks, "The key to understanding innovation is to realize that *collaborative webs are more important than creative people*". Sony introduced the first video recorder, the Betamax, in 1975; but rival JVC "made a key strategic decision in 1976: They would openly share their technology with companies

and allow a collaborative web to emerge". Television arose from a "collaborative web" "extending back for decades". Though unveiled by RCA at the 1939 World's Fair, it began as an idea in 1872. The Wright Brothers may have gotten their plane off the ground, but it didn't fly far. The idea of ailerons came from a collaborative web established by Glen Curtiss while the Wrights themselves were busy filing patent infringement suits.

Sawyer's thesis is that companies thrive when they encourage collaborative webs. Richard Ogle [47] discusses "idea spaces": spaces where ideas can be shared between people:

The mind – seat and organ of human intelligence – is broader and deeper than we thought. It extends far out into the world, more outside than inside. Even without our being aware of it, this extended mind engages closely with our individual mind, shaping and organizing our thinking.

CONCLUSION: THE MOST IMPORTANT COMPONENT OF CREATIVITY: MAKE THE DECISION

Robert Sternberg [48] claims that "the key attribute" of "creative people" is that they make a "decision to be creative". They have the courage, inspiration, and know how to create something new and useful and they do, whether it is an invention, an organizational structure, or a class.

Consequently, the best way to be creative yourself and nurture creativity in your students is to "make the decision" to practice creativity and reward it. Students who are prepared with a knowledge of the creative stages, a practice of techniques like mindfulness and Janus-thinking, and an awareness of toxic and supportive structures are well placed to be creative themselves and encourage creativity in those they supervise. Then they'll know what to do when they see the pirate ship speeding toward them in the Gulf of Aden.

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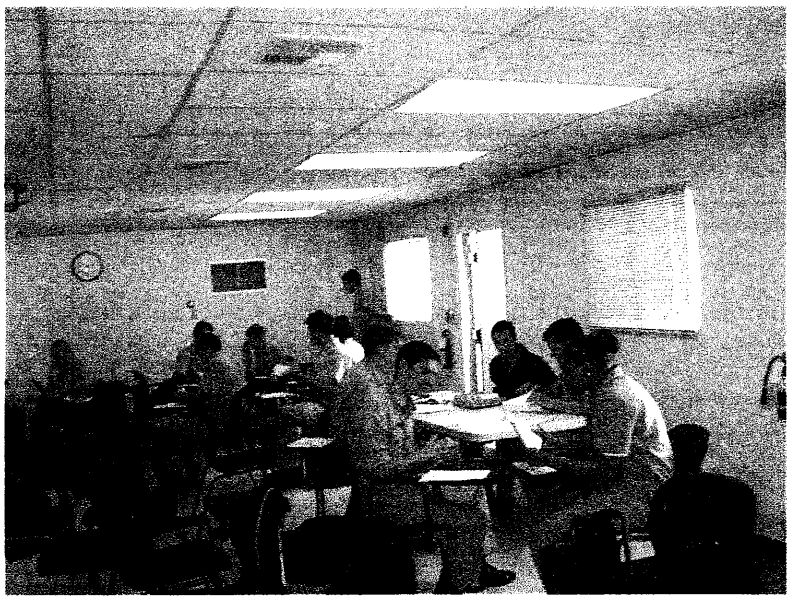

Fig. 4. Students in Creativity Class, Spring, 2009

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