Fostering Creativity and Innovation in Adventist Education

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Intelligence and Creativity

Intelligence and creativity are related but there are some key differences. As reviewed elsewhere (Beardsley, 2002), both are expressed in domains (Gardener, 1983) but creativity involves novelty or the capability to change domains or culture in a permanent way. Divergent thinking is a key feature of creativity, while convergent thinking (figuring out the "correct" response) is key in intelligence. Intelligence has a role, in that domain mastery is a prerequisite to creativity, as will be explained later. They are correlated but "psychometric creativity is independent of metric intelligence, once a threshold IQ of 120 has been reached." (Gardner, 1993, p. 21).

Another distinctive characteristic is that creative activity can be highly enjoyable when there is a balance between challenge and skill. This optimal state of performance has been called "flow," when "things were going well as an almost automatic, effortless, yet highly focused state of consciousness" (Csikszentmihalyi, 1996, pp. 110-111). It may be characterized by a distortion of time, exclusion of distractions through intense concentration, and the merging of action and awareness.

Creativity: a systems model

Csikszentmihalyi goes on to explain that creativity is the cultural equivalent of the biological process of adaptation. In this analogy, cultural genes are "memes" in that they are the units of information that we must learn if culture is to continue. Memes are numbers, language,

recipes, theories, stories, etc. that are passed on and which the creative person changes. If enough see the change as valuable, the change becomes part of culture. (p. 7)

Creativity depends on prior knowledge that must be learned before it can be changed. Secondly, intellectual and social networks stimulate creative thinking. Thirdly, creativity needs social mechanisms to recognize and spread the innovation. These mechanisms include research publications, art guilds and galleries, the marketplace, the catwalk and fashion show, Hollywood and the box office, or international development projects. Creativity is a process by which a symbolic domain in culture is changed. It is a function of attention in that there must be a surplus of attention and wealth beyond what is needed for survival because problems are solved only when a great deal of attention is devoted to them. Creativity tends to be at the intersection of domains and cultures where it is more readily recognized.

Creativity is an interaction between the person, a domain, and the field (Gardner, 1993, p. 9; Csikszentmihalyi; 1996). The domain contains a set of symbolic rules and procedures such as musical notation and harmonic principles. Like the judges holding placards of numbers to evaluate the performance of an ice skater, gatekeepers (the field) evaluate what is valued enough to be assimilated into the culture or domain. They are the experts who evaluate and choose which of the many novelties deserve to be included in the domain. Too much novelty creates chaos, while too little starves it.

Unless an individual contributes something of permanent significance that changes culture, the fact that he has unusual thoughts and is interesting and stimulating may indicate brilliance, but not creativity. Another may be personally creative, evidence divergent thinking and march to the beat of her own drummer, but inner certitude of creativity must be validated by appropriate experts to be deemed Creative with a capital "C" (Csikszentmihalyi, 1996, p. 25).

In fact, creativity is not dependent on brilliance or personal creativity because that may exist only in the mind of the person. Talent—the innate ability to do something well, or even genius—one who is at the same time creative and brilliant, are also not necessary predictors of Creativity that changes culture.

The Florentine Renaissance between 1400 and 1425 described by Csikszentmihalyi shows that the artisans in Florence actually benefited by the constraints imposed upon them. Boundaries can stimulate, rather than inhibit creativity. He comments,

> The important thing to realize is that when the Florentine bankers, churchmen, and heads of great guilds decided to make their city intimidatingly beautiful, they did not just throw money at artists and wait to see what happened. They became intensely involved in the process of encouraging, evaluating, and selecting the works they wanted to see completed....[they] were so seriously concerned with the outcome of their work that the artists were pushed to perform beyond their previous limits. Without the constant encouragement and scrutiny of the members of the Opera, the dome over the cathedral would probably not have been as beautiful as it eventually turned out to be. (p. 34)

In some cases, they even specified the amount of expensive ground lapis lazuli and the weight of gold foil to be used. It was precisely this high engagement from the field that resulted in what Michelangelo declared worthy of being the "Gate of Paradise." Csikszentmihaly writes:

> In this case also a special commission had been formed to supervise the building of the doors for this public edifice. The board was composed of eminent individuals, mostly the leaders of the guild of wool weavers that was financing the project. The board decided that each door should be of bronze and have ten panels illustrating Old Testament themes. Then they wrote to some of the most eminent philosophers, writers, and churchmen in Europe to

request their opinion of which scenes from the Bible should be included in the panels, and how they should be represented. After the answers came in, they drew up a list of specifications for the doors and in 1401 announced a competition for their design.

From the dozens of drawings submitted the board chose five finalists—Brunelleschi and Ghiberti among them. The finalists on the short list were given a year to finish a bronze mock-up of one of the door panels. The subject was to be "The Sacrifice of Isaac" and had to include at least one angel and one sheep in addition to Abraham and his son. During that year all five finalists were paid handsomely by the board for time and materials. In 1402 the jury reconvened to consider the new entries and selected Ghiberti's panel, which showed technical excellence as well as a wonderfully natural yet classical composition.

Lorenzo Ghiberti was twenty-one years old at the time. He spent the next twenty years finishing the north door and then another twenty-seven finishing the famed east door. (p. 35)

Steps in the Creative Process

In his interviews of 91 exceptional, individuals that changed domains or culture, Csikszentmihalyi identified five steps in the creative process: immersion in the "problematic issues that are interesting and arouse curiosity...a period of incubation, during which ideas churn around below the threshold of consciousness....insight [or] several insights interspersed with periods of incubation, evaluation, and elaboration; ...evaluation, when the person must decide whether the insight is valuable and worth pursuing; ...and elaboration." (pp. 79-80). This final stage is what

Edison referred to as 1 percent inspiration and 99 percent perspiration and of which Freud observed, "When inspiration does not come to me, I go halfway to meet it." Another example of dogged discipline and responsiveness to patrons' demands is Bach, who wrote a cantata every few weeks, even when he was sick or exhausted.

Innovation: a systematic approach to exploiting flags of opportunity

According to management guru, Peter Drucker (1985), innovation is a systematic approach to creativity. Innovation is:

> ...the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced...the entrepreneur always searches for change, responds to it, and exploits it as an opportunity" (p. 20, 28)

Drucker identifies seven sources for innovative opportunity, four within the enterprise and the last three outside the enterprise or industry. They are:

1. The unexpected (success, failure, or other outside event);
2. The incongruity between what is and what "ought to be";
3. Innovation based on process need;
4. Changes in industry structure or market structure that catch everyone unawares;
5. Demographics (population changes);
6. Changes in perception, mood, and meaning;
7. New knowledge, both scientific and nonscientific (p. 35)

Analysis is necessary to exploiting opportunity. Even failures are symptoms of opportunity! How does analysis of one of these seven spur innovation? An example of number five (analysis of demographics) follows. In the United States, national demographic growth patterns and institutional data indicate that Loma Linda University (LLU) is favorably positioned for entrepreneurial innovation. It is geographically contingent with the largest growing metropolitan area and in the state with the greatest numerical population growth. While national data project growth in the undergraduate market, institutional data have shown a decrease from 37% undergraduates in 1992 to 31% in 2001. As a health sciences university, this is likely due to two factors: many allied health professions can be completed at a community college for less cost and time, with, for example, no difference in salary between a two-year RN or Physician Assistant and a baccalaureate or masters RN or Physician Assistant. Secondly, some of the allied health professions for example, Physical Therapy and Pharmacy, are moving from a baccalaureate to doctoral entry-level degree. LLU already offers the Doctor of Physical Therapy, so this change is a competitive advantage for LLU. As a health sciences university, LLU is closely tied to the health care market place. That market has been an unstable one and the ability to initiate and terminate academic programs is an advantage that a smaller private university has over a large, public institution. So in response to a national shortage of pharmacists, LLU will open a new school of pharmacy in September, 2002. LLU is also exploring the Christian school market as a potential source of students. Distance education may be another way to educate students not currently attending LLU.

An example of number one above, incongruity precipitating an innovation is described next. Two years ago two faculty who were not SDA were recommended for tenure to the Board of Trustees (BT). Analysis of demographics of faculty hiring decisions revealed an incongruity with

the historical identity and stated mission of the institution. Drucker identifies such dissonance between what "ought" to be and what is as a "symptom of an opportunity to innovate."

Analysis pointed to the inadequacy of the Promotion and Tenure (P&T) criteria. For academia, the "field" is represented in part by P&T criteria. These criteria describe what is valued and how faculty time, effort and resources should be directed. The criteria are used by the field of judges (i.e., members of the P&T committee) who, acting as gatekeepers, determine whether or not the contributions of a faculty member are worthy of reward. They evaluate the legitimacy of claims that the activities of a faculty member are of sufficient merit that the faculty member should be promoted or tenured at LLU.

All faculty struggle with how best to direct their efforts and use their time. P&T criteria help faculty direct their attention and efforts. Because creativity is also a function of the person, and not just the domain or field, it is also necessary to recruit faculty that have a profile compatible with that of LLU.

Over a two-year period, the P&T policy was redrafted to add that in teaching, research, or service activities, faculty should demonstrate how they contribute to the values of spiritual life and wholeness, diversity, or community and global outreach. They accepted and voted upon the revised P&T document at their February 22, 2002 meeting. But more than changes in P&T is needed to bring about the long-term cultural change.

Csikszentmihaly reports an interview with economist Hazel Henderson in which she says that "the real wealth of nations are ecosystem resources and intelligent, problem-solving, creative people." She identifies the world as "systemic and interactive" and states,

> Unless you have a systemic model of the problem that models all of the interfaces and all of the dynamism—and it probably has to be a planetary, within an ecosystem framework—

> you don't know where to push. When you have a good sense, a good map, of how all of those systems are interacting, maybe the policy will need to be pursued in five places at once in order to have feedback effects, or else your one policy will either dissipate and not change the system, or it will have some bad effect somewhere else, or you may amplify the problem in some other system. (p. 300)

The recruitment and selection of faculty is of critical importance in the composition of faculty and University culture, whether tenured or not. The gatekeepers of the field cannot replace the role of the person in achieving a creative change in the culture of LLU. On-going faculty development through annual evaluations, post-tenure review, and University-wide faculty development programs are of secondary importance. Interviewing potential faculty with P&T criteria in mind helps to better select the type of person that could thrive at LLU based on value-related "goodness of fit":

By means of policy change, faculty development, aggressive recruitment efforts, and vigilance in monitoring and reporting of faculty trends, steps can be taken to remove obstacles identified earlier. Finances of the medical center remain a major obstacle. But even within those constraints, a number of ways have been identified that have the potential to create a "Florentine Renaissance" at LLU by directing faculty effort through the P&T process and criteria and taking other steps to systematically develop a faculty and a culture at LLU in which its mission is perpetuated into the future.

Creativity in the context of the goals of Adventist education

Power, thinking, action, truth, duty, and destiny are key concepts in Adventist education. The development of these qualities enable students to be "masters and not slaves of circumstances." The context for these concepts is that:

> Every human being, created in the image of God, is endowed with a **power** akin to that of the Creator—individuality, **power to think and to do**. The men in whom this power is developed are the men who bear responsibilities, who are leaders in enterprise, and who influence character. It is the work of true education to develop this power, to train the youth to be **thinkers**, and not mere reflectors of other men's thought. Instead of confining their study to that which men have said or written, let students be directed to the **sources of truth,** to the vast fields opened for research in nature and revelation. Let them contemplate the great facts of **duty** and **destiny**, and the mind will expand and strengthen. Instead of educated weaklings, institutions of learning may send forth men strong **to think and to act**, men who are **masters and not slaves of circumstances**, men who possess breadth of mind, clearness of thought, and the courage of their convictions."" (White, 1952, p. 17, 18, italics added).

How does the educator foster these learning outcomes in students? What are the implications for fostering creativity and innovation? Based on how expertise is developed, the educator is in a unique position to facilitate domain proficiency. There is no substitute for learning well. Students must learn to internalize the domain; its symbolic elements, rules, and notation. They must also internalize the criteria and selectivity of the field so that attention and efforts can be

focused and poor ideas winnowed out. Creativity, like critical thinking, requires a great deal of content mastery. Just as it is not possible to think critically about nothing, creativity must find expression through a domain. How much is enough? Gardner's (1993) study of seven creative individuals in domains ranging from psychology (Freud), science (Einstein), dance (Graham), and music (Stravinsky), showed significant breakthroughs at 10-year intervals. The "10-year rule" as the time it takes for an individual to gain initial mastery of a domain has been well documented in studies of cognitive psychology.

Learning how to analyze and elicit creative solutions to problems builds upon content mastery. The Root-Bernstein's (1999) have identified 13 "thinking tools" used by creative people. These tools to transform thinking include observing, imaging, abstracting, recognizing patterns, forming patterns, analogizing, body thinking, empathizing, dimensional thinking, modeling, playing, transforming, and synthesizing. They "emphasize the teaching of universal processes of invention in addition to the acquisition of disciplinary products of knowledge." (p. 316). They propose that teaching the arts on an equal footing with the sciences and teaching students the intuitive and imaginative skills helps nurture the nonlogical, nonverbal seeds of creative thinking.

Students also need to be open to the sources of knowledge beyond a domain. As illustrated in the case of the Florentine Renaissance, truly creative thinking and action flowers within the boundaries of constraints. Novelty often lies at the interface between domains. The natural world and revelation in the Word of God are primary sources of truth, applicable to all domains of knowledge. The Spirit of God, in revealing truth, and in hovering over the void at Creation certainly has a role here.

It is through reflection on the call and claim of God that a sense of duty is developed. The light of heaven, eternity, and destiny provides insight gained through no other means.

Faculty can develop students' ability to recognize the flags of opportunity such as incongruity, demographic changes or the need for process improvement. Assignments can provide practice in analyzing opportunities for creativity and innovation in a systematic fashion.

Teaching students to be creative and innovative is not strictly a cognitive exercise. It is also a lifestyle. Faculty should teach and model that action is balanced with rest. Periods of incubation are critical to breakthroughs. The Sabbath, theologically and physiologically is a marvelous gift that fosters and celebrates creativity.

Finally, students must be impressed that creativity has moral and ethical dimensions. It can be used to bless through biomedical research, micro enterprise projects that alleviate poverty, or innovative methods of evangelism for select populations. It can also be used for evil: biological warfare, calculating crime, and deceit. This is why creativity must be learned and practiced by students within the context of duty and destiny. Creativity is not only for utilitarian purposes—necessity is not always the mother of invention. It can also delight, amuse, and inspire. The colors, scents, sounds, and exuberance of creation point to a Creator of a thousand delights, who shares with humans His own creative power.

Questions

Creativity is an interaction between what three elements?

Why is the role of the individual overrated?

What learning exercises in your discipline might create a sense of "flow" in your students?

What might you do in your discipline to develop in students the abilities to think and to do?

What would help them be more creative?

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