Developments in Business Simulation & Experiential Learning, Volume 27, 2000

THE PROBLEM IS - THEY THINK DIFFERENTLY!

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ABSTRACT

Much of the discussion on the problems in education today has focused on student's supposedly short attention spans. Unfortunately, this discussion often ignores or under-emphasizes what is perhaps the most crucial factor - that this group of students thinks and sees the world in ways entirely different from their parents and grandparents. One could say that their approach to learning about and understanding the world takes place in a *random access* or *curvilinear* fashion, while the existing paradigm of teaching is a *linear* model.

This paper presents an overview of what many consider to be the *traditional* cognitive styles and contrasts those with the *techno-centric* cognitive styles of today's learners. It then addresses the implications the *techno-centric* styles have on learning and reveals the advantages that the use of computerized simulations and various types of experiential exercises offer in addressing the challenges that these *techno-centric* styles present. The authors offer a reflective and provocative paper; hoping to stir debate and discussion about cognitive styles and learning behavior and the role simulations have had and might continue to have in facilitating learning.

INTRODUCTION

Much has been made about the learning, or non-learning, habits of today's secondary and post secondary students. Students are criticized for lacking interest, being intellectually lazy and, in general, being recalcitrant learners. Schools are under fire for not teaching the basics, for being too liberal or too conservative, for proselytizing ideologies instead of substance or for not teaching at all. While some of this criticism is probably justified, there is perhaps more to it than simple problems with simple solutions.

Much of the discussion on the problems in education today has focused on student's supposedly short attention spans. Unfortunately, this discussion often ignores or under-emphasizes what is perhaps the most crucial factor - that this group of students thinks and sees the world in ways entirely different from their parents and grandparents. In other words, students today have different learning or cognitive styles than past generations. One could say that their approach to learning about and understanding the world takes place in a *random access* or *curvilinear* fashion, while the existing paradigm of teaching is a *linear* model.

Some have suggested that technology is to blame. Yes, young people are heavy users of technology, but whether technology has changed their cognitive styles is subject to debate. The point is that learning is occurring, but it is taking place in different and novel ways. Technology has emphasized and reinforced certain cognitive aspects and de-emphasized others. Students have learned (or are learning) to adapt to speed and thrive on it. Yet, many educational programs and the firms the students will eventually join have not adapted or changed, except in superficial ways.

This paper presents an overview of what many consider to be the *traditional* cognitive styles and contrasts those with the *techno-centric* cognitive styles of today's learners. It then addresses the implications the *techno-centric* styles have on learning, particularly for business

students, and reveals the advantages that the use of computerized simulations and various types of experiential exercises offer in addressing the challenges that these *techno-centric* styles present.

TRADITIONAL COGNITIVE STYLES

Cognition is the process of thinking, learning, and perceiving. Cognitive style has been defined as "a distinctive mode of perceiving, remembering and problem-solving which reflects individual differences in preferred ways of information processing." (Messick, 1984) Researchers have identified many different cognitive styles over the past few decades. The more well known and commonly agreed upon ones are presented here.

Field Dependence – Independence

One of the more widely accepted styles, developed by Herman Witkin, categorized people by the degree to which a person is dependent on the structure of the prevailing visual field. While some people are very dependent on the visual background, others are not. For example a field dependent person may not be able to pick out the picture within a picture, or find a marble that has dropped onto a similar color rug. A field independent person, on the other hand, can clearly discern the camouflaged soldier.

Conceptual Differentiation

This style classifies people based on the extent to which a person views things as similar or different. In other words, the degree of differentiation that is made. For instance, some people see all birds as robins, while others clearly distinguish the various breeds. People with a broad range see the "big picture" and relationships, but frequently miss the differentiating nuances.

Impulsivity – Reflectivity

Based on the work by Jerome Kagan, this style depicts the impulse person as the one that will finish a timed task without regard to correctness, while a reflective won't complete the task but will perform flawlessly on the portion that was completed. The standard example is the "1 minute math assignment" frequently given to elementary school students. The impulsive will provide an answer for each one, while the reflective will do correctly as many as he can. Typing speed and accuracy tests can be used to measure this style.

Compartmentalization

The degree to which a person categorizes items and labels or classifies ideas is referred to as compartmentalization. While compartmentalizing may help an individual in organizing tasks, it can also result in people that can't "think outside the box" very well.

Conceptual Integration

A conceptual integrator wants to put the pieces of the puzzle together to make a meaningful picture. They want to look at all the symptoms and determine the correct diagnosis. Non-integrators are comfortable letting different events occur without needing to see the relationships.

Tolerance for Fantasy

Some people are more accepting of experiences that are outside the conventional. A hallucinatory drug experience or a virtual-reality game would be welcomed by some and not tolerated by others.

Scanning

This style is the extent to which an individual tries to confirm or verify the judgments that one makes. The person seeks to substantiate the

decision made, not necessarily to determine the quality of the decision made.

The styles listed above (Sternberg, 1997) represent a typical set of commonly accepted, *traditional* cognitive styles. As can be seen, each style can be viewed in terms of a continuum. For example, on the compartmentalization style, some people have a tendency to look at concepts, ideas or information in terms of discrete and mutually exclusive components, while others will try to put ideas and concepts together, even if they do not fit. While work on cognitive styles continues to serve as a research agenda for many educational and psychological researchers, there continues to be a debate as to whether the 'styles' are nothing more than reasonable explanations for the inability of science to understand how thinking occurs. Further, a universally accepted taxonomy of styles remains a challenge. Nonetheless, as Sternberg notes, "Interest in styles remains strong, at least in some circles. The reason is the sense people have that styles exist, that they account for variations in performance that abilities no not account for, and that they may be important in a variety of real-world settings, such as the school, the workplace and even the home." (1997, 147). The purpose of this paper, however, is not to disprove or discredit the traditional cognitive styles, but to suggest a taxonomy of styles which better addresses the learner in the information era. Those styles the authors have chosen to call*, techno-centric*.

TECHNO-CENTRIC COGNITIVE STYLES

The *techno-centric* styles have been suggested by Prensky (1998), although he does not use that term *per se*. The *techno-centric* styles reflect the tremendous influence the Internet, telecommunications, and the immediate access to information are having on today's students. Some of the *techno-centric* styles are not unlike the *traditional* styles, but the direction and theme of the *techno-centric* styles is clearly on technology and the influence technology is having on learning. The *techno-centric* styles are as follows:

- Twitch speed v conventional
- Random access v linear thinking
- Graphics first, text second
- Connected v stand alone
- Active v passive
- Play v work
- Payoff v patience
- Fantasy v reality
- Technology friend v technology foe

The authors will briefly describe the more salient of these *techno-centric* cognitive styles and then discuss the implications each one is having on learning and teaching in the business curriculum. For some styles, a strong contention will be made that the use of computerized business simulations addresses the pedagogical challenges offered by the styles. One is left to ponder the question: does this show great foresight on the part of simulation developers and proponents or is this simply serendipity? The reader will be left to ask if the styles are less of a challenge and more of a justification for the use of business games and simulations.

Twitch speed v Conventional speed.

Twitch speed means that information is presented to us quickly and this information can be processed almost instantaneously. While the ability of humans to "process faster" and even "parallel-process" has always existed, it has become considerably more widespread. College-age people have become accustomed to reacting to stimuli quickly and operating at "high-speed" on a regular, rather than occasional, basis. This does not imply simply information overload, but information "bombardment" as well. More and more students are developing a comfort level with multiple sources of simultaneous input.

Since the initial use of computerized business simulations in the 1960's, instructors have witnessed the feature of parallel learning that

they offer. To illustrate, a marketing instructor can give a formal lecture about the marketing mix and students can experience the implications of the marketing mix in simulation play. As a result there can be several simultaneous flows of information into the cognitive databases of the learners. Although this may not necessarily accelerate the transfer of knowledge from any one source, the use of multiple ports in a parallel learning process can in fact increase the volume of information that can be transferred during each period of time. While more still needs to be done, the use of simulations has been an excellent response to the demand for twitch speed learning by our new learners.

Random access v Linear thinking

Many of us are familiar with the so-called *Honda Effect* based on Richard Pascale's article of the same name. The *Honda Effect* refers to a decidedly western approach to understanding and explaining decision-making, or problem solving. "Western consultants, academics and executives express a preference for oversimplification of reality and cognitively linear explanations of events" (1984, 112). While we acknowledge and pay lip service to the so-called "human factor," the tendency is to overlook the process through which organizations (and students) experiment, adapt, and learn. Academics in particular tend to impute coherence and logic after the fact (Allison, 1969). Thus the linear approach is not only reductionistic, but has little bearing on the cognitive styles of today's students.

The human urge to think in linear ways probably evolved in more primitive times, when it was the right survival strategy to avoid being eaten by predators and to find enough food to survive. But when such straight forward and step wise approaches are brought to bear on complex situations, the result is usually bad decisions (Tofield, 1998). Let's assume that a young athlete is able to run a mile in 5 minutes and that she cuts 2 seconds off her running time each week for six weeks. Based on this sample, she should be breaking the world record in less than a year. The fallacy of this linear thinking model is obvious.

Basically, linear thinking or a linear approach to thinking means that one proceeds in a straightforward, stepwise, logical, coherent, and rational fashion. For example, the linear approach starts by showing students what the typical steps are (should be) for solving a problem. But, is that the way they approach it?

Markulis and Strang (1996) suggest that students can learn better if the pedagogical environment facilitates random-access learning as opposed to linear learning. Their article describes how the use of contextual diagnostic software, used in conjunction with a computerized business simulation, can provide a learning environment that permits non-linear learning. Although their example may demonstrate that pedagogic models can be developed to accommodate some of the demands made by modern learners, it should be recognized that to totally revamp all of a business course, or even a single lecture, to allow for non-linear learning would be a Herculean task. Incidentally, the use of the word "lecture" suggests a great deal about the predisposition of educators to address point A, followed by point B, etc. ad infinitum.

Connected v Stand Alone

Generation Xers are accustomed to being able to reach out to the entire world at any point in time. They have grown up on asynchronous communication modes such as email, computer bulletin boards, user groups, and Internet search engines. Technology has allowed this generation to reach out to the entire world with little effort, creating "a small world after all."

Even the earliest computerized simulations relied on teams of players working collectively. More recent simulations have included features that require students to breach the boundaries of

the traditional classroom. Numerous examples have found their way into the ABSEL literature. There are reports of inter-class exchanges of knowledge, and inter-collegiate activity. Flores et al. (1999) has reported a cutting edge illustration of this example, where students play as virtual teams comprised of members from different continents. It seems that the only limitation is the imagination and energy of the simulation developer and the instructor.

Play v Work

According to Prensky (1998) entertainment software is the number one running application on PCs today, even outpacing word processing. While many criticize the younger generation as lacking intellectually, the computer games they love so much actually require them to think logically, solve puzzles, acquire knowledge, master spatial relationships, and develop manual dexterity. Colleges need to figure out how to incorporate "play" into the curriculum and capitalize on the students' willingness to compete and achieve in the classroom too.

Simulation users have always known that one of the great attractions of simulations is that students tend to view them as play as opposed to work. After all, in simulation parlance, what students do as simulation participants is referred to as play. Indeed this environment will match what these students will experience in most of today's "high tech' jobs. Much of their work will be conducted in a sort of "play" setting.

Payoff v Patience

Students have learned, primarily through computerized video games, that patience can have its rewards. If you master the game you will be rewarded, perhaps with a win, perhaps by advancement to the next level, or maybe a "high score" designation. Unfortunately, if the payoff is not worth the effort students also learn to become very impatient.

Students undoubtedly can easily relate to the extension of this principle when they play business simulations. Although the rewards are perhaps less glitzy, there are still rewards for effective play. One can almost argue that computerized video games make good primers for computerized business simulations. Of course, there may be a good lesson if this is the case. Since modern students are trained as Pavlovian learners with glitzy rewards in their video games, designers of business simulations may be well advised to incorporate *glitz* into their simulations.

Fantasy v Reality

Fantasy, both from the past and the future, permeates the lives of the under-30 generation. This fantasy phenomenon is a direct offshoot of advances in technology. They can play games that are set in medieval times or years into the future. Network connectivity allows people to create fantasy identities and join in fantasy communities. Rather than try to eliminate this aspect, colleges need to design ways to let the students use fantasy to learn. The creation of an "alter-world" where student teams run a fantasy company, and their competition is from other teams from around the world, would teach management skills that were global in nature.

Computerized business and their complementary first cousin, experiential exercises, constantly bridge the gap between fantasy and reality. When they are well designed and well used, they rely on fantasy, but provide insight into reality.

CONCLUSION

Despite these potential 'sea changes' in the cognitive styles and mental models of our students and the world they will face, most instruction is still conducted via traditional methods, the lecture being the most prominent. This means that instructors attempt to communicate information by 'teaching' at or to their audiences. This is a natural trap to fall into

because it is what most teachers have been conditioned to do. But lecturing, as John Holt points out, is actually one of the least efficient ways to convey knowledge (1986). Instructors will need to take into account the different cognitive styles of students and use instructional methods that adequately address these styles. One of the best methods for matching instruction to styles, the authors argue, is to use computerized simulations and games. In that sense, business pedagogy, which utilizes computerized simulations and games, has lead the way. But that lead is only a partial one and may be short lived as change continues to outpace the educational system's ability to respond adequately.

The authors have offered a reflective and provocative paper; hoping to stir debate and discussion about cognitive styles and learning behavior and the role simulations have had and might continue to have in facilitating learning. While the literature on cognitive styles remains controversial and unsettled, this paper proposes a set of *techno-centric* cognitive styles, which address the learning milieu of today's students. The authors argue that two things have changed in today's classrooms - learning styles and the reality that shapes those styles. It is suggested that in many cases, business simulations and computerized games have met the challenges of the *techno-centric* cognitive styles. If the authors are at all accurate, educators will need to re-evaluate their pedagogical theories, processes, and techniques. Further, instructors will be seeking the advice and guidance of organizations such as ABSEL to help adequately address the changes which are occurring in the cognitive styles of today's learners.

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