Learning about how we learn and the dividends of metacognition
By Paul Syme

As educators, we occasionally receive feedback on the courses we teach from past and present students. For example, a comment made by a former Design student of mine who is now studying engineering at University, caught me off guard. She was the top student in her grade twelve Math and Calculus classes, though she informed me that the course which best prepared her for the rigors of University was my Design class. This comment struck me as odd since I, as most would, assumed that her studies in Math and Calculus would be the more obvious contributor to her successes in engineering. In contradiction, however, she pointed out that after being the top student in high school, in university she was in a class of peers who were all top students in their high school math classes. Being the norm rather than the exception, she didn't know how to weigh and value her abilities. Her natural inclination was to compete for top marks. Though this competitive spirit may have motivated her towards success in high school, in university it deterred and crushed her spirit. No matter how hard she worked she couldn't rise above her peers. She concluded that competition was no longer a motivator that would bring her success. Consequently, she began to seek approaches to learning that would offer her rewards in education while rebuilding her esteem without working herself beyond the thresholds of sanity. It was at this point that she began to reflect on the attitudes and skills I aimed to develop with my design students.

She recalled that in Design she was encouraged to seek the dividends offered by being aware of how she learns as well as being conscious of her strengths, weaknesses, aptitudes and energies. Furthermore, competition was exchanged for cooperation where it was hoped that each student aimed to build up their own bag of skills with the objectives of creating stronger designs while also being a resource for their peers. As some students immediately tried and embraced these strategies others, such as this engineering student, didn't recognize the rationale or full value of these concepts and attitudes until the approach to schooling which she had relied on for so many years had failed her. Consequently, by employing the strategies and attitudes towards learning as a way to gain mastery of a subject rather than as a venue for competition, and by being aware of her own cognitive abilities, she reported to have improved her academic performance while calming her anxieties.

As these progressive attitudes towards learning had meaningful implications for a student who was self motivated, intelligent, optimistic and by all accounts the ideal student, I am left to inquire to what degree, and in what ways, might these strategies effect the learning experiences of the average to weaker students? Furthermore, what impact might these approaches to learning have on the experiences of students of varying preferred learning styles? To acquire conclusive rather than rhetorical answers to these questions, a much larger study and paper would have to be pursued. We can, however, explore the promise provided by the evidence and rationale that is leading many educators to apply these pedagogical models in their learning environments.

Metacognition and learning:

There is a term educators use to describe the activity of being conscious and having control over one's own cognitive processes, which is *metacognition.* In essence, when someone understands how they think and learn, that individual is employing metacognition. Metagognition is considered critical to effective learning and success in academic activities. Through metacogniton, a student can take ownership over their learning, a power that can make the difference between having an effective and positive or a failing and horrific learning experience.

Too often, students learn in environments where the professor throws a great deal of data at the them or has them examine a textbook, leaving the student to effectively teach themselves the material -- an experience that should be familiar to those of us who remember freshman survey courses in university. Students who are aware of how they process information can survive in this environment since they can devise strategies to help themselves learn, where as others who can not capitalize on metacognition struggle to cram information into their heads only to forget it shortly after the exam. Using this situation as an example, we can assume that the student who had made use of his or her metacognitive abilities likely had a more rewarding learning experience than her cramming peers. Beyond assumptions, however, research in this area has found that students who achieve poorly in school do so in large part due to having poor metacognitive abilities. Accordingly, educators and researchers have aimed to design courses and approaches to education that would enable students gain

a greater awareness and control over their learning towards adopting strategic approaches to learning.

Metacogitive abilities are learned from a plethora of sources, though mainly from the most obvious places such as, parents, school, and from personal experiences. Each of these common domains offer us unique ways of learning and call on a variety of motivators. For example, when we learn how to play games we might find motivation in the desire to interact with peers in a fun way. Where, in a schooling situation, we might learn a topic because we are motivated by the promise of high grades. Each of these situations, or any learning opportunity, assume two fundamental parts: first, that there is something to be learned; and second, that the learner requires some form of motivation, whether it be intrinsic or extrinsic, positive or coercive. Furthermore, when there is something to be learned we can presume that there is a learning strategy at play. Whether it has been devized to serve the needs of the teacher or the learner a process is engaged with the intent to gain knowledge, skills, or attitudes.

Metacognition provides implications for all of these key areas of learning. It effects how we learn, how deeply we learn and our reasons for learning it. Most critical of these domains is the *why*, for motivation directly effects the quality and depth of the learning experience and goes on to impact the attitude of the individual towards learning, work and themselves. Through positive and relevant motivation the student is more likely engage the learning opportunity with the objective of making the most of the experience, which should compliment the aims of any teacher or employer.

Metacognition as a motivator and a tool for growth

Metacognition improves the motivation of a learner by offering them greater control over the learning experience, often resulting in the course content being more relevant to the individual. Metacognitive activities also increase a student's frequency of success while decreasing the sense of helplessness associated with failure. Moreover, it removes the emphasis on learning as a competitive activity, placing the emphasis on the learning opportunity as a way to gain mastery over skills or knowledge.

When a student is able to understand the best ways in which she learns, in some instances she can manipulate the learning strategy to best suit their learning styles. When this is not possible -- perhaps because the teacher has only offered one way to learn the material or skill -- the student, who must absorb information or learn a skill through a strategy which is out of harmony with their learning style, is less likely to blame themselves for their failure. Rather, in such instances the metacognitive student can recognize that the strategy failed them, or perhaps their effort was unsatisfactory, not their own capacity to learn. Students who encounter these crushing situations and only blame themselves for their failure are inclined to perceive themselves as failures, contributing to a shrinking assessment of their self worth. Conversely, the metacognitive individual who works to modify learning strategies to best fit their preferred learning style, has greater prospects of achieving success and will therefore have a greater sense of self worth and an ever increasing appreciation for learning.

Another motivating result of metacogniton is the emphasis on the individual learner over the learner as part of group. When someone is attentive to how they learn they are paying less attention to the achievements of peers. The metacognitive individual is more inclined to engage a learning opportunity for the promise of developing or gaining mastery over knowledge or skills rather than finding motivation through the external pressures of competition. Research in this area of mastery vs. competition motivation has consistently found that mastery–goal-oriented situations result in higher achievement and greater interest among learners. Competition may be an effective motivator for the individual who is always number one, but we must recognize that only one person can sit in that seat at a time and the pressure to keep that seat must be an awesome and nagging force. For the rest of us, the weight of competition can often be a counter-motivator, ripe with fuel for anxiety and fear.

Contributing to the confidence of learners through mastery based learning strategies and metacognitive activities can also result in the individual being more adaptive to change. The person with a positive self worth and the ability to adapt a situation to their learning style is more inclined to embrace change and meet its demands than the individual who is intimidated by change because they don't feel confident in their capacity to meet a given challenge's objectives.

Metacognition effects our depth of understanding and how we think:

Through metacognitive practices the learner can gain a deeper and broader understanding of the content or skills being offered. When applied, metacognition encourages the learner to examine not only the nature of the content being taught but also the form of how it is being delivered. Metacognition is applied and capitalized on when the learner ventures outside of the conceptual box to gain temporal distance and a clearer sense of the learning objectives. In doing so, she affords herself the opportunity to see the big picture, a vantage point from which she can act to adjust the content to be learned through a more individualized strategy. As a result, this student would be more likely to achieve or exceed their objectives with a deeper understanding of the subject matter. Moreover, where this process models and encourages the critical process of lateral thought, the learner makes use of strategies that can improve her capacity to adapt to change and to confidently and efficiently solve complex problems.

Metacognition in action:

Metacognition is put into action as soon as the reflective individual begins to ask questions about how they learn and apply them to the form and content of the learning opportunity in front of them. Knowledge can be acquired only when the can begin when the learner values a process of asking questions over the need to have the right answers. Only through a process of inquiry and reflection can learn about who we are, how we think, and the nature of the given skill or information we wish to be able to do or know.

Though the specific questions may vary, the metacognitive student might approach a learning opportunity with these questions:

* What am I about to learn?
* What is the nature of this subject?
* What skills or knowledge to I need to begin, and do I have them?
* What do I hope, or am I expected, to know or do at the end of this course?
* How am I being asked to learn this subject?
* How can I adapt this subjects content or form to fit my preferred learning style(s)?

- Fundamentally, how can I go about marrying my abilities with the expectations of this course?

Conclusion:

Where metacognition describes a person's perception of how they learn what they learn, it becomes meaningful when an individual applies their awareness of their preferred learning style to challenging learning opportunities. Those who engage this self regulating process of inquiry are poised to have rewarding and meaningful learning experiences and a greater sense of self worth. Metacognition activities encourages learners to abandon perspectives on learning as a passive process undertaken to satisfy the whims of teachers or employers in exchange for personal ownership over their learning process, effectively becoming adaptive life long learners.