Optimum Academic Performance and its Relation to Emotional Intelligence

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"Being able to enter flow is emotional intelligence at its best; flow represents perhaps the ultimate in harnessing the emotions in the service of performance and learning. In flow, the emotions are not just contained and channeled, but positive, energized and aligned with the task at hand." Daniel Goleman

Abstract *- In Emotional Intelligence, Daniel Goleman discusses the effect of emotional competence on optimum performance. He describes the state of flow in which optimum perfor-mance occurs. Literature from coaching sports talks about this state of total concentration, as well. Our goal as teachers is to provide an atmosphere where flow occurs easily and the students are totally engaged in learning. This paper reviews the elements of flow and describes educa-tional activities and programs which promote flow. It will suggest how these can be tied to self-directed learning strategies to prepare professionals for life-long learning.*

Introduction

I was stuck on a boundary value conduction heat transfer problem in my graduate studies. I had searched several reference texts and found a solution similar to the problem I wanted to solve, but was not sure where to go next. I was referred to a professor of applied math. I presented him with the problem with the assumption that he would suggest a procedure for starting the solution. Instead, he pulled out a piece of paper and laid the problem out carefully. After thinking for a minute, he started writing. For the next twenty minutes, I sat silently as he methodically went about solving the problem. He was totally absorbed. I now know that he had entered the state of flow in which optimum performance occurs.

The Mental State of Flow

In his book, *Emotional Intelligence,*[1] Daniel Goleman describes the research of Mihaly Csikszentmihalyi into the mental state for optimal performance, which he calls *flow*[2]. When in flow, the mind is completely focussed on the task at hand, whether it be solving a math problem, playing tennis, or performing surgery. A person in flow is neither self-conscious nor self-absorbed. Neurological studies have found that the brain is actually at a low energy state when in flow, because there are no competing signals. [3] A physical analogy would be that of a system which is being excited at its natural frequency. A minimum of effort is required to keep it moving since all input energy is going to reinforce the desired motion. A person who is too calm may become lethargic and dull. A person who is too energized may become excited and jittery, with the mind racing at too high a speed. Thus, finding the proper state of mental arousal is one of the keys to getting into the ideal Performance State.

James Lohr, [4] a sports psychologist, says that athletes have reported that, when they are "in the zone", the pace of play seems to slow down and that tennis balls look bigger than grapefruits. Setters in volleyball and pitchers in baseball report that their hands feel "golden", that they can do anything with the ball that they want. One of the distinguishing features of world class performers is that they can move into the state of flow quickly and stay there during hours of practice and performance. They have trained themselves to work in this very focussed mental state.

Csikszentmihalyi says that three conditions are normally present in flow. First, there is a clear set of goals that require appropriate responses. Second, the flow experience provides immediate feedback; i.e., there are concrete outcomes from the activity, which can be assessed as it progresses. Third, the level of challenge is just about manageable with the skills possessed by the participant.

A study of students in a high school of sciences found that students who were most successful were in flow 40% of the time when doing their studying. Low achievers with the same score on a math proficiency test found that study provided flow only 16% of the time. For these students, study created anxiety, with demands outreaching the students' ability. They got their psychic rewards from socialization. Because they failed to hone the skills that would get them into flow, they both forfeited the enjoyment of study and ran the risk of limiting the level of intellectual tasks that will be enjoyable to them in the future. [5]

As Csikszentmihalyi states in his book, *Finding Flow* [6], flow can support a productive life or it can be a form of escape. A person playing games on a computer will likely be in a state of flow once she has learned the game well enough to operate at an intuitive level. Playing the game can develop problem solving skills and hand-eye coordination, but can become a form of escape from other more productive activities. A person is not "happy" when in the state of flow. She is too absorbed by the activity. It is only after the task is completed that she has the leisure to look back on what has been achieved and be satisfied with the result.

Flow and Motivation

Csikszentmihalyi [2] describes the autotelic personality as a person who gains satisfaction from self established goals and

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is not particularly concerned about external rewards or goals. Those who are most effective in achieving flow are satisfied with intrinsic rewards, a feeling of accomplishment for its own sake rather than being motivated by extrinsic factors. Gardner [7] stated that the "healthiest way to teach children is motivating them from inside rather than by threat or promise of reward. It is when kids are bored in school that they fight and act up, or when they are anxious about their schoolwork." Identifying a child's profile of natural competencies and playing to the strengths as well as trying to shore up the weaknesses will lead to optimum performance. When kids experience flow while learning, they will be emboldened to take on challenges in new areas. Mastery in a craft or skill is spurred on by the flow state. Because the experience of flow is so gratifying, it supports continued effort to improve. Those who work for extrinsic rewards never achieve greatness.

The literature on self-directed learning is relevant in the study of flow. Gerald Grow describes four stages of development in becoming self-directed. [8] At the highest level, Stage 4, Grow says that learners set their own standards –with or without the help of experts. They use experts and other resources to pursue these goals. Being independent does not mean being a loner. Learners at stage 4 are both able and willing to take responsibility for their learning, direction and productivity. They exercise skills in time management, project management, goal-setting, self-evaluation, peer critique, information gathering, and use of educational resources. Promoting the skills of self-direction will also move students toward the ability to achieve flow and optimum academic performance. In fact, we expect to use the concept of flow in designing training modules to promote self-directed learning in lower division engineering students.

The goal of a successful academic program will be to provide a balance between stimulating activities that promote optimum performance and developing a value system that supports long-term personal development toward meaningful life goals.

Getting into Flow

While Csikszentmihalyi describes flow as existing for some people in a wide variety of activities, the focus in this paper has to do with academic studies at the college level. For a person to study in flow, there are several factors which will normally be needed. First, there must be a certain level of knowledge and expertise in the area being studied. Flow will normally not exist at the "definition" level of understanding. A student has to be working on a topic in which he has sufficient knowledge and skill that he can perform with reasonable proficiency. We wouldn't expect a beginning tennis player to be in flow. Only a person who has mastered the strokes sufficiently that he can play with detachment will achieve flow when playing tennis. Studies of "expert" behavior describe four levels of functioning: unconscious incompetence, conscious incompetence, conscious competence and, at the highest level, unconscious competence. At the lowest level, a person is not aware of his inability to perform a particular task. When he becomes aware of the limitation and decides to learn the skill required to perform the task, he is at level two. After study and practice, he achieves conscious mastery. With continued practice, he eventually reaches a point where he can perform the desired task without thinking about it. [9] It is at this highest level of unconscious competence that flow is most likely to occur

When we look at our own students, we can see a parallel. Those who do well spend long hours at their homework with a high level of concentration. They have developed a high level of problem solving ability, so they are efficient in learning new material and processes. Students who have never become efficient problem solvers will struggle with all of their studies. Those who do not write well and avoid writing will never get into the Flow State in which effective creative writing can occur.

The ideal Performance State occurs rarely in athletes, and sometimes the best a person can do is to get as close to it as possible. It helps if the person has experienced the ideal Performance State so that he or she will be able to enter it more easily. However, even if he or she has not experienced it, learning to practice the interventions can help him improve performance by refining his state of mental arousal in order to get as close as possible and to learn some interventions that will help him get into the state.

Second, for flow to occur during study with regularity, there must be regularity. A stable and supportive environment and study schedule is important. Creative people typically follow a consistent, if not rigid, schedule of when and where they work. The "where" is based on the location in which they are most creative. Each person must find her own optimum study space. This can be a real problem for college students, since the modern study environment should include a computer with modem attachment. This is not always available in a space that is conducive to study. A noisy roommate or residence hall can make study difficult. A library can provide a quiet space but not necessarily the computer support required. If the time and place are fixed, then the student can expect to enter into an environment where she focuses on her studies. Such things as lighting, music, and ancillary equipment will be developed until the space provides an environment, which supports moving into the state of total concentration needed for flow.

The schedule is as important as the space. Each of us have certain times of the day and night when we are most alert. That is the time when we should be studying. The day's schedule should be organized around these times so that productive study is done when the mind is clear and focussed. Flow cannot occur when a person is tired or not yet awake. Goleman says that to get started in flow takes discipline. There must be an intentional focus of sharp

attention on the task at hand. Once the focus starts to lock in, it takes on a force of its own. The schedule and environment assist in getting the state of flow activated.

Test Taking and Flow

If a student describes difficulties caused by the jitters, nervousness, or a racing mind, then she can use interventions that are intended to calm her down. These interventions are not different than those that are intended to treat test anxiety. The difference between programs for test anxiety and for the Ideal Performance State is in their final intent. With test anxiety, the goal is to remove the anxiety, while for the Ideal Performance State, the goal is to find the ideal level of mental arousal that leads to high performance. There are many commonly used interventions that lower mental arousal levels, such as yoga exercises, staying away from stimulants, avoiding socialization before an exam, and arriving early and spending quiet time immediately before the exam. In extreme cases, students have reported success in the reduction of anxiety through the use of hypnotism and doctor-prescribed chemical interventions.

If the student describes difficulties caused by mental lethargy, such as thinking too slowly then she can use interventions that are intended to speed up the mind. This can include getting more sleep, practicing drills that speed up thinking, and taking practice exams at faster and faster paces. Music of the proper tempo can also be used to help the student reach the proper level of mental arousal. Whether or not a person should take stimulants such as products with caffeine is not within the scope of this paper. Students who feel that a stimulant is needed should consult with proper medical personnel.

We can learn a lot from models of expertise and high performing athletes about the levels of preparation in the knowledge domain that students need in order to experience the Ideal Performance State. Students must have the requisite knowledge and problem solving processes. Let's look at the knowledge base first. Chunks of knowledge can include simple recall of homework problems, basic procedures, basic principles, interpretations, etc. Lower levels of problem solving require recall and recognition. Higher levels require higher levels of knowledge and higher order problem solving skills. For example, if a test problem requires the linking of two normally distinct pieces, or chunks, of information, then the student's mind must have access to both chunks. In the ideal case, the individual already knows both chunks. In the worst case, both chunks are not known, and the student must prepare by learning more chunks. In between are several possibilities. If both are known, but must be refreshed through the use of an equation sheet or by taking an open book exam, then the student will have difficulty seeing the linkage. If the student knows one and the other must be refreshed by looking at the equation sheet or textbook, then he or she has a chance to create a strategy that links both chunks.

The state of "being in the flow" when taking exams can be modeled through an understanding of expertise in chess and through an understanding of high performance in sports. Research studies of experts in chess and similar games between two opponents have shown that the expert executes moves without thinking when he or she is superior to the opponent and reverts to problem thinking when confronted with challenging abilities. [10] In other words, the expert is able to see things intuitively and holistically.

Promoting Effective Student Performance

As instructors, we have an opportunity – and an obligation – to help students develop into effective learners. How can we help them "get into the flow" of learning? Let's start with the student. Virtually all students who enter engineering programs were successful students in high school. The fact that approximately half of them leave engineering suggests that, for many, their early success in math and science did not carry over to college. This may have to do with poor study skills, a lack of maturity in dealing with the challenges of college, or a lack of interest and/or preparation in the introductory course subjects. To engage them in these subjects so that they will continue in engineering and be successful in their studies requires certain factors in the introductory college experience. First, the courses need to be designed so that they provide alternative paths to learning the material. They should include activities, which help students understand the relevance of the topics to the practicing engineer. The first college experience of "flow" is likely to occur when working on a project or design, which goes beyond the regular homework exercises. Creating a personal web page is more exciting than regular programming exercises.

The traditional lecture is of limited help in developing problem solving expertise, particularly in introductory courses. Normally, the instructor has already worked the problem before presenting it in the lecture. The student is impressed with the instructor's expertise. However, the instructor is not modeling his problem solving process, which is much less linear than the problem presented in the lecture. Based on the students feeling of inadequacy when compared to the instructor, the student is likely to give up too soon, assuming that he will never be able to work the problems in math or physics, say.

The Role of Feedback

Students need help in understanding the concept of flow and effective study. They need help in learning how successful college students approach their studies. In the EPICS program at Colorado School of Mines, each student has a faculty mentor who attends all EPICS classes with his/her charges. The mentor is there to help the students become engaged in the college experience at the beginning. Because the mentor is in all EPICS classes, the student knows that he

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can approach the mentor for help on any subject. The mentor provides ongoing feedback on the learning experience and makes it more relevant [11]

At Syracuse, all students are required to take a math placement exam. Those who do poorly have to take a remedial course attached to the regular introductory calculus course before progressing. The remedial course has been so successful, that it has been integrated into the introductory calculus course for all students. The goal is to get students off to a good start in math so that they are not hampered in other topics. This provides additional practice in math drills, which build expertise in mathematical problem solving. [12] This program helps the student learn from the first day of the college career that feedback is important in their academic progress. A poor grade does not mean a poor student, but rather inadequate preparation. Approached positively, this type of feedback promotes the objective self-assessment practiced by Stage 4 self-directed learners.

Feedback is critical in promoting expertise. Initially, an expert must provide the feedback, although as people build expertise, they can provide their own feedback by trying to solve problems for which the answers are available. Mature learners will use standardized exams and problems to test their knowledge as they progress. However, even experts use external feedback. The top athletes and musicians have coaches who help them continue to hone their skills in an endeavor in which they are already worldbeaters.

A critical element of developing student engagement in an activity is the effectiveness and timeliness of the feedback. If a paper is written or a presentation is made and there is no feedback, the educational value is reduced. If, for example, students are involved in evaluating each other's performance on the spot and the feedback is immediate, then they will become much more involved. They will put more time in preparing their paper/ presentation. The feedback does not have to come from the instructor, so long as the student knows that the feedback is valid. Using students to grade each other's effort is an effective learning tool, since students see good and weak work and learn how to evaluate it. In the DTeC program at Binghamton, undergraduate course assistants are used to mark and then discuss writing exercises with freshmen students. The UCA's have taken over a major part of tutoring the students toward better writing.

Conclusion

In a previous paper, Culver explored the implications of Emotional Competence, as described by Goleman, on preparing students for professional life.[13] In this paper, the dimension of emotional competence which impacts optimum performance is examined in more detail. Optimum academic performance occurs when the student has developed the discipline and skills for effective learning. Top performing students can enter the state of flow in which learning is most effective and the resulting intrinsic motivation encourages more and higher scholarship. By helping all students discover the state of flow and the conditions needed for its use, we can move them toward higher learning effectiveness. By designing our courses to provide an appropriate level of challenge, with multiple paths to learn the material and continual feedback to monitor performance, we can assist students in achieving optimum academic performance.

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