

TCORE 122D – Introduction to Science

Midterm Exam – Makeup: 5-13-14 - Example Answers

Ralph has just been told that he is going to need to go to a meeting with a prospective client on the other side of town in one hour. The meeting is expected to last for several hours and will end around 1:30 or so. Unfortunately he was unable to eat a sufficient breakfast so he considers going down to the office lobby where a “sandwich cart” has a selection of pre-made sandwiches that he might be able to scarf down just before the meeting starts. He executes his plan and buys a ham-and-cheese on rye.

As Ralph is entering the building where the meeting will take place he starts eating the sandwich. As the food enters his mouth, he chews each bite and swallows. He finishes the sandwich and a cold drink in the elevator on the way up to the meeting office. By the time he reaches the office he is feeling satiated (no more hunger) but now he feels a different sort of urge and begins looking for a restroom before getting stuck in the long meeting.

When Ralph emerges from the meeting he realizes that the work he had done in preparation probably left something to be desired. The prospective client did not seem all that enthused with his suggestions. He thought he had better go back to the drawing board and try to find a better solution. He reflected on the fact that what he had done had been rushed and probably not his best quality.

1. [15 points] Assume that Ralph was not expecting to have that meeting. He received a message conveying that the meeting would happen. What is the nature of such a message? What is it called when we receive messages about things we were not expecting? Explain the concept and give an example from your own experience.

Answer: Ralph is surprised by the message. It is informational. A message that is unexpected by a receiver conveys information in the technical sense to that receiver. Information is also called “news of difference” meaning that it contains something different than what the receiver expected to receive. I was surprised by the results of the first midterm exam. Those results were a message to me that informed me that I would have to alter the way the course was heading in order to salvage the quarter!

2. [15 points] When Ralph considers going to the sandwich cart (because he might be hungry later) his brain is engaged in what level of management in a hierarchical cybernetic sense? What is the name of the activity in his brain? Explain the concept and give an example of the same kind of process from your experience.

Answer: Ralph is engaged in the planning level of hierarchical management. He is thinking ahead in time realizing that he might get hungry during the meeting; he lays out a plan to avoid that. He is doing strategic thinking. Strategic thinking is where you consider multiple many factors that might be affecting you in some future situation. You consider your own state and your resources and then lay a plan to either take advantage of future opportunities or avoid future negative situations. In considering my objectives for you in this course, and the difficulties we have encountered during the first half, I have started planning a recovery scheme so that you will leave the course with at least some useful knowledge.

3. [15 points] After Ralph decides to buy a sandwich he has to execute his plan. What level of management decisions become active as he goes to the sandwich cart? Which specific kind of decision-making at that level is being executed in seeking out and buying the sandwich? Explain the concept and give an example from your own experience.

Answer: Ralph is engaging the coordination level, specifically the tactical management thinking. He has to direct himself to the sandwich cart, or in other words, coordinate his activities with an external resource (the cart). Ralph's strategic plan is given over to the tactical manager to actually obtain the sandwich so as to avoid being hungry later. Tactical management is the coordination of the individual system with its environmental situation so as to actually get resources or avoid obstacles. Given the situation of the class with respect to learning from the first half of this course, I generated this test as a first step in coordinating my strategic goals with all of the students. I will continue to map out specific actions that will hopefully bring something positive to the class.

4. [15 points] When Ralph starts eating the sandwich on his way to the meeting he is making decisions on how best to use his time. The actual acts of eating and swallowing have to be executed correctly. What level of management decisions is represented in these acts? Which specific kind of decision-making at that level is being executed? Explain the concept and give an example from your own experience.

Answer: Ralph is managing his resources through logistical management. His brain is coordinating the various mechanisms involved in eating the sandwich while making his way to the meeting. In this case Ralph's logistical management is cooperating with the tactical management in order to execute the strategic plan in an optimal way. Logistical management involves coordinating the internal operations of a system. Ralph is eating a sandwich to stave off hunger. The sandwich will be digested by the "operational" system of his digestive tract and supply his whole body with energy. For my work on this course I will need to coordinate my resources better in order to shift the tactics I've been using. I need to think about re-balancing topics to make more effective use of the time remaining in the quarter.

5. [15 points] After some period of time Ralph no longer feels hungry. His digestive process has notified his brain that it is beginning to extract nutrients from the food. What level of

management decisions is working when this happens? What sort of message to his brain is it that dampens his previous feeling of hunger? Explain the concept and give an example from your own experience.

Answer: As suggested in the prior answer, digestion is part of the operational level in Ralph's body. All parts of the process are self-regulated but need some coordination from the logistical management level (for those interested this takes place in the brain stem, e.g. the medulla and pons portions of the lower brain - totally subconsciously). When the nutrients are available as energy to his body, his brain gets feedback signals that tell it that no more food is necessary. This is the lowest level (operational) of cybernetic systems where there is a standard or ideal value of the output (nutrients in his blood stream, for example) and an actual value. When there is an error (e.g. not enough nutrient in his system) then the higher levels are notified and the operational process is adjusted to try to compensate. My operational level for this course is the actual "lectures" and exercises that I had prepared for classes. Now I have to adjust a number of them to accommodate the changes needed in the course. For example I will need to re-work the seminar sessions, perhaps to provide examples of good questions rather than expecting the students to develop them on their own.

6. [5 points] When Ralph realizes he needs a restroom and starts looking for it what level of management is again at work?

Answer: This is the tactical coordination again. His operation level (process) notified the tactical manager of the need to eliminate so he starts actively thinking about finding the facilities - coordinating his behavior with the environment.

7. [25 points] Describe what you think is happening in Ralph's brain in the last paragraph. What concepts are covered in this scenario (at least two)? Explain them and give examples from your own experience.

Answer: Ralph got feedback from the client that suggested the work was not adequate. Ralph went into a meta-learning mode where he analyzed the nature of the feedback (information) and went back to the planning level of cognition to think about what he should do to improve his work in the future. The concepts here involve feedback to guide learning (meta-learning) and strategic thinking (planning level cybernetics). Our human brains are able to receive feedback, both positive and negative (in Ralph's case) and use that information to guide our planning for future activities. This is the cybernetic principle working on a much longer time scale to improve our overall production (output). For myself, hearing so many students complain that they did not know what it meant to come up with good questions to address in a seminar session caused me to stop and think about the task. Since I had taught this exact same course last year and had not had the same kinds of complaints I realized that something else was amiss. I have been gathering information from other teachers in the core to see if I can ascertain why this particular class seems to be struggling with the concept. With the results of the previous midterm exam I now

know that I need to design some new pedagogical approaches in order to maximize the benefit of systems knowledge for this particular class. And that is what I am doing!