Brad Kozel

cct 651

General Principle Journal – Week 1

September 21st 2017

Word recognition relies on context and frequency of input. The two examples that come to mind in relation to this general principle both stem from education. I could not help but reflect on my own learning as I read Reisberg. In my elementary years I was dubbed a slow reader, not a distinction that I liked as a child. I struggled with spelling, forming words and reading at an age appropriate pace. I as I child worked very hard to avoid this type of schoolwork. I still experience these effects when wading into new texts or disciplines. I also remain extremely self-conscious of my spelling to this day. Interestingly, I tend to spell correctly when I am typing but not when I write on the board in front of my classes. It is a bit of a running joke between my students and myself. I think this general principle translates to the classroom in the form of practice. Developing good diverse reading habits as a child provides the collection of contexts and the repeated exposure that primes feature net pathways.

Content area teaching is very focused on reading comprehension right now. We regularly do the work of identifying the tier 3 words that are content specific and likely new or low exposure to the students. I think the context and frequency principle is at play here. Tier 1 and 2 words are words that we expect students to understand because they have many experiences and they appear in multiple contexts. Students when reading content area texts, like a Biology book, have the tendency to skip over these words especially if the word is not bolded and in the glossary. Comprehension to me seems to be about building the context for the students around these new words by placing it into some narrative of biological principle, model or analogy. I see this specifically in when words have multiple contexts, like polar. Polar bear, polar regions, polar coordinates, polar bond, or polar molecule; all provide context for the word polar.

The final point of the Reisberg chapter, object recognition requires knowledge outside of feature nets is key. I can see we are looking at a slice of cognition and that all these systems intertwine. It seems that comprehension must follow word recognition but once you have comprehension of a word, such as polar, the recognition of that word is improved.

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Week 3 Journal

Sept 28th 2017

Principle Statement: Divided attention uses multiple finite cognitive resources for different tasks, the relatedness of tasks and familiarity with the tasks are factors in the quality of attention to each.

I have had the experience of reading or doing CCT work while listening to music. The music floats to the background of my attention but remains a pleasantly in my consciousness. The work does not suffer, in my opinion, and does not appear to require more time. It appears, at least for me, that the cognitive demands of listening to music and engaging in reading, thinking creative and critically and writing do not over whelm my reserves. Based on the readings I wonder if this has to do with practice. Do I pick music that I know will not distract? Do I pair the music to the educational task based on my past experiences? I have not considered this before and I am interested paying closer attention to this in the future.

Multitasking is a hot topic among in the world of education. The current generation dubbed the iGeneration is, in part, defined by their “need to multitask” (Rosen, 2010). From the teacher perspective I have always viewed the concept of multitasking with heavy skepticism. In the classroom the goal is often clear away the other inputs so that students can focus on one sliver of the subject at hand, in my case Biology. Students have a strong desire to listen to music while they do this independent work. The independent work often involves some analysis of a lab, research on the web or reading. It is hard to drill down to one specific example because this is such a common question. The primary task from my point of view is to engage in the learning and the music is the secondary stimulus. I do wonder if the experience is highly individualized since it is so connected to practice? Is it possible that the iGeneration does have a greater capacity for multitasking because of their early and constant exposure to technology? Most recently a student immediately followed his request to listen to music while doing independent work with the statement “it helps me focus”. I think that this brings up another important point; divided focus is a regularly occurring state for many people and especially young people. We are often faced with distractions. Choosing a secondary focus that you know will not deplete your cognitive reserves could ultimately enhance the primary task.

I was interested to see that no connection with divided attention and ADHD was made in Reisberg. This is challenging the way I have always considered ADHD and wonder if there is a connection. Several of the symptom domains listed in figure 5.2 would appear to intersect with divided attention, such as ‘fails to finish’ and ‘does not appear to listen’ (Reisberg, 2016). I know that ADHD is often decried as over diagnosed. Are we simply dealing with a generation of distracted kids that have exhausted their cognitive reserves due to poorly executed multitasking?

Rosen, L. (2010) Welcome to the iGeneration! Psychology Today. (website) <https://www.psychologytoday.com/blog/rewired-the-psychology-technology/201003/welcome-the-igeneration>

Reisberg, D. (2016) Cognition 6th edition. W. W Norton and Company. New York. Print

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Week 6 Journal

October 19th 2017

Principle Statement: Memory is an interconnected system that has no boundaries between events; remembering relies on this interconnectedness and can be affected by many factors including recency, schema, similarity between events, emotional context and/or personal involvement.

Note: *Composing the next paragraph from memory.*

On three occasions my brother has visited my family in Massachusetts. He lives in Michigan with his wife and two kids. I live here, in Mass, with my wife and two kids. They visit in the summer every other year; 2013, 2015 and 2017. The trips varied in length and sequence but have a few events major events. We spend a day in and around Concord doing Concord activities, a day in Boston doing Boston activities and a day at the beach in Ipswitch then go to Rockport. My emotional investment in their visit is high because it is one of the few times that I see my brother and to see our kids together. As I strain to build out the memory of the general pattern of the tips to specific occurrences I see aspects of memory and remembering coming into play. For example in Rockport every year we ate at the same restaurant and I have an image in my mind of us together in the restaurant but it is just one image but I know we went there three times. When I pull on the memory thread a little more I can separate out the occurrences. I have a memory of sitting next to my nephew because I helped him cut his food. This memory (if reliable) places that visit in 2013 based his age; by 2015 that would be a task he could do himself. In this case memory but also inference is connected in the placing of that event to a particular year. In another example I can specifically remember the beach visit 2015 because my second daughter was still an infant and there where those damn biting fly’s all over the place. It turned a potentially wonderful day into a moment of parental worry and thus animated disagreement with in the family (Do we stay or do we go?). These memories are all autobiographical which increases their vividness but the sequence and detail of the trips require more probing and markers that indicate the passage of time. I seem to be grasping at growth of the children in the memories likely because these are big and personal life events.

The readings on memory also brought up the concept of reminiscing for me. I looked it up; it is defined as remembering with pleasure. This past summer I had a chance to go away for a weekend with 3 childhood friends that I have known since elementary school. We attended school together the entire way through undergrad. We now have dispersed and rarely get to see each other but still talk on a regular but infrequent basis. The trip was dominated by reminiscing about the long period of time that we spent together. It struck me in this chapter that reminiscing is a unique form of recall and memory in that the memory itself produces a feeling of pleasure. And that reminiscing could be considered a form of revisiting recall pathways that are positive. This brings me to questions about how we cognitively develop attachments to other individuals and how this is related to our memories.

I was especially interested in the trade offs that exist in dealing with complex memories. The framework of thinking about memory as a network of nodes and recall pathways helped me understand how tradeoffs exist. The combination of recall and schematic memory makes sense filling in the blanks will lead to mistakes but mistakes that usually do not matter, unless you are doing a physiological test or you are an eyewitness to a crime. It is almost more of an efficiency than and error. Forgetting is another interesting concept. We commonly refer to being forgetful but it may just be an acquisition problem. It seems like this could be another efficiency, why hold on to a memory that is never accessed. Certainly lots of considerations in the world of education relate to acquisition, memory and retrieval.

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Week 7 Journal

October 26th 2017

Principle Statement: Expertise is achieved through deliberate practice over long periods of time, expertise is contextualized to specific domains and expert’s posses content knowledge and situational understanding of how to think in a domain.

I have being thinking about what deliberate practice looks like in teaching. The idea the experience in a professional field does not equate into high performance scan well with what I have seen over my years in teaching. There are two narratives of the experienced teacher, one is that they are counting days until retirement, out of touch with their student population and employ outdated teaching methods. The other narrative of is the teacher super star that demands a huge amount of respect from all stakeholders, they deftly connect curriculum to the world and are inspiring change makers in the lives of kids. I think both narratives are true and there are a host of teachers in between these two extremes. Deliberate practice likely separates to narratives. Deliberate practice in teaching likely manifests in meaningful professional development. It also is an extension for a school community value in which everyone is engaged in positive growth in teaching and there is time (and money) set aside to do this growth. In Brookline we have this as a stated value and have mentoring programs and good PD opportunities but as usual time and money often intercede. The best deliberate practicing moments come when educators lead and address a meaningful issue. This reminds me of the point made in readings that having a coach is necessary for deliberate practice.

It was pointed out in the reading that experts in fields often become specialized in a particular domain of that field. Additionally, their expertise does not necessary make them good teachers because they loose the ability to gauge what is hard or easy to understand for a novice. This manifests for me in teaching Biology in a community where many parents are medical doctors and/or researchers in a Biological field. The parental drive to help students with their work or understanding of topics regularly creates problems for students in my classes. Parents can over explain material by giving way too much detail, perpetuate misconceptions because they over simplify or just flat out get it wrong. I have had GPs doctors describe antibiotic resistance in bacteria as –paraphrasing here what the student reported back - *little bugs learning to survive in a hostile environment.* This statement is not very Biological, full of misconceptions about evolution and classification and anthropomorphic. I suspect the expert in this case understood that the concept was difficult, which is true, but they over corrected in making the analogy in a way that required repair in the classroom.

The concept of deliberate practice (DP) is important in education and beyond. There is a strong message to transmit about what it means to improve and it is a repudiation of deterministic ideas about success in particular domains. In that sense the point but there are some further considerations on the DP that I think should be addressed. The first is around professional level sport performances that involve some know biological or physiological factor. DP is needed that is a given but there are some cases where DP is just not enough to reach the top. David Epstein writes about pro baseball hitters in his book the sports gene. It turns out that the best hitters have amazing visual acuity and contrast sensitivity, which are largely thought to be genetic. In this case the variation is a needed precursor to the DP and the combination leads to the expert performance. There are similar examples in endurance-based sports like running.

Another consideration is that expertise is something that is bestowed upon some one within some human construct, business, sport, school, etc. If those constructs have intuitional biases then people will be deprived of the opportunity to do display their expertise or participate in DP.

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Week 8 Journal

November 2nd 2017

Principle Statement: General knowledge and concepts, while difficult to define, are based on prototypes, exemplars and specific knowledge, but are also affected by an individual’s web of beliefs.

There are several examples of this in teaching. Biology is largely about classification and grouping of organisms, cells, molecules, etc. based on the characteristics of the organisms, cells, or molecules. Students are often asked to challenge their beliefs about a concept as they dive deeper into the subject. For example the species concept at various points in a child’s education both formal or informal will change over time as they add more specific knowledge and exemplars to their concept. At an early age people observe that there are different kinds of organisms, later they might understand that species is a descriptor for one type of organism but as they learn about the diversity of life this conception becomes more nuanced. Students are usually challenged by the idea that all dogs are regarded as the same species but groups of organisms that at first seem like one kind (ex. the Finches of the Galapagos) are actually all different species. Incorporation of this into there conception of species requires the specific knowledge of evolution, natural selection and selective breeding. Species becomes even more complex when considering asexual organisms. I wonder when does general knowledge become specialized knowledge or if there is any such distinction.

I see this also play out with my children who are still young at 3 and 5 years old. They are not only adding to their existing concepts but completely new ones arise as they have new experiences. I wonder if this is what leads the intense and innate curiosity in young children. Is it some sort of biologically driven cognitive process to round out their general knowledge? The specific example that jumps to mind is the first time that my youngest saw a zebra. Not surprisingly she struggled for a moment but then described it as a horse and was rather insistent that she was right even when we explained that it was a different animal entirely.

What about when beliefs make individuals resistant to the adding to their conceptions? Then what might be regarded, as general knowledge could be just a predicated misconception or bias? It seems that learning is important to refine and challenge general knowledge and concepts. Also, I wonder if this is another area to think about the cognitive connections to the creative process. Is creativity an ability to experience the general knowledge and concepts systems in a more fluid way? Often the most creative outcomes are a recombination of existing concepts into new, unique and valuable ways. Also, also, how is this different from schema?

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Week 9 Journal

November 9th 2017

Principle Statement: Heuristic reasoning, or thinking fast, allows for efficient judgments but is shaped by the information already gained and frequency of information, the pitfalls of this heuristic reasoning stem from attributing discrepant and infrequent information into a the existing heretical system without challenging judgments through thinking slow.

The phrase - *stop to think about it* – came up for me this week in the readings. This is a phrasing that I use often in the classroom when students are not engaging to the level the material requires. I realize that when I am asking students to stop and think about a concept or biological principle I am asking them to switch from a thinking fast mode into a more analytical slow thinking process. This especially true when I ask students to design experiments and the answers are not readily available. There seems to be a judgment process that plays out in familiar learning situations. Students recognize book learning, lecture learning and are increasingly better at discussion but often struggle when asked to go through a process of thinking. The experience is new and requires planning, predicting and analysis. It is notable that this while new to the students is something that can become familiar. In the Kahneman lecture he noted that type 2 thinking can become type 1 thinking over time as more experience is gained.

In cct650 mathematical thinking we just did some learning around the ecological fallacy. I can see some connections to the process of making judgments. For data collected at the group level you can make group level inferences but making inferences about individuals is beyond the scope of the data collected and thus flawed. An interesting example was given about a positive correlation between per capita cigarettes smoking and life expectancy at the country level. While this correlation exists at a country population level it does not allow us to conclude that the relationship is true for individuals. In fact other knowledge reveals that the ecological fallacy is in play for this example because common wisdom holds that increased smoking for an individual will most likely decrease that individuals life span. This is an interesting situation where the statistics presented show a compelling relationship without stopping to think about to what level we can extrapolate we could fall into a reasoning pitfall.

This concept also seems to be connected to the concept of implicit bias and the trainings that are geared toward helping people to see those biases within. I am wondering more about the conscious awareness of what is occurring during heuristic reasoning. Does the training related to implicit bias pull people into an analytical thinking process around the discrepant or infrequencies that lead to stereotypes?

Brad Kozel

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Week 11 Journal – Your Fertile Brain at Work – by. Chrysikou and the Neuroscience of Creativity video.

November 30th 2017

Principle Statement: Creative thinking is enhanced through methods that *blur you attentional focus* but reengaging the prefrontal cortex is necessary to evaluate the ideas generated.

The reading and the video this week brought to mind examples from my personal and work life. Personally, one of my favorite pastimes is distance running, at various points I have run significant mileage and was a serious hobbyist racing in the local running community*.* When I first heard of the concept of flow I immediately thought of running not creativity. But I wonder if they are connected. The benefit of exercise on cognition is well documented and was popularized in the book Spark by John Ratey. Most of this work is about the effect of exercise on the engaging of the executive control network and working memory, which was described as the “looking out network” in the video from this week. This sparked my interest in thinking about exercises effect on the “looking in network”. In a very brief dive into the literature I found one study that indicated a reduction in default mode network function in relation to exercise (Mcfadden, Cornier, Melanson, Bechtell, & Tregellas, 2013). Granted that the study was looking at the intersection between food intake, exercise and the activation of these networks.

When I think about what I think about while running *(FYI – similarly titled of a book by Haruki Murakami, which I recommend)*, I experience tension between inward reflections and outward thought. What I think about is related to many factors including; my current fitness vs. my level of exertion. I might be alone in the woods or on a busy street with a running group. In all cases where I am able to be contemplative I think that I am and it is often what I cite as the primary reason I run. *It gives my mind time to be quiet and to reflect.* To me that sounds a lot like the “looking in network”.

In my work I see the tension between switching between the creative and critical thinking modes. I agree with the presenter Scott Barry Kaufman, that schools demand the attention of students at a high level to the determinant of “looking in network”. This has furthered my thinking at the neuroscience level of the ongoing shift in how we should be ‘doing school’. Do we construct schools in a traditional model as content delivery entities or should that system be balanced against teachers as facilitators of students diverging paths of learning and growth. This appears to be yet another rational for shifting the way we do school.

Mcfadden, K. L., Cornier, M.-A., Melanson, E. L., Bechtell, J. L., & Tregellas, J. R. (2013). Effects of exercise on resting-state default mode and salience network activity in overweight/obese adults. *Neuroreport October*, *23*(2415), 866–871. https://doi.org/10.1097/WNR.0000000000000013

# Ratey J., (2012) Run, Jump, Learn! How Exercise can transform our Schools. TEDx Talks Manhattan Beach. (Youtube video)

<https://www.youtube.com/watch?v=hBSVZdTQmDs>

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cct 651

Week 12 Journal

December 7th 2017

Principle Statement: Mindfulness is a state that taps into a broad array of cognitive abilities and can be cultivated in a similar fashion as creativity.

The reading this week reminded me that we cognitively exist at a point in the future. We rely on our memory systems to construct an image of the future, near or far, and that future is what we can use to make decisions. It does seem very formulaic and certainly not very present. At BHS right now all juniors are participating in a mindfulness intervention partially inspired by the consistent reporting of stress and anxiety from the students. I found it interesting that Sternberg cited test anxiety as an aspect of “being overly mindful of some which he or she has no control.” (pg. 57). The intervention at my school seems to be combating an outcome of being overly mindful in one moment with being mindful in a different moment. This seems to be related to attention control and focus. Being present for the work and the learning prepares you for the test, learning to prepare and understanding yourself as a learner all, in my experience, help students with challenging assessment environments. Mindfulness can certainly help in becoming present and opening up to a learning experience, which then connects to an awareness of different approach’s or ideas.

I have often considered the free writing exercises we do in CCT as a mindful way to bring myself to the work of the moment. There is also a connection to the creative process and the observation of novel ideas. Very often when free writing I uncover an idea that I did not consider before and I think it is because I am forced to turn of the predictive cognitive processes that occur in other kinds of writing. The end result is that it does not matter what I wrote but the fact I wrote it and maybe in the writing is some thing of use but maybe not. This seems to fit well with Langer and Moldoveanu, when the write, “It does not matter whether what is noticed is important or trivial, as long as it is new to the viewer.” (pg. 60)

In the Yes or No debate of the reading this week, I land on the Yes side. Sternberg assessment of mindfulness is comprehensive and I can see where it intersects with several aspects of cognition. Mindfulness exists in the mind and thus is related to cognition but clearly is not just one ability. Several aspects of cognition and intention control of the cognitive abilities manifest in a mindful state. The fact that you can learn to be more mindful implies there must be cognitive systems that adjust or become more (or less) active. This parallels with what we know about cultivating creativity, which is also about novel ideas.

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Week 13 Journal

December 14th 2017

Principle Statement: Neurodiversity is a component of human variation that is influenced by innate and environmental factors and it is not the same as the neurodiversity paradigm that takes the perspective that there is not one normal type of cognition, assuming so can manifests in social dynamics that lead to oppression.

Neurodiversity was not a concept that I knew by name but after reading about the terminology (and its correct use) I see its manifestations in my work. The school structure groups students based on a number of factors. These groupings at times are problematic in relation to issues of equity. Usually we are thinking of racial inequities but I can see the intersection with neurodiversity. The current model is towards inclusion, which is an effort to place neurodivergent individuals in to regular classroom settings and to support their learning there. This appears to have a connection to the neurodiversity paradigm though I have never heard it described that way in my setting. It makes me wonder about the theoretical underpinnings to inclusion and if it is an outgrowth of neurodiversity research.

There was one quote that the author presented as *correct usage* that I wonder about given the language we use in a school setting. *“Our school aims to be inclusive of students who are Autistic, dyslexic, or otherwise neurodivergent, though there are some types of neurodivergence that we’re still seeking ways to accommodate.”*  When consider autistic and dyslexic forms of neurodivergence both exist on a spectrum, accommodation can mean a great many things from individual to individual. Does the neurodivergent paradigm reject a statement such as, “Brookline High School has a support program for students with autism”, since the program appears to clump all autistic students together even though student to student the support program could look very different?

The other thought that I had while reading this is the neurodivergence that must exist in individuals that are blind or deaf or both. I believe that some deaf advocacy groups have been trying to move away from conceiving of being deaf as a disability but at the same time technology and medicine have gained ground on “curing” deafness. There seems to be an intersection with the neurodiversity paradigms big ideas. It makes me wonder if there was a “cure” for dyslexia would there be a contingent of individuals that choose that over their neurodiversity? And what if it is a choice that a parent is making for a child to alleviate the anticipated difficulties of rigid school structures and teasing classmates? Would that parent be making the wrong choice in the eyes of the neurodiversity movement?