



*WEDNESDAY COMMUNIQUÉ*

**October 28, 2015**

**Of Birds and Frogs:** I have written before to express my reservations about the recent (but not unprecedented) focus on the short-term economical benefits of college education. This singular focus is troubling partly because it leads to a narrowing of our vision in other areas as well. It limits our examination of educational paths: we have all seen the numerous stories celebrating science, technology, engineering, and mathematics (STEM) fields and, the less positive call for the public disinvestment in the arts and humanities majors.

The economical focus collapses the possible paths graduates can take after college. For instance, as a student, it was never clear to me why graduating with a degree in engineering (such as I did) or mathematics should prepare me *only* for a career in technology. This same view of college-as-vocational-training also devalues a college degree, and is behind the idea that we should “lure” students away from what they most cherish, to study something in a (potentially) higher-wage field.

At the root of this narrow focus is a fear for our economic security, and for the economic security of future generations. A broader education, however, may be the best response during uncertain times. A narrow focus on a rigid path aimed at a particular occupation is not well suited to a rapidly changing and unpredictable job market. A robust general education, and a rigorous experience regardless of major, better prepares a student to face a greater range of opportunities. A broader view allows students to follow the path to greater fulfillment, and therefore also to increased learning and self-awareness. A broader view of the purpose of college allows us to see the other rewards that make our journey worthwhile.

I found some happy confirmation of my own musings recently, when I came across the [Pixar Online Library](#), where research in mathematics and computing led to such movies as “Toy Story,” “Up,” and “Inside Out.” Of particular interest may be [the work](#) of UNM Mathematics and Statistics Professor Deborah Sulsky who pioneered the “material point method” (MPM). Professor Sulsky used it for [modeling arctic ice](#) (also see this [video](#)), as seen in “Frozen.”

Mathematicians, computer scientists and engineers contribute to the arts and culture in significant ways. Hermann Weyl, a Mathematician/Physicist at the Princeton Institute of Advanced Studies summed it up perfectly when he said, “My work always tried to unite the true with the beautiful; but when I had to choose one or the other, I usually chose the beautiful.”

Freeman Dyson, in his [2008 AMS Einstein lecture](#), titled “Birds and Frogs” described how some mathematicians are birds who “fly high in the air and survey broad vistas of mathematics to the far horizon. They delight in concepts that unify our thinking...” while others are frogs who “live in the mud below and see only the flowers that grow nearby. They delight in the details of particular objects, and they solve problems one at a time.” The Russian mathematician Abram Besicovitch was a frog, according to Dyson, and had an “architectural” style: “He builds out of simple elements a delicate and complicated architectural structure, usually with a hierarchical plan, and then, when the building is finished, the completed structure leads by simple arguments to an unexpected conclusion. Every Besicovitch proof is a work of art, as carefully constructed as a Bach fugue.”

Study in the arts and humanities can also lead in unexpected directions. The founder of modern intelligence analysis, [Sherman Kent](#), was a Ph.D. in history, and Steve Jobs studied physics, literature, and poetry at Reed College. It seems to me that society needs both birds and frogs in every field. Just as importantly, our students should choose their majors not solely to learn the tools of a trade that can be immediately applied, but rather to know and explain nature’s [beautiful complexity](#), and to appreciate that there is so much more to know beyond their limited time in college.

**To the Main Campus Faculty:** The cost of textbooks keeps on rising, and it now rivals the amount students pay in mandatory student fees! You can help students save money and reduce their cost of attendance by ordering your

textbooks for Spring 2016 and Intersession terms on time. It costs us nothing but a little planning time to do so, so please enter your book information online as soon as possible on the [UNM bookstore website](#), or by sending an email to Peg Lewis ([peglewis@unm.edu](mailto:peglewis@unm.edu)) or Jonathan Benavides ([jonb@unm.edu](mailto:jonb@unm.edu)).

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