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Writing 117: Writing for the Social Sciences

20 May 2019

On the State of Premedical Education and
the Self-Selection Criteria of Premedical Students

Many, aspiring new undergraduate students enter the field of academia with the dream of spring-boarding into the health and medical fields. These ambitious, motivated students want to become the modern world's healers; they want to touch people's lives and fulfill their dreams of becoming doctors. However, many of these students brutally discover that this life-long career choice is both arduous and self-destructive for all but the most dedicated of students. Indeed, the road to doctorhood may be littered with moral pitfalls and the dreams of the super-majority (60%) that fail to make it (Olsen 74). Even so, all of the fault is not on the students, as the current literature shows that colleges and universities do not guide premedical students on the academic, social, nor moral battles needed to be won to gain entry into medical school.

Freshman who want to pursue health professions already come from high school with serious disadvantages. On average, they enter college with only a fractional idea of what career to pursue, but in the case of premedical students, without a good road map of what to learn and how to learn it. As stated by Arum, a sociology professor at NYU, "Although growing proportions of high school graduates are entering higher education, many are not prepared for college-level work and many others have no clear plan for the future... students proceed to higher education regardless of their academic performance" (Arum and Roska 9). Still, even for those who select premedical as their path and commit to it, the earliest hurdles are introductory chemistry and biochemistry courses. Both of these are difficult not just due to nature of the subjects, but also because they are often taught poorly. Cooper, the chemistry department head of Michigan State, noted that although premedical students go through almost two and a half years of chemistry, the bonds between the concepts between classes do not form. She argues that a plurality of these

students go through the motions of classes via rote memorization, but end their undergrad without understanding the applications of chemistry. Instead of connecting the bonds between the atomic models to the biochemical models, “Students see each step in the process as separate, and are often tested on them separately so that they do not see their overall purpose or value.... students must have relevant prior knowledge, new material must be explicitly connected to that prior knowledge” (Cooper 821). While this trend of memorizing over synthesizing seems like it might be due to some negative trait of premeds, further literature shows, that, on the contrary, premeds are trying more than others to understand and grasp the ideas.

One study conducted on the motivations of premeds was by Horowitz, a former associate professor of chemistry at Brooklyn College. He performed a study via a series of random selections and interviews, selecting only from the 2009 class that had self-indicated as ‘Premed.’ In this, Horowitz found that “Only a small number of students (4 of 31) indicated that grades were all that mattered to them” (Horowitz 227). To the contrary, further surveying found that many of them desired to master hard STEM courses, and saw that “[D]oing well in pre-med courses was not sufficient ... that the real reason for wanting to learn the premed course material was simply in order to do well on the Medical College Admission Test” (Horowitz 230). So even though the research shows a plurality of these students desire to intrinsically understand their course material, the structure and learning objects in place by school administration solidly prevent this. For example, Arum criticizes the over reliance on ‘fact’ based multiple choice exams and notes how short-lived the learning for these exams can be. He calls for a return to emphasis on free response and open ended questions, and that “While [students] may be acquiring subject-specific knowledge ... many students are not improving their skills in critical thinking, complex reasoning, or writing” (Arum and Roska 14). All of Arum’s learning metrics, which universities currently fail to meet, are also the cornerstones of the Medical College Admission Test, or MCAT, the final challenge that colleges also leave their students to fight without guidance.

The MCAT acts as the ultimate dividing line between the upperclassmen who were planning to apply to medical school, and the upperclassmen that actually do apply. However, the

question arises if its a metric that universities can even help their students in? In an hyper competitive applicant pool, “[T]here were 47,815 applications to medical schools, and only 20,343 student matriculated. The average GPA for a matriculated student was 3.69” (Olsen 74). Thus, one of the only ways to stand against the competition is to do above the 75th percentile of accepted students. This is hardly an easy feat, as the exam is 7.5 hours in length and challenges both depth and breadth of an applicant’s knowledge. Olsen, a Sociology professor at UC San Diego, describes the nature of the beast, stating that “The first two test the applicants’ knowledge and use of concepts in biology [and] chemistry... The second two test the applicants’ knowledge, use, and critical analysis of behavior and sociocultural determinants” (Olsen 72). Olsen makes it a point to praise the added rigor to the reading and critical thinking components as a reminder that if doctors were trapped in only biochemistry classes (and never took sociology classes), that they would be unable to humanize their patients (Olsen 81). On the contrary, Cooper argues from the perspective of a STEM educator against the MCAT, as “Unfortunately, the proposed chemistry learning objectives [in the 2015 MCAT] do not seem to provide a coherent framework with which to work. Rather, these objectives are fragments, disconnected ideas” (Cooper 820). As Cooper also argued that the structure of current chemistry intro classes was fundamentally flawed, Cooper concedes that students can either learn chemistry as professors teach it (reductionist), or learn it holistically for the MCAT, but not both. Thus, the literature does not agree on if schools can directly help their students survive the MCAT, but the literature on premeds paints an even bleaker picture on where schools do fail: the social lives of premeds.

On top of the high likelihood of failure in classes and on the MCAT, the area premeds students need the most help in is being provided avenues to positively socialize with each other. One earlier study on the lack of positive socialization of premeds was conducted by Anaya, a statistician at Indiana University. She took a sample of 425 medical school applicants compiled by UCLA and the American Council of Education, and ran analysis that looked for the strongest factors contributing to medical school acceptance while controlling for factors like gender or race. She noted that time was a luxury for these students, due to the costly “Investment of their time

and energy in decision making, [which] is guided by the dream of becoming a doctor. The array of decisions and necessary tasks to meet this goal ... indeed requires considerable thought and energy” (Anaya 179). Anaya noted that any time spent outside of classes for organizations that were not research, but still helped premeds, was treated as negative factors by medical school admission committees. Even more worrying, the students passing the first round of applications were those that sacrificed to cram more hours for studying. For example, she exclaimed “[C]o-curricular activities are negatively associated with student learning as measured by performance on the MCAT. Student involvement in college clubs and organizations (-0.20, $p < 0.05$) and working for pay (-0.09, $p < 0.01$) appear to hinder student learning” (Anaya 188). This suggests that those who choose, or need, to work and socialize, are looking at performance between 10% to 20% worse than their peers who focus only on studying. However, the lack of life-study balance is only made worse by the negative stereotypes premedical students hold for each other.

A large array of past and modern literature suggests that premedical students do not trust one another. There is an overarching, inter and intra-cultural belief that premeds are cut-throat to a fault, and that “[T]he stereotype persists not only among non-premeds and faculty, who view premeds as less mature, creative, honest, and humane than non-premeds, but also among premeds themselves who see themselves as more anxious, less socially active, and less politically conscious” (Olsen 74). Clearly, it becomes exceedingly difficult for premedical students to form social circles, study groups, or even make friends if being premed acts like a scarlet letter. To make it worse, there appears to be evidence of social pressure from non-premed peers to switch career focus, as Horowitz pointed out in his study (at a male only college) that “A total of 3 students reported that an earlier focus of theirs on grades had been influenced and shifted by exposure to peers outside of JC [significant others].... causing them to rethink their goals” (Horowitz 229). Thus, the only premed students that make it to a MCAT score and GPA combo high enough to even be in the running for a medical school application (the top 25th percentile of applicants) are those that forgo romance, forgo clubs and sports, and sacrifice any expendable

income they could earn from a job. It stands to reason that the trek to doctorhood is a deary, lonely one, with obfuscating curtains made of stress, studying, and long nights. To top it all off, Anaya noted that the metrics by which undergraduate schools could statistically and significantly help their premed populations would be by providing "[S]ensible participation in co-curricular activities, enrollment in greater numbers of science courses, and involvement with faculty (research and out-of class) are suggested by the results of this study" (Anaya 189). Anaya makes clear the unspoken truth, that research and personal connections are one of the strongest gateways into a good medical school. These are not doors that are open if students are crushed by academics, forced to relearn broken fundamentals for the MCAT, or distrusted by their peers and professors. This black curtain engulfing the surviving premedical students, directly leading to the lack of (or rejection of) ethical teachings to these premeds.

Finally, and most jarringly, undergraduate schools are failing at teaching sound ethics to their premedical students. Colleges often break any semblance of trust by both having 'weeder' courses and turning a blind eye to rampant cheating in these courses. Fundamental courses, like introductory chemistry, are still taught in ways that emphasize fact recall and encourage brute force memorization, but also allow for trivially easy cheating (Cooper 821). As often is the case, undergraduate schools will protect their star pupils from the rare instance one is a cheater, and is caught. After all, schools have to protect their own prestige and brand, leading to simply sweeping event under the rug. For example, following a cheating scandal at University College London Medical School, in which a caught student was permitted to retake an exam without a cheating apparatus (phone), the editors of the British Medical Journal debated (and published on) the actions of the school. While the identity of the cheater was protected by UCL, one editor defended this light punishment, stating "Of course doctors must have integrity, but is it wrong to assume that a person lacks integrity on the basis of one incident" (Spencer 296)? This editor reminded their readers, who are doctors, of the crushing and unrealistic pressure to be perfect both before and during medical school. A dissenting editor retorted that there are cascading results to this, and other instances of whitewashing cheaters. He remarked on how much worse

the competitive field was for this oversight, “As a result of this cheating many very able candidates who passed finals honestly will now seem to be less able on paper than some less able students who received the information... Will these dishonest people now be favored for the best senior house officer jobs” (Spencer 297)? This dissenting editor sharpens the point that schools allowing this marks a clear message, that cheating is okay even if you can get caught. Olsen made clear that the result of allowing doctors, and medical schools, to be purely number and ‘result’ driven to the point where cheating is tolerated, is a world where “[P]remedical and medical students learn to distance themselves from the patients with informal stories that dehumanize the cadaver” (Olsen 73). This cultural acceptance of cheating within pre-medicine and by school administrators permits and encourages these future doctors to deny accountability of their actions, to find the easy way out of what should be learning experiences. However, there are still ways in which the education of premedical students can be drastically improved on all fronts.

On the ethical front, Doering, a researcher from UMass Memorial Medical Center, argues for the continued exposure of premed students to patient care. Doering positively encourages the rising trend for premedical students to accumulate hundreds of hours doing volunteer work that involved human patients. Doering, specifically, shadowed premed students at a hospice, or end of life facility, where he noticed “[P]re-med students gained a deep and personal understanding of the importance of being fully present with their patients, and expressed great humility at the limits of their own knowledge” (Doering 420). Thus, Doering advocates that more undergraduate schools facilitate, or even mandate, that students on the medical tract learn the humanistic, hands on demands of becoming a doctor. On the social front, Olsen noted an upward trend against the anti-social views of premedical students. She guided her readers to the positive note that new “[E]thnographic data and in-depth interviews with premeds [shows] that despite the persistence of ‘cut-throat’ stereotype, premeds in actuality engage in cooperative behavior” (Olsen 74). Finally, on the academic front, there is recent and growing change to improve classes for the medical tract. Cooper still demanded change in the face of the MCAT, even if he disagreed with its guidelines. He argued that “The inception of the new medical school requirements could and should provide

an incentive to redesign our service courses, and in doing so make them more effective and useful not only for premedical students, but for all students. If there is one thing that we do know, it is that current approaches to teaching chemistry are often ineffective” (Cooper 820). While schools are not yet fully supporting their medical tracts as well as some of their other graduate school pathways, the future is showing great improvement in the lives and school support for current and incoming premedical students. Certainly, the way to doctorhood can be made challenging, instead of soul crushing, competitive, but not cloak-and-dagger, and healing, instead of self-destructive, for those that don’t make it the admission pool.

Works Cited

Anaya, Guadalupe. “Correlates of Performance on the MCAT: An Examination of the Influence of College Environments and Experiences on Student Learning”. *Advances in Health Sciences Education* 6.3 (2001): pp. 179–191. [Web](#).

Annotation: Anaya performed statistical analysis to see if there was any correlation between MCAT scores and success in Medical Schools. She found, even when controlling for socioeconomic backgrounds, race, and gender, that the perceived rigor of the incoming student’s undergraduate school and MCAT scores were the most influential factors for predicting success in Medical School.

Arum, Richard and Josipa Roska. “A Lack Of Rigor Leaves Students ’Adrift’ In College”. *National Public Radio* (9 Feb. 2011): pp. 1–14. [Web](#).

Annotation: Arum and Roska surveyed tens of thousands of first year and fourth year American college students to measure if college improves writing and critical thinking skills. Arum and Roska found alarming trends that the majority of incoming freshman were not prepared by high school, and that a majority of American undergraduate students leave ’adrift,’ that is without purpose or reason for their education.

Cooper, Melanie M. “The New MCAT: An Incentive for Reform or a Lost Opportunity?” *Journal of Chemical Education* 90.7 (2013): pp. 820–822. [Web](#).

Annotation: Cooper argues that the new 2015 revisions to the MCAT call for a system wide overhaul of how introductory and organic chemistry are taught. Cooper argues against following the Medical College Admissions Test learning guidelines, stating that instead the MCAT encourages a broken, mishmashed view of chemistry. Cooper ends on the note that the current circula fails to instill pattern recognition of chemical structures and resultant behaviors, but that catering to the new MCAT’s criteria will not fix this problem.

Doering, Alex, et al. “The Undergraduate Hospice Experience: A Way to Teach Pre-Med Students the Importance of Compassionate Patient Care (S725)”. *Journal of Pain and Symptom Management* 49.2 (2015): pp. 420. [Web](#).

Annotation: Doering studied and observed the learning experiences of premedical students who worked in hospices, which are end-of-life facilities. Doering noted an incredible growth in both introspection and the ability to empathetically give patient care in these students.

Horowitz, Gail. “It’s Not Always Just About the Grade: Exploring the Achievement Goal Orientations of Pre-Med Students”. *The Journal of Experimental Education* 78.2 (2010): pp. 215–245. [Web](#).

Annotation: Horowitz studied and surveyed several hundred Premedical students at an all male, Jewish college. Horowitz found that while some premedical students were primarily motivated by getting high grades, these students were a minority. A plurality of students were motivated in-part or entirely by a desire to master their classes so as to become better doctors.

Olsen, Lauren D. “‘It’s on the MCAT for a Reason’: Premedical Students and the Perceived Utility of Sociology”. *Teaching Sociology* 44.2 (2016): pp. 72–83. [Web](#).

Annotation: Olsen argues for the continued importance of Sociology classes and the humanities component of the new, 2015 MCAT. Olsen argues that if doctors are trained with only science and reductionist biochemistry, they will be unable to introspect on their societal roles, or worse, be unable to treat their patients with human dignity.

Spencer, Andy, et al. “Cheating At Medical School”. *BMJ: British Medical Journal* 322.7281 (2001): pp. 296–299. [Web](#).

Annotation: The British Medical Journal’s team of editors exposes the rampant cheating in and before medical school, and debates the ramifications and solutions to the underlying problems.