



The Revealing Effect of Disasters: A Case Study from Tulane University

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Introduction

In the wake of Hurricane Katrina, Tulane University made the decision to cut several of its engineering programs. Among the eliminated programs was civil engineering, a discipline heavily involved with both the levee failures and exacerbated effects of the storm. Indeed, one may have expected a redoubling of education for civil engineers in New Orleans after the storm. On the occasion of ASEE's meeting in New Orleans, this paper seeks to employ higher education history, social scientific critiques of neoliberalism, and first-person narrative to construct a case analysis of Tulane's decision, its antecedents, and its impacts. Overall, the events in this case highlighted a recurring pattern within higher education where the impacts of neoliberal political and economic policies are increasingly felt, mirroring a general societal trend. This is not a mechanism to impugn any singular decision or gainsay specific individuals involved in the ensuing events following Katrina. Instead, this is a conduit to a dialogue about the teleology of engineering education. Moreover, the paper is an opportunity to examine how placement within the confines and suasion of a neoliberal system is affecting engineering education.

As a work of history, social scientific analysis and personal narrative, the following account attains objectivity through situated knowledges.¹ The author was a freshman in college at the time of the storm, scheduled to partake in orientation week events when Katrina made landfall. The personal narrative offers insight into the effects of programmatic decisions on students. Those effects are then parlayed into a broader conversation about engineering education as a whole.

This paper is an invitation to envision a more humanistic alternative to the unrestrained free market ideologies marshalling the state of affairs within engineering education. These same ideologies are steering the state of affairs elsewhere in society, but here we examine engineering education as the local space that we occupy intellectually, physically, emotionally, epistemologically, and ontologically. Engineering education is a local reflection of a global phenomenon. The paper begins with a brief contextual history of neoliberalism in higher education before focusing on engineering education at Tulane. It then transitions to a personal narrative with details of the hurricane's aftermath, moves on to identify issues pertinent to engineering education beyond Tulane, and finally concludes with a set of questions and proposals for the engineering education community to address over the coming years.

In part, this paper is about one freshman engineering student's experiences with administrative decisions when disasters unfold. Additionally, it is about the lessons that these decisions laid bare before the engineering education community. This is an opportunity to consider whether the results in the case were the foregone conclusions of an existence within a neoliberal economic system that is encouraging the permeation of free market enterprises and privatization into higher education. It is a chance to ask whether that pervasive economic philosophy rendered a predictable outcome for the affected engineering programs in this instance. Moreover, it is a chance to reflect upon several questions confronting engineering education. Do administrative decisions, and these in particular, transmit messages about the state of engineering education as a whole? Was this one isolated incident borne of necessity and exigent circumstances, or was it a harbinger of things to come when universities enact policies and dictate priorities in reaction to

the structural circumstances at play? Could universities inadvertently overvalue financial pursuits to the detriment of their larger mission and student learning? More broadly, are neoliberalism and the purpose of higher education incompatible or capable of a harmonious, negotiated coexistence? A case exists for either side; this is simply an opportunity to contemplate the merits and downsides of complicity in the face of external economic forces mutating the environment for the education community.

Contextual history of neoliberalism

In certain contexts, neoliberalism refers to *laissez-faire*, free market capitalism that discourages government spending and instead encourages privatization. It is a theory that prescribes a restricted role for the state limited to merely establishing a framework in which private entities can operate. This typically manifests as a mandate for the government to protect the quality of money and the existence of marketplaces while simultaneously ceding control of the marketplace to private interests.² The term traces its roots back to 1938 at the Colloque Walter Lippman in Paris, France, though several decades passed before it gained significant political influence (p. 31).³ David Harvey has offered a nuanced definition of neoliberalism:

a theory of political economic practices proposing that human well-being can best be advanced by the maximization of entrepreneurial freedoms within an institutional framework characterized by private property rights, individual liberty, unencumbered markets, and free trade.” (p. 22)²

Essentially, it is an amalgamation of neoclassical economic theory and liberal philosophy emphasizing individual freedoms via diminished state roles in the public or private sphere (thus, the combination explains the neologism “neo-liberalism”). As alluded to, close to forty years passed between its philosophical conception and achievement of increased cultural currency during the administrations of Ronald Reagan and Margaret Thatcher in the 1980s.⁴ At the time, characteristic policies were often instituted in countries as a way to encourage economic liberalization, stabilization, and privatization. They typically resulted in divestment from public services, including critical engineered infrastructure such as transportation and flood control systems, and education.⁵ Predictably, the same trend has continued into this century, as seen with the privatization of infrastructure throughout the United States in major metropolitan areas such as Chicago and Philadelphia.⁶ In theory, given the large costs of maintaining and updating infrastructure, public-private partnerships have their own appeal as a means to stem overwhelming budget deficits, but there is a significant potential for these arrangements to go awry when private companies act in their own interests. One example is the privatization of water in Bolivia through contracts with a subsidiary of Bechtel, which helped to instigate the Water Wars in Cochabamba in 2000 and El Alto in 2005.⁷ The arrangement extended property rights to the company to the point that it even enabled the levying of charges on Bolivian citizens for withdrawing water from their own wells that they had built decades before. Privatized infrastructure could also engender conditions leading to inadequate and/or inequitable clean water provision for underrepresented populations, hypothetically. To a large extent, neoliberalism is the philosophy undergirding this attitude of seeing businesses in everything.

This abridged history of neoliberalism is outlined and defined here to establish common ground since several variations of the term's definition have existed since the 1970s (p. 26).⁸ Despite these variations, however, there has been an overall trend among individual members of society toward a shared view of financialization and market-based psychology as it pertains to everyday life.⁹ As Thatcher eloquently stated, "economics is the method; the object is to change the heart and soul."¹⁰ Indeed, the last 30 years have marked this shift toward a normalization of neoliberal thought in everyday mental processes and common sense understanding such that it now purveys the dominant lens through which people view all aspects of human life (p. 165).¹¹ If purifying a product in a chemical processing plant, homogeneity may very well be advantageous; when talking about individuals' thought processes, homogeneity may be more inexpedient. In fact, with this singular mentality comes an associated sense of inevitability and a concomitant removal of a critical examination of reality (p. 127).¹² Consequently, the transition to neoliberalism has progressed from a mid-20th century nascent economic theory to a 21st century dominant mental paradigm devoid of reflexivity. While its creators may have originally envisioned it as an alternative to Keynesian economics and state intervention, neoliberalism has now reached a point of large-scale incursion into human lives. Near the turn of the 21st century, George Soros remarked upon this transition in ordinary life from non-market values to a whittled value system containing nothing *but* market values.¹³ In his book, *The Crisis of Global Capitalism*, Soros states that

Non-monetary values used to play a larger role in people's lives; in particular, culture and the professions were supposed to be governed by cultural and professional values and not construed as business enterprises...It is no exaggeration to say that money rules people's lives to a greater extent than ever before. (p. 115)¹³

This pervasive philosophical outlook that Soros laments has influenced higher education in numerous ways. Starting at the top, as Sheila Slaughter¹⁴ describes, "with money as an intrinsic value, it becomes easier for the spokesperson for the university to mirror the spokesperson for corporations, the chief executive officer, or CEO." Not only does the public face of the university mirror a CEO, but also that university president occasionally *was* previously a business executive. Examples of this include current University of Iowa President J. Bruce Harreld¹⁵ and former university presidents Tim Wolfe at University of Missouri (who preceded Gary Forsee, former CEO of Sprint Corp.)¹⁶ and Simon Newman at Mount St. Mary's.¹⁷ Slaughter contrasts this move toward university president CEOs with the state of affairs one century prior, when university professors "made it clear that they did not want to be part of cutthroat capitalism".¹⁴ Something changed in the intervening century, and it tracks very closely with the rise of neoliberalism.

As the Thatcher and Reagan eras were ascending in British and American politics, instituting neoliberal policies on their way, the United States Congress passed the Bayh-Dole Act of 1980. This legislation enabled universities to patent discoveries that resulted from government-funded research (p. 140).¹⁸ After this, universities began to adopt new policies in order to avail themselves of the business enterprises their faculty might pursue, which marked a clear shift toward a university model mimicking that of a business. Partnerships organized by the Business-Higher Education Forum, established in 1978, helped to bolster this movement.¹⁹ By the new millennium, businesses themselves were partnering with universities in pursuit of profits at

increasing rates. In 2001 alone, venture capital investments poured into U.S. universities to the tune of \$36.5 billion.²⁰

Many of these business-university relationships have a connection to engineering departments. While most of these agreements may not receive significant public attention, some do, such as the partnership between the University of Maryland and Fluid Motion LLC. With grants funded by the Maryland Industrial Partnerships Program (MIPS), which is associated with a technology enterprise unit within the school of engineering at College Park, researchers in the University's School of Public Health had been studying the health effects of Fifth Quarter Fresh (a chocolate milk beverage produced by Fluid Motion) on high school football players. Unfortunately, in December 2015 the University issued a press release touting the health benefits of Fifth Quarter Fresh on high school football players recovering from concussions without the study results passing through peer review.²¹ As several news stories highlighted, the press release timing coincided with the debut of a major motion picture in the United States titled *Concussion*.²² The University quickly backpedaled in order to clarify the nature of the findings, the press release, and the partnership. Is it possible that these private partnerships may go too far? Derek Bok warned that "resourceful companies will pick universities apart, finding individual faculties willing to grant them what they want" (p. 156)¹⁸ before moving on in pursuit of the next revenue stream.

As discussed before, this is not just about corporations encroaching into higher education; it is about the entire shift inuring everyone involved to market "values" and inoculating them with that narrow mentality. It affects facets of university life ranging from language to policies. One example was the diction used by Arizona State University (ASU) President Michael Crow when describing his role at ASU an "academic entrepreneur" and expounding upon that by saying, "We are expanding what it means to be a knowledge enterprise. We use knowledge as a form of venture capital".²³ Dr. Crow clearly evinces the incorporation of a corporation's lexicon into his own. Another example of market language to describe education arose when Stanford professor and Coursera co-founder Daphne Koller described Massive Open Online Courses (MOOCs) in 2013. Koller elaborated on the online education industry having a similar business model as Amazon and eBay in that "content producers go to where the most consumers are, and consumers go to where the most content is".²⁴ To be clear, the "consumers" here are students. Of course, this language extends beyond university presidents or professors and up to the government's own verbiage when discussing higher education, such as when the White House again described students as consumers in a 2015 press release detailing the Department of Education's new College Scorecard.²⁵ Students are not *just* consumers; they are active participants in the entire education process, and reducing them to a single dimension removes a large portion of their agency. Each of these instances demonstrates the degree to which the market-based, neoliberal mindset has become the dominant one in higher education to such an extent that it has influenced even the words used across the gamut of stakeholders and policy makers when discussing disparate topics in higher education.

Beyond the issues of language and business partnerships, additional examples of neoliberalism in higher education include the lax regulation of for-profit colleges and the cost benefit analysis implied when politicians like President Obama or Senator Marco Rubio respectively opine that students should forego art history degrees in favor of manufacturing jobs²⁶ or philosophy degrees

in favor of welding.²⁷ Regarding for-profit colleges, few things could be more consistent with neoliberalism than the notion of removing governments from the education realm in order to allow private corporations to experiment with their projects as with for-profit colleges. The downside arises, in standard fashion, when these institutions oversell themselves to students, misrepresent job placement rates, and engage in other predatory practices like targeting students with low self-esteem.²⁸

The point here is not to recapitulate the entire history of neoliberalism as much as it is to highlight the multiple ways in which the philosophy subsumes higher education. The project knows few boundaries, if any, and it has apparently transcended partisan lines in the United States. When President Obama and Senator Rubio both remark upon the economics of certain majors as if it is the sole consideration for students, it is difficult not to reach that conclusion. Moreover, it is not a stretch of the imagination to posit that this ideology influences thoughts, beliefs, and worldviews for the majority of Americans. As a result, its effects extend beyond dictating diction and manifest in the impactful area of policy making. Indeed, as delineated below, such was the case in 2005 when Hurricane Katrina tore through New Orleans.

Tulane University before August 2005

Tulane University was founded in New Orleans in 1834 as the Medical College of Louisiana.²⁹ Thirteen years later, in 1847, it became part of a larger public university, the University of Louisiana. With the exception of a hiatus during the Civil War, the university continued its operation as a public institution until 1884. At that point in time, Paul Tulane, a wealthy New Orleans businessman, donated over \$1 million in land, cash, and securities “for the promotion and encouragement of intellectual, moral, and industrial education.” The donation led to creation of the Tulane Education Fund (TEF). In turn, the fund’s administrators quickly lobbied for the state of Louisiana to transfer control of the University of Louisiana to the TEF.³⁰ This transfer ultimately gave birth to the Tulane University of New Orleans. It was an act that effectively privatized an institute of higher education, which President Gerald Ford praised in his 1975 address to Tulanians during their April convocation: “I am impressed, as I undoubtedly said before – but I would reiterate it tonight – by Tulane’s unique distinction as the only American university to be converted from State sponsorship to private status.”³¹ Forty years after Ford’s remark, similar privatization moves are now gaining more traction among state legislatures in Louisiana, Maryland, and Wisconsin.³² This turn toward privatization and neoliberal policies in higher education has the veritable ability to affect engineering education in deeply existential ways from the literal existence of programs to their more philosophical *raison d’être*. That was the case in 2015 when Gov. Scott Walker proposed striking language from the University of Wisconsin System’s mission statement about “extend[ing] knowledge and its application beyond the boundaries of its campus” and instead adding in a phrase that “the mission of the system is to develop human resources to meet the state’s workforce needs”.³³

Shifting back to New Orleans, by the late 1800s, Tulane had formed a College of Technology under the tenure of William Johnston, its first president.³⁴ Johnston believed that the scientific side of instruction was going to be an important aspect of the university for the foreseeable future. Furthermore, at the time he also believed that the development of the Industrial and

Mechanical Department would be one of Tulane's most significant contributions to the educational advancement of New Orleans.³⁵

As Tulane entered the new century, it touted programs offering a Bachelor of Engineering degree in chemical engineering, architectural engineering, civil engineering, and a combined mechanical and electrical engineering degree. Fifty years later, collaborations between the School of Engineering and the School of Medicine were helping lay the foundation for the eventual birth of the Department of Biomedical Engineering in 1977.³⁶ Although located five miles apart, the uptown campus (which houses the engineering departments) and downtown medical campuses remain a fruitful source of collaboration between the engineering and medical faculty to this day. Entering into the fall semester of 2005, before Hurricane Katrina passed the Gulf of Mexico, Tulane offered undergraduate and graduate degrees from the following engineering disciplines: computer engineering, mechanical engineering, electrical engineering, civil engineering, chemical engineering, and biomedical engineering.³⁷ At that time, the author was entering the university as a freshman intending to study engineering.

Personal encounter

In August 2005 I was matriculating at Tulane University at the same time that Hurricane Katrina meandered through the Gulf of Mexico. Drawn to the university by a full-tuition scholarship, I planned to study either civil or environmental engineering. To be clear, the university certainly has its own charming allure, which I briefly experienced during a campus visit in my high school senior year. In confluence, the financial, program, and cultural factors all made the decision to attend Tulane a simple one.

The new student brochures used to sport a slogan saying, "Only at Tulane, Only in New Orleans." It was an expression of the unique culture and environment that the university cultivated. While true that Tulane possesses many distinctive attributes, it is still part of a larger society. It reflects both its own character and that of society. In this way, what happened there after Katrina was not a singular, isolated event; similar policy and institutional shifts transpired throughout the city. Furthermore, the broader lessons from this case apply beyond the institution of Tulane and beyond New Orleans and the surrounding communities affected by Katrina.

In the week before all freshmen were scheduled to move in, I had the opportunity to participate in a pre-orientation program. It was a clear chance to build new connections and relationships with some of my future classmates and the city of New Orleans itself. This is relevant because I contend that one of the undervalued assets of higher education is its ability to facilitate these relationships. It is not just a soulless exercise in skill development. Like many human activities, it is a social enterprise, and this introductory week was an extension of that opportunity.

The pre-orientation program ended on Saturday, August 27, freshman move-in day. This was a day that would traditionally entail all the frenetic campus activity one might expect on any university campus. Unfortunately, as the storm progressed closer to the Gulf Coast, move-in day morphed into evacuation day, and the 1:00 PM address from Scott Cowen, Tulane's President, amounted to a brief hello followed by an exhortation to evacuate campus. We were told to plan on returning in four days, once everything passed. Heeding those words, most students left the

majority of their possessions in their dorm rooms and evacuated. Personally, I spent the next twelve hours trekking back to Texas with a small duffle bag of clothes and nervous energy in tow.

What was initially anticipated to be a minor blip in a slate of orientation week activities proved to be something else entirely. Hurricane Katrina made landfall on the morning of Monday, August 29, making its presence known to President Cowen and the skeleton crew of administrators who remained on campus to ride out the storm.³⁸ Despite signs (and hopes) that the worst had passed by that Monday evening, the following morning the administrative team awoke to the devastation of the levee failures and ensuing city-wide flooding. Parts of campus were under ten feet of water. When all was said and done, Tulane's recovery efforts cost \$292 million, comprising \$153 million from the Louisiana governor's Office of Homeland Security and Emergency Preparedness, \$137 million from insurance, and a \$1.5 million loan from the Small Business Administration.³⁹ Of course, being over 500 miles away at the time, I could only witness the information relayed by the news coverage, which showed the magnitude of the storm's devastation at the city level. With the influx of news came the evaporating prospect of a return to New Orleans any time soon. Crass as it was among all the images of suffering and destruction, one pragmatic point became evident: if I wanted to salvage the semester, I would need to find another school. That realization catalyzed a hasty scramble.

Mine became a common narrative – displaced students from New Orleans turned to schools across the country for a temporary academic home. In a brilliant move of community and compassion, and a marked lack of concern about the immediate financial ramifications, universities across the country offered asylum. Loyola University New Orleans students received assistance from 27 sister Jesuit universities that semester.⁴⁰ Oberlin, Brown, and Princeton made explicit offers for aid, relief, and support to Dillard University, a historically black liberal arts college in New Orleans that sustained heavy flooding and fire damage.⁴¹ These are just two instances in the array of assistance, charity, and collective outreach directed toward New Orleans universities.⁴² In total, an estimated 100,000 displaced students from New Orleans colleges and universities were accommodated on campuses across the country that fall.⁴³ As for me, I spent my first semester in college at Texas A&M University as one of the novelty Katrina students whom everyone was eager to meet and befriend. Encountering other Tulane students in College Station was a relief; we would share jokes about being the outsiders wearing green in a sea of maroon and count down the days until we could return to New Orleans. It was not an ungracious sign of disrespect, but we wanted to go back. There was constant talk about what it would take to rebuild the school and the city. Everyone wanted to contribute to the communal effort. Acute stress is known to have a bonding effect on affected people, and this was no different.⁴⁴

Most of us planned in anticipation of the spring. We tracked the intermittent campus updates from the administration, which apprised us of the recovery efforts. We planned not only for the spring semester, but, even more basically, for the times when we could simply retrieve our possessions that we stowed away in the dorm rooms before the evacuation. At the same time, it was important to remain cognizant of the fact that, as inconvenient as it may have been for some of the students, there were countless other students native to New Orleans in much starker situations. In many cases, they had lost more than just a dorm room's worth of items.

Furthermore, it was also important to remember the thousands of people who did not (or could not) evacuate and were consequently left stranded in the city.

My assigned date to return and pick up my stowed away items was November 19, 2005, which I could not attend because I was running a marathon – a minute effort to raise money for New Orleans elementary schools.⁴⁵ I knew that Tulane was the city's largest private employer before the storm.⁴⁶ I also suspected that many university employees had school-aged children, and in order for them to come back to the city there would need to be functional schools for their children to attend. Desperate to do something, even from my remote location, I had the idea that I could run the marathon as a way to raise a little money to donate. The point is that, like the majority of other Tulane students I encountered, I had every intention of returning in January and picking up right where we left off on that Saturday in August. While we bided our time in the fall, we contrived small ways to help in any way we could because we had the sense of belonging to Tulane's community. Tulane was not supposed to be just a place to go to become a more marketable employee one day. It was supposed to surpass those coarse versions of education. By December 8, 2005, that perception suffered a major setback.

Subsequent to Katrina and its immediate aftermath, the Tulane administration convened advisory panels and a task force to consider how best to recover from the storm and proceed into the future. The product of those meetings was the Renewal Plan. As summarized on the Renewal Plan's web page:

The economic pressures caused by Hurricane Katrina required Tulane to examine every part of our organizational structure and look at ways the academic areas could be reorganized. We must maximize organizational efficiency and at the same time become a smaller university more focused on areas in which we have established strengths.⁴⁷

This had consequences for several components of the University, including engineering. Specifically, only chemical engineering and biomedical engineering were adjudged to fit the vision going forward. For civil, environmental, mechanical, electrical, computer science, and computer engineering, there was no future at Tulane. They were already under the microscope following an external review by a panel of distinguished engineering deans that identified those programs as not competitive in areas of graduate studies and research in comparison to similar institutions. In order to redress these deficiencies, Tulane would need to secure resources to support adequate growth. Then Katrina hit, and in the face of unknown student retention and tuition revenue, uncertainty abounded. Instead of trying to remediate the identified programs, Katrina offered a second, expedient solution: cut the programs entirely. In effect, their size rendered them unable to “compete” with Tulane's peer institutions, identified as fellow members of the elite American Association of Universities (AAU) and the larger set of Carnegie Very High Research (“R1”) institutions (N. Altiero, personal communication, January 7, 2016). Therefore the University jettisoned those programs that did not fit their rendition of what it meant to be a Research 1, AAU school. As a student who had come to Tulane to study civil or environmental engineering, my plans were collateral damage.

The major announcement to the community came after I had already cemented plans to leave Texas A&M and return to Tulane in the spring. Like many others, I had naively counted on

returning to campus relatively unscathed by the storm. I had assumed that nothing could damage the burgeoning sense of community I had built in the pre-orientation program and continued building with my fellow displaced students. That is not surprising given the relationship among interpersonal relationships, relatedness, and the value one derives from experiencing new relationships.⁴⁸ We humans tend to value making connections with others and achieving a sense of belonging, so it seemed natural that the same phenomenon should develop here in a higher education setting. Sure, I had not even stepped into a Tulane classroom, but classroom experiences are not the only mediator of relationships between students and their universities. My conception of a university depicted a place to spend four years, make connections, learn, grow, and discover who I could become amidst an environment designed to encourage that process. I ascribed to universities and their programs a human element. They were non-profit entities, after all, so I expected that to mean something. I had presumed that universities might lie outside the dispassionate economic calculations characteristic of private, capitalist institutions. There was supposed to be a fundamental difference.

Ultimately, I may have done something anathema to an engineer; I may have miscalculated. I believed that because I had been inundated with language rife with community and family that there was some substantiating element to those words. All the traditional language endemic in mission statements, on devotion to communities and embodying bastions of education, felt like a ruse at that moment. The mission statement, which proclaims that “Tulane's purpose is to create, communicate and conserve knowledge in order to enrich the capacity of individuals, organizations and communities to think, to learn and to act and lead with integrity and wisdom”⁴⁹ felt hypocritical and vacuous. How could an entity affected so strongly by a civil engineering failure, such as a levee breach, claim a purpose embedded in enriching the capacity of individuals, organizations, or communities while simultaneously eliminating its civil engineering program? Would it not be more consistent with the mission statement to address the needs of the community by creating, communicating, and conserving knowledge about flood mitigation? Beyond the city, what about preserving engineering knowledge that could help with the disappearing wetlands just to the south of New Orleans?⁵⁰ Maybe if the wetlands displayed a more direct path toward economic opportunities then the story would have been different.

Returning to the mission statement, I was left pondering how a university could dedicate itself toward helping others “to act and lead with integrity” when it ostensibly lacked transparency in decision-making and exercised dubious timing to announce such a significant restructuring. Would it not entail more integrity to let students and faculty know that such shifts were under consideration? This is less of a critique of the actual decisions and more a questioning of the manner in which they were communicated to the community at large. They were just the initial observations of a student struggling to make sense of the changes. I needed to form a coherent understanding of where I went astray; how could I be so wrong about what the university represented? As a nonplussed freshman sorting through the wreckage of a second disaster in the span of five months, I struggled to find answers. What message was the administration sending to its students? Intentional or not, these decisions convey meaning.

For the record, my time at Tulane was memorable in a raft of positive ways. More than anything, given the observation that the post-Katrina administrative decisions felt impersonal and alienating, I would be remiss not to recognize the chemical engineering faculty's meticulous

tutelage and veritable concern with the students under their auspices. They cared about and for us, and that has been shown to be an effective mediator of student learning.^{51,52} To suggest anything to the contrary about the faculty there or their effect on undergraduates' level of learning would be not only a misrepresentation but also an arrant insult to them and their efforts. One could point to this as evidence that Tulane did indeed ultimately offer a nurturing environment for its engineering students. That was true at the individual faculty member level, though it may or may not have extended above to the higher administration. Dwelling on this, however, misses the broader point.

Initial impressions

This narrative so far has relied upon personal anecdote as a vehicle to provide insight into the mind of one engineering student closely affected by the decision to eliminate engineering programs and a brief recapitulation of some of the events at Tulane following Katrina. It provides an example of one of the paper's central tenets: higher education is on the precipice of becoming an impersonal exercise in workforce development and little else, diffuse mission statements notwithstanding (see: UW System above). I cannot speak for anyone else, but I spent my first semester in college anxiously awaiting my return to Tulane. Warranted or not, I had continued fostering a connection to the University and my unseen classmates dispersed across the country. That ingenuous sense of community felt betrayed with the Renewal Plan. In its wake arose ambivalence and a reflexive desire to interpret what these actions said.

Naturally, a university's administration expresses ideas and priorities in its actions. While discussing his book, *Excellence Without A Soul*, former Dean of Harvard College and computer science professor Harry Lewis described this reality: "what the leadership says, and implies, and how the leaders act remains important. Those things send signals which students do hear."⁵³ What were the students supposed to be hearing from Tulane's announcement?

Yes, the administration probably needed to introduce some institutional reforms. Moreover, it seems plausible that several former university presidents from across the country would only judiciously lavish praise upon the Renewal Plan if they sincerely believed that it charted the best course for Tulane into the future.⁵⁴ Yet, those concessions still leave several questions unanswered. Where do priorities truly reside in higher education? Should the affected parties (e.g. students, faculty, the larger community outside the university) have a voice at the table, a representative in the room where it happens? Counterfactually, if they did, would anything have changed? Projecting into the future, should the engineering education community assume a more proactive role in helping to shape the policies guiding the direction of program structures, policy formation, and guiding principles? Do mission statements amount to something more than a collection of words wielded as a marketing slogan?

The Renewal Plan sent an estranging message about priorities, especially as they pertained to engineering education. That message was one of hierarchical ranking about what matters in higher education: money. The language of being a "world-class educational and research institution"³⁷ and helping to support the regional biotech and energy industries shouted that point. On the other hand, one cannot prima facie fault a university for striving for excellence in its endeavors, even though the notion is fraught with difficulty if narrowly tailoring excellence to

a singular, monolithic conception. In the face of uncertainty, consolidation to ensure overall survival seems like a reasonable strategy. Simultaneously, however, one might not want money to be the sole factor where decision-making is concerned. That patent incursion of neoliberal thinking into higher education, described above, has been chronicled countless times; there is an entire book genre with titles ranging from *Universities in the Marketplace* to *University, Inc.*, to *The Lost Soul of Higher Education*, to *Excellence Without A Soul* that speaks to this phenomenon.^{18,55,56,57} What remains relatively undiscussed for engineering educators is the extent to which this transition toward extreme free market ideals affects engineering education, and what we could, would, or should do about it.

Where my story is concerned, clearly the plural of “anecdote” is not “data”. It would be imprudent to make hasty generalizations and haphazardly extrapolate from my experiences and those of Tulane to other contexts. One does not need to universalize in order to glean lessons from studying the specific details of Tulane’s case, especially when considering its relationship with recurring patterns in higher education as a whole.

Construction of crises

After Katrina, Tulane adopted a common tactic in the aftermath of upheaval. Several political leaders, from Winston Churchill to Rahm Emanuel, have been credited with saying, “Never let a good crisis go to waste.”⁵⁸ In the wake of Katrina, President Cowen said, “I wouldn’t wish this on anyone” only to follow it with, “But out of every [disaster] comes an opportunity. We might as well take an opportunity to reinvent ourselves.”⁵⁹ Theoretically construed in a number of ways, this might speak to a peculiar form of opportunism in the shadow of a crisis. It is the same modus operandi witnessed numerous times since the 1960s as documented by Naomi Klein in her book *The Shock Doctrine*.⁶⁰ In the book, Klein investigates the way in which policy makers around the world have instituted neoliberal economic policies in the wake of natural or manufactured crises from South Africa to Indonesia to Iraq.

When policy makers meet opposition to their policy proposals and want to enact unpopular changes, they benefit from patiently waiting to eventually seize the moment when a crisis strikes. Or, in cases like those in Chile and Poland, they can make their own catastrophes to shock the economic system and direct it toward neoliberal ideals in the ensuing aftermath.⁶⁰ When the initial crisis happens, an ephemeral blank slate materializes upon which to introduce new policies and institutions. This was the essence of Milton Friedman’s belief that,

Only a crisis – actual or perceived – produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes politically inevitable.(ix)⁶¹

This does not speak to the moral rectitude (or potential lack thereof) of such an operating procedure. It is possible that the morally correct thing to do in such moments of crisis does indeed entail drastic systemic overhaul.

Crises can be morphologically opaque, inconsistent, and difficult to spot instantaneously. They can be human made or natural occurrences – though one should exercise caution when characterizing an event’s genesis strictly to nature. A 7.0 earthquake in a location with strict building codes and well resourced emergency responders produces a very different disaster from an earthquake of the same magnitude in a location without this infrastructure. Katrina’s particulars – from stranded residents waiting to be rescued to the chaotic evacuations to inadequate FEMA trailers – provided observers in stark relief example after example of how disasters are constructed by our actions and inactions, and serve to reveal much about underlying priorities and power relations.⁶²

These similarities in the handling of crises that introduce drastic policy shifts at different levels and in disparate arenas suggest this is not isolated to Tulane. Again, it is not only at Tulane, and it is not only in New Orleans. To wit, is it not possible that the actions of administrators and policy makers are simply symptomatic of a broader financial structure that presages these exacerbated scenarios as the predictable consequences? Imagine the outcomes of a world in which an unfettered free market philosophy dictates the direction of engineering education and what that might mean for: un(der)valued areas, forms of knowledge, and communities; differences in agility/flexibility between private sectors and higher education; an implicit treatment of undergraduates as consumers (which comes with its own byzantine set of arguments); public sector areas like civil engineering; and the burgeoning control over higher education by the cardinal entity - unfettered capitalism. The pervasive incursion of a market mentality could continue having broad, unintended consequences, especially given the potential for market failures ranging from noncompetitive markets, information asymmetry, principal-agent problems, and the undervaluing of public goods. Levee failures have already wreaked their havoc; does the engineering education community need another structural failure to provide a more pungent wake-up call?

The messages sent

As part of the Renewal Plan, several hundred faculty members lost their positions.⁶³ In 2007, the American Association of University Professors (AAUP) censured several New Orleans universities, including Tulane, University of New Orleans, Southern University at New Orleans, and Loyola University New Orleans for faculty treatment following Katrina.⁶⁴ The AAUP report highlighted discrepancies in the way decisions were made, along with the reasons behind them (p. 104).⁶⁵ Providing one such example, in another moment of candor concerning the austerity measures, President Cowen said, “We basically cut the programs that were not the strongest...Under the current way universities operate, you can’t make those decisions under normal circumstances.”⁶⁶ While true, there is probably a reason that those decisions do not pass muster under normal circumstances. Namely, there are relationships to honor, trusts to uphold, and values in operation other than the bottom line.

With private, for-profit companies, society typically countenances that mechanical calculation based in neoliberal economic theory, provided it stays within regulatory bounds, but most universities are not (yet) for-profit entities. Chronicling the encroachment of corporatization in higher education, Ellen Schrecker’s *The Lost Soul of Higher Education* expounds upon a troubling narrative about the changing tide originating in the 1980s (p. 169).⁵⁶ This is the

movement that the engineering education community should explore more closely. If the community wants to avoid the singular vision that companies pursue in the name of profit maximization and increased revenues, then educators will need to assume a more proactive role in identifying what else programs, departments, and universities represent besides instruments for generating financial capital. The aforementioned Harry Lewis expressed the same ideas as Schrecker when delineating the juxtaposition between corporatization in higher education and higher education's capacity to transcend that limited outlook in service of a more noble purpose:

I talk a lot about the consumerism and soullessness of higher education, but...these merely reflect trends in society. But that is not the end of the story. Universities used to be considered among the institutions that stood for the best in society, not the average. They were supposed to be inspiring, in the way no one thinks of a TV station or even a political party as something that is supposed to inspire. As universities have acted more and more like businesses, they have lost some of the old spirit that they were dedicated to the service of society, and should reflect the best of the human spirit, not whatever happened to be going down at the moment.⁵³

Lewis is simultaneously lamenting the current, shallow trends in higher education while reminding us of its deeper potential. Schrecker, Lewis, and many other scholars writing on these shifts in higher education are identifying the vitiating effects of neoliberalism in education as a business mindset dominates and minimizes the loftier goals of higher education. If we want to forestall that continued progression, the engineering education community will need to be more conscientious about the impacts that these shifts are having on students, faculty, departments, and colleges.

Of course, as alluded to with the mention of societal trends, this is more than just the maneuvering of university administrators or private corporations. This is a perennial struggle over institutional ideals and existential purpose. It is a societal shift that has continued since neoliberalism gained traction in the 1970s following the stagflation in the Western world, two oil crises and decimated labor relations (p. 179).³ The transition continued with the financialization of American life in the 1980s and a warping of cultural psychology toward market-based thinking. Nowadays, politicians frequently speak in language saturated with financial terminology. They speak of economic superiority and capital ventures when mentioning STEM education as a means for strong workforce development, racing to be the best, with undertones of a spirit of exceptionalism, and acquiring the best jobs around.⁶⁷ Never mind the notion of balance in society and holistic education. Disregard the ambiguity in these speeches when it comes to discerning what those jobs might be, the derision for art history or philosophy, and what is lost in the race for bigger, stronger, and faster. The question remains: is higher education, and engineering education, in particular, aspirational in its drive to prepare the engineers of tomorrow for whatever they may face, or should it be more closely aligned with the dominant business interests of today? Are so-called T-shaped skills going to help guide engineering education toward simultaneously broad and deep education or engender narrowly tailored conceptions of education dictated by private interests? These skills could help drive innovation and inspire students to work on intractable problems facing society.⁶⁸ Alternatively, they could simply become another widget wielded by companies in their march toward a larger market capitalization.

Even in a more economic-centric conception, educators should be leery of those visions of engineering education that only cater to a select number of private interests. As James Duderstadt said, the nation must have engineers who can invent new products and services, create new industries and jobs, and generate new wealth (p. 43).⁶⁹ That requires students to possess a broad set of skills that enable them to navigate the unknown future. The alternative of restricting programs to fit regional corporate interests could have its own catastrophic consequences. Could such a narrow vision ultimately fail when industries relocate, as happened with Detroit and the auto industry's migration overseas?⁷⁰ At its most basic, engineering education needs a panoply of interests represented, not just those with the largest financial backing. If the engineering education community continues on this route, it would be wise to tread carefully, lest its services one day be adjudged extraneous. In a world with such stringent conditions, as seen in Tulane's case, the vicissitudes of life leave little recourse.

As a student navigating through higher education, it is difficult not to interpret certain messages from institutional and administrative decisions. A freshman who witnessed a major American city flooding as a result of a civil engineering failure might be predictably bemused if a civil engineering program ceased to exist. Such a person would be forgiven for believing the prescient words of President Ford, who, in the same aforementioned 1975 commencement address lauding the privatization of Tulane almost 100 years before, also challenged the engineers in the audience "to devise new techniques for developing cheap, clean, and plentiful energy, **and as a byproduct, to control floods**" (emphasis added).³¹ Ford was speaking to engineers about ways in which they could serve society. He may have been describing hydroelectric dams and their byproducts, but he could have hardly known the applicability and weight of those portentous words in New Orleans for other reasons 30 years later. After Katrina, no longer will there be engineers graduating from Tulane educated in controlling those floods he mentioned. Now Tulane offers only a dual-degree program with Johns Hopkins University and Vanderbilt University in which those institutions will confer a civil engineering degree upon participating students (and the University of New Orleans does still offer a civil engineering undergraduate degree).

Larger questions loom. What are the responsibilities borne by a university for complicity in a system and not resisting more? Despite the countenance of expediency, practical resource limitations do clearly confine the range of possibilities available to administrators. At the same time, the engineering education community would be wise to note the precedence set by engaging in the academic program survival of the fittest. Does this ignore any potential for program remediation? Does it inadvertently communicate to students a set of partially examined ideals that primarily maintain fidelity with market principles and little else? Just as Socrates claimed that the unexamined life is not worth living,⁷¹ neither is the unexamined university ethos worth promulgating. Just as the parent models behavior for a child, or a teacher models behavior for a student, so, too, do organizations model behavior for those people embedded within them. For universities, this translates to students assimilating the institutional values they witness. And just as with the reluctant role model athlete who does not wish to have thousands of children emulating their actions but has no choice in the matter, universities do not have the luxury of shirking their responsibilities as role models to their students. The same applies to the school and departmental level, too. Engineering departments need to exhibit intentional behavior that

extends beyond trite mission statements; the decisions and actions need to align with the lofty ideals the statements espouse.

Arguably, more than anything, this is a call for reflecting upon the desired nature and purpose of engineering education. Without this deliberation, the system could very well be guided solely by corporate interests. Students already identify employment and financial prospects as heavily influencing factors in their decisions to attend universities.⁷² Should this be the primary concern of engineering departments - serving the students' financial interests? Do engineering educators also have obligations to our surrounding communities, and society as a whole, to prepare the versatile engineers that Duderstadt mentions? To help form global citizens? When administrators get the messaging wrong, they risk alienating entire sections of the population and communities because people are not deemed to offer enough financial incentive for attention; educators risk communicating untenable values to students. The economic cost benefit analysis model of decision-making proffers its users with a seemingly amoral set of calculations. Is it specious to ignore the possibility that these evaluations have their own set of latent values woven into them?⁷³ Might it be too easy for some to stand back, point to a decision tree, and claim innocence when a morally bankrupt solution arises?

The potential places to resist

To begin, any conversation about action plans should recognize that engineering education is part of the higher education ecosystem, which in turn may simply be mirroring trends in society as a whole. What happened to Tulane as the result of neoliberalism wading into education policy was not exceptional. It happened elsewhere after the storm. Several Tulane scholars have written about the effects of neoliberalism on New Orleans after Katrina, from tourism vitiating local culture to effacing the extant public school system.^{74,75} There is a relationship between the city and university, as President Cowen described: "As New Orleans goes, so does Tulane, and vice-versa. You can't separate the two."⁷⁶ Issues affecting society affect higher education. Burrowing down one level further, to the extent that there are live fundamental philosophical issues at stake in *higher* education, the same holds true for *engineering* education. They are symbiotic entities rather than discrete bodies occupying the realm of education.

This paper does not purport to have all (or even most) of the answers. It is intended to be an exercise in recognizing a turning tide and imagining alternative modes of existence divorced from the current trend of creeping corporatization and privatization. To that end, the example of Tulane and Katrina served as an instrumental case study to add to the accruing body of evidence of neoliberalism's effects in higher education. Notably, we have not even elucidated all of the pitfalls of corporatization and privatization here, nor will we. As mentioned before, entire books are dedicated to the subject and litigating the negative upshot of that modality in higher education.

Where does that leave the engineering education community? There are four key issues of note from this case. First, there is the issue of transparency. It may be more difficult, but is it possible to maintain transparency throughout the decision process as a way to avoid disaffecting students, and to communicate basic respect for faculty and staff who may be let go at a time when they were most vulnerable? If educators care about students' well-being and connection to their

engineering programs, then programs may need to foster an atmosphere of trust. Any time there is a shadow of an unforthcoming actor, it is only natural for students and colleagues to become circumspect. That is antithetical to the potential to build relationships in and among engineering departments. It is an aspirational goal to supersede treating students as mere customers (faculty as mere producers of grants, publications, graduates; staff as “the help” or worse, invisible) – and more as partners in engineering education. Though aspirational, it is also attainable.

Second, there is the issue of responsibilities to students. Is there a responsibility to the students that extends beyond a transactional one where the student pays and after four years has a piece of paper that opens doors to a career? Beyond teaching them how to calculate the optimal volumetric flow rate through a pipe or residence time for reactants in a tank reactor, do educators have an obligation to teach students how to become effective citizens in the world? As mentioned before, administrative decisions transmit messages to students, so this may translate to a higher degree of concern when making those decisions. Not only does the primary effect count, but so, too, do the secondary and tertiary effects warrant consideration.

Third, there is the issue of responsibility to the surrounding community. Just as with students, is there a responsibility to the surrounding communities, and society as a whole, that extends *beyond* workforce development? At a time when state legislatures are reducing their financial support of higher education, one might argue these universities are less beholden to anyone else. To the contrary, universities still occupy a unique place in society as bastions of development for young adults, continuing learners, or anyone else striving to improve their lives. This is not just about workforce development, but actual human development - emotional development, cognitive development, spiritual development. It may be unorthodox, but engineering education has that same ability to help form the whole human who contributes to society as more than just the engineer contributing to the company. Can engineering educators find that capacity to do more than develop the next human cog in the corporate machine by encouraging students to actively engage with the world?

Fourth, there is the issue of crises in higher education and the citing of exigent circumstances. This method of leveraging moments of crisis to enact sweeping policy measures poses a threat to anyone subject to them, which includes, but is not limited to, higher education. Friedman noted the potential for reform following crises, President Cowen echoed it, and if educators are not careful and cognizant of its existence, this method will persist as a tool in the shed of certain reformers. At the most basic level, all of these issues revolve around pushing back against the ubiquitous free-market mentality in education as an effort to regain the more humanistic goals of higher education.

Conclusion

In the wake of Katrina, Tulane University undoubtedly faced unenviable circumstances. In the future, other universities will face adversities and a concomitant need to make tough decisions. When they arrive, the higher education community should be circumspect of their provenance. Educators should question who is ultimately driving the decisions and whose interests are under consideration. Who is represented at the table when that occurs? Should educators expect students to be placed firmly at the top of the list? If they are not, then it might behoove the

community to seek the reasons offered for the deviation. Furthermore, given historical precedent it should no longer come as a surprise that financial justifications are foisted upon the public when higher education adopts a model of neoliberalism and corporate ideologies. The pursuit of prestige and money is the predictable consequence, but it is not a foregone conclusion that engineering education has to be this way. It is possible to advocate for more transcendent ideals.

In the case of Tulane, Katrina and the ensuing flooding revealed important lessons about engineering education, higher education, and society as a whole. As David Brooks noted only days after the storm, “Floods wash away the surface of society, the settled way things have been done. They expose the underlying power structures, the injustices, the patterns of corruption and the unacknowledged inequalities.”⁷⁹ On this occasion to convene in New Orleans almost eleven years after the storm, take a moment to reflect upon the revelations from Katrina. In part, the storm offered another instance of a trend toward neoliberalism in education, just as in government and society, and its effects on engineering education. Paradoxically, although the particular events themselves may have been unpredictable, the aftermath with the engineering programs may have been a predictable denouement, a consequence of operating in an economic system geared toward unfettered capitalism at the expense of more fundamental values in education. Is it possible that there exists an unstable equilibrium in engineering education - one balancing financial interests and society’s interests, belying the specious assumption that these are unquestionably the same? This trend will persist unless the community continues evolving from feckless bystanders to active participants advocating on behalf of those higher ideals that make us worthy of the moniker higher education.

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