

Bridging the Great Divide

Reconciling STEM Fields and the Humanities on Today's College Campuses

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Introduction

Certain “practical” fields like computer science require clearly defined skill sets, often in the form of fluency in programming languages. Once one is fluent in the language, she is well positioned to use it to produce new and original ideas and content such as software applications. That said, in other fields that require public speaking and professional writing or editing, one must have a strong grasp of a much broader range of competencies that may also be more difficult to specifically define as in computer science. Most of these competencies involve fluent use of one or more natural languages (like English), usually both written and spoken, and in academic circles fall under the umbrella term of the liberal arts. When a technical journal on computer science or related topics has an opening for its managing editor, the candidate with a foot planted firmly in both worlds will have a clear competitive advantage over a strict specialist in one or the other. More specifically, as President Donald Farish of Roger Williams University in Rhode Island explains, “The practical gets you the first job. The liberal arts gets you to be CEO” (Sapiano 2012). This kind of flexibility is certainly a wonderful prospect for future college graduates. But is this just a coded message for *science good; humanities...less good?*

To President Farish, undergraduates at his private institution should ideally graduate with “two arrows in their quiver” (*Ibid.*). Given the inherent ups and downs of the job market, especially for new, inexperienced college graduates, it is logically advisable that undergraduate students prepare to be both flexible and amenable to a wide range of job opportunities upon graduation. While this kind of pragmatic approach to higher education is by no means revolutionary, liberal-arts-based institutions have, most recently since the economic downturn in the United States, been faced with increasingly demanding challenges to produce high rates of market-ready graduates. This attitude tends to strongly favor more qualitative, “practical” fields

like the science, technology, engineering, and mathematics subject areas captured by the term “STEM.” But many humanists argue that in reprioritizing to meet these perceived needs, we are neglecting essential aspects of our rich cultural and literary patrimony, not to mention important socio-behavioral factors such as listening skills, empathy, and leadership. If the fact remains that the market is continuously driven by the STEM fields (and the technology and methods derived therefrom), how are students, professors, and administrators to reconcile these conflicting priorities?

How to achieve a healthy balance between the so-called “two cultures” on today’s college campuses is a desirable outcome for multiple reasons, not the least of which is job-preparedness. Many institutions’ mission statements speak directly to this issue of producing well-rounded individuals as well, further identifying this as a strong priority from a philosophical as well as a practical standpoint. This white paper takes into account how colleges and universities are approaching this divide - whether real or perceived - between the STEM fields and the humanities. Case studies of individuals who may have found themselves either stuck between both camps *or* happily balanced between the two are considered and overall campus culture and environment are viewed as important factors as well. Suggestions for best practices for colleges and universities will comprise the bulk of this paper’s conclusion.

‘The Two Cultures’

Innovation is fueled by both creative ideas and the technical prowess to support them with results, whether in the form of a product, a service, or a methodology. But which is the more important element, creativity or technicality? This debate is as old as human industry itself and it

never ceases to be a source of clichéd antagonism. But it also continues in the form of curricular policies as well as the marketability - whether real or perceived - of different areas of study.

Considering the economic downturn in the United States starting in 2008, the arguments for prioritizing “hard” over “soft” skills or knowledge have become ever more skewed towards the former. However, many experts caution against allowing market-driven forces to goad us towards construing these issues as a zero-sum game. In a *New Republic* op-ed of 2013, the best-selling popular science writer and Harvard psychologist Steven Pinker explains that “the promise of science is to enrich and diversify the intellectual tools of humanistic scholarship, not to obliterate them.” In turn, he continues with a caveat aimed at the purveyors of the humanities, adding that they “would enjoy more of the explanatory depth of the sciences, to say nothing of the kind of a progressive agenda that appeals to deans and donors” (Pinker 2013). Calls for more cross-disciplinary communication, he implies, are essential to this greater efficiency.

In 1959, the lecturer C.P. Snow identified the emergence of two distinct cultures in the western world: scientists (especially physical scientists) and non-scientists, led by the often outspoken class of literary intellectuals. He stated, “Between these two groups...there is little communication and, instead of fellow-feeling, something like hostility” (Stringer 1983: 172). Considering Snow himself was both a physical chemist *and* an accomplished novelist - by “training” and by “vocation,” respectively (Snow 1959: 1) - how are we to understand his comments other than the manifestation of his desire for more individuals to transcend this suspected dichotomy? Is the subtext simply that we emulate his own dynamic example? In this sense, his rhetoric becomes doubly compelling, if not highly controversial in its generalization.

While many, including Stringer (1983), have since argued against Snow’s polemic - much of which is anecdotal - there are nevertheless clear distinctions between the *methods*

employed using scientific/quantitative reasoning as opposed to a more philosophical/qualitative dialectic. Does this lead to different *kinds* of people, however? People that, perhaps, even hold wildly different moral or ethical values from each other? Snow primarily laments the inability of scientists and humanists to *communicate* and, furthermore, to socialize across “party” lines. While he does imply that this was the case during his time of writing in the middle of the twentieth century, most contemporary educators at the tertiary level throughout the United States would be aghast at such a notion of duality in regards to the students and graduates of their institutions; the modern college graduate is “supposed” to be not only well educated, but socially and ethically ready for the great, big, diverse world-at-large, regardless of context or interlocutor. This is the hope, of course.

It is true, without communication and collaboration across disciplinary lines, Snow’s lament does indeed take on a certain poignancy. If anything, he serves as a fascinating case study in his role as a successful professional deeply rooted in both the sciences and the humanities. But he certainly was not the first, nor will he be the last. For example, the highly successful novelists M. Somerset Maugham and Michael Crichton were both originally trained as physicians. Each used his scientific, analytic background to craft works of intricate, innovative literature. The question, then, remains: How do we not only cross-pollinate STEM with the humanities, but furthermore engender learning that produces well-rounded students and professionals who fully grasp the importance of both “sides”? After all, brilliant “hard” thinkers like Snow and Pinker would never had become the celebrated figures they were or are, respectively, without “soft” skills like English composition, rhetoric, and philosophy to communicate their “harder,” more quantitative analyses.

Citing the case of Stanford University, Tamar Lewin writes, “Some 45 percent of the faculty members in Stanford’s main undergraduate division are clustered in the humanities — but only 15 percent of the students” (2013). At an institution so well-regarded for its STEM facilities and programs, it is not surprising that student interest would skew this way. Also, we must consider how relatively recent much of the newer developments in the STEM fields have emerged. Literature, on the other hand, is of course ancient. “But,” she continues, “with the recession having helped turn college, in the popular view, into largely a tool for job preparation, administrators are concerned” (*Ibid.*). The notion here is that times have changed enough in the last six to seven years to reveal a gaping incongruity between the bygone era that produced those 45% of faculty in the humanities and that in which current or recent undergraduates find themselves today.

Whether we can, as a society, reconsider and redefine the inherent value of an undergraduate degree - any undergraduate degree - in and of itself is a topic for a much larger study. What is clear is that at this point in history the value of the quantitative side of thinking has at least beaten out the *perceived* marketability of the qualitative. According to Alire and Evans, “The reality is that three undergraduate degree models are now in play: general/liberal education with no specialty, applied, and mixed. The last model has been growing in favor over the last 20 or so years, in part because it helps avoid coming to grips with the fundamental issue: immediate applications versus being able to adjust effectively to changing life situations” (2010: 87). As we have seen, the debate surrounding this “fundamental issue” continues to grow more complex as market priorities shift to ever-heightened expectations of efficiency, automation, and productivity. But the growing popularity of the mixed model shows that students, as President

Farish would would hope, either already are or are increasingly becoming more aware of the benefits of balancing both breadth and depth in their choice of courses and programs.

Curricular Approaches and Rebel Spirits

The eminent educator and higher education critic Derek Bok has observed, “[A] longitudinal study of twenty-four thousand undergraduates revealed that majoring in engineering was associated with declines in writing ability, cultural awareness, and political and civic participation; that education majors became less proficient in problem solving, critical thinking, and general knowledge; and that science majors wrote less well as seniors than they had as freshmen and were less inclined to participate in civic affairs” (Bok 2013: 171-172). How can we prevent this “back-sliding” in the graduates of the future? He further details the crux of the issue:

...faculties assume that students will develop oral communication skills and acquire an adequate civic education simply by completing the four-year undergraduate program, or that competence in moral reasoning or expository writing can be attained in a single course, or that these capabilities (along with other aims, such as the development of “global awareness” or quantitative skills) will be achieved if the faculty is urged to incorporate the necessary material into their existing courses. The validity of these assumptions is seldom put to a rigorous test, but the curriculum itself is approved nonetheless. (*Ibid.*: 174).

Despite such discouraging statistics and tendencies, higher education administrators are tasked with paying due diligence to their own mission statements, namely, to graduate law-abiding, productive citizens of the world. (Or, if not the world, then at least of their local communities.) If being an alumnus or alumna of a college or university is to bear any real meaning in this country or beyond, it behooves administrators to indeed facilitate, as Bok suggests, such “serious faculty discussions.”

Some invested parties that are leading the charge to bridge the gap are doing so at the risk of their own careers and reputations. Much of this is occurring amongst intrepid researchers who, like C.P. Snow, refuse to be polarized by the perceived STEM/humanities dichotomy. In one case, a literary studies scholar has literally gone down fighting: Jonathan Gottschall, PhD has taken up mixed martial arts as a means to better understand the humanities (namely, classical literature) from physical, behavioral, evolutionary, and cognitive perspectives. But he has yet to be rewarded for his intrepid interdisciplinarity. Writing on this complicated, ongoing case, the *Chronicle of Higher Education*'s David Wescott explains, "The story of how things went so wrong for a promising young scholar is one of disciplinary politics, contentious methodological debates, and the respective statures of the sciences and the humanities. Above all it is the story of how brash literary Darwinists and evolutionary theorists attempted to 'save' English departments — by forcing them to adopt scientific methodology — and were, on the whole, repelled" (2015). It appears from this case that while in theory dynamic interdisciplinarity is an ideal, in practice it leads to much dispute over how it should or could be executed.

Is this a case of the unwritten rules against the mixing of the "two cultures"? It very much appears to be. Gottschall complains of the humanities' "contempt for reality" and that if something is not done to inject a more holistic approach, "the alternative is to let literature study keep spinning off into a corner of irrelevance to die" (*Ibid.*). Whether Gottschall's iconoclasm is eventually rewarded with greater respect in academe is yet to be seen. His cause has already been championed by such academic heavyweights as E.O. Wilson and the aforementioned Steven Pinker. But he remains grossly underemployed and, seemingly for now, difficult to accommodate given many humanities departments' tendencies towards traditional attitudes and hiring practices.

What Employers Want

Current undergraduate students must think long and hard about their abilities to secure a job, repay loans, possibly apply and be accepted into a graduate program, and furthermore attempt to obtain and maintain a certain level of quality of life, ideally all without compromising one's individual passions, dreams, and interests. Keeping in mind these many moving parts, what is the best practice at the undergraduate level? Allowing employers - ostensibly the already entrenched engines of economic activity - to answer this question is constructive at this point.

“Business leaders...seem to favor a curriculum that embraces a variety of goals extending well beyond a strictly vocational program,” writes Derek Bok. He continues,

Thus, when employers were asked in a recent survey what qualities they would like colleges to emphasize more, large majorities expressed strong support, not for more technical skills, but for such familiar liberal arts goals as thinking critically, communicating effectively both orally and in writing, acquiring a sensitivity and concern for ethical issues, and learning to understand and work effectively with people of different cultures, backgrounds, and races. (2013: 169).

As anyone who has ever secured a job - *any* job - can affirm, many of the more intangible skills required in the workplace are not necessarily taught in the classroom: teamwork, leadership, collegiality, and empathy. So what, then, should colleges focus on if students are on the whole inexperienced as to how to apply whatever pertinent knowledge they acquired during their studies? “The problem is a growing gap between the public needs and the reality of the performance of the institutions of American higher education,” say Newman et al. (2004: 47). Business leaders' criticism of higher education is that graduates are “lacking ‘creative’ and ‘practical’ intelligence” (*Ibid.* 72). Can we even teach creativity and practicality? Perhaps not. But at the very least college-level programs in any area should aspire to offer opportunities for

these traits to emerge, grow, and, with hard work, flourish into something applicable to the job market. It certainly is preferable that students genuinely enjoy and are interested in their field of study. Nor should be discounted the potentially high value of extra-curricular activities like clubs, teams, internships, or on-campus jobs towards accruing much illuminating and very possibly job-marketable experience.

In lieu of either despair or partisanship in these matters and keeping the end-goal of securing employment forever in mind, many colleges have opted for a more interdisciplinary approach. “Genuine interdisciplinary work presupposes not just broad interdisciplinary thinking but also the ability to collaborate intelligently with disciplinary experts. This requires in-depth training in at least one (and ideally two) disciplines” (van der Wende 2014). As President Farish has also confirmed with his “two arrows” plan, the more dynamic the range of study, the more likely a student will be to secure gainful employment upon graduation. There is, at least in Farish’s comments, a subtextual notion of the need to repair the perceived unmarketability of liberal arts degrees, particularly as seen in his announcement’s syntax: “Those who choose liberal-arts majors will be encouraged, but not required, to add a professional minor—and vice versa” (Supiano 2012). The rhetoric here is diplomatic but decisive.

Simsek & Hacifazlioglu, two Turkish academics, give further insight: “Scholarship in the 21st century is characterized by innovations that question the disciplinary boundaries in the academy. Interdisciplinary programs broke through the divisions created in disciplinary programs” (2012: 742). While the second sentence is somewhat of a tautology, this statement is nevertheless essential to appreciating how very interconnected all aspects of the globalized economy are and likely will continue to be. Conversely, in their book *The Future of Higher Education: Rhetoric, Reality, and the Risks of the Market*, Knight, et al. report, “Although

advocates of interdisciplinary programs have argued that integrating interdisciplinarity into undergraduate curricula better prepares students for the workforce and for civic participation by facilitating the development of problem solving and critical thinking skills, few studies support the claim that interdisciplinary curricula have positive effects on learning. Consequently, some scholars have questioned whether interdisciplinary education is superior to discipline-based education” (2012: 144). Outcomes will differ based on students and programs, of course, but if heightening the likelihood for success is the goal of all, how can we best reconcile these mixed results and move on to more practical solutions?

One innovative project known as “Knacktive,” implemented at Northwest Missouri State University, has attempted to bridge the gap between not only theory and practice but also various degree programs whose students otherwise would not likely have worked together. This project also addresses the aforementioned complaints of prospective employers regarding recent graduates’ unpreparedness for the job market. Described by Shadinger and Toomey as a “one-term course that incorporates a highly select group of undergraduate students and replicates the intense teamwork atmosphere of a technology-oriented, professional marketing communication agency” (2014: 55), the initiative brought together students from five separate disciplines: art/graphic design; interactive digital media; computer science; public relations, journalism, and media studies; and marketing and business management. This kind of interdisciplinary team indeed looks much like that which a similarly focused “real” company might employ. In fact, the projects developed as coursework were indeed cases with real clients expecting real deliverables. The team was also facilitated by five faculty members representing these respective disciplines. Furthermore, “Although other college-level student agencies exist, many are staffed by students from only one discipline” (*Ibid.*). Thus, following through on the

academy's attempts to simulate the active market, Knacktive (whose name itself was chosen by the inaugural student team), while not necessarily a curricular mainstay, at the very least proves how college campuses can serve as real incubators of practical experience and knowledge production. Furthermore, "It was only when the first Knacktive students received interviews for heretofore-unattainable internships and job interviews that the faculty fully realized just how special and effective the...experience was for the students" (*Ibid.*). The conclusion of this experiment speaks for itself.

Conclusions

Much of what an institution decides to implement for its undergraduate curriculum will be based on a wide range of factors including its history, (possibly) its relationship with a religious ideology, its geographic location, its physical plant, etc. But, as we have seen, some factors must be considered from a market perspective, such as what business leaders are saying they would like and not like from freshly minted college graduates.

Further supporting his move to encourage the "two arrows in their quiver" policy, Roger Williams' President Farish explained,

...we're enhancing our product – not by throwing out everything that works in higher education (we still ensure that all our students are well versed in the liberal arts, we house students in residence halls and we promote a robust on-campus learning environment) – but by augmenting our time-honored strengths and values through ensuring that our graduates have the practical skills required for success in today's economy. Small steps, some critics say. Bold actions, we believe. There is no single silver bullet that will instantly resolve all of the issues facing higher education. (Farish et al. 2013).

I propose the following in order to fully execute on such goals. Specifically, I offer suggestions that seek to further reconcile the perceived disconnects between the STEM fields and the humanities:

1. **Extracurriculars.** The potential impact of extracurricular activities towards creating connections between otherwise “unrelated” students cannot be stressed enough. While various kinds of activities and organizations have existed on campuses for many centuries, their effects may not be fully appreciated, prioritized, and, most importantly, analyzed. Through clubs, mixers, outings, and student employment, those who would otherwise have no exposure to “the other half” are better able to see what benefits they might derive from diversifying their education. At the very least, the heightened exposure can ideally give students a more accurate impression of students in widely differing degree programs. Conversations in these contexts often lead to deeper inquiries that otherwise never would have taken place. Common campus mainstays that serve as nexuses for students of all disciplines are radio stations, religious organizations, ethnic students’ associations, political clubs, and volunteer organizations. Furthermore, offices that administer registered student organizations have not only the obligation but also the prerogative to make *regular assessments of the impact that they have on a given college climate*. Where appropriate, funding for registered student organizations should be prioritized, defended, and secured, especially in the case of those with a physical presence, such as newspapers and television/radio stations, where larger numbers of students can congregate, collaborate, and network. The goal here, especially in the case of larger schools, is to prevent the kind of social fracturing of the student body that can lead to non-communication between and among students in their many degree programs.

Deans of students should also be involved in this discussion, as not all students are necessarily affiliated with a registered student organization but are nevertheless integral members of their campus environments. While it is not advisable to *require* all students to join and actively participate in at least one RSO, deans of students should do their utmost to encourage all students to at least consider their great benefits.

2. **Active and dynamic advising.** The collaboration among undergraduate advisors, faculty, and departmental administration is essential to facilitating students who desire to pursue dynamic curricula. If advisors are unable to cross “party” lines on behalf of their increasingly interdisciplinary students, students may not feel capable of navigating between what the faculty and administration view as “unrelated” areas of study. While advising programs may vary widely not only among different institutions but also by department within a single institution, a re-structuring at a higher administrative level may be essential to facilitating the kind of dialogue necessary to creating a cohesive campus environment. More practically, advisors should be encouraged to shadow each other, crossing departmental lines and learning from the methods, successes, and challenges of departments with which they may have little to no contact otherwise.
3. **The faculty discussion.** Provosts are usually the administrators tasked with working with curricular matters across disciplinary lines. Therefore, they are particularly well-positioned to be the leaders of discussion among faculty on how to best cope with the recent “mixing” of expectations among college students and employers alike, as detailed above by Alire and Evans (2010). These “serious faculty discussions” recommended by Bok (2013) may need to take place outside of the normal environs of academe. Thus, events such as off-campus faculty retreats can be particularly productive as a means for

both administrators and faculty to forge a strong sense of mission and focus across “party” lines in the pursuit of serving their students as members of an overarching community and not just as majors in one particular department or school. This kind of event requires a high level of preparation, strategy, and collaboration to execute successfully and thus may call for the assistance of experienced professional consultants to achieve.

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