

Academic Program Prioritization: An Existential Threat to Geoscience Departments

Carl Drummond, Dept. of Physics, Purdue University Fort Wayne, Fort Wayne, Indiana 46805, USA, drummond@pfw.edu

INSTITUTIONAL AND DEPARTMENTAL BACKGROUND

On 31 December 2016, the Department of Geosciences at Indiana University–Purdue University Fort Wayne (IPFW) was closed, and admission to the bachelors of science in geology degree program was suspended. I was serving as Vice Chancellor for Academic Affairs at the time, so it was my job to make the necessary changes. Having been a member of the department for more than 20 years, managing the processes that lead to that decision was extremely difficult. The following review of the events that led to department closure is intended to provide a framework for understanding the context and process of program prioritization. By implementing the proactive countermeasures described, other at-risk geoscience programs may hope to survive future economic oscillations and the increasingly common application of private sector models of organizational efficiency within the academy.

Because of its significant service function, the Department of Geosciences at IPFW experienced fluctuations in credit-hour production that were closely linked to the broader enrollment patterns of the university. Maximum enrollment occurred in fall of 2011 (Table 1). Subsequently, there was a failure to recognize the possibility of, or adequately plan for, a post-recessionary decline in total campus enrollment. Declining tuition revenue resulted in significant budget shortfalls from 2012 through 2017. In response, a campus-wide hiring freeze, voluntary early retirement programs, and non-voluntary reduction-in-force programs were all implemented. However, even these divestment plans could not keep pace with declining revenue.

The department had historically been a small undergraduate program with faculty teaching a 3/3 load. Some 40% of instructional capacity was dedicated to upper

division courses for majors and accounted for between 3% and 5% of the departmental total credit hours, while some 60% of instructional capacity was dedicated to general education courses heavily enrolled by non-majors (Drummond and Markin, 2008). The Department of Geosciences served an average of 31 majors and graduated four students per year (Table 1).

THE CHALLENGES OF PRIORITIZATION

In March 2014, a small team of IPFW administrators attended a conference sponsored by the higher education consulting organization Academic Impressions where the ideas of Robert Dickeson, former president of Colorado State University, were presented. Dickeson is an advocate for institutional efficiency, and the conference was intended to provide the training and tools necessary to launch a process of program prioritization and elimination (Dickeson, 2010). This approach involves the identification of a suite of performance metrics, the ranking of the institution's programs into quintiles, and investment or divestment in programs according to their ranking. The participants in the training process supervised a task force of faculty and staff who were asked to develop assessment methods, analyze data, and craft recommendations both at the unit and the university level that would guide resource prioritization.

The IPFW task force recognized a series of systemic challenges concerning the

prioritization process. The first was the absence of an accurate cost accounting protocol. Departmental data that should have informed academic performance metrics were both poorly defined and incompletely recorded. Additionally, revenue generated by online courses was isolated from and independent of the general fund. Faced with an inability to access accurate department financial data, the task force could not proceed with establishing financially based metrics.

In response to these challenges, a survey was developed that required departments to report on their mission, accomplishments, accreditations, inefficiencies, academic and budget data, and departmental goals. The task force members then provided written responses to these reports.

PROGRAM CLOSURE

On 6 May 2016, the task force issued a second report. Although a total of 41 recommendations touching all aspects of university operations were presented, the core of the report consisted of three recommendations that fell within the broad heading of "Evaluate Academic Program Efficiencies." Recommendation 2.1 called for the creation of a set of academic performance metrics, while recommendations 2.2 and 2.3 called for the review of academic programs and administrative organization at the departmental level.

In late August 2016 a response to recommendation 2.1 was issued by the administration that defined the concepts of

TABLE 1. SUMMARY OF PERSONNEL, CREDIT HOURS DELIVERED, AND STUDENT HEADCOUNTS FOR THE DEPT. OF GEOSCIENCES DURING ACADEMIC YEARS 2010–2011 THROUGH 2014–2015

Academic Year	Faculty		Credit Hours			Head Count	
	Tenured/ Tenure Track	Continuing Lecturer	100–200	300–400	%	Majors	Graduates
14–15	5	1	3938	236	5.7	29	4
13–14	5	1	4781	150	3.0	32	3
12–13	5	1	5394	215	3.8	29	7
11–12	5	1	5868	168	2.8	36	4
10–11	5	1	5680	183	3.1	33	3

programmatic and departmental viability. Utilizing accurate academic performance data, three metrics were established. *Program demand*—number of students new to a program; *student participation*—number of declared majors; *productivity*—number of graduates. In addition, three metric ratios were calculated: *graduation efficiency*—number of students who graduate divided by the number of majors; *student attrition*—number of students who stop out divided by the number of majors; *growth trend*—number of students entering the program divided by the number of students graduating, changing to a new major, or stopping out. Values of each metric were calculated for the five year period 2011–2012 through 2015–2016, and on 19 September 2016 a document was issued that reviewed all academic programs and departments and included recommendations and expectations.

From the quantitative analysis, it was clear the Department of Geology's performance metrics were dismal. However, the department had extensively documented the scholarly and engagement activities of both students and faculty. An initial recommendation to maintain the B.S. in geology program was based on the recognition that those contributions would wane if the department was closed. Three departmental goals were established: restructure the geosciences program through faculty replacement, build connections to high school students, and build connections to local industries to increase student employment placement. In addition to those recommendations, continuous monitoring of departmental metrics, development of curricular pathways to attract students to the major, and collaboration with the civil engineering program were expected.

During a meeting on 13 October 2016, the trustees of Purdue University made clear that the prioritization process was to be completed more rapidly than the timetable described in the September plan. This acceleration had its origin in the impending realignment of academic programs between Indiana University and Purdue University. A revised response to recommendations 2.2 and 2.3 was issued on 18 October 2016. Along with the B.S. in geology, admissions to degree programs in French, German, and philosophy were also suspended. The departments of geology and philosophy were closed and four departmental mergers impacting eight additional programs were

also implemented. The faculty of the department found new academic homes in the departments of biology, chemistry, and physics. These changes were projected to create an immediate cost savings of US\$200,000, followed by about US\$1.1M in annually recurring savings.

LESSONS LEARNED

While recognizing that no two sets of institutional circumstances are identical, and accepting that many different factors can lead to a department's elevated risk of closure, the experiences and lessons learned from the IPFW events are valuable examples for other departments. The Department of Geosciences had been viewed by the administration as a small, but successful, academic program. A concern regarding the number of majors was frequently considered during departmental reviews but was overlooked because of the efficient delivery of total credit hours. As such, the department felt, and largely was, protected from critical review. However, the department failed to recognize how an institutional shift from valuing credit hour production to student completion could create a threat. Adjustment of department priorities in recognition of the significance of these institutional changes and an understanding of how performance metrics were calculated would have been a necessary but not sufficient step in staving off closure.

Due to the demographics of the department's faculty, a series of three retirements were planned between 2014 and 2018. The opportunity existed, at the time of the first retirement, to realign the composition of the faculty in a way that would support a transition to an applied geotechnical curriculum. Although there was no guarantee that the department's fate would have been different, a curricular shift would have, at least in principle, provided a path to sustaining the department. Typically, if opportunities for changes in personnel are well-aligned with strategic curricular evolution (Ulanski, 1995), a department is demonstrating the capacity to meet the needs of future students.

The Department of Geosciences had a short time in which to establish a client relationship with civil engineering. Only by building curricular linkages, and by populating upper-division courses with students from outside the geology major, can at-risk programs build safeguards against future closure (Anderson et al., 2006; Renshaw,

2014). Likewise, establishing meaningful relationships with regional business and industry had been a departmental goal. However, a pipeline for the employment of graduates was never achieved. With no clear post-graduation pathway, with no collaboration between employers and the department in recruiting prospective students, and without a strong alumni base, there was no viable mechanism to increase student participation in the department.

The Department of Geosciences at IPFW is not the first geosciences program to be closed and almost certainly will not be the last. The department fell victim to an academic program prioritization process in large part because it failed to consider and implement existing strategies, many of which are available through the Carleton College Science Education Resource Center's *Building Strong Departments* resources (<https://serc.carleton.edu/departments/index.html>). The IPFW experience has shown that the most critical characteristics of a department that is resistant under the pressures of program closure are progressive and engaged department leadership coupled with a collective willingness to accept and positively respond to opportunities for change. By reviewing the combination of structural weaknesses and missteps described above, at-risk departments can take actions that will reduce their vulnerability.

REFERENCES CITED

- Anderson, S.W., Flood, T.P., and Munk, L., 2006, Bucking the trend: Three new geoscience programs: *Journal of Geoscience Education*, v. 54, no. 1, p. 41–49, <https://doi.org/10.5408/1089-9995-54.1.41>.
- Dickeson, R.C., 2010, *Prioritizing Academic Programs and Services*: Jossey-Bass, San Francisco, <https://doi.org/10.1002/9781118269541>.
- Drummond, C.N., and Markin, J.M., 2008, An analysis of the bachelor of science in geology degree as offered in the United States: *Journal of Geoscience Education*, v. 56, no. 2, p. 113–119, <https://doi.org/10.5408/1089-9995-56.2.113>.
- Renshaw, C.E., 2014, Design and assessment of a skills-based geoscience curriculum: *Journal of Geoscience Education*, v. 62, no. 4, p. 668–678, <https://doi.org/10.5408/13-100.1>.
- Ulanski, S.L., 1995, Curriculum reform in undergraduate geology programs: *Journal of Geological Education*, v. 43, no. 1, p. 43–46, <https://doi.org/10.5408/0022-1368-43.1.43>.

MANUSCRIPT RECEIVED 10 JULY 2019

REVISED MANUSCRIPT RECEIVED 23 AUG. 2019

MANUSCRIPT ACCEPTED 17 SEPT. 2019

GSA 2019 Annual Meeting Wrap-Up

GSA TODAY



THE GEOLOGICAL SOCIETY
OF AMERICA®

VOL. 30, NO. 1 | JANUARY 2020

Fate of the Lower Lithosphere during Shallow-Angle Subduction: The Laramide Example

