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The PhD in the US: Criticisms, Facts, and Remedies

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Doctoral education in the United States has in recent years received a number of criticisms. In response, several initiatives have been developed to address some of these criticisms. In addition, three major surveys have been undertaken to better understand the process, content, and outcome of doctoral education. This paper explores the criticisms and outlines the initiatives for change. It argues that initiatives for change in doctoral education are important first-step responses to the criticisms; however, they must be accompanied by ongoing research that can provide empirical data on doctoral student experiences, career paths, and on the impacts of the initiatives themselves.
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Introduction

The US PhD is a much sought after degree both nationally and internationally. US doctoral education serves as a model throughout much of the world. However, within the US, the doctoral education is not without it critics. During the past 10 years, the criticism of doctoral education has generated national attention and resulted in a call to re-evaluate whether this education measures up in content, structure, and process to prepare scholars and researchers for present and future societal needs (Committee on Science, Engineering and Public Policy, 1995; Hood, 2000).

In this paper, I will first contextualize the debates, criticisms, and initiatives, with some basic data on US doctoral production;[1] second, present the criticisms voiced, examine whether they can be substantiated by empirical findings; third, describe the intentions and focus of five programmatic national initiative; and fourth, end with a critical analysis of the likelihood of successful impact of these initiatives and a focus on the active participation of doctoral students in bringing about change in their education. My thesis is that initiatives for change in doctoral education are important first-step responses

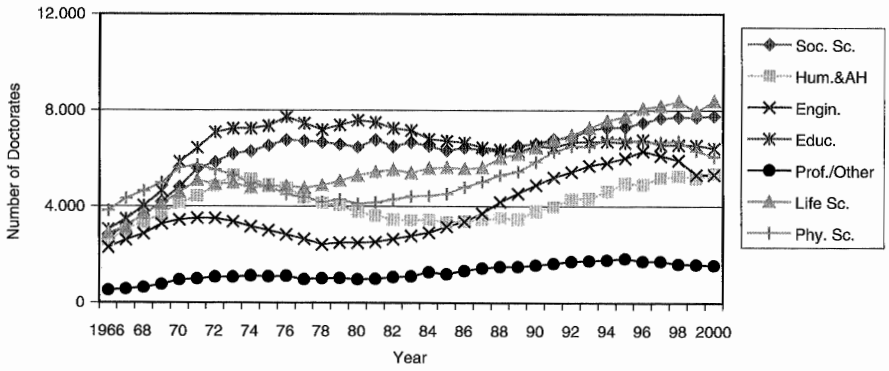
to the criticisms; however, they must be accompanied by ongoing research that can provide empirical data on doctoral student experiences, career paths, and on the impacts of the initiatives themselves.

PhD Production: A Brief Overview[2]

Presently, over 40,000 PhDs are awarded annually in the US. The growth in PhD production began during the 1960s with the Vietnam War. Many men deferred the draft by going to graduate school — and thus the early 1970s show a dramatic increase in doctorate awards (NORC, 2001). This PhD production rate leveled off over the 1980s and began to increase again in the 1990s (Graph 1).

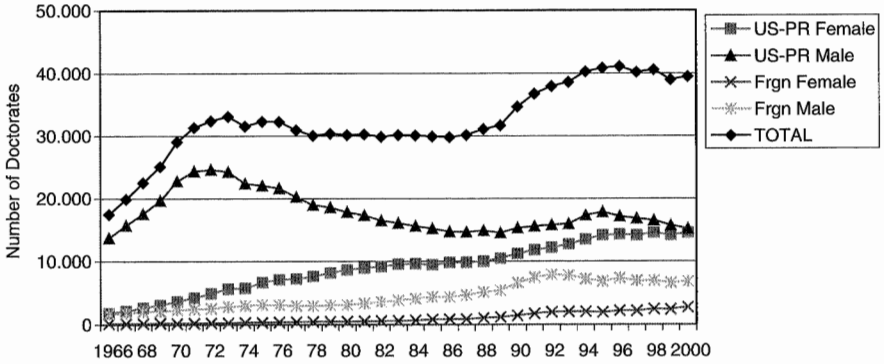
This recent increase stems from higher enrollments in the life sciences, physical sciences, engineering, and humanities doctoral programs and includes an increase in the influx of international students in natural science and engineering fields. Roughly 50% of the international PhD students remain in the US after degree completion (Gupta *et al.*, 2003). Fueling the increase in PhDs, particularly in humanities and arts, has been the widely publicized, but false, prediction of a shortage of PhD recipients in the late 1980s (Bowen and Sosa, 1989; Atkinson, 1990). Along with the general increase in PhD enrollments, we see that women's participation in the doctoral degree steadily increased since the 1960s (Graph 2).

Women's PhD acquisition surpassed men's in education, the social sciences, and since the year 2000, is equal to that of men in the humanities (NORC,



Source: CIRGE, UW Seattle, 10-21-02, NSF Web CASPAR, Doctoral Record File. From Survey of Earned Doctorates via WebCASPAR (http://caspar.nsf.gov)

Graph 1. US doctoral degrees by major field of study 1966–2000.



Source: CIRGE, UW Seattle, 10-21-02, NSF Web CASPAR, Doctoral Record File. From Survey of Earned Doctorates via WebCASPAR (http://caspar.nsf.gov)

Graph 2. US doctoral degrees by gender and citizenship 1966–2000.

Table 1 Higher education attainment in US (age >25) in 2000

Level of education	*% of population*
Some college or more	51
Bachelor or more	25.6
Masters	5.9
Professional	1.5
Doctoral	1.2

Source: CIRGE, UW Seattle, 10-21-2002, Digest of Educational Statistics, 2001. From National Center of Educational Statistics (http://nces.ed.gov/programs/digest/)

2001). Despite the increase in PhD production, the ratio of PhDs to bachelor degrees has stayed fairly stable between 3.5 and 4.3% during the last 20 years, and at 3% when we count only degrees awarded to US citizen and permanent residents. About 25% of the US population holds a bachelor degree and 1.5% holds a doctoral degree, including MDs and JDs (Table 1).

Just over 400 institutions award doctoral degrees. However, 50 of these 406 institutions award about 50% of all doctoral degrees (Table 2).

As a result, doctoral education is concentrated in a few institutions, mainly the major research universities, and the majority of which are members of the American Association of Universities. The largest 'PhD mills' are the major public universities, led by University of California in Berkeley, which awards roughly 750–800 PhDs annually. The top private universities follow in PhD production these major state universities.

Table 2 US doctorate production by type of institution in 2000

Institution type	*No. of institutions*	*No. of PhDs*	*% total PhDs*
All	406	41,368	100
Research I	89	27,168	66
AAU	61	21,748	53
Largest	50	21,228	51
Largest	25	13,351	32
Largest	10	6,442	15

Source: CIRGE, UW Seattle, 10-21-2002, Digest of Educational Statistics, 2001. From National Center of Educational Statistics (http://nces.ed.gov/programs/digest/)

Although the number of faculty at US colleges and universities has steadily increased during the last 30 years, the number of tenure-track faculty has not increased in relation to the increase in the undergraduate students population. The number of 'other faculty' referring to the non-tenure track, annually appointed lecturers, instructors, affiliates, is steadily increasing (Gappa and Leslie, 1993; Sommer, 1994; Baldwin and Chronister, 2001).

Against the background of these present dimensions of doctoral education in the US, the major points of criticism of doctoral education have to be understood as they have emerged nationally over the last 15 years. Who is voicing these criticisms? What are the counter-positions of these criticisms (often voiced by faculty)? What empirical research confirms or disputes these criticisms? How do former PhD students on the basis of having applied their doctoral degrees, assess their doctoral education? I turn to these questions in the following section.

Criticisms of Doctoral Education

In this section, I will address the major criticism of doctoral education in the United States. However, I will begin with some background on three recent national surveys that help shed light on student and former student perspectives on these criticisms: 'Survey on Doctoral Education and Career Preparation' (Golde and Dore, 2001), the '2000 National Doctoral Program Survey' (NAGPS, 2001), and the 'PhDs — Ten Years Later' (Nerad and Cerny, 2002).

The Golde and Dore (2001) survey and the subsequent report, 'At Cross Purposes: What the Experiences about Today's Doctoral Students Reveal about Doctoral Education,' was initiated by the Pew Charitable Trusts, a private foundation, which until recently has included a focus on higher education. This study administered in 1999, surveyed doctoral from 11 disciplines at 27 major research universities — in all, 4,000 students in their

third year or beyond. This study focused on their 'current' experience in their programs, and on whether they regarded themselves prepared for their subsequent careers. This study had a 42.3% response rate.

The National Associate of Graduate and Professional Students study (NAGPS, 2001) was funded by the Sloan Foundation. It sought to survey every student who has been enrolled at least for one semester since 1995. The study focused on students' learning environment, faculty/student mentoring and advising relationships, clarity and transparency of program structure, whether the program fostered diversity, and it assessed the implementation of recommendations given by the National Research Council (Committee on Science, Engineering and Public Policy, 1995) and the Association of Graduate Schools within American Association of Universities (1991). The study received responses from 32,000 current and recent doctoral students from 5,000 doctoral programs and 400 universities across the US and Canada. The response rate cannot be calculated because the basic survey population cannot be assessed as the survey and the call for completion was posted on the web. This method had no way of knowing how many students heard about the survey and chose to complete it.

The Nerad and Cerny (2002) study, 'PhDs — Ten Years Later', funded by the Mellon Foundation and the National Science Foundation, surveyed roughly 6,000 PhD recipients from 61 research universities 10–14 years after degree completion, in six disciplines: biochemistry, computer science, electrical engineering, English, mathematics, and political science. The response rate of this study was 66% of the domestic PhD recipients and 52% of international PhD recipients. The study focused the career paths from the time the respondents received their PhD to 1996/97 to 10–14 years later and the retrospective evaluation of the quality and usefulness of their doctoral education, information about their job search, and job satisfaction.

The major criticisms of US doctoral education that have arisen over the past few years and are addressed by the three previously mentioned surveys are:

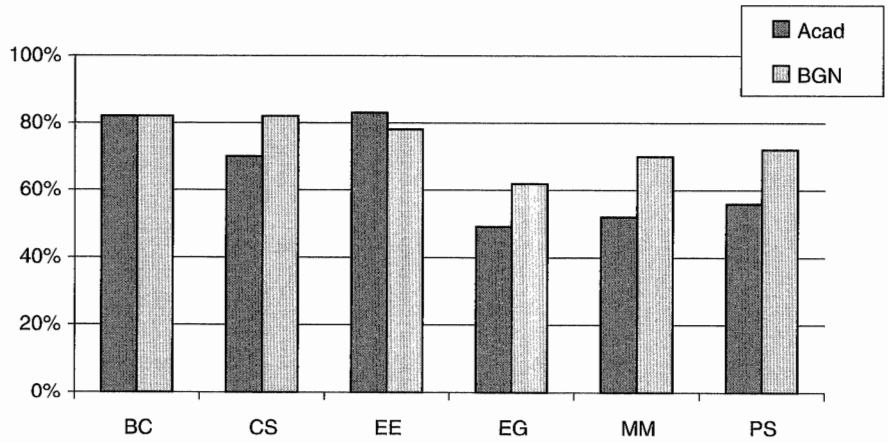
- Doctoral students are educated and trained too narrowly.
- They lack key professional skills, such as collaborating effectively and working in teams, have no organizational and managerial skills.
- They are ill prepared to teach.
- They are taking too long to complete their doctoral studies and in some field many do not complete their degrees at all.
- Doctoral students are ill informed about employment outside academia.

I would add to this list — doctoral students have a too-long transition period from PhD completion to stable employment.

The first two criticisms come from the employment sectors outside academia, that is, industry, business, government, and non-profits that employ PhD recipients. A widely publicized report by the National Academy of Science (Committee on Science, Engineering and Public Policy, 1995) brought national attention to these criticisms. These two criticisms reflect the traditional notion that the PhD is the entrance ticket to a faculty career path alone. The criticism that PhD recipients are educated and trained too narrowly is difficult to substantiate; in other words, we do not really know by what criteria industry is determining this assessment. In contrast, faculty currently training graduate students argue that a primary objective in educating their students is to train researchers and scholars, which, by definition, equals a broad education. When we ask PhD recipients themselves about their education and professional skills acquisition, we find that overall they tend to agree with industry ('PhDs — Ten Years Later'). They explicitly recommend that doctoral programs have increased breadth and interdisciplinary in their curriculum (Graph 3).

They also recommend that doctoral programs offer greater opportunities for developing professional skills by fostering collaborative and teamwork environments and by teaching organizational and managerial skills.

The third criticism, that students are ill prepared to teach, comes from those higher education institutions that are mainly teaching institutions (4-year institutions, liberal arts college, and 2-year colleges) and from students themselves (Boice, 1992; Menges *et al.*, 1999; Nyqust *et al.*, 1999; Austin, 2002;



Graph 3. Assessment of PhDs of importance of learning teamwork during PhD education by sector.

Nyquist, 2002). Unlike the first two criticisms, this third criticism has no obvious counter-positions, except from the English and foreign language faculty and their doctoral students. These doctoral programs offer plentiful teaching opportunities and some training in how to teach because these programs serve a large undergraduate student body and because they have few funding sources for their doctoral students. The teaching assistantships are the main financial means of doctoral students to fund their education in these fields. All three recent national studies found insufficient training of how to teach despite recent claims by graduate deans that the lack of pedagogical training has been adequately addressed. Moreover, the respondents of these studies cite a desire for a component of their doctoral study that introduces and prepares for *all* facets of a faculty position: teaching, writing grants, participating in committee work, administrating departments. In short, they want an introduction to the politics of the academic workplace.

The fourth criticism, that doctoral students take too long and do not complete, comes from a variety of sources, such as state and national policy-makers who are concerned about the cost of a drawn-out doctoral education and the filling of needed positions in R&D job sectors. (Interestingly, the age of a PhD graduate is not of great concern to policy-makers in the US.) This criticism also comes from graduate deans who are concerned with resources for funding graduate students and the flow of incoming talented graduates to their programs (Tuckman *et al.*, 1990; Bowen and Rudenstine, 1992). An argument that graduate deans and department chairs often make is that PhD recipients with a long time to degree are at a disadvantage when job searching. However, the 'PhDs — Ten Years Later' study could not substantiate this concern. It showed only a minor correlation between the length of a doctoral degree and job type.

In contrast, many professors in the humanities and the social sciences argue that over the past few decades, the volume of knowledge has increased and students need to be proficient with a greater number of methodological approaches (Nerad and Cerny, 1999; Tobias, 1999). Consequently, degree completion necessarily takes a longer time. In the sciences, where the time to doctoral degree stayed fairly even, around 5–6 years, the acquisition of additional methodological tools takes place *after* the PhD has been completed, in the postdoctoral years. When we consider not time-to-degree, but time to first professional job, PhD recipients in the humanities, social sciences, and sciences are about the same.

While the empirical studies do not inquire about student attitudes toward time-to-degree, we surmise that a long time to a doctoral degree is a factor for some students. Students in the sciences and engineering are well funded and have a reasonable time-to-degree. Those in the humanities and social sciences have the double burden of limited funding resources and long courses of study. Given the limited funding, many doctoral students need to take on additional

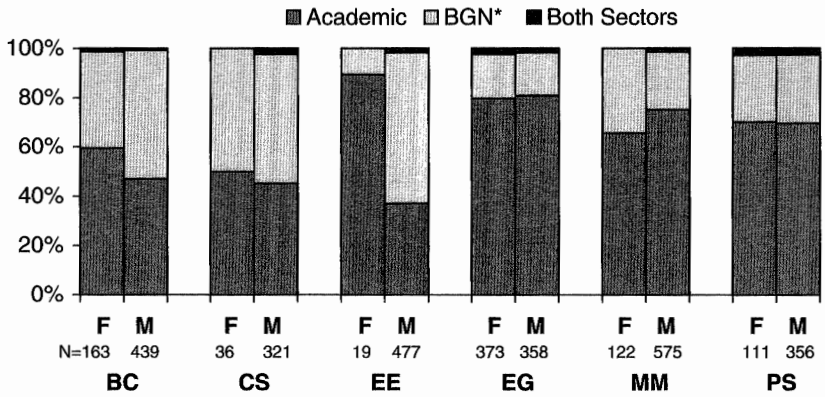
work, unrelated to their thesis and in turn take longer to complete. Many PhD recipients in humanities and social science accumulate debt on average $20,000–$30,000 of accumulated debt (NORC, 2001).

The fifth criticism that doctoral students are ill informed about employment outside academia comes from the current and former students and private funding agencies (Golde and Dore, 2001; NAGPS, 2001; Nyquist, 2002). University administrators and department chairs, except in engineering and the biotechnology fields, do not see this criticism as valid. For them, the main purpose of doctoral training is still to produce the next generation of faculty. And yet, all three studies found that students want information about jobs outside academia. In fact, contrary to university administrators and department chairs assumption, that all students aspire to a faculty career, overall only about 50% of the survey respondents aspired to faculty positions as shown in the 'PhDs — Ten Years Later' study. This percentage varies by field: more students in the humanities and social sciences wanted to become faculty and fewer students in the sciences. Despite the fact that only about half of the PhD students sought faculty positions, they experienced apprehension in articulating their actual career goals. Students told vivid stories, even 10 years later, about encountering unsupportive climates in their programs toward students who had career goals other than the professoriate. The NAGS study showed that students want curricula that are broad enough to give them a choice of careers, and therefore want that the choices they make are respected.

The 'PhDs — Ten Years Later' study found that 10–14 years after degree completion, 2/3 of English, mathematics, and political science PhD recipients were found to be in professorial positions. Half of all biochemistry and roughly 1/3 in computer science and electrical engineering PhD recipients were in faculty positions. Clearly, a large proportion of PhD recipients are employed in positions outside the academic sector (Graph 4).

This fifth criticism is highly intriguing because it gets at a key current tension in US doctoral education. What we see with this criticism is the effects of an increasingly limited academic job market. Although this limited academic job market for tenure-track faculty positions is well known and documented among university administrators, faculty, and students, it is only the students who must face the reality of a job search. It is only the students who are forced to broaden their job search in order to find adequate employment. University administrators tend to mediate this job market (in fact benefit from it) by hiring non-tenure track temporary lectures (primarily women) to teach the increasing undergraduate student population and do not establish an adequate number of tenure-track faculty positions.

For faculty several different factors come into play. First, given the tight academic job market and recognizing their own good fortune, faculty feel



Graph 4. Employment sector by gender, December 1995.

helpless and become aloof toward their students in their search for employment (Goldsmith, 2000; Harvey, 2000; Nerad and Cerny, 2000). After all, they themselves do not have experience outside academia, which means they do not have contacts, they do not know the various job opportunities, and they do not know the nature of the application process. Second, the academic value system tends to reward faculty for placing their graduates in faculty positions preferable at the top research universities. Despite genuine commitment to their individual advisees, professors end up upholding the traditional value systems at the expense of their students. Faculty unwillingness to act upon providing their students information about careers outside academia is a function of their own fear that they themselves will be viewed by their peers as unsuccessful because their students are not seeking faculty positions.

In the United States, campus career centers offer some workshops for career placement for doctoral students. These centers, which operate independent of departments and that aim to provide students with information of careers outside academia, undermine the well-intended support, by referring to non-academic careers euphemistically as 'alternative' or 'other' careers, thus reproducing the academic norm. Students of all fields are aware that people with engineering and life science PhDs have excellent job opportunities outside academia. In fact, these highly paid industry and business jobs resulted in an increase in engineering faculty salaries in order to retain some engineering PhD recipients in academia. Overall, students are beginning to recognize that a PhD in our present knowledge-based society has value outside academia and they want to learn about those opportunities.

The last criticism I wish to add is not one voiced by former students or by other parties. This criticism refers to the long and arduous transition period from degree completion to stable employment for roughly half of the PhD recipients. The 'PhDs — Ten Years Later' study found that those PhD recipients, who did end up in a faculty position, did not follow a smooth linear path from PhD completion to assistant, associate, and full professor. In the fields of English, political science, and mathematics it took PhD recipients up to 4 years to land a tenure-track position because of the limited job market. Many ended up spending these interim years in year-to-year, low-paying, teaching positions without benefits while building their publication records. The added publications, not the extended teaching experience, increased their likelihood of being a successful academic job candidate.

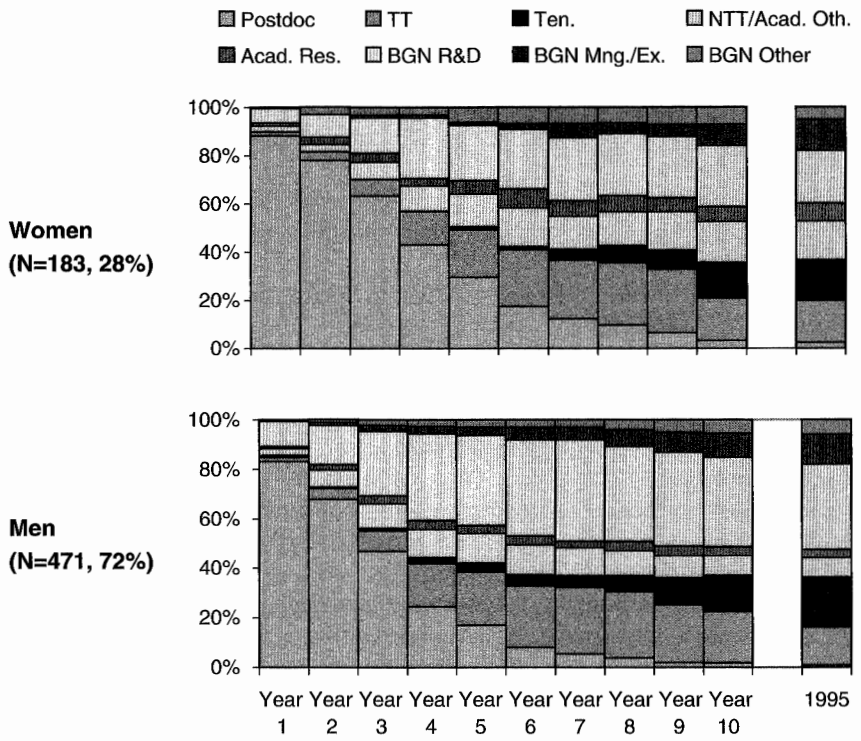
In the life sciences, in the case of the 'PhD — Ten Years Later' study, biochemistry PhD recipients also took 4 years after degree completion to find more stable employment. Most of life science PhDs (80%) spent on the average 4 years in low-paying postdoctoral positions, with minimal benefits (Graph 5).

During these postdoctoral years, they build their publication records and also acquire additional experience in research methodologies and grant writing, thus making them stronger candidates for faculty positions. Therefore, the postdoctoral position works as a stepping-stone to an academic career. However, for women the postdoctoral years do not necessarily have that stepping-stone function to a research career as it does for men. Given the biological clock, more women than men opt for postdoctoral positions in order to combine the family and career building. So while the family might grow, women's careers stagnate.

Initiatives for Change

These criticisms have not fallen on deaf ears. Private and national foundations, which provide a substantial number of graduate fellowships, have responded to these criticisms because they have a clear financial interest in ensuring that their money invested fulfills foundation missions. Currently in the US there are several initiatives to address various aspects of the criticism of doctoral education. Private foundations, reflecting the particular US higher education system, fund all but one of the initiatives.

National Science Foundation: The Integrative Graduate Education Research and Traineeship program (IGERT).
Council of Graduate Schools: Preparing the Future Faculty/Preparing the Future Professional.
The Carnegie Foundation for the Advancement of Teaching: Carnegie Initiative on the Doctorate.



Graph 5. Career paths of biochemistry PhDs by gender.

The Woodrow Wilson National Fellowship Foundation: The Responsive PhD, including the Humanities at work program.
The Sloan Foundation/Council of Graduate Schools/Ford Foundation: Professional Master's Programs.

I am not reporting here on initiatives that are mainly web-based information dissemination projects and that do not have a major program associated with them, such as the 'Re-envisioning the PhD' also initiated by the Pew Charitable Trusts, and the 'Next Wave' and Postdoctoral Network by the American Association for the Advancement of Science and *Science* Magazine.

The National Foundation IGERT initiative proposes the creation of doctoral programs that are centered on theme-based research. This initiative

is very similar to German Research Council funded Graduiertenkollegs. The goals are:

- To provide funding for doctoral students that is more independent of the faculty advisor by tying the funding to the doctoral program and not the faculty advisor.
- To build doctoral programs that are interdisciplinary.
- To educate and train doctoral students in problem-oriented and theme-based research programs.
- To provide access for doctoral students to professionals in their field who work outside academia.
- To organize the structure of the program so students learn the maximum range of professional skills, from learning how to teach, to working in teams, publishing, presentation skills, and learning organizational skills.
- To bring diversity to doctoral programs.

This initiative does not provide funding for faculty. It mainly provides funding for students. There is some administrative program support and some curriculum development support. With the shifting of funding away from faculty to students and an emphasis on the learning conditions, NSF hopes to reduce the time to doctoral degree and create the next generation of scholars who are better prepared to address the large-scale problems of industrialized societies that cannot be solved by a single disciplinary focus or by a single researcher. NSF has allocated 64 million dollars over 5 years to this initiative and currently there are 70 IGERT programs at 55 universities.

The second initiative, Preparing the Future Faculty, was originally initiated and funded by the Pew Charitable Trusts Foundation and coordinated by the Associate of American Colleges and Universities and Council of Graduate Schools in 1993. Currently the Council of Graduate Schools runs this program via private donors. The initiative goals are:

- To prepare present doctoral students for their role as future faculty.

At some campuses, this has been extended to prepare students for their role as professionals in their field.

Today about 295 institutions participate. The majority are Master's and Bachelor's institutions, and 43 doctoral granting universities. The initiative sponsors seminars and workshops to introduce doctoral students to the different types of institutes of higher education, their responsibilities as teachers, researchers, and in providing service to the academic community. It places students into internship at these various institutions where they teach under the mentorship of an established professor. Thus doctoral students have multiple mentors. It also offers pedagogical workshops. Since 1998, the PFF

works together with disciplinary associations. These associations select the participating doctoral programs.

The third initiative, Carnegie Initiative on the Doctorate, by the Carnegie Foundation for the Advancement of Teaching is a multi-year research and action project to support departmental efforts to structure their doctoral programs more purposefully. This initiative exists since summer 2002 and addresses the disciplinary communities of six fields: chemistry, education, English, history, mathematics, and neurosciences. It fosters discipline-based conceptual work. Departments that apply and are selected to participate in this initiative receive advice and funding for two of their members to attend meetings with their counterparts in other participating programs where they share experiences and information about restructuring their programs. They do this work in collaboration with their professional associations. In short, this initiative tries to stimulate a debate about the structure of doctoral programs by engaging the national association of a discipline in such a conversation, just as the Preparing the Future Faculty initiatives did.

The fourth initiative, The Responsive PhD, by the Woodrow Wilson National Fellowship Foundation is an initiative that focuses not directly on students or departments; it intends to support the initiator of change at a university, that is, department deans, divisional deans, and department chairs. It provides information on best practices in graduate education, by bringing participating members together to share their experiences with their own best practices, particularly on the implementation process. The Foundation funds the information-sharing meetings and provides some financial support to institutions that wish to implement one of the best practices. The Woodrow Wilson Foundation also created the Humanities at Work project that consists of a 2-year postdoctoral fellowship program, practicum grants of $1,500 for graduate students, and a public scholarship grant for faculty.

The fifth initiative, the Professional Science Master's Program, by Sloan Foundation/Council of Graduate Schools/Ford Foundation is an initiative that proposes a better match between the career options and the career opportunities of graduate students in the sciences and social sciences. This program responds to the criticism of doctoral education of time-to-degree, high attrition rate, the limited academic job market, and student desire for non-faculty positions by providing an alternative route to a substantiated professional terminal science master's degree. This initiative funds institutions to develop a new type of science master's degree that equips people to work outside of academia. It targets flagship research universities to develop a 2-year master's programs that are heavily oriented toward interdisciplinary course work. This terminal degree is opposed to the traditional 1-year master's degree in the sciences that is really simply a stepping stone to the PhD and that is considered a conciliatory degree for those who do not make it to the PhD.

These initiates address different aspects of the criticism, they have different opinions about strategies that will bring about change, and therefore target different groups: students, departments, deans, and universities. They are, however, uneven in their scope; some function more as a bandage to the problem than as a cure. The Woodrow Wilson initiative acknowledges the critiques, however, has insufficient financial means and is limited in its programmatic structure. While it is absolutely useful to have an exchange of best practices, and encourage contact of humanities students with non-academic work places, the initiative at present offers minimal incentives for implementing these best practices. It appeals to a moral imperative of the necessity of change and the good will of top campus administrators.

The Carnegie initiative, while more of a grass-root level approach, provides basically no financial incentive. The incentive it provides is one of advice and the promise of national visibility, thus a raising of status to the participating departments. Since it was only launched in the summer of 2002, little can be said about it.

Council of Graduate Schools' Preparing the Future the Future Professoriate addresses the criticism that PhD recipients are ill prepared for their faculty positions. It keeps in place a fairly traditional notion of what PhD recipients are trained to do: enter the academic faculty positions.

The Sloan and the CGS/Ford Foundation initiatives are the most pragmatic of the initiatives. It addresses particularly the limited academic job market situation and proposes to strengthen the master's degree. Yet, it too keeps in place the idea that the doctorate is solely for preparing the next generation of faculty.

The IGERT initiative is the most comprehensive approach. It addresses all of the critiques and it follows through with a truly innovative approach to changing doctoral education. Consequently, it is likely to have a far-reaching impact on change and innovation in doctoral education, because the major public state universities, which educate the largest number of PhD students, have embraced it.

Discussion

As we saw, doctoral students play an active role in criticizing US doctoral education. Their criticism addresses both the content of the education, the structure, and the process of doctoral education. They ask for a more interdisciplinary approach in their programs and for a closer relationship with the 'real' world. But mostly their criticism focuses on the process of their education, the interaction with faculty, their peers, the acquisition of knowledge and skills that turns them into scholars who can function both

inside and outside academia. They are interested in using their PhD to find employment. This does not mean they are solely vocational oriented. They want intellectually challenging employment, with a high degree of autonomy, as the 'PhDs — Ten Years Later' study found. They want to apply their scholarly training for work that solves real problems in the world. They look for employment that fulfills these criteria both inside *and* outside academia. In the US, people with PhDs are not mainly interested in getting an education in order to find work that pays the most. People with such goals stop after the Bachelor's degree or enroll in MBA programs or go to Law School specializing in the lucrative sides of a law career, or attend medical school. Current PhD recipients still ascribe to a value of the education that surpassed purely economic purposes, *and* they are also realistic.

In order to make the university listen to their concerns mostly about their conditions as teaching assistants, doctoral students launched national surveys to hold up a mirror to departments and universities, and they formed graduate student unions linked to large US union organizations such as the American Automobile and Transportation Union (University of California, Berkeley, New York University, Yale, University of California San Diego, University of Wisconsin, University of Washington have formed unions). They know that university administrators fear negative publicity about their institution. They used the media publicity in their strategies. In fact, the fear of increased union activity and the fear of a negative press has pressured a number of universities into revisiting their doctoral education and making improvements in the educational learning and working environment. Moreover, the values of a consumer society, where the client has some influence on the product and the production, and the culture of a client-service orientation has penetrated the universities (see the increase of student services, including food and sports facilities). This increasing culture of consumer orientation, combined with the above-described fear of further unionization, and fear of a negative image in the public eye[3] are pressuring universities to consider changes in doctoral education. The likelihood that doctoral students' criticisms are heard and acted upon is presently great.

Whether, however, the renewed focus on and activities in doctoral education will be fruitful and not be bypassed by the present US anti-terrorist politics and accompanying isolationist tendencies since 9/11, remains to be seen. US doctoral education has a historical precedence, where similar criticisms were voiced and a beginning focus on doctoral education emerged, in the early 1960s. However, these beginnings were overtaken by the events of the civil rights movement, the anti-Vietnam protest, and a resulting student movement, which puts criticism and reform of doctoral education on the backburner on US campuses. The six present initiatives, in their own limited way, address the criticism and are a beginning. In 5 years from now, we will hopefully report on

more evidence of change in US doctoral education that truly educates students for the 21st century and to operate as global citizens.

Notes

1 In this paper I am using the term PhD, that is the strict academic doctoral degree, interchangeably with the generic term, doctoral education, that also includes professional doctoral degrees such as the EdD, Dr of Engineering or Dr in Public Health, but NOT the doctorate of law, the JD, nor the medical doctorate, the MD, which are strictly professional degree with no research dissertation.
2 It is worth noting that in the United States people working towards a PhD are considered graduate students. As such they are eligible to student loans, fellowships, research and teaching assistantships, and tuition and fee waivers. If they received funding from the university it is generally as research or teaching assistants. They do not have faculty status.
3 Particularly in times of high reliance on funding through multiple sources.

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