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ABSTRACT

Given the growing need to look across national borders in order to be prepared for global challenges confronting higher education in the coming decades, it can be expected that institutional administrators in the U.S. and other western countries will need information on the quality and efficiency of their activities, including an international comparative perspective. This paper discusses the methodological and structural problems institutional researchers confront when trying to compare the attributes and quality of activities across institutions of higher education in various countries. The comparison of the efficiency and quality of doctoral education is used as an example. The paper defines the attributes of doctoral education as found in the Netherlands and the United States. Similarities and differences across the two nations are discussed and particular attention is given to methodological and structural problems that arise for institutional researchers making comparisons across the two nations' systems of doctoral education. (Contains 57 references.) (GLR)

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Peter A. M. Maassen and Maia I. Bergman

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Jean Endo
Chair and Editor
Forum Publications
Editorial Advisory Committee

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Introduction and Perspective

> *... all of its accomplishments notwithstanding, graduate education in the United States is far from any ideal state. Nor would anyone claim that its prospects and future role are well understood and assured. The recent Hearings and Reauthorization of the Higher Education Act, reports issued by the Association of American Universities (AAU), and numerous commentaries attest to wide-ranging debates that continue. Similar issues are also being discussed in other countries. (Bowen & Rudenstine, 1992)*

Recently, institutions of higher education have been increasingly asked to meet a multitude of societal demands-- 'to ensure greater economic efficiency, quality of outcome, student access, and accountability.'[1] As a framework of reference for assessing the quality and efficiency of certain aspects of an institution's activities, the performance of comparable institutions can be used as is done by many American colleges and universities. This comparison, however, is typically restricted to other U.S. institutions. Given the growing need to look across national borders in order to be prepared for global challenges confronting higher education in the coming decades, it can be expected that institutional administrators in the U.S. and other western countries will need information on the quality and efficiency of their activities which includes an international comparative perspective.

The purpose of this paper is to discuss the methodological and structural problems institutional researchers will confront when trying to compare the attributes and quality of activities across institutions of varying countries. Doctoral education is used as an example of an area of interest that might receive considerable attention in higher education in the coming years. Recent studies have shed important light on various processes and outcomes of postgraduate-doctoral education. In this paper some of the issues derived from the research literature regarding the efficiency and quality of doctoral education will be discussed in a comparative way using American and Dutch higher education examples to illustrate an international perspective.

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[1] Goedegebuure, L.C.J., et. al., June 1992, Higher Education Policy in International Comparative Perspective, Enschede (The Netherlands): Center for Higher Education Policy Studies.

Literature Review: Research on Postgraduate - Doctoral Education

Aspects of graduate education in the United States have been investigated over the last 40 years. Studies have been concerned with the efficiency and the quality of doctoral education.[1] Recently, next to the impressive study of Bowen and Rudenstine (1992), e.g., Bowen and Sosa (1989), Isaac, et al. (1992), and a number of reports by the National Research Council (1992), various issues related to doctoral education in the U.S. have been examined. Postgraduate education in other nations of the European Community, e.g., Britain, France, Germany, the Netherlands, Norway, and Sweden, has also been the subject of recent review and assessment.[2] In many of the nations, the nature of the interest in postgraduate studies and education for the doctorate, in particular, has centered on improvement via reform, e.g., reform in structure, financing, and process.[3]

Much of the research underscoring the reform concerns in Norway, Sweden, the U.K., and the U.S, has focused on outcomes associated with postgraduate training, doctoral education, such as efficiencies in the production of research doctorates (number of degrees awarded, duration of doctoral study, as well as attrition and completion rates).[4] Financial support has also been reviewed with an interest in ascertaining the relationship between persistence and degree completion with the amount and type of student funding.[5] Studies have also reviewed stages of doctoral study with particular focus on the role of the research thesis or dissertation.[6]

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[1]Early efforts to do comprehensive studies on doctoral education include: Hollis, Ernest V., 1945, Toward Improving Ph.D. Programs, Washington, D.C.: American Council on Education; Berelson, Bernard, 1960, Graduate Education in the United States New York: McGraw-Hill, Inc.; Cartter, Allan M., 1966, An Assessment of Quality in Graduate Education, Washington, D.C.: American Council on Education; Heiss, Ann M., 1970, Doctoral Education in Prestigious Universities, Berkeley (Calif.): Center for Research and Development in Higher Education.; Roose, Kenneth D. and Anderson, Charles J., 1970, A Rating of Graduate Programs, Washington, D.C.: Amercian Council on Education; Committee on an Assessment of Quality-Related Characteristics of Research Doctorate Programs in the United States (Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall, ed.s), 1982, An Assessment of Research-Doctorate Programs in the United States, Washington, D.C.: National Academy Press.

[2]Blume, S., 1986, "The Development and Current Dilemmas of Postgraduate Education", European Journal of Education (21): 217-222; Kyvik, S., 1986, "Postgraduate Education in Norway," European Journal of Education (21): 251-260.

[3]Association of American Universities (AAU) and the Association of Graduate Schools (AGS) of the AAU, 1990, Institutional Policies to Improve Doctoral Education, Washington, D.C.: AAU; Breneman, David, 1977, Efficiency in Graduate Education: An Attempted Reform (a Report to the Ford Foundation); Huber, Ludwig, 1986, "A Field of Uncertainty: Postgraduate Studies in the Federal Republic of Germany," European Journal of Education (21): 287-305; Lipschutz, Susan, "Enhancing Success in Doctoral Education: From Policy to Practice," in Baird, Leonard (forthcoming NDIR sourcebook with tentative publication title: Increasing Graduate Student Retention and Degree Attainment, San Francisco: Jossey-Bass); Maassen, Peter A. M. and Frans A. van Vught (ed.s), 1989, Dutch Higher Education in Transition, Culemborg: Lemma; Miselis, Karen L., William McManus, and Elieen Kraus, 1991, "We Can Improve Our Graduate Programs: Analysis of Ph.D. Student Attrition and Time to Degree at Penn," unpublished paper from the Associate for Institutional Research Conference, San Francisco, 1991; Van Hout, Johannes, 1986, "Towards a New Structure for Postgraduate Research Training in the Netherlands," European Journal of Education (21): 275-286; Zetterblom, Goran, 1986, "Postgraduate Education in Sweden: Reforms and Results," European Journal of Education (21): 261-273.

[4]Bowen, William G., Graham Lord, and Julie Ann Sosa, 1991, "Measuring Time to the Doctorate: a Reinterpretation of the Evidence," Proceedings of the National Academy of Sciences USA (88): 713-717; Economic and Social Research Council, "The Social Science Ph.D.: The ESRC Enquiry on Submission Rates," Winfield Report. London: School Governing Publishing, 1983; Tuckman, Howard, Susan Coyle, and Yupin Bea, 1990, On Time to the Doctorate: A Study of Increased Time to Complete Doctorates in Science and Engineering, Washington, D.C.: National Academy Press.

[5]Abedi, Jamel and Ellen Benkin, 1987, "The Effects of Students' Academic, Financial, and Demographic Variables on Time to the Doctorate," Research in Higher Education 27(1): 3-14; Girvis, Jean E. and Virginia Wemmerus, 1988, "Developing Models of Graduate Student Degree Progress," Journal of Higher Education 59(2): 163-189; Malaney, Gary D., 1987, "Who Receives Financial Support to Pursue Graduate Study?" Research in Higher Education 26(1): 85-97.

[6]Council of Graduate Schools (CGS), The Role and Nature of the Doctoral Dissertation, Washington, D.C.: Council of Graduate Schools, 1991; Economic and Social Research Council, 1986, The Preparation and Supervision of Research Theses in the Social Sciences, London: ESRC; University of Michigan, Horace H. Rackham School of Graduate Studies, 1976, The Role of The Dissertation in Doctoral Education at the University of Michigan; Debeauvais, Michel, "Doctoral Theses in France: a Case of 'Reformitis,'" European Journal of Education (21): 375-384; Isaac, Paul D, Stephen V. Quinlan,

In addition, the supply and demand for faculty and research personnel in academe and industry have also been reviewed with respect to the higher education systems' capacity to meet the future labor market needs.[1] Further, it has been noted that academic and research institutions are increasingly becoming multi-national in terms of senior faculty and researcher composition. In terms of mobility, Cipra found that mathematicians from the Soviet Union and Eastern Europe filled the demand for faculty in the U.S. during the late-1980s.[2] However, even with the emphasis placed on understanding the multi-faceted environment of doctoral education and research training *within* the many countries, the international comparative perspective has been fairly limited until very recently[3], perhaps with the exception of the attention paid in the U.S. to the increasing number of non-citizens earning the doctorate from U.S. universities.[4]

The Cross National Perspective: A View of Postgraduate - Doctoral Education in the Netherlands and the United States

Doctoral education can be described in terms of five major aspects including: purpose and function; structure and organization; process; academic discipline and culture (knowledge-based field of study); and participants. These aspects can be further defined by attributes, e.g., participant attributes such as academic performance measures for students (grades assessments, standardized tests) or reputational factors of faculty (publication/honor measures). Recently, process attributes have been used to define efficiency in the system of higher education, e.g., completion rates and duration of study leading to the doctorate. Further, summative quality assessments regarding doctoral education have been derived from studies of the attributes of doctoral education, particularly in the United States.

The following sections will define the attributes of doctoral education as found in the Netherlands and the United States. Similarities and differences across the two nations will be discussed in terms of the aspects and attributes. Particular attention will be given to methodological and structural problems that arise for institutional researchers in terms of making comparisons across the two nations' systems of doctoral education.

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and Mindy M. Walker, 1992, "Faculty Perceptions of the Doctoral Dissertation," Journal of Higher Education 63 (3): 241-267.

[1]Association of American Universities, 1990, The Ph.D. Shortage: The Federal Role, Washington, D.C.: AAU; Atkinson, Richard C., April 1990, "Supply and Demand for Scientists and Engineers: A National Crisis in the Making," Science (248): 425-432; Bowen, Howard R. and Jack H. Schuster, 1986, American Professors: A National Resource Imperiled, New York: Oxford University Press; Bowen, William G. and Julie Ann Sosa, 1989, Prospects for Faculty in the Arts and Sciences: A Study of Factors Affecting Demand and Supply, 1987-2012; Breneman, David W. and Ted I.K. Youn, 1988, Academic Labor Markets and Careers, New York: Falmer Press; Ehrenberg, Ronald G., 1991, "Academic Labor Supply," in Clotfelter, et. al., Economic Challenges in Higher Education, Chicago (Ill.): University of Chicago Press; National Center for Education Statistics, 1990, Institutional Policies and Practices Regarding Faculty in Higher Education, Washington, D.C.: U.S. Department of Education.

2Cipra, Barry, 1991. "Math Ph.D.'s: Bleak Picture." Science (252): 252-253.

[3]A major research publication which focuses on graduate and doctoral education in five nations (Britain, France, Germany, Japan, and the United States) is forthcoming from the University of California Press in June 1993. The authors are indebted to Dr. Burton Clark for sharing the manuscript of The Research Foundations of Graduate Education with them. This work contributes significantly to the understanding of the postgraduate education environment within several nations by offering a macro-level description of the structures of research foundations and the integration of postgraduate education/training within those foundations.

[4]In the U.S., in particular, there has been an increasing and significant production of doctorates granted to foreign students from U.S. research universities. In 1991 almost 25% of the earned doctorates from U.S. universities were granted to students with temporary visas. The field specific distribution of doctorates granted to foreign students in 1991 included: 35% of Physical Sciences (including mathematics and computer sciences); 47% of Engineering; 24% of Life Sciences; 16% of Social Sciences, and 12% of Humanities. Asian nations were the predominant source of the foreign doctorate recipients of 1991 with nearly 4500 Ph.D.s granted to students from the People's Republic of China (1,710), the Republic of Korea (1,333), and Taiwan (1,280). Other nations represented among the 1991 degree recipients in order of decreasing frequency of degree counts include: India (883), Canada (484), Iran (239), England (193), Germany (175), Greece (175), Japan (157), Mexico (154). United States. National Research Council, 1991, Summary Report 1991: Doctorate Recipients from United States Universities. Washington, D.C.: National Academy Press, pp. 5,13.

Doctoral Education in the United States.

Higher education in the United States has grown to have substantial volume, has acquired significant market attributes[1], has developed as a highly stratified system of postsecondary learning[2], and has become tremendously diverse -- in terms of institutions' missions, structures and organization, processes, and participants. Graduate education, in particular, has comprised a significant portion of the overall system since World War II. In fact, Patricia Gumport has commented that "compared to other countries, the scale of operations [for graduate education] is awesome, spanning some 800 of the country's 3,400 higher education institutions, enrolling almost 1.5 million graduate students, and awarding annually about 300,000 masters degrees, 75,000 professional degrees, and 33,000 doctorates."[3] At the apex of this system of higher education has emerged doctoral education. Doctoral education in the U.S. has been noted for its tight integration of scholarly education and research training.[4]

Purpose and Function.

Contemporary graduate doctoral education in the United States has acquired three major purposes and functions.[5] First, doctoral education and training has sought to develop the future generation of scholarly and technically proficient researchers and teachers[6] to replenish the faculties within the system of colleges and univerisites, the nation's domain of both research and scholarship. Second, doctoral education has been recognized as a mechanism for attracting and supplying needed labor within the higher education enterprise -- to support (supplement) the research and teaching functions of the universities -- in terms of graduate student research and teaching assistantship appointments.[7] Third, doctoral education has become a key contributor of labor (intellectual capital) for the non-academic workplace, e.g., the multi-national companies with significant industrial/technological research investments such as IBM, NEC, or Ford Motor Company.[8]

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[1]Market competition pervades the U.S. system of higher education. Institutions compete for funds, facilities, faculty, and students. Further, students and faculty compete for places within the institutions of higher education, and faculty compete for research opportunities.

[2]In the American system, Burton Clark has commented, there has been " a clear distinction between a four-year undergraduate programs ending with a bachelor's degree and postbachelor programs leading to master's and doctoral degrees." Clark, Burton R., 1993 (forthcoming), The Research Foundations of Graduate Education, Berkeley (Calif.): University of California Press, p. xviii.

[3]Gumport, Patricia J., "Graduate Education and Organized Research in the United States," in Clark, Burton R.,1993 (forthcoming), p 225.

[4]Gumport, Patricia J., 1993.

[5]Debate about the primary purpose of the university has been prevalent during the 1980s; and consequently, there is associated debate about the primary purpose of graduate education and training. Issues relating to scholarship and professionalism are frequently mentioned areas of concern. For a discussion of the issues see: Perlikan, Jaroslav, 1983, Scholarship and Its Survival: Questions on the Idea of Graduate Education, Princeton: The Carnegie Foundation for the Advancement of Teaching.

[6]The 'training of college teachers' has been an historically consistent mission of U.S. doctoral education since its inception in the late-1880s. More importantly, however, is the notion that it is graduate education at the department/program level which "inducts [doctoral students] into the discipline, transmitting skills and knowledge and shaping and creating values and attitudes regarding what knowledge is and how to best pursue it." Trow, Martin, 1977, "Department as Contexts for Teaching and Learning," in Academic Departments, San Francisco: Jossey-Bass, p. 15.

[7]Gumport, Patricia J., "Graduate Education and Organized Research in the United States," in Clark, Burton, The Research Foundations of Graduate Education, Berkeley (Calif.): University of California Press, pp. 225-293.

[8]Bowen. Howard R., 1984, "Graduate Education and Social Responsibility," in Pelczar, Michael J., Jr. and Lewis C. Solmon (ed.s), *Keeping Graduate Responsive to National Needs*, New Directions for Higher Education, pp. 113-119; United States, Office of Science and Technology Policy, Executive Office of the President, 1986, *Report of the White House Science Council Panel on the Health of U.S. Colleges and Universities*. Washington, D.C.; U.S. News and World Report, "Japan's Research Raid: Companies from Across the Pacific are Setting up R&D labs in America," March 22, 1993, pp. 46-47.

Structure and Organization.

Doctoral education and training have been integrated components of university activity in the United States since the late-1880s. Over the last 100 years a tremendous diversity of universities and relationships among universities have evolved.[1] Presently, institutions granting doctoral degrees are classified according to varying attributes, e.g., infrastructure investment, financial resources (both research funding and endowments), number and size of departments offering doctoral degrees, and degree production statistics.[2] In terms of administrative structure within institutions, a recent publication of the Council of Graduate Schools has noted that, "typically, the administration of Ph.D. degree programs is carried out at three distinctly different administrative levels: the graduate division or school[3], the department or program, and the faculty or dissertation advisor."[4]

In general, however, academic departments/programs have emerged as the primary organizational units governing doctoral education within universities in this country. Departments/programs have become the locus of responsibility for many activities influencing the environment for doctoral education including: recruiting faculty and students; supporting faculties' efforts to compete for research projects and funding (e.g., research and endowment monies) which are associated with graduate student financing attributes; designing and implementing academic-curricular processes and requirements; as well as, evaluation and improvement exercises.[5] A loose coupling of departments predominates the institutional structure for doctoral education within most universites in the U.S., and a loose coupling of faculty members in conjunction with a somewhat bounded academic discipline forms the departmental structure.[6]

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[1]Universities can be associated with one another via a gamut of affiliations, e.g., they can be members of a system such as that found in the public California system, they can be state schools with autonomy - yet - loosely associated by their funding sources and geographic locations such as some of the universities found in Michigan, they can be affiliated with each other as a function of prestige, i.e. the Ivy League institutions, and they can loosely connected through their membership in such buffer organizations as the Council of Graduate Schools.

[2]Given the volume of doctoral degree activity in the U.S., it has become increasingly prevalent to note the differentiation among institutions which produce doctorate degrees. There are four levels of Carnegie Classifications into which doctorate producing institutions fall -- each class is differentiated from the other in terms of research resources and volume of doctorate production: Research I, Research II, Doctorate I and Doctorate II. Institutions are further differentiated in terms of prestige. A further source of distinctiveness among doctoral degree granting institutions is membership in the Association of American Universities (AAU). The AAU is comprised of the executive heads (Presidents and Chancellors) of 59 select universities. Membership is determined by the breadth and quality of graduate and professional work done at the University. Encyclopedia of Associations, 1993, 27th edition, Detroit (Mich.): Gale Research Publications.

[3]"The graduate division, with the concurrence of the faculty, establishes the broad requriements for the degree and the administrative format for the development of each individual program. ... The graduate division may or may not set course requirements for the degree, but it usually establishes the form for the program and dissertation advising, and for the final university oral. Although there are several different kinds of administrative structure for graduate education, two models predominate, and most others are variations on these two. In one, the graduate division is responsible for all graduate degrees offered by the instituion. In this model, all graduate committees and graduate students are responsible to the graduate dean, and final determination that degree requirements have been met is the responsbility of the dean. In the second model, there is a graduate school in the Arts and Sciences, and the sphere of the graduate dean's authority may be limited to departments and colleges in that area alone. Professional schools, in this structure. are responsible for their own graduate programs." Council of Graduate Schools, 1990, A Policy Statement: The Doctor of Philosophy Degree, Washington, D.C., pp. 3-5.

[4]Council of Graduate Schools, 1990, A Policy Statement: The Doctor of Philosophy Degree, Washington, D.C., pp. 3-5.

[5]Trow has noted that "the department in most American universities has almost complete autonomy over graduate education in its discipline ... on the whole, the department determines the graduate curriculum and recruits and admits students." Further, it has been the academic department that largly controlled the faculty in terms of recruitment and promotion. Trow, Martin, 1977, "Department as Contexts for Teaching and Learning," in Academic Departments, San Francisco: Jossey-Bass, pp. 15, 19-20.

[6]Weick, Karl E. Educational Organizations as Loosely Coupled Systems, in Peterson, Marvin W. (ed.), 1991, Organization and Governance in Higher Education, ASHE Reader Series, Needham Heights (Mass.): Ginn Press, 4th ed.pp. 103-117.

Attributes of interest in terms of the institution:

- Carnegie classification of the doctoral institution

- Membership in associations such as AAU or consortia of research organizations

- Fiscal and physical resources:
  - Investment in research infrastructure (lab facilities, library holdings, etc.)
  - Investment in research personnel (non-academic appointments)
  - Investment in teaching infrastructure (buildings, library holdings, etc.)
  - Financial portfolio for institution: general funds, research funds, endowment funds, etc.

- Academic resources:
  - Number of departments/programs (disciplinary breadth across institution)
    - Number of faculty, support staff, students
    - Composition of personnel (faculty, student, staff)
  - Number and level of degrees granted (disciplinary depth across institution)

- Environmental attributes:
  - General perceived reputation of institution, e.g., elite
  - Mission of institution, e.g., diversity versus single sex or racial focus
  - Participant perceptions about the climate of the institution, e.g., competitiveness, supportiveness, etc.

Attributes of interest in terms of the program/department:

- Scale of the doctoral program
  - number of faculty and number of doctoral students
  - ratio of faculty to students, especially with regard to dissertation responsibilities, associated degree output

- Breadth/depth of (inter)disciplinary coverage within the field of study

- Organization for decision-making and associated activities within the program
  - Chair, Committee structure and membership, etc.
  - Fluidity of change in terms of participation in organization for decision-making (length of time on committees, etc.)

- Fiscal and physical resources -- availability of support (academic and financial)
  - Investment in research infrastructure in discipline: lab facilities, library holdings, etc.
  - Financial portfolio for department: general funds, research funds, endowment funds, etc.

- Environmental attributes:
  - General perceived reputation of department, e.g., vital and productive
  - Mission of department, e.g., innovative versus traditional
  - Participant perceptions about the climate of the department, e.g., competitiveness, supportiveness, etc.

Process in Doctoral Education in the United States.

Several types of processes have become apparent in doctoral education in the United States. A recruitment process, a placement process, and an academic process have emerged. The following sections have briefly commented about the recruitment and placement processes. The academic process has been given more attention, and has been presented in a more detailed manner.

The Recruitment and Placement Processes.

Departments have been responsible for recruiting and retaining faculty. The faculty has become significant for doctoral education because faculty resources have influenced the recruitment of students. Specifically, faculty have defined the nature and context for departmental scholarship, research training, and teaching in terms of disciplinary aspects of higher education at the doctoral level. In addition, faculty research projects have often been the mechanism by which departments attract prospective talent. Not only have students tended to search for departments which provide faculty expertise in the academic subject of their interest, but students have also tended to be attracted to departments which have funding resources.

The placement process has also emerged as an important aspect of doctoral education that has been linked to student recruitment activities and the academic process. It has been argued that placement of graduates affects recruitment of prospective students. Specifically, departments (and institutions) have attempted to use alumni information to demonstrate the quality of the department in a manner that would suggest 'value-added' from the alumni's association with the department. While little research about placement has been readily available, some resources such as the National Research Foundation's Doctorate Records File have provided the opportunity to examine Ph.D. recipients' immediate postgraduation professional activities since the mid-1970s.[1] Lastly, a study as early as 1970 has suggested that the placement process has affected academic process attributes such as completion rates and time to degree.[2]

In sum, in the U.S., recruitment of students has been predominantly organized at the departmental level and has been competitive. Recruitment of students has been, to a large extent, dependent on departments' abilities to attract and retain faculty known for exceptional scholarship, teaching and associated research resources (e.g., funded projects) as well as attempt to demonstrate 'value-added' by alumni placement.[3] Attributes of interest with regard to the recruitment process have been outlined in the departmental attributes of interest, e.g., scale of program, breadth and depth of disciplinary coverage within field, fiscal and physical resources as well as environmental attributes.

The Academic Process: The Apparent Routine.

The process of doctoral education has been, in general, the means of training and developing the next generation of scholarly and technically proficient researcher-teachers. In the United States, this process has been systematically routinized across academic departments/programs and graduate schools.[4] To a large extent most graduate doctoral

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[1] National Research Council, 1993, Summary Report 1991: Doctorate Recipients from United States Universities. Washington, D.C.: National Academy Press.

[2] Breneman studied the Ph.D. production process as a function of prestige seeking/reinforcing behavior during the late 1960s. He concluded that departments will behave in a manner to seek to enhance or maintain their own prestige via placement of their graduates. Breneman, David W., 1970, The Doctor of Philosophy Production Process: A Study of Departmental Behavior, unpublished dissertation, Berkeley (Calif.): University of California.

[3] Trow, Martin, 1977, "Department as Contexts for Teaching and Learning," in Academic Departments, San Francisco: Jossey-Bass, pp. 15, 19-20.

[4] While doctoral education in the U.S. has been fairly routinized in terms of process, this process also has an organic aspect. Specifically, the dissertion stage effort, e.g. the research phase culminating in the production of new knowledge, has evolved as series of events unique to the individual and his mentor/advisor (or associated research team/committee) and the field of study being investigated.

degree programs have been organized in terms of stages of educational and evaluative activities under the direction of academic departments.[1]

The educational and evaluative activities frequently have included curricula comprised of: taught courses/seminar series and associated proficiency exercises (e.g. research projects, papers, problem sets, and/or examinations) typically spanning a two year period of time; followed by individual learning efforts such as directed reading/research under the supervision of faculty and associated higher level assessments (e.g., preliminary/qualifying examination efforts often including thesis preparation for intermediate degree conferral) typically lasting one year; followed by the preparation of the dissertation prospectus under the direction of a single mentor or committee of faculty which may also last one year; and lastly, the completion of the dissertation stage under the direction of a single mentor or committee of faculty where considerable independent effort is demonstrated by the graduate student (this phase typically has included: research, analysis, and reporting efforts). The dissertation stage may last between one and four years depending on the nature of the discipline, the mode of the research activity, and the expectations regarding the dissertation thesis.[2]

The Academic Process: The Hidden Routine -- Teaching and Research Assistantships.

In addition to the course-oriented curriculum and individually focused research stages of graduate education a hidden-routine has become embedded in most doctoral programs in the United States. This hidden routine has emerged as a function of funding for graduate education and has appeared as assistantship (employment) activity, teaching and/or research assistantship employment. It has been argued that teaching and research assistantships provide a means to potentially integrate doctoral students into the academic environment -- to increase student-faculty contact, to familiarize students with the teaching/research environment, and to provide the opportunity to reinforce aspects of the academic culture in 'applied' situations. This integration has been suggested to provide the opportunity for students to work closely with faculty such that progress in the degree programs can be expedited.[3]

Yet, a double-edged sword has emerged regarding assistantships. It has been recognized that certain appointments have been contributing to doctoral students' capacity to define and complete dissertation projects, particularly research assistantships in the applied science and technological fields of study. However, another perspective has suggested that assistantships --both research and teaching appointments -- compete with the time and energy that has been required for the students' successful and timely progress during the later stages of doctoral education. Further, it has been commented that there are institutional incentives to keep doctoral students employed in the teaching and research enterprise beyond time which benefit them directly -- particularly because advanced graduate students often contribute significantly to faculty research projects as well as teaching activities at fairly low costs to the institutions.[4]

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[1]Remotely associated with curricular - educational stages of doctoral programs are stages of persistence in graduate education recently noted by Tinto. He has postulated three stages of persistence associated with doctoral degree progress. These stages include: "that of transition and adjustment, that of attaining candidacy or what might be referred to as the development of competence, and that of completing the research project leading to the awarding of the doctoral degree." Tinto, 1991, "Toward a Theory of Graduate Persistence," Draft Version of a paper presented at the Aducational Research Association Conference.

[2]Lipschutz, Susan S. 1992, "A Re-examination of the Climate for Doctoral Education at the University of Michigan," Communicator, Washington, D.C.: Council of Graduate Schools, pp. 8-11; Nerad and Cerny, 1991.

[3]Nerad and Cerny, 1991; Bowen and Rudenstine, 1992.

[4]Association of American Universities and the Association of Graduate Schools of the AAU, 1990, Institutional Policies To Improve Doctoral Education, Washington, D.C., p. 7; Bowen and Rudenstine, 1992.

Attributes of interest in terms of the academic process include:

- •Organized and routinized processes of doctoral education
  - ••Stages of curriculum
  - ••Mode of education and research training during stages
    - •••Lecture, seminar, tutorial, practicum, supervised, independent
    - •••Linkage and integration among the stages

- •Dissertation Process
  - ••Means of identifying dissertation topic (scale of origination: student .- . faculty defined)
  - ••Mode of research (isolated research - individualized or team research - part of project)
  - ••Frequency of contact with dissertation supervisor (infrequent - every few weeks/months or daily -- because of teaching/research assistantship (other?) activities)
- •Dissertation content:
  - ••Operatively versus conceptually creative product
  - ••Demonstration of capacity versus Magnum Opus

- •Measures of production: outcomes only
  - ••Counts of milestones: ABD, and doctoral degrees
  - ••Time to milestones: ABD, and doctoral degree
- •Measures of success and efficiency: input - through put - output
  - ••ABD rates and completion rates; and, attrition rates from entry
  - ••Time to ABD and to doctorate from entry;and, time to attrition from entry.

- •Environmental attributes:
  - ••Funding sources, type, and timing of funding
    - ••• fellowship, teaching and/or research appointment
    - ••• early, mid-, advanced stages of doctoral program

  - ••Departmental culture attributes-- integration opportunities (colloquia, seminars, etc.)
  - ••Satisfaction of the the participants with the process
    - •••Interpersonal dynamics between mentors, students, and their peers
    - •••Nature of the process of defining dissertation projects

  - ••Influence of external factors affecting completion, attrition, and time measures
    - •••Labor market dynamics (academic and non-academic markets)
    - •••Personal factors (finances, non-academic commitments, etc.)

Academic - Disciplinary Aspect.

The content of doctoral education generally has been defined by: knowledge associated with the field of study; scholarly approaches and research methods/techniques employed to compile, critique, and investigate the current knowledge and used to generate new knowledge; as well as the values of the culture associated with the academic discipline. Publication attributes have also been closely associated with the disciplines, e.g., physical sciences and technological disciplines tend to use journals as the most prevalent means to share their research whereas humanities and social sciences have tended to publish books and encyclopedic compilations.[1]

The nature of knowledge and research techniques associated with the disciplines are varied and offer different challenges for scholarship and research training. Some of these challenges include: the prospects for keeping abreast

[1]Becher, Tony, 1989, Academic Tribes and Territories: Intellectual Enquiry and the Cultures of Disciplines, Bristol (Penn.): Society for Research into Higher Education & Open University Press.

of current knowledge/research techniques given the enormous volume of new information emerging from research associated with disciplines in the biological and health sciences; the feasibility of integrating different reseach methods or theoretical approaches across two or more distinct disciplines to foster the emergence of interdisciplinary fields of study; and, the demands of applying new theory in critique and method to fields of study where there is a voluminous amount of historical knowledge typically associated with many of the humanistic disciplines.[1]

Attributes of interest in terms of the academic discipline include:

- •Nature of the discipline: biological, physical, technological science or social science, or humanities (arts and letters)
- •Nature of the research activity associated with the discipline: team (apprenticeships) versus isolated research; laboratory versus library, etc.
- •Nature of the expectations in terms of dissertation research and thesis
- •Nature of the publication of research activity: journal versus book; frequency of publication

Participants.

The primary participants involved with doctoral education have been faculty, students, and alumni. These participants have varying attributes associated with them, e.g., prior experiences, motivations and behaviors, as well as creative capacities. The attributes influence both the expectations and the performance of the participants relative to their contributions to their academic discipline, their behavior within their department and profession, as well as their abilities to bring resources to their institution.

Attributes of interest in terms of the participants include:

- •Faculty characteristics and reputational measures
  - ••Area of expertise -- academic discipline (specialization, e.g., area study and method of inquiry)
  - ••Publication history (citation history), award/recognition history
  - ••Research resources (grants, funded project activity)
  - ••Department activity (chairperson, other responsibilities)
  - ••Mentor productivity (number of Ph.D.s supervised)
  - ••Prior education e.g., credentials (Ph.D., lower degrees) and institutions associated with prior academic credentials (prestige associated with institution and department)
- •Student characteristics and reputational measures
  - ••Standard measures performances (GRE scores: general and subject area tests)
  - ••Prior education and associated measures such as undergraduate/graduate institution and performance measures (e.g., grade point average or first class honors from examinations at prior university)
  - ••Motivation and commitment measures (letters of application, prior experiences)
- •Alumni characteristics and reputational measures
  - ••Placement of alumni immediately following doctorate activity
  - ••Long term professional accomplishments

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[1] AAU and AGS, 1992; Clark, Burton, 1993 (forthcoming); Lipschutz, Susan S. 1992; Nerad, Maresi and Joseph Cerny, 1991; Trow, Martin, 1977.

Doctoral education in the Netherlands.

Dutch higher education.

Dutch higher education can be regarded as a binary system consisting of two sectors, i.e. a university sector and a sector for higher vocational education (in Dutch Hoger Beroepsonderwijs, abbreviated as HBO). The universities' first degree, obtained after four years of study, roughly equates a Master degree. This can be followed by a doctoral degree (Ph.D.), also awarded by universities, taking approximately another four years. The HBO-institutions award the bachelor degree as their first and final qualification after a maximum of four years of study. HBO-institutions do not award a doctorate, but graduates can qualify for a doctoral degree at a university at the discretion of the university.

History of doctoral education in the Netherlands[1]

One of the most striking characteristics of Dutch doctoral education is that traditionally it hardly can be regarded as a form of education. In principle everyone with a Dutch Master degree had the right to try to obtain a Dutch doctoral degree. The initiative for writing a doctoral thesis was a personal initiative, while the quality of the thesis had in the end to be judged by a full professor. It can be argued that in many senses taking a doctoral degree was a private matter in the Netherlands. Each working relationship between a full professor and a person writing a doctoral thesis was in practice a unique one. Together they determined the workplan, time schedule, nature of the research, etc. As a consequence the full professor was at the same time judge and supervisor, while the person working on his/her Ph.D. was not a doctoral student but either belonged to the academic staff of the university or had a job outside the university. The university as an organization was not directly responsible for the process leading to a Ph.D. degree. In general , there were only regulations at the university as well as the system level with respect to the procedures for the approval of the thesis manuscript, implying that there were only marginal legal requirements as regards the process for taking a Ph.D. There was no governmental policy with respect to quality and quantity of doctoral theses, nor the process leading to a Ph.D.

It will be obvious that even though taking a Ph.D. was a private matter, for specific kinds of research, esp. medical, engineering, and science research, facilities were needed that in general could not be afforded by an individual. As a result many individuals working on their Ph.D. in these disciplines had a specific temporary appointment as 'scientific assistant.' The starting point for such a position was that these assistants would get a salary, i.e., time, an office, computer facilities, the use of the library, telephone, secretarial support, etc., to make it possible for them to work on their theses. In many cases they had a teaching obligation, up to a maximum of 40% of their time.

Most doctoral theses produced by 'scientific assistants' came about in medical and science departments. In the other disciplines these special staff positions were less important. This is caused by the relative low output of these positions and by the possibility in the other disciplines to combine the activities for writing a doctoral thesis with a regular job either inside or outside the university.

The most important characteristics of the 'scientific assistants' were (Van Hout, 1988):

1. Their average age is 29, with the assistants from the Arts and Social Science being in general older than the assistants from Science.
2. Almost 90% of all scientific assistants were male.
3. Most assistants in the Sciences started almost immediately after getting their Master degree, while the assistants from Social Science and Arts in most cases first had another job.

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[1]This section is to a large extent based upon: J.F.M.J. van Hout, M.J.F. Hulshof, and H.J.J. Jurgens, De opleiding van onderzoekers: Een evaluatieonderzoek naar het functioneren van het AiO-stelsel, Zoetermeer, Ministerie van Onderwijs en Wetenschappen, 1991.

The most important bottlenecks as regards the functioning of the scientific assistants were:

1. The teaching obligations of the assistants took in many cases more than 40% of their working time. In addition, many assistants felt insecure as regards their teaching because of a rather limited experience in teaching. Most aspects seriously endangered the progress of the doctoral research.
2. For many assistants the supervising of their theses work was a problem. Especially in the Arts and Social Sciences the assistants were unsatisfied about their supervisor.
3. The percentage of assistants finishing their theses in four years is very low. Many never finished their theses while others were delayed many years.
4. The legal status of the assistants was seen as a problem. They belonged to the academic staff, but had in most cases an unclear position in their department, were heavily dependent on their supervisor, and had a temporary position.

Next to these practical problems influencing the functioning of scientific assistants doctoral education was regarded more and more as a national higher education policy issue, especially because of the low output, i.e., the relatively small number of doctoral theses, of the process. In addition, the low coherence of most thesis work with the regular research programs of departments, the lack of a 'doctoral education culture' in a number of disciplines, and the long time it took most of those finishing a doctoral thesis in Arts and Social Science, were mentioned in various governmental documents as serious problems.

Notwithstanding the above mentioned problems, the decision taken to change the process leading to a Ph.D. was a side-effect of the discussion on a more central problem, i.e., the financing of regular university education. The sharp increase in student numbers in the 1960s and '70s led to a number of ministerial proposals as regards the structure of first (= Master) degree university education. These proposals intended to reduce the average time it took students to finish their Master degree program, through shortening the nominal length of the Master programs from 5 (+) to four years and reducing the enrollment period, i.e., the time students are allowed to enroll in the universities. The consequence of all these proposals would be that the general goal of all university first degree programs to 'train the students to become independent scientific researchers' would become impractical with respect to most students. From the first proposal in 1968 to 1986 when a new structure to train scientific researchers was actually introduced, political discussions in this matter were focused on creating a new four-year basic program in all disciplines, open to all qualified students, leading to a Master degree and a new formal structure for various special training and programs, especially a research training (or doctoral education), with access only for a small part of the best students graduating from the four-year programs.

From the moment it was politically accepted that the traditional general goal of university education could no longer be upheld, at least not for the majority of the students, it was clear that not only the goals but also the organization and design of first degree education had to be changed. Next to that also a separate system for training scientific researchers had to be developed, implying that for the first time in Dutch university education the process leading to a Ph.D. degree would get a uniform structure and clear legal base. Although the design of this new structure was not based directly on the previous experiences, e.g., with scientific assistants, nonetheless, attempts were made to at least take them into account. Before describing some characteristics of this new structure we first want to discuss briefly how it came into existence.

Restructuring of university education.

There is a clear pattern to be distinguished in the general policy developments on higher education in the Netherlands since the mid-1970s: starting with more or less ad hoc restructuring and retrenchment operations the minister of Education and Science introduced a new governmental strategy towards higher education in 1985.[1] This strategy was announced in a policy document called Higher Education: Autonomy and Quality (in Dutch abbreviated HOAK), and successively translated into an important policy instrument, i.e., a new planning and funding system, and a new higher education bill, i.e., the WHW bill. An important part of this development has been the restructuring of

[1]Maassen, Peter A. M. and Frans A. van Vught, 1989, Dutch Higher Education in Transition: Policy Issues in Higher Education in the Netherlands, Culemborg: Lemma.

university education, i.e.. the introduction of the so-called Two Tier structure in 1983 and the developments that followed. Three successive ministers have focused on a different part of this new structure. The first one, Pais, designed it and succeeded in getting it accepted by parliament. During his period of office only the first tier, i.e., the four-year Master degree programs, was made concrete. The second one, Deetman, introduced the so-called AiO, an abbreviation (in Dutch: Assistenten in Opleiding; in English: 'Research Trainees') of a new staff position in Dutch higher education. AiO's are appointed for four years during which they are supposed to write a dissertation. Although officially they are part of the academic staff, compared to the situation in other higher education systems they can be considered as doctoral students enrolled in the second tier. During Deetman's period of office the structure of the second tier in which the AiO's and other students were supposed to work received little attention. One of the main complaints as regards the second tier was that the facilities for the students, e.g., with respect to supervision were completely inadequate. The third minister, Ritzen, is trying to finish the work of his predecessors by designing an adequate structure for the second tier. One of the ideas accepted is the introduction of research schools for talented second tier research students. In each of these schools 40 to 50 AiOs and other two tier students will be trained and guided adequately. One or a number of universities will be responsible for the research schools, although close cooperation with business will be possible, if not stimulated. The idea of a research school is based on the assumption that talent and resources should be concentrated instead of fragmented.

Doctoral education since 1986: the AiO-system.

The introduction of the AiO-system in 1986 implied that the process leading to the highest Dutch academic degree, i.e., the Ph.D., has become the responsibility of the institutions as well as the government. As a consequence each department is expected to formulate the organization and goals of the scholarly and research training of their AiOs. In addition the requirements with respect to the supervisors and the AiOs have to be made explicit, as well as the relationship with the labour market, and the nature of the courses that the AiOs have to follow.

The most important general starting-points of the whole AiO-system are:

1. The AiO-training is regarded as continued scientific education instead of a vocational researchers' training. In general, a maximum of 10% of the graduates from the first (= Master) phase of Dutch university education are accepted as AiOs.

2. There are no specific regulations as regards the learning model to be used. Even though it has been made clear that 'schooling' has to be part of the AiO-system, it has been left to the individual universities to decide upon the minimum and maximum time for the 'schooling' or teaching of the AiOs. The universities are allowed to setup up a graduate school for this matter.

3. As regards the output of the system, the universities and the government have agreed upon a minimum number of AiO-position per institution, without specifying it for each discipline.

4. AiOs are appointed for four years during which period they are expected to finish their doctoral thesis. Their functioning is judged after one year which makes it possible to dismiss an AiO after a year if he/she does not show enough progress.

5. The AiO-system is supposed to add to the improvement of the research output and quality of universities.

6. One of the starting-points of the AiO-system is that the positions should be filled on the basis of an open competition. It was expected that the increased mobility would lead to an improvement of the quality of research in Dutch universities. Until now the open competition is hardly realized. Most AiO appointed in a specific department are Master degree graduates from the same department.

7. The AiO-system was expected to assist in making Dutch university education less expensive. AiOs are supposed to replace older, rather expensive academic staff, and take over (part of) their teaching responsibilities. In table 1 it can be seen that this starting point has certainly been realized at the moment. The number of associate professors especially has been reduced strongly in favor of the number of AiOs.

8. The salaries of the AiOs are cut seriously, based on the idea that the AiOs are being trained, instead of being productive. They receive 55% of the fixed salary for starting academics when they start. Over the four years of their contract this percentage is gradually increased to 85%. Despite the expectations this low income has not been a major barrier for attracting enough qualified AiOs. It might have caused the low mobility mentioned above (see 6), but no research is available on this matter.

TABLE 1: University academic staff (in FTEs)

Position	1983	1988	1991
Full Professor	2,761	2,446	2,385
Assoc. Professor	6,073	2,280	2,391
Asst. Professor	6,494	6,175	6,059
Other Aca. Staff	3,134	7,496	5,864
AiOs (Res. Trainees)		*2,674*	*5,120*
Non-Aca. Staff	20,970	21,294	20,946
Total	39,432	42,365	42,764

Source: DMES (Dutch Ministry of Education and Science), 1990, p. 269; WOPI, 1992.

The personnel structure of the university sector was reorganized in the first half of the 1980s. Next to the financial considerations one of the starting-points of this reorganization was that personnel policy in this sector should no longer be career oriented, but instead be position oriented. Enrollment figures, disciplinary nature, and a number of other considerations since 1984 form the basis for the number of academic staff positions in every university department. As can be seen in table 1, this had important consequences for the number of traditional, in most occasions tenured, academic staff members, i.e., full professors, associate professors, and assistant professors in the universities. Compared to the situation in 1983, the number of associate professors, for example, has dropped between 1983 and 1991 (as expressed in FTEs) more than 60%. The reorganization has led to a decrease (in FTEs) of the traditional academic staff positions (i.e., full, associate, and assistant professors) of over 30%. It will be clear from the above description that figures on the number of AiOs are always presented as part of the figures on academic staff in Dutch universities and never as part of university enrollment figures.

Doctoral education in the Netherlands is going through a transition period. The introduction of the AiO-system can be regarded as the first major step towards a system in which persons working on their doctoral theses in the Netherlands are really students instead of academic staff. Although the AiOs are academic staff members they are regarded and treated more and more as doctoral students. Nevertheless, as long as they belong formal' to the academic staff it will be very difficult to compare relevant aspects of Dutch doctoral education with doctoral education in countries where persons working on their doctoral theses are primarily formally students.

In the next concluding section we will make some general remarks on the specific problems institutional researchers might have to face when they try to compare aspects and attributes of doctoral education in the United States with the Netherlands. Although these remarks cannot be generalized to apply to doctoral education in continental Western Europe in general, there are a number of similarities between doctoral education in the Netherlands and in other European countries, esp., Germany and Nordic countries, that make these remarks of potential value to these countries, too.

Cross National Comparison of Doctoral Education: Methodological Aspects for Institutional Researchers.

Method and perspective: the macro-level context (structure, organization and process).
Peterson noted that the decade of the 1990s brings an emerging need for institutional researchers to pay particular attention to the larger contexts in which information gathering and analyses take place.[1] It is clear that comparing doctoral education on a cross national basis requires institutional researchers to gain both an understanding of the culture of the nation in which the doctoral education takes place as well as the culture of the educational system. While there is evolution and change in the United States in terms of scholarship, participants, and institutions associated with doctoral education and training, this change is minimal relative to the significant transformations currently taking place in the Netherlands. So, one constraint in terms of comparing cross national aspects of doctoral education between the United States and the Netherlands is that there is significant change occurring in the structure and organization of the Dutch system of higher education which has implications for doctoral education, in particular. Further, the Dutch process of doctoral education is also changing to the extent that there is an emerging -- more structured -- approach regarding the process which leads individuals to the doctorate degree. Subsequently, comparisons will in essence require flexibility in defining terms, generating statistics, and understanding the significance of rapid evolution in one nation's system relative to the stability in another nation's system. So, the contextual perspective is of particular importance in comparing cross national systems of doctoral education across the United States and the Netherlands.

Method and perspective: the nature of scholarship.
To a large extent the nature of scholarship (research) in academic disciplines is similar for doctoral education in both nations. Even though the structure, organization, and process of doctoral education are dramatically different, scholars essentially face the same aspects in terms of the nature of research in their disciplines. Scholarship, for the most part, lacks national borders. Literature and research results are, in general, freely distributed among the nations of the world. Further, methodologies for research are shared via professional activities outside the university environment as well as within the university environment by cross-national collaborative research ventures. So, in some manner, comparing the challenges of developing new knowledge across national borders is less constrained by differences in national systems' organization, structure, process, or participants.

Method and perspective: the participants.
The classification of the individuals pursuing doctorates in the two nations is different. While both systems have faculty who are responsible for directing the activities of the person pursuing the doctorate, there are really no doctoral 'students' in the Netherlands. As noted in the Dutch system, for the most part persons pursuing the doctorate degree have been members of the university staff system; whereas, the persons pursuing the doctorate in the United States are considered to be 'students' of an institution even though they might also be employed outside the institution or within the institution, e.g., graduate students research and teaching assistants. The introduction of the AiO position in the late-1980s and the current activity of reform in the structure and process of Dutch higher education have tremendous implications in terms of comparing doctoral education across the two nations. As the Dutch system moves to be more structurally similar to the U.S. system, i.e., more formalized training programs with AiOs seen more as trainees, there may be more prospects for truly comparing the scholarly development, research activities and progress of AiOs in terms of doctorate degree activities with U.S. graduate student teaching and research assistantships.

Conclusion.
Conducting cross national comparisons of doctoral education yields interesting information. Doctorates are produced in many nations' systems of higher education. The structure, organization, and process of producing doctorates varies considerably between the United States and the Netherlands. However, even with the differences in the system of doctoral education, research is conducted, new knowledge is produced, and faculties are replenished. There are constraints in terms of trying to compare the systems of doctoral education, particularly with regard to the rapid transformation of the higher education system in the Netherlands. However, it is valuable to begin to study the aspects and attributes, to begin to make rough comparisons, and to a certain extent to identify similarities and differences.

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[1] Peterson, Marvin. "Contextual Planning: New Approaches for New Challenges." Plenary session from the European Association for Institutional Research, Brussel, Belgium, 6-9 September, 1992.

References.

Abedi, Jamel and Ellen Benkin, 1987, "The Effects of Students' Academic, Financial, and Demographic Variables on Time to the Doctorate," Research in Higher Education 27(1): 3-14.

Association of American Universities (AAU) and the Association of Graduate Schools (AGS) of the AAU, 1990, Institutional Policies to Improve Doctoral Education, Washington, D.C.: AAU.

Association of American Universities, 1990, The Ph.D. Shortage: The Federal Role, Washington, D.C.: AAU.

Atkinson, Richard C., April 1990, "Supply and Demand for Scientists and Engineers: A National Crisis in the Making," Science (248): 425-432.

Becher, Tony, 1989, Academic Tribes and Territories: Intellectual Enquiry and the Cultures of Disciplines, Bristol (Penn.): Society for Research into Higher Education & Open University Press.

Berelson, Bernard, 1960, Graduate Education in the United States New York: McGraw-Hill, Inc.

Blume, S., 1986, "The Development and Current Dilemmas of Postgraduate Education", European Journal of Education (21): 217-222.

Bowen, Howard R., 1984, "Graduate Education and Social Responsibility," in Pelczar, Michael J., Jr. and Lewis C. Solmon (ed.s), *Keeping Graduate Responsive to National Needs*, New Directions for Higher Education, pp. 113-119.

Bowen, Howard R. and Jack H. Schuster, 1986, American Professors: A National Resource Imperiled, New York: Oxford University Press.

Bowen, William G., Graham Lord, and Julie Ann Sosa, 1991, "Measuring Time to the Doctorate: a Reinterpretation of the Evidence," Proceedings of the National Academy of Sciences USA (88): 713-717.

Bowen, William and Neil Rudenstine, 1992, In Pursuit of the Ph.D., Princeton (N.J.): Princeton University Press.

Bowen, William G. and Julie Ann Sosa, 1989, Prospects for Faculty in the Arts and Sciences: A Study of Factors Affecting Demand and Supply, 1987-2012.

Breneman, David, 1977, Efficiency in Graduate Education: An Attempted Reform (a Report to the Ford Foundation.

Breneman, David W., 1970, The Doctor of Philosophy Production Process: A Study of Departmental Behavior, unpublished dissertation, Berkeley (Calif.): University of California.

Breneman, David W. and Ted I.K. Youn, 1988, Academic Labor Markets and Careers, New York: Falmer Press.

Cartter, Allan M., 1966, An Assessment of Quality in Graduate Education, Washington, D.C.: American Council on Education.

Cipra, Barry, 1991. "Math Ph.D.'s: Bleak Picture." Science (252): 252-253.

Clark, Burton R., 1993 (forthcoming), The Research Foundations of Graduate Education, Berkeley (Calif.): University of California Press.

Committee on an Assessment of Quality-Related Characteristics of Research Doctorate Programs in the United States (Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall, ed.s), 1982, An Assessment of Research-Doctorate Programs in the United States, Washington, D.C.: National Academy Press.

Council of Graduate Schools, 1990, A Policy Statement: The Doctor of Philosophy Degree, Washington, D.C.

Council of Graduate Schools, 1991, The Role and Nature of the Doctoral Dissertation, Washington, D.C.: Council of Graduate Schools.

Debeauvais, Michel, "Doctoral Theses in France: a Case of 'Reformitis,'" European Journal of Education (21): 375-384.

Dutch Ministry of Education and Science, 1990, Hoger Onderwijs en Onderzoek Plan, The Hague: DPO.

Economic and Social Research Council, 1986, The Preparation and Supervision of Research Theses in the Social Sciences, London: ESRC.

Economic and Social Research Council, 1983, "The Social Science Ph.D.: The ESRC Enquiry on Submission Rates," Winfield Report. London: School Governing Publishing.

Ehrenberg, Ronald G., 1991, "Academic Labor Supply," in Clotfelter, et. al., Economic Challenges in Higher Education, Chicago (Ill.): University of Chicago Press; National Center for Education Statistics, 1990, Institutional Policies and Practices Regarding Faculty in Higher Education, Washington, D.C.: U.S. Department of Education.

Encyclopedia of Associations, 1993, 27th edition, Detroit (Mich.): Gale Research Publications.

Girvis, Jean E. and Virginia Wemmerus, 1988, "Developing Models of Graduate Student Degree Progress," Journal of Higher Education 59(2): 163-189.

Goedegebuure, L.C.J., et. al., June 1992, Higher Education Policy in International Comparative Perspective, Enschede (The Netherlands): Center for Higher Education Policy Studies.

Gumport, Patricia J., "Graduate Education and Organized Research in the United States," in Clark. Burton, The Research Foundations of Graduate Education, Berkeley (Calif.): University of California Press, pp. 225-293.

Heiss, Ann M., 1970, Doctoral Education in Prestigious Universities, Berkeley (Calif.): Center for Research and Development in Higher Education.

Hollis, Ernest V., 1945, Toward Improving Ph.D. Programs, Washington, D.C.: American Council on Education.

Huber, Ludwig, 1986, "A Field of Uncertainty: Postgraduate Studies in the Federal Republic of Germany," European Journal of Education (21): 287-305.

Isaac, Paul D, Stephen V. Quinlan, and Mindy M. Walker, 1992, "Faculty Perceptions of the Doctoral Dissertation," Journal of Higher Education 63 (3): 241-267.

Kyvik, S., 1986, "Postgraduate Education in Norway," European Journal of Education (21): 251-260.

Lipschutz, Susan, "Enhancing Success in Doctoral Education: From Policy to Practice," in Baird, Leonard (forthcoming NDIR sourcebook with tentative publication title: Increasing Graduate Student Retention and Degree Attainment, San Francisco: Jossey-Bass).

Lipschutz, Susan S. 1992, "A Re-examination of the Climate for Doctoral Education at the University of Michigan," Communicator, Washington, D.C.: Council of Graduate Schools.

Maassen, Peter A. M. and Frans A. van Vught (ed.s), 1989, Dutch Higher Education in Transition, Culemborg: Lemma.

Malaney, Gary D., 1987, "Who Receives Financial Support to Pursue Graduate Study?" Research in Higher Education 26(1): 85-97.

Miselis, Karen L., William McManus, and Elieen Kraus, 1991, "We Can Improve Our Graduate Programs: Analysis of Ph.D. Student Attrition and Time to Degree at Penn," unpublished paper from the Associate for Institutional Research Conference, San Francisco, 1991.

Nerad, Maresi and Joseph Cerny, 1991, "From Facts to Action: Expanding the Role of the Graduate Division," Communicator, Special Issue, Washington, D.C.: Council of Graduate Schools.

Pelikan, Jaroslav, 1983, Scholarship and Its Survival: Questions on the Idea of Graduate Education, Princeton: The Carnegie Foundation for the Advancement of Teaching.

Peterson, Marvin. "Contextual Planning: New Approaches for New Challenges." Plenary session from the European Association for Institutional Research Forum, 6-9 September, 1992.

Roose, Kenneth D. and Anderson, Charles J., 1970, A Rating of Graduate Programs, Washington, D.C.: Amercian Council on Education.

Tinto, Vincent, 1991, "Toward a Theory of Graduate Persistence," Draft Version of a paper presented at the Aducational Research Association Conference.

Trow, Martin, 1977, "Department as Contexts for Teaching and Learning," in Academic Departments, San Francisco: Jossey-Bass.

Tuckman, Howard, Susan Coyle, and Yupin Bea, 1990, On Time to the Doctorate: A Study of Increased Time to Complete Doctorates in Science and Engineering, Washington, D.C.: National Academy Press.

United States. National Research Council, 1993, Summary Report 1991: Doctorate Recipients from United States Universities. Washington, D.C.: National Academy Press.

United States. Office of Science and Technology Policy, Executive Office of the President, 1986, *Report of the White House Science Council Panel on the Health of U.S. Colleges and Universities.* Washington, D.C.

U.S. News and World Report, "Japan's Research Raid: Companies from Across the Pacific are Setting up R&D labs in America," March 22, 1993, pp. 46-47.

University of Michigan, Horace H. Rackham School of Graduate Studies, 1976, The Role of The Dissertation in Doctoral Education at the University of Michigan.

Van Hout, Johannes, 1986, "Towards a New Structure for Postgraduate Research Training in the Netherlands," European Journal of Education (21): 275-286.

Van Hout, Johannes, 1988, Onderzoekers in Opleiding: Een Verklaringsmodel voor Problemen van Promotie-Assistenten en Assistenten in Opleiding, Nijmegen: IOWO.

Van Hout, J.F., M.J.F. Hulshof, and H.J.J. Jurgens, 1991, De opleiding van onderzoekers: Een evaluatieonderzoek naar het functioneren van het AiO-stelsel, Zoetermeer, Ministerie van Onderwijs en Wetenschappen.

Weick, Karl E. Educational Organizations as Loosely Coupled Systems, in Peterson, Marvin W. (ed.), 1991, Organization and Governance in Higher Education, ASHE Reader Series, Needham Heights (Mass.): Ginn Press, 4th ed.

WOPI (Wetenschappelijk Onderwijs Personeelsinformatie), 1992, Utrecht, VSNU.

Zetterblom, Goran, 1986, "Postgraduate Education in Sweden: Reforms and Results," European Journal of Education (21): 261-273.