



Montana State University's pursuit of prestige: research activity and its effects on graduate education
by Christopher John Junghans

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education
in Education

Montana State University

© Copyright by Christopher John Junghans (2002)

Abstract:

This study was initiated and supported by the Dean of the College of Graduate Studies at Montana State University just before the Carnegie Foundation for the Advancement of Teaching published its revised, interim standards for its classification system of higher education institutions in October 1999. The dean was concerned that Montana State University may have been pursuing Grant and Contract Activity at the expense of the institution's teaching mission, which turned out to be one of the concerns at the Carnegie Foundation that led to its classification system's revisions. Literature reviewed for the study addressed questions of how university teaching and research missions can be treated in a way that strengthens both. There appeared to be anecdotal evidence and lore at Montana State University to suggest that the two missions are incompatible at some basic level. If that were true, the researcher would have expected to encounter a "please don't bother me about teaching, I'm a researcher" attitude from the Montana State University prominent researchers interviewed. In the qualitative component of this study, at least, quite the opposite view was found. This study found strong evidence to support the claim that prominent research faculty at Montana State University place a high priority on the institution's educational mission. The quantitative component of the study described a number of institutional trends, including flat doctoral production during a period (1989-1999) of booming Grant and Contract Activity. These results suggest that policy changes may be considered at Montana State University to better allow research activity to benefit graduate instruction and doctoral production, a goal that the Carnegie Foundation for the Advancement of Teaching appeared to consider relevant in revising its classification system of higher education institutions.

MONTANA STATE UNIVERSITY'S PURSUIT OF PRESTIGE:

RESEARCH ACTIVITY AND ITS EFFECTS

ON GRADUATE EDUCATION

by

Christopher John Junghans

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

in

Education

MONTANA STATE UNIVERSITY

Bozeman, Montana

April 2002

© COPYRIGHT

By

Christopher John Junghans

2002

All Rights Reserved

D378
J956

APPROVAL

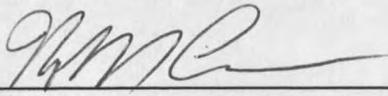
Of a dissertation submitted by

Christopher John Junghans

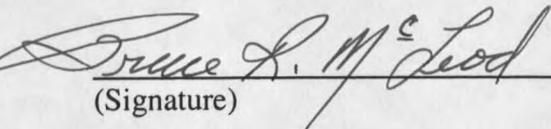
This dissertation has been read by each member of the dissertation committee and has been found to be satisfactory regarding content, English Usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

Robert N. Carson	 <hr/> (Signature)	<u>4-22-02</u> Date
------------------	---	------------------------

Approved for the Department of Education

Robert N. Carson	 <hr/> (Signature)	<u>4-22-02</u> Date
------------------	--	------------------------

Approved for the College of Graduate Studies

Bruce McLeod	 <hr/> (Signature)	<u>4-22-02</u> Date
--------------	--	------------------------

STATEMENT OF PERMISSION TO USE

In presenting this dissertation in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the library. I further agree that copying of this dissertation is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this dissertation should be referred to Bell & Howard Information and Learning, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute my dissertation in and from microform along with the non-exclusive right to reproduce and distribute my abstract in any format in whole or in part.

Signature



Date

4/19/02

For My Boys
Tony, Luca, and Erich

TABLE OF CONTENTS

1. INTRODUCTION TO STUDY	1
CHAPTER INTRODUCTION.....	1
PROBLEM.....	1
PURPOSE.....	3
THEORETICAL BASIS.....	4
QUESTION.....	6
IMPORTANCE OF STUDY.....	6
OPERATIONAL DEFINITIONS.....	8
ASSUMPTIONS AND LIMITATIONS.....	9
ORGANIZATION OF THE STUDY.....	10
2. LITERATURE REVIEW	12
CHAPTER INTRODUCTION.....	12
CRITERIA FOR SELECTING THE LITERATURE.....	12
MONTANA STATE UNIVERSITY AND THE LAND GRANT MISSION.....	15
CURRENT UNDERSTANDING OF THE PROBLEM.....	17
PREVIOUS RESEARCH OF THE PROBLEM.....	21
PREVIOUS METHODOLOGIES USED FOR PROBLEM.....	27
RELATED PROBLEMS.....	37
CONCLUDING ASSESSMENT OF THE LITERATURE OF THE PROBLEM.....	45
STRENGTHS IN THE LITERATURE OF THE PROBLEM.....	51
WEAKNESSES IN THE LITERATURE OF THE PROBLEM.....	56
AREAS FOR FURTHER INQUIRY.....	59
3. METHODOLOGY.....	65
POPULATION.....	65
QUALITATIVE COMPONENT.....	66
Selection of Subjects.....	66
Materials.....	67
Instrument.....	68
Data Analysis Strategy.....	69
Validity and Reliability.....	71

QUANTITATIVE COMPONENT.....	73
Rationale for Quantitative Component.....	73
Invalidity and Minimization	74
Procedure	75
Analysis Strategy.....	75
ASSUMPTIONS AND LIMITATIONS	77
TIMEFRAME	79
CHAPTER SUMMARY.....	79
4. RESULTS	80
CHAPTER INTRODUCTION.....	80
GENERAL RESULTS OF THE QUALITATIVE DATA ANALYSIS	81
RESEARCH AND TEACHING AS UNIFIED ACTIVITIES.....	82
POSTDOCTORAL, DOCTORAL AND OTHER STUDENTS IN RESEARCH.....	89
Montana State's Assessment of Faculty Teaching and Research.....	96
STATE SUPPORT FOR RESEARCH AT MSU	105
RESULTS OF THE QUANTITATIVE DATA ANALYSIS	112
Discussion of Unified Teaching and Research Theme.....	113
COLLEGE OF AGRICULTURE	122
COLLEGE OF EDUCATION, HEALTH AND HUMAN DEVELOPMENT	125
COLLEGE OF ENGINEERING	127
COLLEGE OF LETTERS AND SCIENCE.....	130
SUMMARY OF UNIFIED RESEARCH AND TEACHING THEME	133
DISCUSSION OF POSTDOCTORAL RESEARCHERS AND STUDENTS THEME.....	134
DISCUSSION OF MONTANA STATE'S ASSESSMENT OF FACULTY TEACHING AND RESEARCH THEME.....	135
DISCUSSION OF STATE SUPPORT FOR RESEARCH THEME.....	136
CHAPTER SUMMARY.....	136
5. CONCLUSIONS.....	138
CHAPTER INTRODUCTION.....	138
Summary of Problem, Methodology and Results	138
Interpretation of Results	140
Corresponding Conclusions Drawn from Interpreted Results	146
DISCUSSION OF BROADER IMPLICATIONS OF THE FINDINGS.....	148

Corresponding Conclusions Drawn from Interpreted Results	146
DISCUSSION OF BROADER IMPLICATIONS OF THE FINDINGS.....	148
Theoretical Implications	148
Practical Implications	150
Limitations of the study	153
SUMMARY OF CONCLUSIONS.....	153
Answer to Question	153
Implementation of Findings	154
REFERENCES CITED	155
REFERENCES	156
APPENDICES	164
APPENDIX A: Qualitative component Questions.....	165
APPENDIX B: Figures	171

LIST OF TABLES

Table	Page
1. Grants and Contracts at Montana State University	113
2. Montana State University Doctor's Degrees Awarded with and without College of Education, Health, and Human Development	115
3. Montana State University Grants and Contracts with and without College of Education, Health and Human Development	116
4. Montana State University Doctoral Candidates with and without College of Education, Health, and Human Development Candidates	118
5. Graduate Research and Teaching Assistants, and Postdoctoral Researchers at Montana State University	119
6. Cumulative Grade Point Average of Montana State University Doctoral Candidates	120
7. Montana State University Full-time Equivalent of Tenurable and Nontenurable Faculty	121
8. Montana State University Grants and Contracts and Indirect Cost Distribution in College of Agriculture.....	122
9. Montana State University Graduate Degree Production and Grants and Contracts in College of Agriculture	124
10. Montana State University Grants and Contracts and Indirect Cost Distribution in College of Education, Health, and Human Development	125
11. Montana State University Graduate Degree Production and Grants and Contracts in College of Education, Health, and Human Development...	126
12. Montana State University Grants and Contracts and Indirect Cost Distribution in the College of Engineering	128

13. Montana State University Graduate Degree Production and Grants and Contracts Activity in the College of Engineering.....	129
14. Montana State University Grants and Contracts and Indirect Cost Distribution in the College of Letters and Science.....	131
15. Montana State University Graduate Degree Production and Grants and Contracts in the College of Letters and Science.....	132

LIST OF FIGURES

Figure	Page
1. Grants and Contracts at Montana State University.....	172
2. Montana State University Doctor's Degrees Awarded with and without College of Education, Health, and Human Development	173
3. Montana State University Grants and Contracts with and without College of Education, Health, and Human Development	174
4. Montana State University Doctoral Candidates with and without College of Education, Health, and Human Development candidates	175
5. Montana State University Graduate Teaching Assistants	176
6. Montana State University Graduate Research Assistants	177
7. Montana State University Postdoctoral Researchers	178
8. Annual Cumulative Grade Point Average of Montana State University Doctoral Candidates	179
9. Montana State University Full Time Equivalent of Tenurable and Nontenable Faculty	180
10. Montana State University Grants and Contracts in the College of Agriculture	181
11. Montana State University Doctoral Candidates at College of Agriculture .	182
12. Montana State University Grants and Contracts Per Doctor's Degree Awarded in College of Agriculture.....	183
13. Montana State University Grants and Contracts in College of Education, Health, and Human Development.....	184
14. Montana State University Doctoral Candidates in College of Education, Health, and Human Development.....	185

15. Montana State University Grants and Contracts Per Doctorate in College of Education, Health, and Human Development	186
16. Montana State University Grants and Contracts in College of Engineering	187
17. Montana State University Doctoral Candidates in College of Engineering	188
18. Montana State University Grants and Contracts Per Doctorate Awarded in College of Engineering	189
19. Montana State University Grants and Contracts in Letters & Science College	190
20. Montana State University Doctoral Candidates in College of Letters and Science	191
21. Montana State University Grants and Contracts Per Doctorate in College of Letters and Science	192
22. Montana State University Grants and Contracts Per Doctorate (Without College of Education, Health, and Human Development).....	193
23. Montana State University Grants and Contracts Per Doctorate (With College of Education, Health, and Human Development)	194

Abstract

This study was initiated and supported by the Dean of the College of Graduate Studies at Montana State University just before the Carnegie Foundation for the Advancement of Teaching published its revised, interim standards for its classification system of higher education institutions in October 1999. The dean was concerned that Montana State University may have been pursuing Grant and Contract Activity at the expense of the institution's teaching mission, which turned out to be one of the concerns at the Carnegie Foundation that led to its classification system's revisions. Literature reviewed for the study addressed questions of how university teaching and research missions can be treated in a way that strengthens both. There appeared to be anecdotal evidence and lore at Montana State University to suggest that the two missions are incompatible at some basic level. If that were true, the researcher would have expected to encounter a "please don't bother me about teaching, I'm a researcher" attitude from the Montana State University prominent researchers interviewed. In the qualitative component of this study, at least, quite the opposite view was found. This study found strong evidence to support the claim that prominent research faculty at Montana State University place a high priority on the institution's educational mission. The quantitative component of the study described a number of institutional trends, including flat doctoral production during a period (1989-1999) of booming Grant and Contract Activity. These results suggest that policy changes may be considered at Montana State University to better allow research activity to benefit graduate instruction and doctoral production, a goal that the Carnegie Foundation for the Advancement of Teaching appeared to consider relevant in revising its classification system of higher education institutions.

CHAPTER 1

INTRODUCTION TO STUDY

Chapter Introduction

The problem, purpose and question of the study are presented in this chapter. The chapter addresses the theoretical basis for a case study of graduate instruction at Montana State University. The qualitative and quantitative components of the study are described. The characteristics of the study are introduced. These include a rationale for the importance of the study, operational definitions of the study, assumptions and limitations, and the organization of the study.

Problem

The number of doctoral degrees awarded at Montana State University from 1989 to 1999 remained relatively constant during a dramatic increase in grant and contract activity at the University, from \$15 million in 1989 to \$50 million in 1999. The apparent disconnect between booming funded research activity (i.e., grants and contracts) and flat production of doctoral degrees concerned the dean of the College of Graduate Studies at Montana State University. His original hypothesis was that the university might have

shifted its emphasis from teaching to research. In his view, one possible result of that shift may have been Montana State's recruitment and deference to high profile researchers, who then generally avoided doctoral students in favor of less demanding, more able postdoctoral researchers. The dean supported this study in order to gather data and analysis for possible future policy decisions. This study described how funded research activity affected the instructional mission of Montana State University at the doctoral level between 1989 and 1999.

While it may be evident to some on many campuses that an emphasis on research deprives the teaching mission of both resources and faculty devotion, it has not been shown that teaching and research at Montana State University are incompatible. One of the successes of American research universities in the 20th Century has been shown to be their respective abilities to deliver quality research according to marketplace demands (Graham & Diamond, 1997). By more than tripling its funded research activity between 1989 and 1999, Montana State University appeared to be capitalizing on federal and commercial demands for its research capacity. The negative institutional effects on universities competing for research funding, however, has led the Carnegie Foundation for the Advancement of Teaching to undertake substantial revisions of its widely recognized classification system of higher education institutions (McCormick, 1999). "The drive to 'move up' in the classification system can affect resource allocation and

hiring, possibly at the expense of other components of institutional mission that are less finely measured or absent from the classification's definitions," (McCormick, 1999). The problem this study addressed is whether Montana State has compromised its graduate instructional mission during a period of dramatic increase in its research activity.

Purpose

There were steady increases between 1989 and 1999 in the numbers of postdoctoral researchers and non-tenurable faculty at Montana State. Over the same period of time, doctoral degree production remained flat. These two trends suggested to the Dean of Montana State University's College of Graduate Studies that doctoral candidates might not have benefited from the increased research activity at the University. While faculty and administrators at Montana State might reasonably assume that the benefits of increased research activity at the University naturally trickle down to graduate students in the form of stipends and (dissertation) research topics, this assumption may or may not be the case. It was the purpose of this study to examine the available evidence for the assumption. The results of this study were intended to inform Montana State University administrators—in particular, the Dean of the College of Graduate Studies—regarding the effects of University policies on doctoral production and grant and contract activity. An analysis of those results in chapter 5 of this study was

intended to provide some additional basis for an evaluation of Montana State University policies governing grant and contract activity and doctoral production.

This study described how funded research activity affected the instructional mission of Montana State University at the doctoral level between 1989 and 1999. This study contains a qualitative component in which prominent faculty researchers at Montana State discuss the meaning of their work. This study contains a descriptive, quantitative component in which pertinent data from Montana State's institutional records are presented. Both components address the research question of this study. The purpose of an analysis and discussion of these components in chapters 4 and 5 of this study was intended to inform policy makers at Montana State University regarding effects its rising research activities are having on graduate education. The study was intended to provide information and analysis helpful to the development of successful policies governing Montana State University's teaching and research missions.

Theoretical Basis

The mission statement of Montana State University's College of Graduate Studies points out the fundamental importance of research in benefiting graduate instruction. The

availability of Montana State faculty and facilities “allows graduate students the opportunity to conduct high level, in-depth investigation of their subject of interest,” (Montana State University, 2000). Montana State University’s College of Graduate Studies mission statement reflects the historical influence on American higher education by the German model of a productive relationship between research-centered faculty and students (Veysey, 1965). The statement also reflects the research role assigned to Montana State University’s original predecessor, the Agricultural College of the State of Montana, established in 1893 as a land-grant institution under the Morrill Act (Rydell, Safford & Mullen, 1992).

American higher education beginning in the late 19th Century was modeled after the German research institutions in which graduate study was largely research and laboratory based (Veysey, 1965). At these institutions, learning was as much a matter of professional apprenticeship as it was a matter of studying textbooks and listening to lectures. Having adopted this model for over a century, American universities have become the most productive in the world, both in terms of the recognized quality of education and the quality and quantity of scientific research (Graham & Diamond, 1997). Historically, it seems odd to argue that research and teaching are somehow incompatible, except to the extent that institutional policies set up conflicts over resources, or create a reward structure that fails to encourage the integration of both sets of duties. This case

study of Montana State University attempts to determine whether institutional policies may have created such a conflict between the University's fundamental missions of graduate instruction and research.

Question

If research activity at Montana State is meant to benefit doctoral students, why did the number of doctoral degrees awarded by Montana State University remain flat during a ten-year period in which research activity increased from \$15 million in 1989 to \$50 million in 1999?

Importance of Study

This study described a ten-year relationship (1989-1999) between research activity and graduate instruction at Montana State University. These data and their analysis may provide a basis for evaluating University policy governing graduate programs and grant and contract activity at Montana State University. This study was limited to Montana State University's Graduate College, and its results have direct applicability to Montana State only. However, as a case study of a land-grant institution with rising research activity and flat doctoral degree production, it may serve a cautious

reader some illumination for respective policy considerations at other institutions of higher education with similarly apparent trends.

Whatever the results, the policy considerations of this study to Montana State administrators and faculty should be significant. If prominent Montana State faculty researchers appear to successfully integrate their respective research and teaching duties (in the qualitative component of the study), how well is this integration at Montana State demonstrable by institutional data (in the quantitative component of the study)?

Depending upon these results, policies and processes at Montana State might be altered to allow the research and the teaching duties of Montana State faculty to better support and strengthen one another. For example, how can policies for promotion and tenure, institutional support and resource allocation best support MSU's faculty's integration of teaching and research duties?

The Carnegie Foundation for the Advancement of Teaching revised in 2000 its classification criteria for higher education institutions. The revision reduced the significance of funded research and increased the significance of the breadth and rate of doctoral production (McCormick, 1999). "Although the Carnegie Classification is not intended to confer status or influence institutions' access to resources, we recognize that it has both effects, and that they are most evident among doctorate-granting universities," (McCormick, 1999, p.1). This study provided data and analysis regarding the relationship

between Montana State's research and teaching missions between 1989 and 1999. If Montana State administrators and faculty are to ensure that neither of these historical missions is pursued at the expense of the other, then the results of this study should prove useful to them.

Operational Definitions

Montana State as an institution is defined as a Doctoral/Research-Intensive University. The Carnegie Foundation for the Advancement of Teaching's latest classification edition defines a Doctoral/Research-Intensive university as offering a wide range of baccalaureate programs. Such a university is "committed to graduate education through the doctorate," with at least 10 doctoral degrees awarded per year across three or more disciplines, or at least 20 doctoral degrees per year overall (Carnegie, 2000). The Carnegie Foundation defines a Doctoral/Research-Extensive University as producing at least 50 doctorates across at least 15 disciplines (Carnegie, 2000). Montana State's mission as a public, Land Grant University also defines the institution.

Research activity is defined as the amount of grants and contracts awarded to Montana State University researchers by external funding sources. These data were collected from Montana State University's Office of Grants and Contracts. Faculty at Montana State University are defined as either tenurable (i.e., tenured or on a tenure-

track) or non-tenurable (i.e., not on tenure track). These data were collected from Montana State University's Institutional Research Office. Graduate Teaching Assistants are graduate students with teaching assignments. Graduate Research Assistants are graduate students with research assignments. Data on these students were collected from the Office of the College of Graduate Studies at Montana State University. Postdoctoral researchers are defined as non-student researchers hired by Montana State University. Data on these researchers were collected from the Office of Institutional Research at Montana State University. The number of doctoral degrees awarded by Montana State University defines graduate instructional activity. These data were collected from the Office of Institutional Research at the University.

Assumptions and Limitations

This study was limited to describing the changing conditions of research activity at Montana State University and the possible effects those conditions have had on graduate instructional quality and doctoral degrees awarded from 1989-1999. The case study method allowed the researcher to closely examine local conditions and the quantifiable and qualitative results of those conditions. A multi-site study necessarily

broadens such an examination, but may be less helpful to consumers of the study who are primarily interested in the conditions and results at a single institution. The detailed knowledge created by the study of a particular case may lead to theoretical insights that are useful as a basis for generalization beyond the original case study (Merriam, 1998; Yin, 1994).

This study used quantitative, institutional data to define instructional quality: doctoral degree production. The researcher recognized that this operational definition of instructional quality reduces its richer, scholarly meaning. Boyer argued for an expansion of the notion of scholarship to include teaching (1990). He divided the concept of scholarship into four kinds: (1) the scholarship of discovery (basic research); (2) the scholarship of integration (literature reviews and other synthetic tasks); (3) the scholarship of application (professional service or outreach); and (4) the scholarship of teaching. While reducing an analysis of instruction at the graduate level to an examination of doctoral degree production, this study relied on Boyer's multifaceted concept of scholarship in its analysis of the qualitative and quantitative data collected (chapters 4 and 5).

Organization of the Study

The approach of this study in examining graduate education in relation to funded research activity drew broadly on the approach taken by the Carnegie Foundation for the Advancement of Teaching in its classification of institutions of higher education (Carnegie, 2000). The Foundation is developing more subtle ways of classifying higher education institutions, scheduled for release in 2005. The Foundation shifted its classification criteria in 2000 from amounts of funded research to the number and kind of doctoral degrees awarded (McCormick, 1999). McCormick indicated that The Carnegie Foundation's 2005 Classification will shift further in that direction by taking into account particular institutional missions for its classification purposes (1999).

As a case study of Montana State University, this study examined data collected in the light of the institution's historical and current mission—in particular its graduate education mission. After a review of the literature in chapter 2, and a description of the qualitative and quantitative methods used in the collection of data in chapter 3, the results of the qualitative and then quantitative data are presented and interpreted in chapter 4. Chapter 5 draws broader, theoretical conclusions regarding the results of the study, and addresses possible policy questions for Montana State University's College of Graduate Studies regarding doctoral production and grant and contract activity.

CHAPTER 2

LITERATURE REVIEW

Chapter Introduction

This chapter reviews the literature of the problem. The criteria for the selection of the literature are presented. Themes in the literature describe the current understanding of the problem, previous research of the problem and methodologies used to research the problem. Two problems related to the study, faculty workload and faculty unionization, are addressed. A concluding section summarizes the literature of the problem. Strengths and weaknesses in the literature of the problem, including gaps and saturation points, are described in the concluding section. Avenues for further inquiry, including student evaluations of graduate instruction at Montana State University, conclude this chapter.

Criteria for Selecting the Literature

The historical relationship between the federal government and the academic recipients of the currently \$15 billion awarded for annual scientific research was considered in this literature review (Goldman & Williams, 2000, p.67). This relationship was considered relevant to this study because it provides the context in which any

assessment of the impact of federal funding of research at Montana State University might be made. This historical relationship helps to establish the context in which policies on federally funded research and graduate education at Montana State University might properly be considered. The literature reviewed here attempts to anticipate possible, future questions posed by this study of Montana State University. Do federal regulations for funded research at Montana State University diminish or impede the University's mission to educate graduate students, for example? Or is the condition of a discipline or department at Montana State University itself hindering that mission? Such questions cannot be adequately addressed without an examination of the larger context of the relationship between government funding agencies and U.S. research universities, and Montana State University in particular.

Literature that addresses historical and current rationales for university research, particularly as it relates to doctoral-level instruction, is reviewed. The literature in this area was rich, as the question of measuring and balancing faculty research and teaching duties have occupied those who study and administer higher education for quite some time. This literature included work on the changing character of American higher education, declining state support for public universities, quality standards and assessments, causes and consequences of unfinished doctoral degrees, and the political accountability of higher education institutions.

In 1999, Montana State University completed its ten-year institutional self-study for the Northwest Association of Schools and Colleges, Commission on Colleges. This piece of literature, rich in institutional data gathered by Montana State University administrators, staff and faculty for accreditation purposes, is reviewed and relied upon in this study as a vital source for assessing Montana State University's stated purpose and progress. Other Montana State University policy documents, such as the Productivity, Quality and Outcomes Agreement with the Montana Governor's Office, the Montana Board of Regents and the Montana Commissioner of Higher Education, were reviewed for this study. Public statements by Montana State University officials and other interested parties that address funded research and the instructional mission of the University were also reviewed for this study.

This study posed a direct question about whether Montana State University fulfilled its instructional mission at the doctoral level during a time of unprecedented growth in its research activity. Therefore, as a case study of Montana State, sources that described the mission and operation of the university were reviewed to introduce the current understanding of the problem. The historical and current purpose of Montana State University, as a public, Land Grant University leads a broader consideration of the problem.

Montana State University and the Land Grant Mission

As a Land Grant institution, Montana shares much of its historical mission with the 72 institutions created by the Morrill Act of 1862 (Veysey, 1965). The Land Grant mission contains three parts: research, teaching and service. It is the relationship at Montana State between the first two parts of this mission that this study addressed, specifically for the period of time between 1989 and 1999, when research activity more than tripled. In addition to the Morrill Act, which was intended to expand access to American higher education, the Hatch Act of 1887 created agricultural experiment stations that boosted the concept of basic and applied research (Kerr, 1964). In 1893, only four years after Montana had become the forty-first state, Governor John E. Rickards signed the bill establishing the first state-supported college that would eventually become Montana State University (Rydell, Safford & Mullen, 1992). It was called the Agricultural College of the State of Montana, reflecting its status as a Land Grant institution.

Before World War II, research activity at Montana State University was largely in agriculture, with a focus on improving the state's dominant economic engine (Rydell, Safford & Mullen, 1992, p.253). The federal government's role in agricultural research in Montana was prominent from the beginning, with the U.S. Department of Agriculture's

joint administration of the first agricultural experiment station in Moccasin established in 1907 (1992, p.254). In 1991, Montana State University soil scientist Hayden Ferguson said that "in relation to the total state economy, research and development here at the College of Agriculture has contributed so much that it has probably had the greatest in-state impact of any such program in the nation," (1992, p.253). Agricultural research at Montana State University has included work on irrigation methods, the development of the beet sugar industry, new varieties of sustainable grains, and veterinary breakthroughs that increased the viability of Montana livestock (1992, p.255).

Research activity at Montana State University since World War II has been profoundly influenced by the federal government's support of basic research in science, as all American universities have (1992, p.243). From 1940 to 1960, federal grants for university research increased by a factor of 100, to \$1.5 billion per year in 1960; in 1991, total federal support for university research was about \$30 billion per year (Kerr, 1994). In 1950, the National Science Foundation (NSF) was created to distribute federal monies to American universities for basic scientific research (1992, p.244). In order to broaden the distribution of these monies beyond a handful of powerful research universities, the NSF created the Experimental Program to Stimulate Competitive Research (EPSCoR) in 1978, which targeted 17 "have not" states. In 1979, Montana State University plant pathologist Dr. Gary Strobel secured an EPSCoR grant and established Montanans on a

New Trac for Science (MONTTS), allowing any researcher in the state to apply for NSF funding (1992, p.244). According to Strobel, Montana's success ratio under EPSCoR (33 percent) is well about the national average (1992, p.244).

EPSCoR has been criticized for promoting a "geographical redistribution" of federal funds for science over the traditional, peer-reviewed method of funding in place since World War II (Martino, 1992). Citing comparisons between the EPSCoR states and the averages of all states and of the "top ten" NSF-funded states (Mervin,1990), Martino argues that EPSCoR states "...are not supporting research with their own funds, their science faculties are on the average less research-oriented (fewer Ph.D.s), and their research output (publications) is well below the national average," (1992, p.53). Martino points out that where the EPSCoR states perform up to the national and "top ten" averages is in the production of B.S. degrees in science. He concludes that "geographic redistribution may well have the effect of destroying good science training colleges while turning them into second-rate research universities, at the expense of first-rate research universities," (1992, p.53).

Current Understanding of the Problem

The Kellogg Commission recently completed a six-part study conducted under the auspices of the National Association of State Universities and Land Grant Colleges on

the future of state and Land Grant universities in the United States (Kellogg Commission, 2000). This study recommends state and Land Grant universities build a "new covenant" with the American people to better serve their rapidly changing needs for education in the 21st Century. Similarly, the Carnegie Foundation for the Advancement of Teaching revised its classification system for higher education institutions in 2000 in an attempt to de-emphasize its use by prestige-driven universities to pursue research at the expense of other institutional missions, such as instruction (McCormick, 1999). For technical as well as philosophical reasons, the Carnegie Foundation for the Advancement of Teaching's 2000 Classification paid more attention to the number and breadth of doctoral degrees awarded at an institution and less attention to the funded research activity at an institution (McCormick, 1999).

The Carnegie Foundation's next revision of its classification system is expected in 2005. This revision is expected to take into account an institution's mission, as defined by the institution, for classifying purposes (McCormick, 1999). The Kellogg study and the Carnegie classification system of 2000 represent prominent attempts to describe the current state of American universities in the context of their respective missions. This study describes the relationship between the research and teaching missions at Montana State University, and in particular the relationship between funded research and doctoral education. Additional literature that addresses local, regional, national and international

efforts to assess institutional progress in higher education, particularly at the doctoral level, are reviewed below under methodologies used with the problem.

According to the College of Graduate Studies (2001), Montana State University offers 17 doctoral degree programs in 14 departments. Six of these doctoral degrees are offered in the College of Engineering, with degree options in particular areas of concentration, by the departments of Chemical Engineering, Civil Engineering, Computer Science, Electrical and Computer Engineering, and the Department of Mechanical and Industrial Engineering. The nine other departments awarding doctoral degrees—also with options for areas of concentration—are the departments of Chemistry and Biochemistry, Ecology, Education, Land Resources and Environmental Sciences, Mathematical Sciences, Microbiology, Physics, Plant Sciences, and Veterinary Molecular Biology.

According to Montana State University's Office of Institutional Research (2001), the total number of doctoral students was 219 in 1990-91 and 269 in 2000-01, with a peak of 334 in 1996-97. Total Montana State University student enrollment over this period of time, including masters, doctoral and undergraduate students, went from 10,392 in 1990-91 to 11,761 in 2000-01 (with no significant peak during the intervening years).

These enrollments, in particular that of doctoral students during this period of time, correspond to a period of time when annually funded research at Montana State University more than tripled, from \$15 million in 1989 to \$50 in 1999. During this same

period of time the number of graduate research and teaching assistantships, which includes doctoral and master's students, remained flat, while the number of postdoctoral researchers increased more than six-fold, from 10 in 1989 to 64 in 1999. A snapshot figure available on the number of postdoctoral researchers working at Montana State University was taken by the College of Graduate Studies on December 4, 2000, which showed 89 on Montana State University's payroll (McLeod, 2000).

The explanation of a flat doctoral production at Montana State University between 1989 and 1999 during a period of strong growth in funded research may be found in the absence of any increase in research and teaching assistantships awarded to graduate students during that period of time. Geiger has observed that flat national doctoral production between 1954 and 1958 can be traced to a dearth of financial support for graduate students. The explosive growth of national doctoral production in the 1960s can be traced to the dramatic rise of federal research and direct doctoral student funding (Geiger, 1990, p. 221). Federal research funds have historically "trickled down" to graduate students in the form of research and teaching assistantships. Lovitts' survey of 175 students who left doctoral programs without degrees indicated financial reasons are given 19 percent of the time (2001, p. 177). Beyond the direct financial support assistantships provide, indirect benefits include access to active research topics and better inclusion in departmental culture. Lovitts' students cited such "academic reasons" 49

percent of the time in explaining their departure from a doctoral program without a degree (the remaining 23 percent cite personal reasons). Lovitts and others have lamented the lack of national and even institutional data on graduate programs, including rates of attrition (Lovitts, 2001; Breneman, 1975; Damrosch, 1995; Bowen & Rudenstine, 1992). Lovitts compiled the work of three prominent researchers in the field of graduate attrition to develop some estimates of doctoral attrition. She determined that between about 1950-53 and 1972-76 the rate of attrition at top institutions (rated by recipients of prestigious fellowships) was 40 to 55 percent, and 50 to 60 percent at all other institutions (2001, p. 176). Unfortunately, like many institutions of higher education, Montana State University's College of Graduate Studies has not collected data on doctoral attrition rates.

The significance of the dramatic increase in the employment of postdoctoral researchers with a concurrent flatness of doctoral production helped to raise the question of this study, given the exceptionally strong increases in federally funded research at Montana State University over the same time. Interestingly enough, potential disruption to Montana State University's instructional mission (including graduate education) by an administrative policy to aggressively pursue federal research funding in the early 1980s, was anticipated by one of its own graduate students (Western, 1984).

Previous Research of the Problem

Kenneth Henry Western received his master's degree in Public Administration from Montana State in 1984, after submitting a professional paper entitled "The Risks of Excellence: The Role of Research at Montana State University." He was employed at Montana State's Office of Publications and News Services, and served an internship required for the Master's in Public Administration (MPA) in the Office of the Vice President for Research. Western helped to prepare the 1980 annual report on research activities at Montana State, though he is careful to point out that his paper was written to meet the requirement for the MPA degree and should not be read as an official, internal planning or assessment document. Western's positions at the university, however, gave him access to institutional data and policy statements that allow him to examine the larger implications of Montana State's (then recent) administrative decision to capitalize on its research mission. Western asked in his introduction, "What kind of research program is consistent with the aims, responsibilities and potential capabilities of Montana State University?" (1984, p. 4). He concluded this first chapter with a warning that may be correctly viewed as the purpose of the current study to assess: "The institution [Montana State] is cautioned that to base an overall survival strategy on an expanded research program is risky," (1984, p. 6).

Western's paper was submitted during a time when funded research at Montana State University, although historically high, experienced a slight dip. He begins his recording of Montana State University's funded research activity in 1947, with an award of a \$13,000 grant from a private company and adds that it was not until 1965 that Montana State University generated \$1 million in grant and contract expenditures (1984, p. 13). Following the funded research trend at Montana State University, Western reports its growth from 1970, when it amounted to \$1.3 million and 1980, after it had increased to \$6.7 million and then to \$7.7 million in 1981 (1994, p. 13). "However, this dropped in 1982 to \$6.8 million and again in 1983 to \$6.75 million...Significantly, the decline accompanied a drop in federal support of program activity from 75 percent in 1980 to 65 percent in 1983. The drop in research and program funding after years of steady growth is an ominous sign for Montana State University, which has set its sights high..." (Western, 1984, p. 13). Dr. John W. Jutila, Vice President for Research, in whose office Western interned, specifically defined those "sights" in his supplement to Montana State University's 1980 self-study report. Planning for the period of 1980 to 1985, Jutila set a goal of \$18 million in grants and contracts income (1980). In hindsight, this turned out to be above Montana State's capacity at the time to attract; that amount was still not quite reached in 1989, when grant and contract activity was about \$15 million, the year that begins the current study's focus. The rate of growth in the following decade did easily

match that of Jutila's earlier expectations, with grants and contracts activity reaching \$50 million in 1999.

In addition to ambitious expectations for growth in grants and contracts, Jutila called for "increased research space totaling 200,000 square feet" and "at least 100 new research professionals added to staff," as well as a number of other specific, research-promoting goals for Montana State University by 1985 (Jutila, 1980). In concluding his reporting of Montana State University's research goals, as officially articulated by Jutila, Western noted that:

The institution may soon be faced with decisions about which disciplines to emphasize in terms of research and which to neglect for funding. The setting of the five-year goals directs the university toward the area of natural sciences and engineering, leaving perhaps only the question of which programs and curriculums in these areas will flourish (1984, p. 18).

Western cited Gross and Bramsch who reported that the decision to emphasize research carries certain costs:

There are definite and predictable sets of goals, which characterize universities of high and low productivity. High productivity means focusing on research and graduate study and placing less emphasis upon traditional goals such as producing well-rounded students, loyalty to the local institution, or satisfying the needs of persons in the local areas (Western, 1984, p. 19).

Balderson wrote of the "inevitable tension" at research universities between the education of undergraduates and graduate students, "for few universities have established a

graduate faculty separate from the faculty that teaches undergraduates," (1995, p. 243). Montana State University does not have separate faculties, though the number of faculty on 100 percent research appointments (i.e., without teaching or service duties) has reportedly increased dramatically between 1989-1999, from 10 to 50 (see qualitative results, ch.4). Further, the dramatic increase in the employment of postdoctoral researchers on campus during the same period may be seen as fulfilling the increase in "research professionals" on staff called for by Jutila back in 1980.

The costs that concerned Western at Montana State University have been expressed more recently on a national perspective. The President's Council of Advisors on Science and Technology warned that "[It] is unreasonable to expect that the system of research-intensive universities will continue to grow" and that it is "ill-advised" for such universities "to aspire to excel in all or most areas of scholarship," (Bromley, 1992). Western acknowledges the necessary and transforming changes that have occurred at Land Grant Universities since their creation by the Morrill Act of 1862, but "what remains unchanged are the concepts and values that comprise these institutions and continue to guide faculty and administrators," (1984, p. 19).

Based on numerous interviews with former Montana State administrators, Montana State University historian Dr. Pierce Mullen reported that increased dependence on federal grant monies for scientific research distracts faculty from the university's

instructional mission (1992, p.243). Mullen writes that "science departments have experienced increasing tension as faculty members have become more and more deeply involved in their own research and less and less concerned with both the undergraduate and graduate teaching missions of the university," (1992, p.243).

On the national level, Clark Kerr has cited the increase in federal research funding as contributing to the distraction of university faculty away from undergraduate instruction (1991). Sponsored to study the problem by the Carnegie Foundation for the Advancement of Teaching, Boyer argued for a multifaceted definition of scholarship that included an emphasis on the "scholarship of teaching," as well as the "scholarship of discovery," or, research (1990). The Boyer Commission on Educating Undergraduates in the Research University then reported its recommendations to invigorate undergraduate education in the face of increased university research activity in "Reinventing Undergraduate Education: A Blueprint for America's Research Universities." Both Boyer and Kerr presume to protect undergraduate education from the expansion of funded university research, which is otherwise assumed to benefit graduate education. This study examines that assumption in the particular case of Montana State University. Did funded research benefit Montana State University doctoral students during the strong 1989-1999 growth in funded research activity at the University?

Previous Methodologies Used for Problem

Studies of doctoral programs have been hampered by a dearth of data, both institutional and national. This has been explained by the wide variety of departmental approaches to doctoral programs, and by the administrative weakness of graduate deans (Geiger, 1993; Lovitts, 2001, pp. 8-10; Goldman & Williams, 2000, pp. 71-72; Damrosch, 1995, pp. 143-144; Grigg, 1965, pp. 105-109; Cartter, 1996, pp. 4-5; Breneman, 1975: pp. 73-75). "Doctoral education has been perhaps the most anarchic area of American higher education," (Geiger, 1993, p. 221). Researchers of doctoral programs have used quantitative measurements using "input" (i.e., admitted students) and "output" (i.e., doctorates awarded) models for assessing program quality and efficiency (Breneman, 1975; Bowen & Rundenstine, 1992; Krohn, 1992). Historical studies of American doctoral programs, which attempt to explain current conditions based upon the origins of those programs, are numerous (Whitehead, 1932; Hofstadter & Metzger, 1955; Barzun, 1968; Kennedy, 1997; Graham & Diamond, 1997; Pelikan, 1983; Damrosch, 1995; Grigg, 1965; Geiger, 1993; Williams, 1991; Western, 1984). Faculty surveys of graduate program quality, which include both quantified data from those surveys as well as qualitative interviews with faculty members, appeared in the literature (Cartter, 1966; Serow & Demery, 1999).

Lovitts' research focused on interviews and surveys of graduate students themselves, on the premise that 40 years of ignoring high attrition rates among doctoral candidates by university departments and administrations called for an examination of the candidates' self-reported reasons for their attrition (2001). Management models for analyzing the proper administration of higher education have also been employed to address challenges that have traditionally remained in the academic sphere (Balderston, 1995; Peterson, Dill, Mets, et. al., 1997). Financial data that attempt to reveal the relationship between federally funded university research and its impact upon other institutional missions have been collected and analyzed (Martino, 1992; Goldman & Williams, 2000). One rather unique study establishes the apparently close connection between Nobel Prize-winning researchers and the likelihood of their research apprentices (i.e., graduate students and postdoctoral researchers) going on to win the prestigious award themselves (Zuckerman, 1977). Although not strictly scholarly works, state commissions on higher education and institutional self-studies for accreditation purposes should not be ignored in the literature of assessing doctoral programs (Taylor, 1974; Mudd, 1990; Evaluation Committee Report, 1999).

Geiger's historical treatment of American research universities since World War II describes in great legislative and policy detail how universities were called upon to support the war effort and then encouraged by the federal government to continue to

serve national peacetime needs (1993). Wartime needs of the nation set focused objectives for federally selected universities and research teams (e.g., the development of the atomic bomb). A significant break in the tradition of assigning projects to individual universities came in the funding practices developed by the Office of Naval Research (ONR) (1993, pp. 23-25). ONR was not a significant participant among the U.S. military branches in the funding of wartime university research.

In 1945, seeking to increase the Navy's share of university-conducted research, ONR initiated two significant changes from the wartime funding of university research. These changes were intended to appeal to the existing culture of scientific researchers at American universities, in order to compete with other branches of the military already entrenched in the employment of university research. One change by ONR was to allow university researchers themselves to propose topics for funded investigation, rather than to allow the topics to be directed from a centralized Navy office. The other was to agree that the research funded by ONR would be unclassified and publishable. In shifting the control of research to university scientists, ONR did indeed attract the interests and work of scientists at leading U.S. research universities, showing that the ideals of Vannevar Bush had an eminent practicality.

In the early 1950s Cold War fears turned some American state and federal officeholders, most notably Senator McCarthy, into domestic "red" (i.e., Communist)

hunters (Geiger, 1993, pp. 37-40). As in other employment sectors of the U.S. economy during those times, university faculties were required to sign oaths of loyalty and appear before state and national committee hearings to swear that they were not Communists. In 1953, Congress subpoenaed over 100 university teachers, and at least 30 were fired from their positions after testifying (Geiger, 1993, p. 39). Such numbers themselves hardly warrant an interpretation of major disruption at American universities. Geiger, however, cited instances of serious academic harm (such as at the University of Illinois) and a more pervasive if less ostensible increase in the level of federal influence on the supposed autonomy of university faculty (1993, p. 40).

In his historical analysis of graduate education since World War II, when federally funded university research began to boom, Geiger notes that about 3,000 earned doctorates per year were awarded just before the war and climbed rapidly to almost 9,000 in the mid-1950s (1993, p. 217). By the mid-1970s, American research universities awarded over 33,000 doctorates, peaking in 1973 at 34,790 degrees. Geiger uses baby-boom demographics to partly explain this explosive expansion of the supply of doctorates to meet the teaching demands of growing university enrollments. He points out that while a few prominent scholars warned against seeing the apparent shortage of university teachers as a crisis, this is in fact how it was perceived by most analysts throughout the 1960s (1993, p. 218). Geiger describes the willingness of American universities to vastly

expand their doctoral cohorts as driven by an incentive “to do well for themselves by doing good for the country,” since new or expanded doctoral programs increased the prestige of an institution (1993, p. 218).

In fact, Geiger notes doctoral programs had been expanding since World War II. “In 1949, just over 100 regular universities awarded doctoral degrees. By 1970, after doctorates had expanded over six-fold, the number of doctoral institutions had doubled. At least 35 universities conferred their first doctorates in the 1950s and 45 more in the 1960s,” (Geiger, 1993, p. 219). Research-oriented universities meanwhile worried about the quality of doctoral education (Carter, 1966, pp. 119-121). Geiger reports that the top 15 universities in 1925 graduated 76 percent of the total number of doctorates awarded in the U.S., while in 1957 their share had been reduced to 43 percent (1993, p. 219). Based upon such data, federal and private foundations responded to the presumption of erosion of graduate education quality by awarding grants directly to the most qualified doctoral candidates rather than to the graduate school in which they were to be enrolled (Geiger, 1993, pp. 219-221). These foundations also supplied “cost of instruction” funds to the institutions chosen by the grant-supported doctoral candidates, which invariably ranked in the top tier of recognized research universities (Geiger, 1993, p. 221).

Geiger states that increases in federal research funding “should have brought about at least a doubling of research assistantships in the 1960s,” though data available

for that period are "uncertain," (1993, p. 222). Geiger tempers his tacit assumption that the data would show research funding supported graduate research assistantships in the 1960s by pointing out that teaching assistantships rose more rapidly than enrollments from the late 1950s to the mid-1960s, at both public and private institutions (1993, p. 222). This he explains by the use of graduate students to teach lower level courses, noting that even the prestigious University of California at Berkeley and the University of Michigan employed graduate teaching assistants to teach more than 40 percent of their lower division courses (1993, p. 222).

While Geiger does not explicitly connect the rise in federal research funding at universities with the trend toward using graduate students to teach, the connection is implicit. As university faculty became busy with increased research work, federally funded, then graduate students, also in part federally funded, could be used to fill in for them in the classroom. Geiger states that in the midst of this era of increased financial support for graduate students (either by fellowships, state and/or federal support in the form of research and teaching assistantships, and tuition waivers), two major problems were recognized at the time: longer time to degree and doctoral attrition rates (1993, pp. 224-229).

Geiger attributes the lack of decrease in the time to degree for doctoral candidates, despite increased financial support for them in the 1960s, to the fact that support was

focused toward supporting the start of graduate study rather than toward its completion (1993, p. 224). A combination of the lack of support for ABDs (all but dissertation) and their attractiveness as instructors at universities with increased enrollment (where they concurrently and, often, over an increasing length of time, completed their dissertations), prolonged the time to degree (especially in the humanities and social sciences). Geiger stresses the “perverse and rational” behavior of academic departments that recruited a large cohort of doctoral candidates with a lengthened time to degree and high rate of attrition (1993, p. 225).

A larger population of graduate students yielded further benefits in advanced classes to teach and [serve as] graduate assistants...Departments consequently had strong incentives to expand their recruitment of graduate students as long as qualified applicants were available. The constraint they faced was on the output side. Only those Ph.D.s who were placed into other strong departments conferred prestige upon their mentors. Producing too many doctorates, and seeing them forced to accept employment in undistinguished, non-research institutions, would soon diminish the reputation of a department and its members, (Geiger, 1993, p. 225).

Geiger reports that the attrition rate for qualified doctoral students in the 1960s was 75 percent in the humanities, 70 percent in the social sciences and 40 percent in the natural sciences (1993, p. 226). Again, Geiger turns to prestige to explain institutional complacency toward these levels of attrition, which continue to the present (Lovitts, 2001, p. 23). “One reason [for complacency about attrition] was that enhancing prestige, whatever its undesirable incidental effects, was an inherent goal of research universities

as well as of their faculty members. This shared purpose was just one of the reasons why graduate education proved so recalcitrant to reforms," (Geiger, 1993, p. 227).

Alfred North Whitehead addressed many distinguished academic audiences about the purpose of the university, as schools of education and schools of research fruitfully combined. In these addresses and in his writing, Whitehead draws upon an intimate knowledge of the history of the development of academic curriculum and institutions, both in the U.S. and abroad. In the *Atlantic Monthly*, Whitehead wrote, "The justification for a university is that it preserves the connection between knowledge and the zest of life, by uniting the young and the old in the imaginative consideration of learning," (Whitehead, 1932, p. 139). He goes on to say that the uniting of education and research must be the purpose of any efficient faculty, adding:

Do you want your teachers to be imaginative? Then encourage them to do research. Do you want your researchers to be imaginative? Then bring them into intellectual sympathy with the young at the most eager, imaginative period of life, when intellects are just entering upon their mature discipline. Make your researchers explain themselves to active minds, plastic and with the world before them; make your young students crown their period of intellectual acquisition by some contact with minds gifted with experience of intellectual adventure, (Whitehead, 1932, pp. 146-147).

The American research university, particularly the land-grant university, has a focus on the commercial and social application of research that the German ideals of *Lehrfreiheit* (academic freedom of faculty) and *Lehrnfreiheit* (academic freedom of

students) does not entirely account for. The historical progress of *Wissenschaft* (Science) developed in the German system of higher education was almost entirely turned over to the freely pursued academic activities of university faculty and their students, without any significant pressure from administrative, social or commercial needs (Hofstadter & Metzger, 1955, pp. 382-387). Service as an academic duty is largely an American creation (Kennedy, 1997). It emerged from both a different appointment system for American faculty, where institutional loyalty is the expectation, and from U.S. industrial interests in training a workforce and applying university research to solve industrial problems (Hofstadter & Metzger, 1955, pp. 380-381). The focus on practical production rather than pure science (*Wissenschaft*) at American universities is alternatively told as either the greatest success story of academia or the cause of vast institutional problems (Graham & Diamond, 1997; Barzun, 1968, pp. 251-258).

Any interpretation of the condition of American universities, individually or collectively, ultimately resides in a value judgement. Allan Cartter was one of the first prominent researchers in the field of database assessment of quality in graduate education. In an early work, he wrote that "In an operational sense, quality *is* [emphasis in the original] someone's subjective assessment, for there is no way of objectively measuring what is in essence an attribute of value," (Cartter, 1966, p. 4). Whitehead

appears to have recognized the tendency toward measurable and applicable production at the American institutions he addressed. He writes:

It must not be supposed that the output of a university in the form of original ideas is solely to be measured by printed papers and books labeled with the names of their authors. Mankind is as individual in its mode of output as in the substance of its thoughts. For some of the most fertile minds composition in writing, or in a form reducible to writing, seems to be an impossibility. In every faculty you will find that some of the more brilliant teachers are not among those who publish. Their originality requires for its expression direct intercourse with their pupils in the form of lectures, or of personal discussion. Such men exercise an immense influence; and yet, after the generation of their pupils has passed away, they sleep among the innumerable unthanked benefactors of humanity. Fortunately, one of them is immortal—Socrates, (Whitehead, 1932, pp. 148-149).

While an assessment of graduate school quality may come down to a judgement about the purpose and value of higher education, many historical treatments of the development and operation of graduate programs rely upon analyses of institutional data. Using survey data from university administrators, faculty and students, Grigg noted that much criticism of graduate education has centered on the practice of training students for research rather than for teaching (Grigg, 1965). Among those criticisms has been the length of the doctoral program and the notion of the dissertation as an original piece of research (rather than as a training instrument). The diffuse nature of responsibility for graduate programs among individual departments has made it difficult for American graduate schools to address criticisms that focus on the nature of graduate education as a

whole. Given the responsibility of awarding graduate degrees without a faculty of its own, many graduate colleges form graduate councils made up of diverse faculty members, who formulate the rules and regulations for degree programs. Significantly, graduate councils appear rarely to initiate changes or innovations, but rather, mostly handle issues that originate in the academic departments of the university (Grigg, 1965).

Grigg discussed minimum standards for doctoral programs in the areas of administration, faculty, library, facilities and student body; however, he noted that most faculty members who teach graduate students and serve on graduate councils have other institutional concerns, largely relating to their own respective departments (Grigg, 1965). Graduate deans, advised by faculty councils, rarely possess the administrative power to affect departmental behavior regarding graduate education, largely because they control no significant portion of the university budget (Breneman, 1975). "Because of this limited budget authority, it is unrealistic to expect the dean's office to be a powerful force for change in graduate education," (Breneman, 1975, p. 73).

Related Problems

Former Montana State University President Michael Malone created the Quality and Outcomes Task Force in the fall of 1994. At the urging of the Montana Commissioner of Higher Education in the spring of 1995, "Productivity" was added to

the goals of the task force, leading to the Productivity, Quality and Outcomes (PQ&O) Agreement. The Governor of Montana, the Chairman of the Board of Regents, the Commissioner of Higher Education and the President of Montana State University signed this agreement on September 29, 1995. Its implementation was placed under the direction of Montana State's Provost and Vice President for Academic Affairs, who directed committees and appointed task forces to address specific issues in the agreement (Malone, 1997). After rejecting in the summer of 1995 a draft Agreement approved by Montana State's Faculty Council, then-Commissioner Jeffrey Baker added two goals that were considered part of the Agreement by the September 29 cosigners: a 15 percent increase in undergraduate instruction, and an annual 15 percent increase in research. Instruction would be measured by class credits per instructional FTE (full-time equivalent, for tenured and tenure-track faculty). Research would be measured by annual funded research (grant and contract activity). The baseline for both these measurements would be fiscal year 1993. The other goals of the Agreement were to:

1. Increase Access to Undergraduate Education
2. Increase the Quality and Availability of Advising
3. Increase the Quality of Undergraduate Education Through Smaller Classes and Through Active and Alternative Modes of Learning
4. Increase the Quality of Undergraduate Education Through Expanded Involvement of Undergraduates in Research and Creative Work
5. Increase the Quality of Education Through Greater Access to Information Technologies Reward and Further Develop Teaching Excellence

6. Continue Growth in External Funding Support for Student Learning and Education
7. Expand Off-Campus Access to Classes and Educational Resources Throughout Montana
8. Enhance Access to the Intellectual and Physical Resources of the University to Support the Economic Development of Montana

In his October 13 cover memorandum to the submission of the 1997 PQ&O Interim Report, then-President Michael Malone wrote the Commissioner of Higher Education that "I am especially concerned that the record seems to indicate that we are failing to enhance the Instructional portion of our budget," (Malone, 1997). Malone went on to explain at some length the University's significant use of its "discretionary" expenditures as opposed to its "fixed costs" and "fee waivers." Malone wrote:

When adjustments are made for these factors [i.e., fixed costs and fee waivers], the percentage of discretionary investments in the Instructional sector has remained virtually unchanged from 62.74 percent in FY 1993 to 62.73 percent in FY 1997. We are finding it very frustrating that investments in improved Instruction, such as wiring of academic buildings, classroom improvements, and library investments, are actually undercutting this measurement standard. While this explanation still does not enlarge the percentage of Instructional funding, we are hopeful that this can occur in the future..." (1997).

The PQ&O Agreement is related to this study because it attempts to analyze instructional quality at Montana State University, albeit largely at the undergraduate level. In negotiating the standards and measurements in the Agreement with Commissioner of Higher Education Baker, Montana State University President Malone

proposed in a September 1, 1995, memorandum to reduce the 1993 baseline for class credits per faculty FTE from 14.3. "Because the focus of the Montana State University document is upon undergraduate instruction, we recommend that, using the FY 1994 teaching load study, we break out the undergraduate proportion of the teaching load total, which is 12.17 class credits per FTE," (Malone, 1995). Based upon Malone's reference to the 14.3 class credits per FTE baseline in the submission of the 1997 PQ&O Interim Report, it appears that Malone's 1995 proposal of 12.17 class credits per FTE was not adopted in the final PQ&O Agreement. The negotiation between Malone and Baker regarding a baseline for the measurement of faculty productivity at Montana State University for the PQ&O Agreement is significant to this study because an operational, institutional consideration of faculty workload emerges.

When faculty workload is formally addressed later in the September 1, 1995, draft of the PQ&O Agreement, the three components of teaching, research and service of a public, land-grant institution are invoked. "This document concentrates on the undergraduate teaching component, and the creation of new knowledge (research), but the other components must be kept in mind, for they are integral parts of the faculty workload at Montana State University-Bozeman and not always separable from one another," (Malone, 1995, p. 6). This note of philosophical caution in an administrative document attempting to practically define faculty workload resonates with the literature

reviewed here on the history of combining teaching and research in institutions of higher education. The drafters of the PQ&O Agreement at Montana State University appear to have understood that the political impetus outside the university behind the formulation of the Agreement may cost the institution more than will be measured by the Agreement's standards. They write:

We emphasize that the faculty at MSU-Bozeman already has a full (100 percent) workload as measured by any reasonable standards. Therefore, the workload implications of this document reflect a reallocation of resources and reaffirmation of commitment to quality and access in the undergraduate programs. The result is a shifting of effort toward undergraduate teaching...while not reducing efforts to meet the scholarly or service missions of the institution (1995, p. 6).

If the premise of this statement is accepted, namely, that faculty are at a full workload, then any shifting of resources to undergraduate teaching, while holding commitments to scholarly (research) and service missions constant, must necessarily remove resources from some part of the university. Graduate education at Montana State University goes notably unmentioned in this excerpt from the Agreement. The PQ&O Agreement, with its explicit emphasis on faculty workload in relation to undergraduate education at MSU, on the whole has little to say regarding graduate education. This is significant because the Agreement, in its statement of intent, attempts to "match what the collective-bargaining campuses have produced, in a non-unionized context," (Malone, 1995).

Whether in a unionized or non-unionized context, it may be relevant to this study to ask who represented Montana State's College of Graduate Studies at the PQ&O bargaining table? According to his September 1, 1995 memorandum to Commissioner Baker, President Malone offered to separate graduate courses from the definition of faculty workload in order to begin the Agreement with a lower baseline measurement of course credits per faculty FTE. Since there is no separate graduate faculty at Montana State University, it would appear that Malone's proposal for the PQ&O Agreement would have altogether removed graduate instruction from the definition of faculty workload at Montana State University. While the baseline figure adopted in the final PQ&O Agreement of September 29, 1995 appears to include graduate instruction, the implications for failing to leave any significant place for graduate education in the PQ&O Agreement is related to the focus of this study.

Faculties at several Montana university campuses are unionized, including the University of Montana-Missoula, though Montana State University's faculty (Bozeman) is not. The state affiliates of two national organizers of university faculty in Montana, the National Education Association and the American Federation of Teachers (affiliated with the AFL-CIO) merged in September 2000. This organization, MEA-MFT, also affiliated with the AFL-CIO, now represents most unionized higher education faculty in Montana, as well as most unionized Montana K-12 teachers. The significance of this development

to this study pertains to two issues. The first is that the new organization, even before it formally merged, has taken the quality of Montana higher education as its rallying cry. "The quality of education at the university system is in serious trouble, and negotiations are the key to reversing the decline in quality," (Minow, 1999, p. 1). Whether or not this organizing strategy reaches sympathetic faculty ears at Montana State University, negotiated bargaining agreements are applied to Montana State University's faculty because they are reached with the Montana University System.

The Montana Board of Regents recognizes the University Teachers' Union (UTU) of the University of Montana as the exclusive bargaining representative "for all persons on academic appointment to the rank of instructor, assistant professor, associate professor, professor, and all others on any academic appointment..." (University Teachers Union Bargaining Agreement, 1999, p. 4). Specifically, negotiated agreements on workload definitions for Montana university faculty are recognized by the Montana University System. In the current agreement with the UTU, "instructional workload will also be measured through a workload protocol to be developed by the parties, which better reflects the full range of instructional activities," (UTU Bargaining Agreement, 1999, p. 99). Whether or not Montana State faculty themselves organize into a collective bargaining unit, the Montana University System through the Board of Regents will be legally bound to apply its negotiated definitions of faculty workload in administrative

policies to Montana State University. As with the PQ&O Agreement of 1995, the implications of any negotiated agreement with UTU on faculty workload definitions may be related to the focus of this study.

Montana State University, or Montana State College as it was then known, had a small but vocal chapter of members who organized in the late 1940s (Rydell, Safford & Mullen, 1992, p. 76). A collective bargaining initiative under the American Association of University Professors (AAUP) platform was voted down on May 18, 1978 at Montana State University (Rydell, Safford & Mullen, 1992). In 1989, MSU faculty again voted down an initiative to unionize (Rydell, Safford & Mullen, 1992). In other parts of the United States, increased graduate student organization by unions has been reported (Bronfenbrenner & Juravich, 2001). While no evidence of this is apparent at Montana State University, the 1999 accreditation report states that graduate "stipends are lean at MSU and should be increased to at least a level that keeps pace with the cost of living," (Commission on Colleges, 1999). Because of the implications of negotiated bargaining agreements on university policies treating faculty or graduate student workload, potential unionization of either faculty or graduate students at Montana State may be related to the focus of this study.

