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Program theory of a USDA grants program for use in evaluation based on quantitative content analysis and oral history narrative analysis

Elena Yu Polush
Iowa State University

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Program theory of a USDA grants program for use in evaluation based on
quantitative content analysis and oral history narrative analysis

by

Elena Yu. Polush

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Agricultural Education

Program of Study Committee:
Nancy Grudens-Schuck, Co-major Professor
Carl W. Roberts, Co-major Professor
Robert A. Martin
David G. Acker
Emily L. Moore
Mack C. Shelley
Henry M. Bahn

Iowa State University

Ames, Iowa

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Abstract

This research was conceived on the premise that a good evaluation plan for a program begins with explicating the program's essential conceptual underpinnings, namely the program theory. Theory-based evaluation is generally recognized as enhancing the quality of evaluation. However, the theory-based approach remains underutilized in evaluation of federal competitive grants programs. The goal of the research was to depict a coherent description of program theory for the Higher Education Challenge (HEC) grants program grounded on core aspects of theories developed in two studies. The research used quantitative content analysis to systematically study the texts of Request for Application (RFA) for the HEC grants program. The analysis centered on examining linear changes and continuity in emphasis during eleven years of the HEC's implementation. Eight themes were identified indicating trends toward continuity and changes. These themes were used to draw inferences about the HEC's program theory. The research also employed an oral history study to describe the HEC program developers' assumptions about a rationale for the way this program was structured. Utilizing narrative analysis, six program's intentionalities were identified. These intentionalities were used to describe the HEC's program theory and map eight chains of positive consequences to explain how the HEC grants program was intended to bring about its effects. The findings of both studies were used to construct a coherent depiction of the HEC's program theory and develop recommendations to inform this program's evaluation.

Keywords: *agricultural education; competitive grants program; content analysis; evaluation; oral history; program theory; US Department of Agriculture*

CHAPTER 1. INTRODUCTION

Introduction

The prime role of the federal government in the U.S. is to provide for public goods. According to Cooper (2003), the federal government continues to be one of the largest buyers of goods and services in the U.S. There are two mechanisms that the federal government uses to purchase goods. They are procurement contracts and the federal government assistance systems. Each mechanism has a long history of legal relations that has evolved over time. The federal government uses an assistance mechanism to promote and attain national priorities. The tradition of the federal government assistance system originates in the Constitution (Allen, Winchester, & Charles, 2004).

Federal assistance system

The federal assistance system is defined as “aid, whether in the form of money, services, facilities or other help, provided by the federal government to states and local governments, educational institutions, medical institutions and other organizations for a ‘public purpose of support and stimulation,’ i.e. the purpose of promoting or furthering the public good or general welfare” (Allen, Winchester, & Charles, 2004, p. 2). The federal assistance system is governed by a rich body of legislation and regulations that serves the purpose of (1) establishing assistance authorities and (2) delegating the discretion to federal agencies to enter into assistance relationships with designated or selected grantees to implement projects. A competitive grants program and cooperative agreement are the two major funding mechanisms of the federal assistance system.

Nowadays, the federal assistance system constitutes a substantial share of federal appropriations. To illustrate this point, in fiscal year (FY) 2006 there were 1,636 federal domestic assistance programs available representing close to \$2 trillion worth of federal allocations (Ashworth, 2006). The *Catalog of Domestic Assistance* specifies 15 types of federal assistance, with approximately 2,000

programs administered by the 26 federal grant-making agencies (Allen, Winchester, & Charles, 2004). Further, grants program is the largest and fastest growing component of the federal assistance system. Grants are distinguished by (a) purpose, a.k.a. categorical grants (formula and project grants), (b) entitlement (mandatory versus discretionary), or (c) funding requirement (funded entirely or partially by the federal government, continuation grant).

Based on the recent congressional trends (i.e., debates about formula funds and special grants, called “earmarks”), a bigger share of funding in the future most likely will continue to go into grants awarded competitively. Competitive grants are called discretionary grants. Discretionary grants are “when the grantor Agency either has the discretion to select whether to award assistance agreement at all, or, if it must award assistance agreements, it has the discretion to select the Recipients” (Allen, Winchester, & Charles, 2004, p. 10-3). There appear to be no government-wide requirements for competition in the selection of discretionary awards. The process is primarily driven by the agencies “either because of statutory requirements, or a desire to be fair and select the best Recipients” (p. 11-1). In other words, competitive grants are mechanisms aimed at encouraging participation for funding among a wide range of the most highly-qualified performers (i.e., applicants). Hence, a review of the merits of applications by using evaluation and selection criteria is an inseparable component of this process.

Understanding the history of the federal grants management system is important, because this knowledge provides greater insight into the underlying assumptions of a federal competitive grants program, which was the focus of this study. The most important historical milestones of the federal grants management system (with the emphasis on grants) are discussed below.

Federal grants management system

Cooper (2003) provides a comprehensive overview of the economic development of the United States. He argues that the reliance of the federal government on itself for meeting its own needs and providing for public goods

gradually shifted to the private sector as the country continued its development throughout the course of history. These changes ultimately resulted in establishing a procurement by contract system. However, not all of the transfers were accommodated via the private sector; the federal government also passed some of its functions to the states. “In such instances, the Federal Government attempted to entice the states to act in support of certain federal priorities by offering federal assistance” (Allen, Winchester, & Charles, 2004, p. 2-2).

The beginning of the 19th century can be regarded as the historical milestone of the grants program inception within the federal assistance system. For example, settlement of the lands in the West gave birth to the first assistance programs that were in the form of real estate–type grants rather than actual money. Those programs were the precursors of two important legislations: the Homestead Act and the Land-Grant Act of 1862. After the establishment of the land-grant system for higher education under the Morrill Act of 1862, the Hatch Act of 1887 provided provisions to subsidize state agricultural experiment stations aimed at the development of agricultural research in those institutions and states. The Hatch Act marked the expansion of federal assistance from grants of land to grants of services, facilities, money and other aid, as well as encouragement of research (Allen, Winchester, & Charles, 2004). The culminating point of the progression of federal assistance and the formation of its programs is constituted by the “grant-in-aid” programs of 1930s.

The establishment of the National Cancer Institute in the 1930s and the National Science Foundation in the 1950s marked the beginning and the acceptance of research grants as a funding mechanism to support fundamental research in place of the procurement contract. Further, the Grant Act of 1958 enabled other agencies that did not have grant making legislative authority to award research grants. That promoted a tremendous growth in the size and scope of federal grants programs in the 1960s and 1970s. This was the era of grand–scale programs supported by federal funding under the policies of the “War on Poverty” and the “Great Society” (Rossi, Lipsey, & Freeman, 1999). As grants continued multiplying,

so did the need for federal oversight aimed at effective management of funds. Congress was concerned about the state of federal assistance practices, which entailed an enormous number of policies, more technical assistance, specific and detail oriented programs, and huge state bureaucracies.

The Federal Grant and Cooperative Agreement Act of 1977 was enacted to reform the federal assistance system. The act contained language and identified federal assistance as one of the federal funding mechanisms. The terms “grants” and “cooperative agreements” were also officially defined. Congress characterized the act as “an initial step to eliminate the ineffectiveness and waste resulting from confusion over the definition and understanding of legal instruments used to carry out transactions and reflect basic relationships between the Federal Government and non-Federal entities” (Allen, Winchester, & Charles, 2004, p. 4-2).

In the 1980s the emphasis was on deregulation and federal oversight. There were ongoing debates in Congress between the Reagan (Republican) administration and the Democratic-controlled Congress to cut back on federal grant funding, particularly for education, which was believed to be a state prerogative. Further, in 1980, the Health, Education and Welfare Department split into the Department of Health and Human Services and the Department of Education. In addition, the situation between federal agencies and grantees was increasingly tense caused by the abundance of categorical grant programs, increased oversight, and adversity in the relationships among state, local government and federal government (Ashworth, 2006). This situation resulted in less accountability and little cooperation with federal agencies.

In the 1990s the federal effort was on improving the confidence of people in government and strengthening the federal government’s ability to adequately address public needs. Federal programs’ design focused on general goals, while giving more administrative flexibility to grantees to accomplish specific objectives using federal grant funds. With the passage of the Government Performance and Results Act of 1993, the emphasis shifted towards federal agencies demonstrating their program efficiency and effectiveness using empirical evidence (quantifiable

measures) based on project accomplishments. Increasingly, agencies required greater internal accountability for results from grantees as a way to demonstrate the sufficiency of their own performance (Ashworth, 2006).

This effort led to duplicative and complex federal administrative requirements. The Federal Financial Management Improvement Act of 1999 was passed by Congress and was aimed at streamlining and improving the effectiveness and performance of federal financial assistance programs (Allen, Winchester, & Charles, 2004). This trend continues at the present time with the passage of other public laws and regulations (e.g., Federal Management Agenda [launched in August 2001], Program Assessment Rating Tool [introduced in 2004], E-Grants Initiative). The charted course aims at governing with accountability (e.g., making federal agencies more accountable, improving reporting systems, promoting results-based program management, and providing objective information).

In brief, these are the most important authorities of the federal assistance system. In addition, there are specific requirements, regulations, guidelines, and instructions that govern the administration of federal assistance programs. These administrative requirements vary from program to program and agency to agency. However, one of the main assumptions of the federal grants system appears to be that the use of federal dollars should leverage or enhance state or local expenditures (i.e., supplement) rather than “free up” states to redirect money to other state or local priorities (i.e., supplant) (Allen, Winchester, & Charles, 2004; see also Ashworth, 2006).

Each year the federal government awards grants for conducting most of the nation’s educational, health, social welfare, housing, environmental, criminal justice and transportation programs (Allen, Winchester, & Charles, 2004). Roughly \$400 billion is annually disbursed by the federal government through grants (<http://www.grants.gov/>, retrieved, March 29, 2007). However, this pool of money is not sufficient to address complex and growing national priorities (e.g., in the areas of research, education, health, welfare, and security). For example, the federal government used to support almost 50% of the national research and development

(R&D) effort. During the last decade this figure has decreased to almost 30% according to most recent citations (e.g., National Grants Management Association, 2006). When resources are scarce and emerging needs are rising, answering the questions about “How much?” and “What kinds of programs?” to fund matters greatly.

Consequently, the federal government currently is placing a greater emphasis on enhancing responsible expenditure, namely “transparency” and ensuring receipt of intended benefits by intended users, namely “accountability”. Increasingly, competitive grants program funding is performance based. The availability of “timely, technically sound information for legislative oversight, for program management, and for public awareness . . .” (Chelimsky, Cordray, & Datta, 1989, p. 25) in all governmental programs is important. Evaluation plays a key role in generating this kind of knowledge.

Evaluation

Evaluation is an essential analytical process in humankind’s intellectual and practical endeavors (Scriven, 1991). Coley and Scheinberg (2000) argue that it is through developments in evaluation processes and the application of its strategies in consideration with the program’s environment that “major strides have been made in human service programming” (p. 55). Evaluation has always been an important hallmark of “governing with accountability.” Donaldson and Lipsey (2006) attribute the “first major boom” (p. 56) in evaluation to the birth of large-scale social programs and policies to combat poverty supported by federal funding in the 1960s and early 1970s. According to them, this period also marked the development of “many of our most sophisticated experimental methods, quasi-experimental designs, and data analytic techniques for generalized causal inferences . . . in response to the challenges of determining the net impact of these and subsequent large-scale government programs and policies” (p. 56).

Program theory–based evaluation

The purpose of evaluation is typically considered as a process of generating knowledge about the *merit*, *worth*, and *value* of a program or service, called an “evaluand,” that can be used for the betterment of its intended users. Evaluation as a field of practice is experiencing a second boom, one which promotes the role of theories in evaluation practice (Donaldson & Lipsey, 2006). One of the field’s theoretical advancements is “program theory–based evaluation,” which is an approach that “focuses on the nature of evaluand itself” (p. 64). Program theory is defined as a process for identification of mediators of success, discovery of people’s latent theories, and illustration of chains of causal linkages, to list but a few of the ways evaluators refer to program theory (Buckman, 1987; Chen, 2005; Rogers, Hacsı, Petrosino, & Huebner, 2000; Weiss, 1998). Scriven (1998) suggests (although arguing in length that program theory should not always be the main business of evaluators) that “requiring some knowledge of the linkages in the field of the evaluand – although few of them would qualify as theories – is desirable and often essential for good program evaluation” (p. 286).

However, constrained by various circumstances (e.g., time, funding) in practice, it can be argued that evaluators tend to put more emphasis on evaluation rather than the program itself (Weiss, 1998). Weiss claims that paying closer attention to the program is crucial because knowledge about the program guides the evaluation process (i.e., purpose of evaluation, evaluation questions, evaluation design, methods of data collection, data analysis and interpretation, and recommendations). SenGupta (2002) suggests that beginning with a good program theory is one of the missing guiding principles in evaluation practice. He argues that program theory is “one path to make evidence more acceptable and useful for decision–making” (p. 105) aimed at refining and improving the program. Hence, in the era of promoting social benefit, understanding the program’s underlying mechanism (i.e., how the program is supposed to bring about its effects) should be an important part of evaluation, because it leads to evaluation that is sensitive and responsive to the phenomenon of study – the program itself.

The need for program theory is further magnified for evaluations of a federal competitive grants program that utilizes transparency and accountability as main performance descriptors to demonstrate its contribution to addressing social needs. Fixing the measures of program performance on these two descriptors alone limits the evaluation inquiry to the examination of means-ends relations (i.e., “black box”, input/output studies) and underestimates the importance of understanding the knowledge links (i.e., causal links) that tie the program means to ends (Bickman, 1987; Weiss, 1998). Consequently, a common evaluation method is to develop a logic model that depicts links between a program’s resources, activities and outcomes (Taylor–Powell, Jones, & Henert, 2003). Yet, other approaches could be used to better understand the underlying mechanisms presumed to be responsible for these linkages (Leeuw, 2003; see also Harris, 2005; Rogers, 2005; Turnbull, 2002).

Program theory focuses on what is happening inside the black box; that is “the mechanisms that mediate between the delivery (and receipt) of the program and the emergence of the outcome of interest” (Weiss, p. 57). The program theory approach facilitates (a) planning evaluation that is grounded on substantive knowledge about the program and (b) designing evaluation that allows gathering credible evidence aimed at reaching justifiable conclusions and ensuring their use for the program improvements (Donaldson & Lipsey, 2006; see also Chen, 2005). In other words, program theory is a heuristic tool that “allows both knowledge growth and program improvement to occur” at the same time (SenGupta, 2002, p. 106). With this view, the program theory–based approach is a valuable tool for evaluation of a federal competitive grants program that has an established history, and which continuous funding largely depends on determining its merit, worth, and significance.

Research Approach

The researcher studied the Higher Education Challenge (HEC) grants program also referred to as the Challenge Grants program, which is a premier federal competitive grants program in the food and agricultural sciences. The

program is administered by the Higher Education Programs sub-unit in the Science and Education Resources Development (SERD) unit at the Cooperative State Research, Education and Extension Services (CSREES) agency, U.S. Department of Agriculture (USDA). The program is authorized to provide competitive grant funds to colleges and universities to encourage excellence in undergraduate teaching programs in one or more of its target areas, which include (a) improving curricula to meet the needs of scientists and professionals, (b) promoting faculty development to serve students' needs better in knowledge and knowledge acquisition, (c) enhancing instructional delivery systems, and (d) expanding experiential learning opportunities of students. The HEC program was authorized in 1977 and funding became available in 1990.

In light of congressional mandates for validating program performance as a funding criterion, USDA–CSREES has been more actively engaged in program accountability and evaluation currently than at any other time in its history. The Office of Management and Budget's (OMB) Performance Assessment Rating Tool (PART) now requires the agency to respond to specific questions regarding program purpose and design, strategic planning, program management, and program results. CSREES education grants programs tend to be broader in scope than research and extension programs, and are more difficult to align with a specific strategic goal or objective (H. Bahn, personal communication November 10, 2003). Consequently, new conceptual perspectives to program evaluation are viewed as potentially beneficial.

Research goal and objectives

The research main question was, "What constitutes a good evaluation for a competitive grants program?" This study was conceived on the premise that a good program evaluation begins with explicating the program's essential conceptual underpinnings. In other words, the focus of the research was on articulating a program theory for use in future evaluations of HEC. The goal of the research was to produce a coherent description of original conceptions, assumptions, and

expectations that constituted a rationale for the way the HEC grants program was structured and currently operates. In the context of this research, this description was constructed based on the understanding of the HEC developers' perceptions (about how this program would bring about improved effects) that guided their decisions and, ultimately, actions planning this program (Weiss, 1998). The "program developers" – a term used throughout the dissertation – refers to the individuals who originated or acted as staff during the early years of the program. Their names and other identifying characteristics have been kept private in line with ethics of confidentiality, discussed further in a subsequent chapter.

The research specific objectives were:

Objective #1. Identify patterns of both changes and continuity in the HEC program's emphasis over time (i.e., 1995-2005) as depicted in its official documents, specifically within the Request for Application (RFA).

Objective # 2. Determine the HEC developers' beliefs that were the basis of their decisions pertaining to planning for this program's activities.

Objective # 3. Provide a coherent depiction of the HEC's original conceptions and develop recommendations for professional evaluators about potential ways of evaluating the HEC grants program.

Research design

To meet the above–stated objectives of the research, the researcher used two independent studies to develop a description of the HEC's program theory. The researcher's assumption was that different analytical modes of depicting theoretical premises upon which the HEC was grounded would allow (a) having a closer look at the HEC grants program from a variety of perspectives and (b) generating insights that would have been overlooked or considered insignificant under a "one method" approach. Specifically, the researcher was interested in understanding *what* was emphasized (i.e., a descriptive mode) and *why* it was emphasized (i.e., an exploratory mode) as ways of eliciting the HEC's program theory.

The researcher utilized quantitative content analysis to study systematically the texts of Request for Applications (RFAs) for the HEC grants program aimed at providing a description of the HEC's program theory. The researcher also conducted oral history interviews with four participants (i.e., developers) who initiated and built this program. The researcher then used interview narratives to understand the meanings of the HEC developers' experiences. She employed a hermeneutics interpretation in the literary theory tradition of qualitative inquiry to read and interpret the narratives aimed at (a) describing a historical situation within which the program was developed, and (b) constructing a description of the HEC program's underlying mechanisms.

The level of analysis of both studies was at the HEC program level versus the funded-project level. Both studies' analyses were performed within the HEC program's written discourse. Hence, in both studies texts determined the parameters within which the descriptors of the HEC's program theory were developed. The findings of the both studies (i.e., two theories) were then used to depict a coherent description of the HEC's program theory and develop a set of recommendations for a professional evaluator to potentially guide his or her choice of evaluation questions and sources of data.

Designing this study as a multi-method inquiry, the researcher's position was that "everything counted." A perfect method does not exist. The emphasis was on using each method responsibly. That is appreciating the method's abilities (i.e., strengths and limitations) to guide the development of a description of the HEC's program theory within each study. Further, this research was understood as a case study per Yin (2005) because it (1) examined the HEC grants program within its real-life context, (2) addressed both descriptive and explanatory questions, and (3) employed multiple sources of evidence. In addition, this research employed a modified protocol of case study research. One of the characteristics of case study research is that data collection and data analysis are conducted at the same time (Yin, 2003). In this study, the researcher utilized a more traditional approach, namely data in both studies were analyzed after they were collected. Further, it was a

“holistic” case study design. The findings of this design are commonly viewed as being confined within the case itself (Yin, 2003).

CSREES innovation grant

The content analysis and oral history studies were part of a bigger research project titled *Constructing a Program Theory to Support Program Evaluation of the CSREES Higher Education Challenge Grants Competitive Program*. This research project received funding from CSREES in the form of an Innovation Grant for Fiscal Year (FY) 2004, which is the agency’s internal grants program to support innovative and creative partnership projects between the agency and the university community. Professor B. Lynn Jones, in the Department of Agricultural Education and Studies, Iowa State University, was the Project Investigator (PI). Dr. Robert Martin, Chair of the Department of Agricultural Education and Studies and Ms. Elena Polush, doctoral candidate in the Department of Agricultural Education and Studies were co-PIs. The project duration was from July 1, 2004 to October 30, 2006.

The goal of the project was to understand, systematically capture, and articulate the HEC’s program theory in the context of program evaluation as perceived and understood by the prime stakeholders; the project directors at the higher education institutions, program managers in the agency, and member of the peer review panels (including representatives outside the higher education institutions). The project employed qualitative and quantitative approaches within a mixed methods design.

Specifically, the project utilized (a) oral history interviews with four participants, (b) quantitative content analysis of the RFAs texts, (c) interpretive case study with 11 Project Directors (PDs) at Iowa State University (ISU), who received the HEC awards, (d) Delphi study (2 rounds) with 13 participants nationwide, who served on the HEC peer review panels, and (e) telephone survey with 277 PDs nationwide, who had received the HEC awards from 1990 to 2003. Appendix A contains the research project description.

General assumptions

Four main assumptions guided this research overall design. They included:

1. A theory of the HEC grants program existed but was implicit at the start of the study.
2. Program theory approach was presumed to lead to the development of a more insightful evaluation for the HEC grants program.
3. Utilizing both qualitative and quantitative methods was assumed to aid a better understanding of the HEC's program theory.
4. The researcher was an "instrument" in both studies.

Further, each study (i.e., content analysis and oral history) had specific assumptions that are provided in the respective chapters that follow.

Definition of Terms

Black box evaluation: "An evaluation that mainly assesses the relationship between intervention and outcome" (Chen, 2005, p. 43).

Developer: One who establishes or one who lays a foundation of a program, also an author or one from whom anything originates. Used in this research as "program developer" and may be interchanged with "participant" within the oral history study.

Dictionary (in content analysis study): "A list of words or phrases associated with theoretical concept of interest" (Shapiro, 1997, p. 225).

Discourse: "Actual practices of talking and writing" (Phillips & Hardy, 2002, p. 3).

Evaluand: A generic term for what is being evaluated (e.g., person, program, project, product, performance, etc.) (Scriven, 1991).

Evaluation: "The systematic assessment of the operation and/or outcomes of a program or policy, compared to explicit or implicit standards, in order to contribute to the improvement of the program or policy" (Weiss, 1998, p. 330).

Hermeneutics: "Originally denoting the theory of interpretations of the Scriptures, it is now used more generally to signify the philosophy and theory of interpretation" (Czarniawska, 2004, p. 139).

Matching funds: Also known as cost-sharing, this is a requirement for a recipient of a federal award to contribute (or match the government's contribution) a portion of the total project cost. Most cost sharing is based on statute or legislative intent. The match required may be 50-50 or any other mix as specified in the governing legislation (Allen, Winchester, & Charles, 2004).

Narrative: Broadly defined, narratives are people's stories produced in a variety of genres (Czarniawska, 2004).

Program: "A structured intervention to improve the well-being of people, groups, organizations, or communities. Program varies in size, scope, duration, and clarity and specificity of goals" (Weiss, 1998, p. 335).

Program theory: "The set of beliefs that underlie action" (Weiss, 1998, p. 55).

Qualitative research: An umbrella term that encompasses several philosophical or theoretical orientations (the most common being interpretive, critical, and postmodern) that have a common thread of the search for meaning and understanding that, in turn, are socially constructed by individuals in interaction with their world (Merriam & Associates, 2002).

Quantitative content analysis: Mapping non-numerical statements into a matrix of statistically manipulatable symbols (Roberts, 2001).

Quantitative research: Research approach that examines phenomena that are expressed both numerically and analyzed statistically (Scriven, 1991; Weiss, 1998).

Dissertation Organization

The dissertation consists of four chapters. References are provided after each chapter specific to that chapter. In addition to this Chapter 1: Introduction, the dissertation includes:

Chapter 2: "Description of a competitive grants program's theory from its request for applications." This is a stand-alone study that utilizes quantitative content analysis of the texts of Request for Applications (RFAs) for the HEC grants program.

Chapter 3: “Oral history narratives as the basis for constructing a program theory for a federal grants program.” This is a stand-alone qualitative inquiry that employs oral history interviews with the HEC developers.

Chapter 4: “Coherent depiction of the Challenge Grants program’s theory and recommendations for evaluation”. This chapter (a) examines similarities and differences between the two theories developed in chapters 2 and 3, and (b) provides recommendations for the professional evaluator on ways to design an evaluation for this program.

The dissertation also contains four appendices. Appendix A provides a description of the research project supported by the Innovation Fund of the Cooperative State Research, Education and Extension Services. Appendix B contains additional tables for the content analysis study. Appendix C includes an interview guide and a copy of the first communication with the participants in the oral history study. Appendix C also contains a copy of the researcher’s communication with a member of the ISU Human Subjects Review Committee to determine the status of the oral history study concerning meeting the Institutional Review Board’s (IRB) requirements for human subjects’ protection. Appendix D contains chains of positive consequences that correspond to specific aspects of the HEC’s program theory articulated in the oral history study.

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CHAPTER 2. DESCRIPTION OF A COMPETITIVE GRANTS PROGRAM'S THEORY FROM ITS REQUESTS FOR APPLICATIONS

Introduction

Theory-based or theory-driven evaluation is of emerging importance in evaluation research and practice. In the case of a federal assistance grants program, conceptualization of an agency's program theory (PT) is important for planning and conducting evaluation at the program level to better understand the program's mechanism to attain its social benefits (Rossi, Freeman, & Lipsey, 1999). PT contributes to methodological advancement, enhances the quality of evaluation, and strengthens links among evaluation, program development and implementation, and policy and decision making (Bickman, 1990). The important rigor-building role of program theory has been well articulated and solid program theory has been emphasized in the evaluation literature (Bickman, 1987, 1990; Leeuw, 2003; SenGupta, 2002; Stame, 2004; Van Der Knapp, 2004; Weiss, 1998).

The researcher studied the program theory of the Higher Education Challenge (HEC) competitive grants program to help provide the agency with a theoretical framework for developing an evaluation plan for this program. In the lexicon of program evaluation, program theory is a description of the causal explanations (linkages) between program inputs (resources) and expected (desired) program outcomes (Bickman, 1987). Causality assumes an action (event) that brings about an effect (Lipsey, 1993). For example, people's beliefs might be considered as causally governing their actions (James, 1907). Causal explanations would then consist of specifying beliefs that underlie actions. In the researcher's view, the process of articulating the theory of an intervention is to produce an explicit description of the conceptions, assumptions, and beliefs "upon which people build their program plans" (Weiss, 1998, p. 55). This study produces such a description regarding the HEC program.

The HEC grants program is administered by the U.S. Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service

(CSREES). It is the premier federal grants program for supporting basic, applied, and developmental teaching and learning activities in agriculture, broadly defined, and related fields. In this study, findings are reported on changes and continuity (or stability) in program emphasis as communicated by the agency to potential project directors over time within the program's organizational discourse. The term discourse is used in this study in a very broad sense to refer to "actual practices of talking and writing" (Phillips & Hardy, 2002, p. 5). The researcher investigated written discourse produced by the HEC grants program, specifically within the program's official documents.

Theoretical perspective

Evaluation research is practical in nature. The main purpose of evaluation is to determine "the merit, worth, and value of things" (Scriven, 1991, p. 1). Evaluation findings are the products of this process. For the most part, evaluators give priority to the applications of their research to program evaluation design, planning, and implementation. This is not to say that theoretical approaches to evaluation are of less importance (Weiss, 1998). When involved in knowledge construction, evaluation research is just as applied and research-based as when it targets concrete program alternatives (Scriven, 1998). Yet the fact remains that the theory-based approach to evaluation is underemphasized and unutilized by practitioners most of the time (Bickman, 1987; Donaldson & Lipsey, 2006).

For the practitioner, model construction is widely used to depict program activities causally (e.g., via logic models comprised of inputs, outputs, throughputs, outcomes, and impacts). For the researcher, the concern is that theories in evaluation are prescriptive (or normative) action models rather than descriptive (or causative) change models (Chen, 2005). Even though Schwandt (1991) considers this distinction between practice and research orientations as artificial, he nevertheless argues that willingness to examine a program's theoretical underpinnings furthers the thinking of evaluation "as scientifically conceived social inquiry" (p. 70). Dahler-Larsen (2005) sees the role of theory-based approaches in

revitalizing “the scientific element in evaluation” (p. 630). Considering the complexity of societal (i.e., social, economic, political, human resources) issues and ambiguity of “social thought” (Schwandt, p. 63), evaluation research has an emerging need to develop nonprescriptive but descriptive theories that “deal with the core concepts of evaluation” (Scriven, 1998, p. 70) and give evaluators more confidence in assessing programs’ prescriptive nature.

Bickman (1987) asserts that program theory is “a plausible and sensible model of how a program is supposed to work” (p. 5). Evaluation program theory implies causal reasoning. In other words, one aspect of the program is presumed to be conditioned by the presence of the other. Babbie (2007) claims that causal patterns are probabilistic in nature. That is, “the effect occurs more often when the causes occur than when the causes are absent – but not always” (p. 4). Both modes of reasoning (causal and probabilistic) are used to predict the future. And it is probability theory that provides social scientists with a framework for answering causal questions while dealing with situations in the presence of uncertainty (Rudas, 2004).

Salsburg (2001) claims that probability is the current word for a very ancient concept. Over two millennia ago Aristotle stated, “It is the nature of probability that improbable things will happen” (cited in Salsburg, p. ix). And in its original meaning it implied a person’s sense of what might be expected. A contemporary description of “what might be expected” would begin by presuming a random variable’s distribution function (or as is almost always the case in social science research by assuming that data follow an already known probability distribution), and continue by predicting future events of the same random variable. It is in fact the concept of a probability distribution that allows researchers to deal with uncertainties by putting constraints on the randomness of occurrences and thereby permitting future predictions conditional on the validity of these constraints and the likelihood of stochastic error.

There are good reasons for uncertainties in the social sciences generally, and in evaluation research specifically. The most important source of uncertainty is due to one obtaining only a fraction of all possible measurements (values, observations)

during the sampling process. Other sources of uncertainty may be associated with measures' lack of validity or reliability, logistic and ethical constraints (for example applying randomized experimental designs in evaluation), and researchers' conceptualization of research issues, to name but a few. Nonetheless, Rudas (2004) argues that probability can serve as "the relevant frame of reference in both data collection and data analysis" (p. 62).

The researcher was interested in exploring inferential statistics, although as Tukey put it, "exploration has been rather neglected; confirmation has been rather sanctified, and neither action is justifiable" (as cited in Mark, 2006, p. 10). The motivation was to infer from the data variables (evaluative emphasis) for constructing the HEC program's theory. Probability theory served as the theoretical context from which the study's analytic assumptions were drawn, allowing the data to be conceptualized as random variables, and subsequently analyzed and interpreted.

Research questions

The objective of this study was to identify linear changes and continuity in program emphasis. The following four research questions guided the content analysis:

1. What social benefit was the HEC program expected to produce?
2. How was the HEC grants program's contribution to these expected social benefits depicted?
3. What practices and services did the HEC grants program offer to project directors (PDs)?
4. What practices and services were expected from project directors by the HEC grants program?

Study's main assumptions

Several assumptions and approaches guided this study's conceptualization. The researcher's position was that the sustainability of the HEC grants program

relied upon its original emphases (e.g., key components of its program theory) being stable over time (i.e., continued, maintained, or otherwise kept in existence). Thus the focus was on examining changes and continuity in emphases during eleven years of its implementation (i.e., from 1995 to 2005). The researcher only investigated linear trends in these changes and continuity, using linear regression that, in turn, is regarded as a standard statistical tool in the social and educational sciences (Aldrich & Nelson, 1984). Further, it was assumed that (1) the HEC grants program theory existed but was implicit, (2) this program theory could be depicted from its official documents, and (3) identified themes could serve as a credible source of information whereby HEC's program theory could be made explicit. Assumptions that guided specific phases of this research are stated further in the text.

Method: Content Analysis

Content analysis (CA) was originally a quantitative approach to analyzing data that are—at least initially—nonnumeric (e.g., documents, photos, fashions). These traditional CAs were developed by communication specialists, who often took a positivist approach to their data (Berelson, 1952). Specifically, its inception was predicated on the main idea that the aim of CA was to lend “a quantitative classification of a given body of content in terms of a system of categories devised to yield data relevant to specific hypotheses concerning that content” (Kaplan & Goldsen as cited in Berelson, p. 15). After reviewing the most commonly used definitions of CA at that time, Berelson identified six distinguishing characteristics of CA, among which were the objective, systematic, and quantitative attributes of this method. These three characteristics have long been recognized as essentially required for “a proper definition of content analysis” (Berelson, p. 16). Although this requirement has been challenged as the field has progressed, namely with the development of relational approaches to CA and qualitative methods (Krippendorff, 1980; also see Altheide, 1996; Hijmans, 1996; Merten, 1996), the method most often involves some form of quantitative analysis.

The range of current applications of content analysis is diverse and cuts across many disciplines. Neuendorf (2002) suggests that content analysis is one of the fastest growing techniques in quantitative research. He defines content analysis as “the systematic, objective, quantitative analysis of messages characteristics” (p. 1). Content analysis is a multipurpose research method where communication content is the study’s object and the basis of inferences (Holsti, 1969). The term communication was defined broadly in this study as the effect that a source intends to have on his or her audiences via its content (Shannon & Weaver, 1949). In the context of this study, the texts of Requests for Applications (RFAs) were intended to communicate a set of propositions (i.e., constructs, terms, and definitions) to potential project directors with the purpose of soliciting project applications that would contribute to the HEC program’s desired outcomes.

Approaches to content analysis

Although the term content analysis is referred to primarily as a systematic-quantifying method, qualitative-interpretive approaches to content analysis are also used (Gunter, 2000; Hijmans, 1996). Through the history of scientific inquiry advancements and accompanying epistemological debates, social researchers have used different rationales to distinguish qualitative and quantitative methods. For some, it is a definitional matter (Roberts, 1997); for others, it is a philosophical one (Smith, 1989). Roberts suggests using a single indicator to distinguish quantitative from qualitative methods, specifically “if the method yields data matrices from which probabilistic inferences (i.e. p -values) can legitimately be drawn, the method is quantitative” (p. 2). Otherwise, it is qualitative. Qualitative content analysis has flourished with the development of hermeneutics and interpretive methodologies (Hijmans, 1996). They are more inductive, non–statistical, and exploratory than quantitative content analysis methods (Roberts, 1997).

Content analysis in evaluation: qualitative method

The most commonly used approach to content analysis in evaluation is a qualitative–interpretive method. Qualitative assessment of documentary materials and the usage of qualitative data analysis software appear to be considered more appropriate and more often reported in evaluation literature than quantitative methods (Constantino & Greene, 2003; Dart & Davis, 2003; Leeuw, 2003; also see Mathison, 2005). In addition, because of logistic and ethical considerations, temporal and financial constraints, and other matters, it appears that the qualitative analysis of written documents is often utilized to gain insights, learn about historical perspectives, and provide summative information about the program and not so much as a systematically applied rigorous procedure in the investigation of documents' content as a method of program evaluation. Krippendorff (2004) defines this approach to content analysis as “text–driven analyses.” He further states that even with the convenience of using text analysis software, such an approach does not make the process more objective because “such text explorations are essentially limited to a single analyst’s conceptions and ability to read” (p. 341).

Further, evaluators’ reliance on interviews, observational, or other sources of non–experimental data creates a dilemma in today’s age of program accountability and outcome–based evaluation. For example, evaluators agree that cause–effect attribution is a thorny matter because in most instances the role of evaluation is to provide causal explanation, whereas evaluation data tend to be based on qualitative, illustrative observations of program activities as they naturally occur. Another aspect of the dilemma is political in nature. For example, the No Child Left Behind (NCLB) Act of 2001 and Scientific Research in Education report (National Research Council [NRC], 2002) declare randomized experimental designs as the “gold standard” for judging legitimacy and quality of inquiry (Lincoln & Cannella, 2004; also see Maxwell, 2004; Pierre, 2002). Federal agencies require “scientific” meaning and quantifiable data as evidence of program effectiveness. That makes qualitative inquiries and assessments less legitimate than quantitative ones (e.g., randomized experimental design) as a basis for obtaining funding to support their studies.

On the other hand, Sechrest and Scott (1993) observe that in evaluation “even when it is possible to use randomized experimental designs, often the end result is not optimal, and other nonexperimental approaches are needed to aid in the interpretation of the results” (p. 1). Although new strategies have been considered (e.g., Meta-Analysis [Cook (1993)] and “shoestring evaluation” [Bamberger, Rugh, Church, and Fort (2004)]), further development and utilization of rigorous, visible, and responsive alternative strategies in program evaluation are needed. Further, Sechrest and Scott argue that “methods to be improved involve all aspects of the evaluation, beginning with the design and setup of the research and moving on to data collection and analyses and, finally, to the interpretation of results” (p. 2). Quantitative content analysis is universally regarded as utilizing systematic and unobtrusive measures (Babbie, 2007; Webb, Campbell, Schwartz, & Sechrest, 2000). Moreover, the method’s systematic approach to concrete materials strengthens the likelihood of reliability in content analysis studies (Babbie, 2007).

The study’s content analysis

The researcher employed quantitative content analysis as a research method in her study. There were two reasons she chose this method. First, the technique’s defining characteristics—systematic, unobtrusive, statistical method—match the research’s objective to define variables of importance to the HEC by following a procedure based on systematically applied rules for the inclusion or exclusion of variables in the analysis. Second, the investigator’s interest in the use of documentary evidence (plus availability of this evidence in the research setting) and in the subject’s (i.e., program developers’) language lends itself to the technique (Berelson, 1952; Holsti, 1969; Krippendorff, 1980; Pool, 1959). By applying a systematic text analysis procedure, the researcher’s intent was to measure (quantify) and not to judge changes and continuity in the program’s emphasis over time.

Roberts (2001) ventures an operational definition of quantitative content analysis as the mapping of non-numerical statements into a matrix of statistically

manipulatable symbols. This is the definition of content analysis used in this study. The purpose of this study was to examine the texts of RFAs for the HEC grants program aimed at (1) determining variables (textual themes) of importance to the program developers, and (2) determining linear trend in their mentions. The study dealt with *what* was said in the texts of RFAs or more generally, of what were the intended communications from the agency to potential project directors (Pool, 1959). The researcher did not investigate the effect of what was communicated by the agency on these potential project directors.

Hence, the content analysis was limited to text and was both quantitative and thematic. In addition, it provided a “representational” (as opposed to an “instrumental”) interpretation. The distinction between the two is the issue of whose perspective, the texts authors’ (i.e., the sources) or the researcher’s, is used to interpret the meaning of texts under the analysis (Roberts, 2001). Shapiro (1997) states that in a representational content analysis the researcher seeks “to measure the intended meanings of the authors of texts” (p. 228), whereas in an instrumental study “the language behavior of the source” is viewed as a collection of “symptoms from which unconscious or unacknowledged characteristics are to be inferred” (p. 229) by the researcher. An instrumental orientation to the text is frequently utilized in behavioral and clinical psychology studies, when the clinician’s superior knowledge about a phenomenon (i.e., the patients’ symptoms as gleaned from psychometric tests) takes precedence over the sources’ perspectives.

In this study the researcher presumed that the program developers intended in the texts of the RFAs to communicate their views, beliefs, and values about the program to interested researchers (i.e., potential project directors) outside the agency. Thus, the researcher’s representational approach to understanding the RFAs texts meant that the researcher attempted to infer these values from the language of the texts as one segment in her evaluation of the agency’s program. To this end, variables were identified for analysis in hopes of preserving the agency’s original language. Thus the researcher used a representational CA method in an effort to articulate the HEC grants program’s theory.

Data

In content analysis research which data are analyzed, how data are defined, and from which population data are drawn must be made clear (Krippendorff, 1980). Lindlof (1995) suggests that the documents are “the ‘paper trail’ left by events and processes” (p. 208). Collecting the HEC grants program documents produced at the program level was an important activity of the research. The HEC grants program’s official documents were regarded as cultural artifacts (Roberts, 2001). Written documents are artifacts that carry into the future the “lived-through” experiences of their producers as depicted within and attributed to the particularities of their contextual realities’ time and space. Written documents are portraits of realities narrated by various actors. Altheide (1996) indicates that documents enable researchers to place the emerging meaning of a phenomenon in context and track the process through detailed investigation.

The researcher collected official documents of the HEC grants program, including the Policy Act, the Code of Federal Regulations, agency reports, national studies, and RFAs. In this study, these materials were regarded as regulatory and conceptual warrants, decision rules and rationality justification, and political and conceptual artifacts of the HEC grants program. By reading these documents the researcher was able to gain a better understanding of the HEC programs within its broad historical perspective, and, more specifically, to learn about its goals and objectives, its relation to social benefits, and its various activities that may have been of concern and have taken place at different times. The index of the collected HEC grants program’s official documents can be viewed in Table B1 (see Appendix B).

By examining the collected official documents, it was apparent that the RFAs were the only documents that had been produced regularly. Other collected documents were either one time publications (e.g., program’s legislative documents) or issued intermittently (e.g., needs assessment studies, reports). Only RFAs were included in this study’s content analysis because content analyses rely on the existence of a body of documents that are produced systematically over time or other social context (Roberts, 2001). Only the RFAs met this criterion.

The HEC RFA is announced once a year. An RFA is an official document that translates the generalities defined by the Administrative Provisions into the specifics intended for and communicated to an audience of interested and potential applicants, namely Project Directors (PDs). Funding for the HEC program became available in 1990, and the first RFA was issued in 1991. The researcher attempted to obtain all fifteen RFAs that had been issued during 1991–2005 (the intended time for the content analysis study). The researcher was not able to retrieve the HEC program’s first four RFAs, specifically those issued in fiscal years 1991, 1992, 1993, and 1994. RFAs were not available in electronic format prior to 1999. These early RFAs were also unavailable in the agency’s archived records. The RFA issued in 1995 was the earliest available. All HEC program’s official documents were collected with the permission of the agency’s staff.

With the assistance of the National Program Leader (NPL) of the HEC grants program, the researcher was able to retrieve ten RFAs. Four were available in paper copy only, three of which were obtained from the agency’s archival records. The remaining six RFAs were available in both electronic and paper formats. One RFA (issued in 1997) was unattainable. The availability and the format of the RFAs documents are summarized in Table 1.

Table 1

The availability of RFAs used in the CA study

| Year | Availability |
|------|-----------------|
| 1991 | not available |
| 1992 | not available |
| 1993 | not available |
| 1994 | not available |
| 1995 | paper copy only |

Table 1 (continued)

| Year | Availability |
|------|-----------------------------|
| 1996 | paper copy only |
| 1997 | not available |
| 1998 | paper copy only |
| 1999 | paper and electronic format |
| 2000 | paper copy only |
| 2001 | paper and electronic format |
| 2002 | paper and electronic format |
| 2003 | paper and electronic format |
| 2004 | paper and electronic format |
| 2005 | paper and electronic format |

Note: RFA = Request for Application; CA = Content Analysis.

The availability of RFAs determined the final period of this study, which was from 1995 to 2005. The researcher utilized a “move forward in time” approach to organizing the available ten RFAs. In other words, the content analysis data were recorded and analyzed in chronological order by the year each RFA was issued starting in 1995 and ending in 2005.

Babbie (2007) asserts that it is appropriate to sample in content analysis, as one usually cannot view all documents. To make probabilistic inferences, data have to represent a segment or portion of a population from which the sample is to be drawn. The approach employed in the content analysis was to draw probabilistic inferences from a sample of RFAs to the organizational discourse from which they were assumed to have been randomly selected. This decision was warranted by the

fact that documents are one of Czarniawska's (2004) forms of narrative. And narrative is regarded as a form of social life, a form of knowledge, and a communicative act (Czarniawska). Therefore, in the context of this study the RFA was viewed as representative of the agency's discourse about the HEC program.

Discourse was defined in Foucault's tradition. Namely, discourse was referred to broadly as systems of thought that construct subjects and their world (Foucault, 1972). Organizational discourse about the HEC grants program was identified by the researcher as a hypothetical population or universe. The RFA texts were regarded as the empirical materials of discourse (Phillips & Hardy, 2002). Although the sample of ten RFAs might be considered a "near census" of all RFAs generated between 1995 and 2005, it was assumed that they were drawn from the population of all of the agency's official discourse about the HEC grants program. In the context of this study, the ten RFAs were thus referred to as a "sample of RFAs" or the "RFAs in the sample".

RFAs have a fixed location in time, having been produced within a specific historical and social (organizational) context. Webb, Campbell, Schwartz, and Sechrest (2000) define "time sampling" as the substitution of time for location in a sampling procedure. The authors assert that "time sampling is of interest not only for its control over population fluctuations which might confound comparisons, but also permits control over the possibility of variable content at different times of the day or different months of the year" (p. 175). Webb et al. also suggest that time sampling should also apply over months and years. The RFAs in the sample thus comprise a "time discursive sample". Each RFA was presumed representative of the HEC's organizational discourse about the program during the year the RFA was issued. The researcher used the following frame from which the sample of RFAs was selected:

- Year₁₉₉₅ -- HEC's organizational discourse about the program – RFA₁₉₉₅
- Year₁₉₉₆ -- HEC's organizational discourse about the program – RFA₁₉₉₆
- Year₁₉₉₈ -- HEC's organizational discourse about the program – RFA₁₉₉₈
- Year₁₉₉₉ -- HEC's organizational discourse about the program – RFA₁₉₉₉

Year₂₀₀₀ -- HEC's organizational discourse about the program – RFA₂₀₀₀

Year₂₀₀₁ -- HEC's organizational discourse about the program – RFA₂₀₀₁

Year₂₀₀₂ -- HEC's organizational discourse about the program – RFA₂₀₀₂

Year₂₀₀₃ -- HEC's organizational discourse about the program – RFA₂₀₀₃

Year₂₀₀₄ -- HEC's organizational discourse about the program – RFA₂₀₀₄

Year₂₀₀₅ -- HEC's organizational discourse about the program – RFA₂₀₀₅

Data from documents are frequently too raw to be used as is. The raw data were converted to counts using data structuring and coding facilities within Textual Content Analysis (TCA) software, which was used to analyze the data. Commonly one also does some kind of adjustments and/or conversion to one's count data. This is usually necessary to account for extraneous sources of information (Webb, Campbell, Schwartz, & Sechrest, 2000). A statistical adjustment (or data transformation approach) was used in this study's analysis.

Context of Content Analysis

Krippendorff (1980) claims that “data are made available to the content analyst, their context is not” (p. 26). He argues that any content analysis must be performed and justified in terms of the context of the data. Because the content analysis is context sensitive, it is especially important that the researcher defines the context of the study explicitly. Reflective of Babbie's (2007) definition of theory as “a systematic explanation for the observations that relate to a particular aspect of life” (p. 10), in this study sustainability comprised the central aspect of the HEC grants program to be analyzed. Sustainability connotes some element of continuity in purpose. Further, Scheirer (2005) suggests that “the topic of sustainability is often set within a life cycle about program development, implementation, evaluation . . .” (p. 322). Hence, the researcher chose sustainability as an important strand of this research through which to explicate the HEC's program theory as a framework of its evaluation plan design.

Scheirer (2005) analyzed 19 empirical studies to examine the extent of sustainability of American and Canadian health-related programs. For the analysis,

the author used three measures of sustainability, specifically (1) continued program activities, (2) continued benefits to the clients, and (3) continued capacity development of a community. The conceptual framework of Scheirer's analysis is centered on the question, "what happens after the funding ends for a specific project" (p. 323). He analyzed the aspects of continuation of multiple local projects at their original sites, using an organizational unit of analysis. Scheirer claims that five factors contribute to project sustainability, specifically (1) the project can be modified over time, (2) a champion is present, (3) the project fits with its organization's mission and procedures, (4) benefits to staff members and/or clients are readily perceived, and (5) stakeholders in other organizations provide support. Scheirer did not assess the sustainability of program (as opposed to project) activities. In contrast, this study's explanation is at the HEC grants program level.

The organizational discourse of this study was defined at the agency (CSREES) level where HEC grants program is administered. The key research question of this study was, "What program emphases have been sustained over time?" The researcher used an approach to measuring sustainability that focused on cognitive components of programs as suggested by Weiss, Coffman, and Bohan-Baker (2002), who address the issue of sustainability by assessing the reciprocal contribution that evaluation can make to project sustainability. The authors draw their ideas from their experiences of being involved in the Harvard Family Research Project's five year evaluation of the W. K. Kellogg Foundation's large-scale Devolution Initiative. Weiss, Coffman, and Bohan-Baker suggest that evaluation "can take a much more vital and deliberate role" (p. 2) in supporting project sustainability of large-scale foundation funded initiatives. The authors view evaluation as the foundations' strategic ally that facilitates and monitors projects' progress on sustainability, particularly regarding the ideas, beliefs, principles, or values on which an initiative is based or which it promotes.

The focus of this study was on maintaining the HEC program developers' ideas, assumptions, beliefs, and principles (all thought as ideals) over time. For the purpose of the study, individuals who envisaged and initiated the HEC grants

program were referred to as developers. These individuals worked at the agency and designed the foundation of this competitive grants program. They were the ones with whom the idea of this funding opportunity originated. These were the individuals who extended the idea further to the land grant colleges and universities, communities at large, industry partners, and professional societies, building coalitions among these entities and assessing the program's existing and future needs. They lead a collective effort to refine and further develop the idea that was later empowered via legislative authorizations and funded through appropriation provisions as a formal program.

The developers' ideals were translated into specific requirements and concrete program activities that formed the language of RFAs. Each RFA was regarded as an official, annually-issued document of the HEC grants program. It set out details of the HEC program that were initially formulated by the program's developers and were further formalized by legislative authorities who then imposed administrative provisions and governing principles that were ultimately translated by the agency into concrete requirements. An RFA was viewed as a composite of feedback from stakeholders at both the program and project levels. From a social scientific perspective, an RFA could be regarded as a construction of a discursive environment (namely, the domain of the funding program's interest) within which Project Directors (PDs) can develop their ideas for projects and agency personnel can evaluate and predict advancements. In the case of the HEC grants program, such advancements referred to strengthening of institutional capacities, responding to educational needs, and expanding the U.S. agricultural workforce.

Of primary concern to this study then was the sustainability of the HEC grants program's original emphases. The researcher examined linear changes and continuity in the HEC grants program's emphases as articulated in RFAs by its developers from the program early years to its most recent ones. These changes and lack of changes (i.e., continuity) were also regarded as being reflective of processes internal to the agency's development and organizational behavior in response to political pressures related to the federal assistance system. The

researcher presumed (as a null hypothesis) continuity in the program's initial ideas about (1) social benefits that the program was expected to produce, (2) the program's relations to expected benefits, (3) practices and services that the program was expected to provide to its stakeholders or PDs, and (4) practices and services that were expected from PDs in return (i.e., PDs' shared responsibilities sought by the agency).

Deviations from sustainability were presumed to depend on short term drifts and long term effects in the program's original ideals. The underlying motivation was the researcher's concern that a long-term effect might simply be due to the granting agency's short-term inertia (or drift), rather than to a long-term adaptation (adjustment, modification) to consistent changes in the environment, which may have altered its RFA emphases monotonically over time.

Boundaries of the study

Krippendorff (1980) suggests that "any research effort must define the boundaries beyond which its analysis does not extend" (p. 26). These boundaries provide structure and concreteness with respect to what is perceived as relevant and not relevant to the study. Defining boundaries of the study is essential when articulating an evaluation program theory and conducting a content analysis. Rossi, Freeman, and Lipsey (1999) suggest that "defining program boundaries to ensure that they encompass all the important activities, events, and resources linked to one or more outcomes recognized as central to the endeavor" (p. 162) is critical to theory-based program evaluation.

Consistent with this study's representational interest in how the HEC developers defined their program's boundaries, the researcher took their views in this regard. The HEC developers defined their grants program as a set of activities and resources under Science and Education Resources Development (SERD), Cooperative State Research, Education, and Extension Service (CSREES), U. S. Department of Agriculture (USDA) that fit with the agency's mission and procedures and that had benefits and an identifiable role in stimulating the development of

quality education that was (1) necessary to produce undergraduates capable of strengthening the nation's food and agricultural scientific and professional workforce, and (2) successful in addressing the HEC grants program priority areas in eligible colleges and universities. "Program" was thus defined here as a structured intervention to improve the well-being of its beneficiaries (Weiss, 1998). The agency's organizational discourse about the HEC grants program comprised the contextual boundary within which this study's analysis sought to make the underlying mechanism of this intervention explicit.

Setting the stage

Earlier the researcher presumed that assumptions and expectations about the HEC grants program's services and practices had not been fully articulated and/or systematically recorded. She made this assumption based on her experiences studying the HEC grants program for the last four years, specifically developing the research idea, interacting with the agency personnel, reading the program's documents, and implementing this research. In addition, the researcher had been working as a competitive grants program administrator since 2002. In a situation like this when a program's conceptualization is implicit rather than articulated, Rossi, Freeman, and Lipsey (1999) counsel evaluators to "extract and describe it through some appropriate means before it can be analyzed and assessed" (p. 160).

One of the "means" that in the evaluation literature is considered almost always readily available is written descriptions of a program. Rossi, Freeman, and Lipsy (1999) argue that a program's written documents "will generally . . . permit creation of a first approximation to a program theory description" (p. 164). For programs with legislative origins, like the HEC grants program, they suggest analyzing documents authorizing legislation, documentation of legislative history, accompanying regulations and guidelines, program announcements, grant applications, contract documents, fiscal reports, the program internal documents, to mention but a few. Yet the authors list these types of documents without mentioning any text analysis methodology that might be employed.

Christie and Alkin (2003) conducted a case study that was aimed at developing and refining the University of California at Los Angeles (UCLA) academic outreach program's theory within a user-oriented evaluation framework. The authors share Chen's view that "the literature review process is a fundamental step in developing a program theory" (cited in Christie & Alkin, p. 377). Christie and Alkin reviewed the program's literature related to school reform research and various theories related to students' preparation for university admission, which was the context of their project. It was a complementary piece aimed to inform the research design and to ensure breadth, depth, and valid interpretation of the study's findings. In other words, the literature review was undertaken to set the context of the study. It was not utilized as a research method of the study's design. Following Christie and Alkin, Chen (2005), and Rossi, Freeman, and Lipsy (1999) this study analysis was understood within the literature on the HEC competitive grants program's official documents, reports, and related publications. The competitive grants program that has been in existence for sixteen years can be regarded as mature and, hence, amenable to a serious evaluation effort.

Content Analysis Operational Model

Neuman (2003) argues that, although content analysis is used for exploratory and explanatory inquiry, it is primarily utilized in descriptive research. This analysis is descriptive. Inferential statistics (and thus probability theory) are used under the assumption that the RFAs in the sample are representative of the HEC's organizational discourse about this program and not merely a population unto themselves.

Data collection instrument

Computer assisted text analysis methods originated in the 1960s (Roberts, 1997). Many computer programs for text analysis have since become available. For example, Neuendorf (2002, p. 226) provides a table with some of the best programs. For an exhaustive list of quantitative text analysis programs, the author recommends

visiting Harald Klein's text analysis resource page that can be accessed at <http://academic.csuohio.edu/kneuendorf/content/> (retrieved February 24, 2007). In this study, Textual Content Analysis (TCA) software was used to analyze the text of HEC RFAs. TCA has been developed intermittently since 1997 by Dr. Carl W. Roberts, Associate Professor in the Departments of Sociology and Statistics at Iowa State University. It supports quantitative analysis of texts that is performed on a data matrix (C. W. Roberts, personal communication, May 26, 2005).

At the time of this writing, TCA had not been sold commercially. Dr. Carl W. Roberts uses the software in his comparative historical research (Roberts, Zuell, Landmann, & Wang 2005; Roberts, Popping, & Pan 2006). Dr. Roberts' colleagues and students utilize TCA in their studies to further test and evaluate the program in various research contexts (sociology, communication, education, to name a few). Dr. Roberts uses researchers' feedback to guide updates in the program. During its development TCA has been substantially improved. TCA was used in this analysis because it was readily available for the researcher (given that Dr. Roberts was a Co-Major Professor of the researcher); Dr. Roberts provided necessary training to assist the researcher with the software installation and learning about importing, structuring, coding, and exporting data into a matrix (an important factor since this study was the researcher's first experience with computer content analysis software); and the researcher was comfortable using TCA.

Because the researcher was interested in analyzing the content of RFA texts, the RFA was identified as the unit of analysis in this study. The goal of the CA was to gain an understanding of the HEC grants program's attributes that were of importance to the program developers and could be measured over time. Therefore, each RFA was considered as a communicative means by which the program developers' ideals were encoded for "transmission" to potential applicants (project directors) via sets of symbols (written text).

Variables, values, and measurement

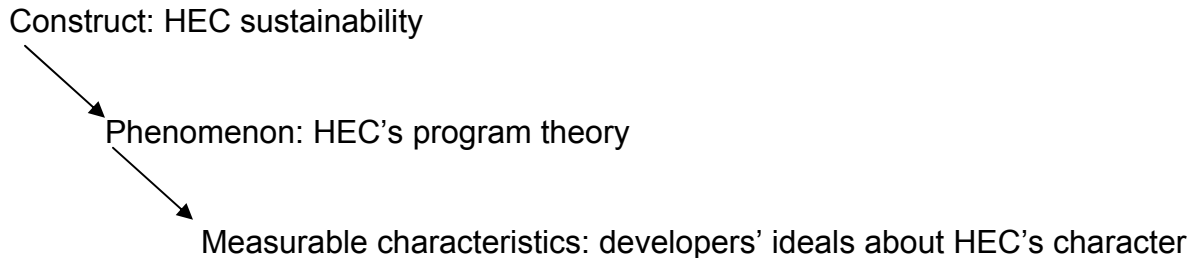
The data matrix approach to operational logic of the CA “greatly simplifies the task of delineating the domain of possible questions that quantitative text analyses are able to address” (Roberts, 2001, p. 2698). The CA data matrix consists of variables of interest, which are columns of the matrix, and unit of analysis, which are rows of the matrix. In this study, the RFA was the unit of analysis that corresponded to each of the CA data matrix’s rows. The variables (or columns) of the matrix were determined by using four criteria that had been chosen as the basis for selecting the RFA texts for the analysis. The criteria reflected the conceptual themes of the previously stated four research questions and referenced the HEC’s (1) social benefits, (2) contribution to expected benefits, (3) HEC programs’ practices and services to the HEC program, and (4) PDs’ practices and services in return to the HEC program. Only selected parts of the RFA texts were used in the text analysis.

Data selection and coding

Selecting and recording data for the analysis make up “the process of transforming raw data into standardized form” (Babbie, 2007, p. 325). This is also a systematic process of creating a “data language” that is “the descriptive apparatus into which terms an analyst casts his data” (Krippendorff, 1980, p. 85). Further, the data language mediates between source material (i.e., concrete phenomena) and the study’s findings. As mentioned earlier, content analysis is especially context sensitive. Therefore, the relationships between the data language and the source material have to be articulated clearly so that “findings based on these data lead to insights about real phenomena” (p. 75).

An analyst’s conceptual scheme underlies the construction of this data language (Krippendorff, 1980). Sustainability was a hypothetical construct that was presumed to be measurable. The HEC’s program theory (PT) was the phenomenon of this study. Measurable characteristics were identified with the HEC program developers’ concepts, assumptions, and beliefs (i.e., the developers’ ideals) that were conveyed to potential PDs via the RFA texts. These characteristics, in turn,

were presumed constituting the stable foundation of the program. Consequently, the logic of conceiving this study's scheme was the following:

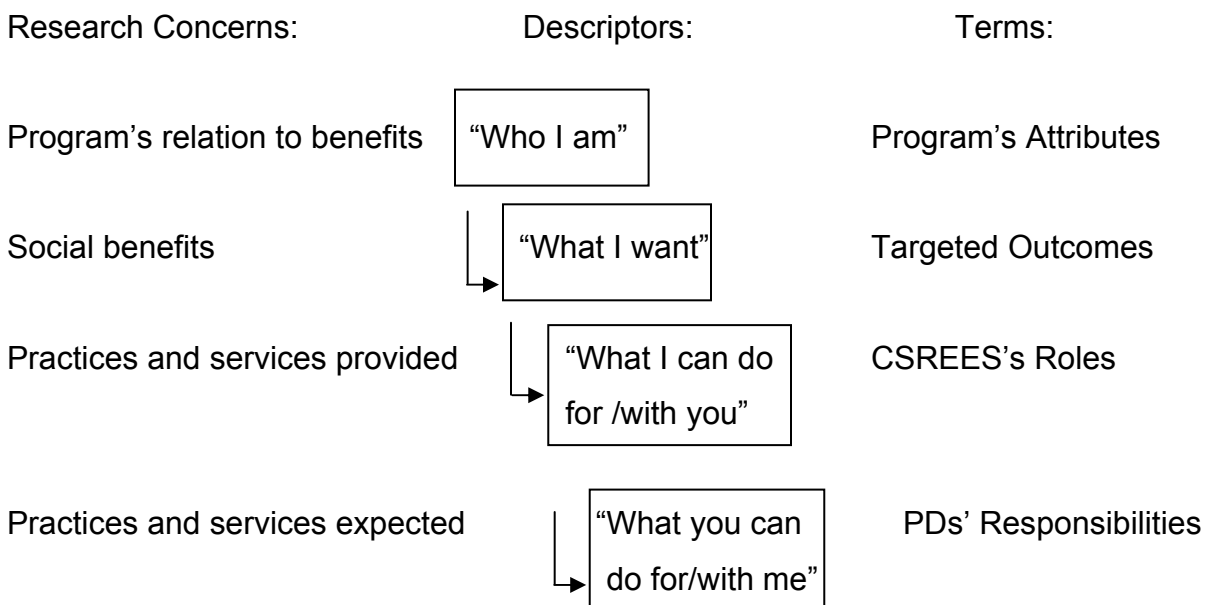


With this in mind, the researcher used the four research questions (i.e., research concerns) to develop four descriptors. The descriptors were presumed to capture the image of the HEC's PT in the RFAs' texts. They were (1) "who I am," (2) "what I want," (3) "what I can do for/with you," and (4) "what you can do for/with me." Using these descriptors, the researcher developed four terms to record the data: (1) program's attributes, (2) program targeted outcomes, (3) agency's role, and (4) PDs' responsibilities. The descriptors and terms formed the content of this study's conceptual scheme that later was used to construct the content analysis' data language. The conceptual scheme is shown in Figure 1. The scheme was understood in view of the HEC grants program two interrelated environments, specifically implementation and evaluation (Nakamura & Smallwood, 1980). Implementation signifies the process of carrying out the HEC's PT image. And evaluation determines how effective the HEC has been in implementing its PT.

Hence, formalized statements in the RFA texts (i.e., the HEC program developers' ideals) formed this analysis's data language. Scriven (1991) asserts that ideals are idealistic, often impractical. While researching the history of the HEC grants program, the researcher found that the agency launched a national needs assessment study and worked collaboratively with the national land grant system and industries to determine the HEC grants program's goals. Therefore, the term ideal was understood as a description of the HEC grants program's intended

outcome (also referred to as objective) held by its developers and recorded in the RFA texts (Scriven, 1991).

Figure 1. The HEC grants' Program Theory conceptual scheme.



Data selection

A framework to select and code the data is illustrated in Table 2. To select the texts for the analysis, the researcher started with four previously stated research questions. The research questions are listed in the first column of the table. The researcher then used these four questions and previously identified descriptors to determine a structure to be applied uniformly across the texts of all RFAs in the selection of the texts to be analyzed using TCA. The structure served to highlight particular parts of the text (textual divisions within RFA) related to the four questions. The imposed structure appears in the second column of Table 2. It consisted of the following categories and their subcategories (1) HEC expectations; (2) HEC specific objectives; (3) HEC domain broken into three subcategories, and (4) PDs' domain broken in two categories. The categories were aligned with descriptors to infer from the source material for constructing the HEC's program theory. The RFA is a well

structured document. The text is organized in various components and sub groupings, each communicating different information to potential PDs. Given a small sample of RFAs, the researcher focused on major divisions in the text of RFA. The components of the RFA texts that were used in the analysis appear in the third column. The logic depicted in the first three columns of the Table 2 is as follows:

research questions →

predetermined structure to select the text →

text of RFA selected for analysis

After applying this structure across all RFAs in the sample the selected texts comprised the raw data that were analyzed using TCA. A file with the selected texts for the analysis was imported into TCA. After delineating RFA boundaries, a dictionary was developed and applied. Shapiro (1997) defines a dictionary as “a list of words or phrases associated with theoretical concepts of interest” (p. 228). In this study’ analysis, the creation of the dictionary entailed specifying problematics and themes. A problematic corresponded to a broad research question, whereas themes were subclasses of similar words and phrases.

The researcher conceived themes while selecting texts for the analysis. Specifically, the terms of the researcher’s conceptual scheme became the problematics, whereas themes evolved while coding the data in TCA. Further, the researcher coded manifest content (e.g., concrete words and phrases) within the structured RFA texts that fit the evolving themes. The researcher chose this method because she was interested in measuring the number of times themes were mentioned in each text. And coding the manifest content allowed looking for visible, concrete terms that were already in the text. In addition, Babbie (2007) argues that this method offers the advantage of ease and reliability in coding. The themes that emerged from coding are listed in the fourth column of Table 2. Themes resided in the message. The fifth column of Table 2 lists criteria that the researcher used to ensure that the only texts selected for analysis were ones related to the research questions.

Table 2
Themes Analyzed in Content Analysis of the Higher Education Challenge Grants Program (HEC)

| Research Questions of CA | Descriptors: Structure imposed on the text across RFAs | RFAs' components used | Problematics: Themes | Criteria used when coding the text |
|--|--|---|--|--|
| 1. What social benefit was the HEC program expected to produce? | "What I want": HEC Expectations. | Purpose of the program. | <u>Targeted outcomes</u> : attract talents, improve curricula, and build infrastructure. | Consistency with national priorities. |
| 2. How was the HEC grants program's contribution to these expected social benefits depicted? | "Who I am": HEC Specific Objectives. | Targeted need areas supported, purpose of the program. | <u>Program attributes</u> : broaden term agriculture, aspire quality, provide funding, leverage institutional resources, define rules, and sustain changes. | Relevance and importance of the grants program. |
| 3. What practices and services did the HEC grants program offer to project directors (PDs)? | "What I can do for/with you": HEC's Domain: HEC services. | Degree levels supported, stakeholders' input, administrative provisions, administrative provisions. | <u>CSREES's Roles</u> : determine program niche, establish merit review, develop review criteria, assist institution, acquire feedback, communicate, and provide opportunity to share. | Merit of the program (rational needs, priorities). |
| | Legitimate recipients. Review process. | Eligibility. Application review requirements. | | |
| 4. What practices and services were expected from project directors (PDs) in return? | "What you can do for/with me": PDs' Domain: Project breadth and quality. | Project description | <u>PDs' Responsibilities</u> : develop project outcomes, measure program performance, require progress reporting, enable creativity, and use innovative teaching. | Constitution of quality of higher education in agriculture and food systems. |
| | In-house requirements (quality indicators). | Evaluation criteria, award administration. | | |

Note. Goal was to measure changes in HEC program emphases; boundaries of analysis were organizational discourse about the HEC grants program; and unit of analysis was Request for Application (RFA).

Coding

Shapiro (1997) asserts that coders “are regarded as instruments recording what they, as competent language users, understand as the contents of . . . accounts of events” (p. 233). In this study, the researcher herself recorded the data for the analysis. She viewed her role as intermediary between the RFA raw texts and a computer. Specifically, the researcher coded the “natural language” of the RFA texts into a “data language” (Krippendorff, 1980, p. 85) on each theme that was used in the analysis. Therefore, the researcher not only used the instrument (i.e., software for data-matrix generation) but she was the instrument in this study. Further, human coders “offer opportunities to freely specify the meanings in the text the research seeks to categorize” (Shapiro, 1997, p. 225). It was presumed that coding by the researcher would allow for consistency and quality control while recording the RFA texts for analysis. Thus, this study used computer–assisted human instrumentation.

The researcher kept notes of analytic procedures that she developed and applied to organize the data for the analysis. One of the commonly stated requirements of CA is that evolving themes “must be exhaustive and mutually exclusive” (Krippendorff, 1980, p. 75). This requirement is concerned with obtaining reliability of recording. While reading the RFAs texts, ambiguity of the linguistic terms became evident. Specifically, to better distinguish among different themes, ultimately to minimize duplication in themes mentioned within each problematic, there was a need to differentiate among expectation, requirement, and evaluation. The researcher developed the following definitions:

- Expectation was defined as intended or recommended.
- Requirement was considered as forced (e.g., should, must).
- Evaluation was defined as justification of some value.

These definitions were part of the researcher’s field notes (i.e., coding sheets).

As mentioned earlier, the researcher began with four problematics. They were (I) program attributes; (II) targeted outcomes; (III) CSREES’s roles; and (IV) PDs’ responsibilities. These problematics were the researcher’s conceptual guide. They

were less detailed but corresponded directly to the research questions and the RFA texts' formal structure. Themes within each problematic were more detailed. They further explicated the meaning of their respective problematics and served as data points. Themes were recorded in TCA's dictionary.

Krippendorff (1980) argues that defining themes and asserting how they may represent the text's message characteristics is an art. Yet he suggests a few major approaches for operationalizing the semantics of data language to obtain reliability in coding. In this study the researcher utilized a combination of "single word–designation" and "an extensional list" (p. 76) to code the RFAs' texts selected for the analysis (i.e., source material). The researcher assigned either a word– and/or an expression–designation in the source material to the theme to which they were attributed to belong. Each theme was recorded as a distinct class represented by a different set of raw data, meaning that each theme conveyed a distinct aspect of its problematic (Krippendorff, 1980). In addition to clearly defining terms, the researcher relied on her understanding of the HEC grants program context, knowledge of the program's history, familiarity with the RFA texts, and experience with the grants world in assigning text components to themes. The researcher recorded twenty one themes. The description of each theme is provided in Table B2 (see Appendix B).

All themes were regarded as characteristics of agency discourse. Their frequency conveyed program developers' emphasis on their ideals. For example, the problematic "program attributes" breaks down into five themes. The "broaden term agriculture" theme signified the agency's intent to *endorse a changing nature of agriculture* beyond its traditional definition, as mere production. The "aspire quality" theme signified the agency's intent to *encourage innovative proposals with a potential for national impact*. The focus was on qualities (i.e., effectiveness, efficiency) in proposals that were desirable to the agency. The "provide funding" theme signified the agency's intent to *be specific about its fiscal level of commitment to support projects*. The "leverage institutional resources" theme signified the agency's intent to *have an impact on education in the food and agricultural sciences*. The "define rules" theme signified the agency's intent to *explain rules and*

procedures. The focus was on allowability and compliance. The “sustain changes” theme signified the agency’s intent to *sustain areas of importance for funding support*. In summary, “program attributes” problematic broadly signified a *conveying of CSREES’s self-introduction (i.e. “who I am”) to potential Project Directors (PDs)*. This introduction described the agency’s intentional:

1. endorsing a changing nature of agriculture;
2. encouraging innovative proposals with potential for national impact;
3. articulating fiscal level of commitment to support project;
4. having an impact on education in the food and agricultural sciences;
5. explaining rules and procedures; and
6. sustaining areas of importance for funding.

The “targeted outcomes” problematic breaks down into three themes. The “attract talent” theme signified the targeted needs in the area of strengthening workforce, improving quality of students, improving the image of agriculture, and effective usage of intellectual resources aimed at revitalizing the nation’s economic competencies in the area of the food and agricultural sciences. The emphasis was on quality of the future workforce and career opportunities. The “improve curricula” theme was identified with the targeted need to improve the quality of curricula at colleges and universities necessary to strengthen students’ competencies and meet the needs of the changing image of agriculture. The focus was on content and quality of educational programs and opportunities for faculty development. The “build infrastructure” theme signified a need for improved institutional infrastructure. The focus was on institutional capacities and resources to meet the emerging needs of educational programs in the area of the food and agricultural sciences. In summary, the “targeted outcomes” problematic broadly signified a conveying to potential PDs what CSREES’s objectives were (i.e., “what I want”). Targeted outcomes were assumed to be evaluative and were linked to the “true needs” (i.e., performance and treatment needs) that the HEC grants program was charged to meet (Scriven, 1991). These needs consisted of:

1. attracting talented people into the agricultural workforce;

2. developing the talents of these people via improvements in educational curricula; and
3. developing talents of these people via improvements in educational infrastructure.

The “CSREES’s roles” problematic breaks down into seven themes. The “maintain program niche” theme signified *the HEC grants program unique capacity at the national level* to respond to identified state, regional, national or international educational needs in the food and agricultural sciences. The “establish merit review” theme signified *the agency’ responsibility to establish and conduct a merit review evaluation of proposals*. The focus was on procedures that underlie the agency’s review process. The “develop review criteria” theme signified *the agency’s responsibility to develop criteria of quality proposals* such that each submitted proposal received consideration via a merit review process. The emphasis was on identifying proposal evaluation criteria that were acceptable to peer reviewers. The “assist institutions” theme signified *the agency’s responsibility to define areas of its services and practices*. The “acquire feedback” theme signified *the agency’s responsibility to invite input from stakeholders (presumably anyone who is “not actively involved in the day-to-day operations” [Scriven, 1991, p. 334] of the program including its supporters and opponents) and incorporate it into the HEC RFAs*. The “communicate” theme signified *the agency’s responsibility and commitment to communicate*. The “provide opportunity to share” theme signified *the agency’s responsibility to organize PD meetings to share projects’ accomplishments*. In summary, the “CSREES’s role” problematic broadly signified a *conveying to potential PDs what practices and services CSREES can provide (i.e., “what I can do for/with you”)*. These services and practices consisted of:

1. maintaining HEC grants program’s unique position at the national level ;
2. establishing a merit review of proposals received;
3. developing review criteria of quality proposals acceptable to peer reviewers;
4. defining areas of services to the potential PDs;
5. inviting input from stakeholders about the HEC grants program;

6. maintaining communication; and
7. organizing a meeting for PDs to share projects' accomplishments.

The "PDs' responsibilities" problematic breaks down into five themes. The "develop project outcomes" theme signified *PDs' requirement to demonstrate their projects' merit, worth, and effectiveness* to a peer review audience. The "measure program performance" theme signified PDs' requirement *to provide the agency with key data for the assessment of HEC performance*. The emphasis was on determining attributes sought by the agency and aimed at assessing the program's impact on quality of education via its supported projects. The "require progress reporting" theme signified *PDs' responsibility to comply with project progress reporting procedures*. The focus was on reporting activities for which PDs were responsible at various stages of project implementation and closing. The "enable creativity" theme signified PDs' responsibility *to consider ideas for projects development recommended by the agency* to enable creativity in projects' development and implementation. The "use innovative teaching" theme signified *PDs' responsibility meeting agency's specific requirements directed to projects' content and strategies*. In summary, the "PDs' responsibilities" problematic broadly signified *a conveying to potential PDs of their responsibilities (i.e., "what you can do for/with me")*. These responsibilities consisted of:

1. demonstrating their projects' merit, worth, and effectiveness;
2. providing the agency with concrete data to assess HEC performance;
3. submitting project progress reports;
4. using creative approaches for project development; and
5. meeting requirements for innovative teaching.

Babbie (2007) defines variables as "logical groupings of attributes" (p. 14). In this analysis variables are themes. Table 3 lists themes under their corresponding problematics. Problematics are assigned Roman numerals; themes are assigned Arabic ones. In addition, this study's data matrix is shown in Table 4. Each cell of the matrix contains the corresponding RFA's total number of mentions of each theme.

Table 3
Coded Variables in Content Analysis Matrix

| Problematic | Variable | |
|---------------------------|----------------------------------|--------|
| | Theme | Number |
| I. Program attributes | Broaden term agriculture | 1 |
| | Aspire quality | 2 |
| | Provide funding | 3 |
| | Leverage institutional resources | 4 |
| | Define rules | 5 |
| | Sustain changes | 6 |
| II. Targeted outcomes | Attract talent | 7 |
| | Improve curricula | 8 |
| | Build infrastructure | 9 |
| III. CSREES's roles | Maintain program niche | 10 |
| | Establish merit review | 11 |
| | Develop review criteria | 12 |
| | Assist institutions | 13 |
| | Acquire feedback | 14 |
| | Communicate | 15 |
| | Provide opportunity to share | 16 |
| IV. PDs' responsibilities | Develop project outcomes | 17 |
| | Measure program performance | 18 |
| | Require progress reporting | 19 |
| | Enable creativity | 20 |
| | Use innovative teaching | 21 |

Note. CSREES = Cooperative State Research, Education, and Extension Service;
 PD = Project Director

Table 4

Data Matrix Used in the Content Analysis

| Coded Variables RFAs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|----------------------------|---|---|---|---|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1995 | 1 | 7 | 2 | 1 | 16 | 4 | 14 | 10 | 16 | 1 | 3 | 15 | 7 | 0 | 0 | 3 | 2 | 0 | 4 | 91 | 3 |
| 1996 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 14 | 0 | 0 | 0 | 1 | 2 | 4 | 6 | 49 | 2 |
| 1998 | 0 | 1 | 1 | 0 | 13 | 1 | 1 | 1 | 2 | 1 | 1 | 14 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 46 | 0 |
| 1999 | 1 | 5 | 1 | 1 | 19 | 4 | 2 | 1 | 1 | 2 | 1 | 15 | 0 | 2 | 1 | 0 | 4 | 0 | 0 | 63 | 0 |
| 2000 | 1 | 4 | 1 | 1 | 17 | 4 | 3 | 3 | 3 | 1 | 1 | 15 | 0 | 2 | 1 | 0 | 4 | 0 | 0 | 66 | 0 |
| 2001 | 1 | 2 | 2 | 2 | 16 | 4 | 2 | 3 | 2 | 1 | 1 | 15 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 69 | 0 |
| 2002 | 1 | 0 | 1 | 1 | 14 | 4 | 1 | 3 | 9 | 1 | 9 | 17 | 4 | 0 | 9 | 2 | 8 | 12 | 4 | 42 | 0 |
| 2003 | 2 | 1 | 2 | 0 | 4 | 8 | 3 | 0 | 13 | 1 | 11 | 8 | 2 | 6 | 6 | 2 | 6 | 12 | 8 | 52 | 27 |
| 2004 | 2 | 2 | 2 | 1 | 2 | 7 | 2 | 1 | 10 | 1 | 13 | 7 | 0 | 5 | 6 | 2 | 8 | 12 | 8 | 65 | 25 |
| 2005 | 1 | 0 | 2 | 2 | 0 | 6 | 2 | 1 | 1 | 1 | 13 | 5 | 1 | 5 | 5 | 2 | 7 | 12 | 9 | 42 | 39 |

Note. RFA = Request for Application. Variables coding system is shown in Table 3. Numbers in the matrix's cells are the variables' measurements (counts of mentions in the texts of RFAs) that were obtained using Textual Content Analysis (TCA).

Variable illustration: values and measurements

Variable values. Of interest were linear changes in RFAs' emphasis on each variable (there were 21 variables) from 1995 to 2005. For the purpose of illustration, let us consider one variable, specifically *communicate* (variable 15 in the data matrix in Table 4). The below discussion of this variable also applies to the remaining twenty variables.

Since the context of this study was the HEC program's organizational discourse and the boundaries were set within the program, *communicate* was considered a characteristic of the agency, namely its responsibility and commitment to communicate. To determine the number of times the *communicate* theme was mentioned in a given RFA, the researcher first had to determine its textual lexicon, namely words/expressions that were regarded as concrete terms associated with the theme as it appeared in the text. As an example, the researcher searched for words such as *communication, provide, inform, information, announce, and acknowledgement(s)* wherever they served as an indicator of emphasis on agency communication. In addition, *communicate* emphasis was identified according to certain phrases that contained descriptors such as *CSREES will acknowledge, strongly encouraged to provide, will be sent to, please contact, acknowledgement will contain, encouraged to contact, for the purpose of, for the reasons set forth, and acknowledged in writing.*

TCA tabulated the number of times each theme was mentioned in the text of each RFA in the sample. Table 5 lists values of the variable, *communicate* (or C).

Table 5

Numbers of mentions of 'communicate' in 10 RFAs

| Year | C |
|------|---|
| 1995 | 0 |
| 1996 | 0 |
| 1998 | 0 |
| 1999 | 1 |

Table 5 (continued)

| Year | C |
|------|---|
| 2000 | 1 |
| 2001 | 1 |
| 2002 | 9 |
| 2003 | 6 |
| 2004 | 6 |
| 2005 | 5 |

Note. RFA = Request for Applications. Count “0” did not necessarily imply that the *communicate* theme was not mentioned in the RFA texts. It meant that the theme was not mentioned in the RFA texts used in the analysis.

A random variable, X , is an operation, which if repeated can produce different results. A random variable cannot be assigned a value. It does not describe the actual outcome of a particular experiment, but rather encompasses all possible, as-yet-undetermined outcomes in terms of a real number (Iversen, 1996). In other words, what one is primarily interested in while conducting an experiment or an observational study is “some function of the outcome as opposed to the actual outcome itself” (Ross, 2002). *Communicate*, as a random variable of interest, was viewed as a real-value function defined on its sample space. Mathematically, the random variable, C , is denoted as $C = \{(c_1, c_2, c_3, \dots, c_{10}), 0 \leq c_i < \infty, i = 1, 2, 3, \dots, 10\}$. C can take on at most a countable number of possible values. It is a discrete random variable with its realized values obtained through the previously described coding process.

Variable measurements. A random variable provides a complete description of all possible outcomes and probabilities. Although one doesn’t know the outcome of an operation with certainty, one can draw inferences about the set of all possible outcomes of that operation. Each outcome from this study’s coding operations consisted of the number of times the *communicate* theme was mentioned in the text

of a particular RFA. The random variable, C (i.e., counts of the thematic variable, *communicate*), can take the value of any nonnegative integer. That is, $C = \{c, 0 \leq c < \infty\}$. And any instance, a , of a specific outcome of C constitutes an event. That is: $a = \text{number of mentions (an integer between } 0, 1, \dots, \infty)$

To illustrate this point under the assumption that the ten RFAs comprised a random sample of organizational discourse about the program, the number of mentions, 9, of *communicate* in 2002 (as listed in Table 5) is an event that might have had a different outcome if we were to draw a different sample of organizational discourse from 2002. The sample space, S_C , consists of all hypothetical outcomes that can be realized. S_C is the finite list $(A_1, A_2, A_3, \dots, A_{10})$, where each A_i represents an as-yet-unrealized outcome. Table 5's variable, C , corresponds to only one of these outcomes (i.e., to one set of 10 a 's).

The term *discrete* characterizes sample spaces with either finite or a "countably infinite" number of outcomes (Yaspan, 1968). Further, the researcher assumed that each of the obtained outcomes of mentions of *communicate* had a positive probability, since basic outcomes with zero probabilities can be discarded in the discrete case without affecting event probabilities. Since C is a discrete random variable it will have probability lumps, associated with zero and each positive integer. "Probability" is referred to here as the probability that an event will occur. In the discrete case, a random variable consists of its possible values (i.e., its outcome events) and their respective probabilities, denoted as $P(a_i) = P_i$.

Random variables and probability distributions are important for conceptualizing all possible outcomes and their probabilities at the same time, whereby reality is conceived in terms of the totality of observations in the presence of uncertainty (Rudas, 2004). Salsburg (2001) mentions that "things" of science are not the observables but the mathematical distribution functions that describe the probabilities associated with observations. Following this thought, the measurement of C was the set of counts (or number of mentions) of *communicate* in the RFA texts in the sample. The objective in this analysis was to detect linear trends or continuity in these counts as evidence of shifting or stable emphasis within program

organizational discourse. At this point, the discussion turns to the probability distribution of *communicate* mentions across RFAs over time.

Probability distribution. The probability that, for example, $C = 6$ in 2003 (see Table 5) depends on the study's assumption about the underlying distribution of C . It clearly has a discrete distribution, meaning that possible outcomes can only be nonnegative integers. Thus, one cannot assume a normal distribution, which is continuous. Instead, the assumption was that the underlying distribution was *Poisson*. The random variable C can be considered to be a *Poisson* random variable with parameter λ if for some $\lambda > 0$,

$$p(i) = P\{C = i\} = e^{-\lambda} \frac{\lambda^i}{i!}, i=0, 1, 2, \dots$$

Poisson probability distribution applies when each event, a , is a count (here *communicate* mentions) measured in a finite space. The finite space in this study referred to the relatively fixed size of RFA texts, which is analogous to the fixed time span typically associated with *Poisson* random variables (Ross, 2002).

The *Poisson* distribution is a discrete distribution defined on the integers $(0, 1, 2, \dots)$ with weight function:

$$f(c) = \frac{\lambda^c e^{-\lambda}}{c!} \text{ where } c = 0, 1, 2, \dots \text{ and } \lambda \text{ is a positive parameter such that } E(C) = \lambda \text{ and}$$

$$\text{Var}(C) = \lambda$$

After calculating a mean and variance for C , this characteristic of *Poisson*

distributions did not appear to hold: $\bar{C} = 2.9$ and $\hat{\sigma}_c^2 = 10.8$. This anomaly may be due in part to a lack of independence between counts obtained in adjacent years. In fact, this violation can be traced by looking at C values as shown in Table 5. It is

evident that there were similar values of C that followed each other in sequence between 1995-2001 and 2003-2004.

Logic of applying a linear probability model

Recall here, the objective of this research was to identify linear changes and continuity in emphasis within HEC program discourse. The researcher's interest in this content analysis was to account for both short-term drifts and long-term linear trends. A linear probability model was considered. Regression analysis has become a standard statistical tool in the social sciences mostly due to the multivariate nature of many of its research problems (Aldrich & Nelson, 1984). Linear models comprise a large class of well studied and theoretically grounded models, of which numerical aspects are relatively easy. However, they are appropriate under a specific set of assumptions. They include (1) homoscedasticity, (2) linearity, (3) randomness, and (4) normality. In the study, the following linear model was proposed for the random variable, C , as well as all other variables:

(1)

$$\hat{C}'_t = \hat{b}_1 + \hat{b}_2 C'_{t-1} + \hat{b}_3 t + e, \text{ where}$$

1. $C'_t = \sqrt{C_t + 1} + \sqrt{C_t}$ and $C'_{t-1} = \sqrt{C_{t-1} + 1} + \sqrt{C_{t-1}}$, which is the Freeman–Tukey transformation (cited in Weisberg, 1985) to be used when some C_t 's are zero or small;
2. C'_t is a function of the number of times that in the RFA for year, t , it was mentioned that the granting agency is responsible to initiate grant-related communication;
3. \hat{b}_2 : The short-term 'drift' in the granting agency, such that it tends to mention (or not mention) its communication responsibility across adjacent years of RFAs (net of any long-term linear trend in such mentioning);

4. \hat{b}_3 : The long-term linear effects in mentions within RFAs of agency responsibility for communication (net of agency 'drift' as explained in point "3");
5. t : Is the number of years after the first available RFA (i.e., after 1995).

The underlying motivation for adding C'_{t-1} into the model was the researcher's concern that a long-term trend may simply be due to the granting agency's short-term inertia or drift rather than to a long-term adaptation to consistent changes in the environment, which may have altered its RFA emphases monotonically over time (as stated earlier in this text). The variable, t , measured how long after the program's fifth year that the RFA had been written. t was a meaningful variable in the context of this analysis. This assertion distinguished this research from a classical time series study, where C'_{t-1} is not important in terms of its added value to findings' interpretation. Here, the lagged variable, C'_{t-1} , takes the concept of proximity into account. It was assumed that what was emphasized in the 1995 RFA was reasonably close to the program's developers' original ideals. Pertaining to later RFAs, these ideals were considered to be consecutively further away from the original ones. Of interest was whether the program's original ideals had changed due to drift (as measured by \hat{b}_2) or to some long-term linear tendency (as measured by \hat{b}_3).

The position that the researcher took was that any dependency in realized values of C'_t that existed across the RFAs could be accounted for in terms of modeling short-term drifts and long-term linear trends. In linear regression model terminology, C'_t was a dependent variable and C'_{t-1} and t were independent variables. Moreover, the independent variable, C'_{t-1} , and the square root transformations used in obtaining both C'_t and C'_{t-1} were intended to meet the randomness and homoscedasticity assumptions of linear regression, plus the assumption that the errors, ε_i , were independently and identically distributed (Neter,

Kutner, Nachtsheim, & Wasserman, 1996, p. 772). The linear model's values of C'_t , C'_{t-1} , and t are shown in Table 6.

Table 6

Transformed Values of Variables C'_t and C'_{t-1} , and t

| C'_t | C'_{t-1} | t |
|--------|------------|-----|
| 1.0 | 1.0 | 1 |
| 1.0 | 1.0 | 2 |
| 2.41 | 1.0 | 3 |
| 2.41 | 2.41 | 4 |
| 2.41 | 2.41 | 5 |
| 6.16 | 2.41 | 6 |
| 5.10 | 6.16 | 7 |
| 5.10 | 5.10 | 8 |
| 4.69 | 5.10 | 9 |

The sample spaces for each variable were the following:

$$C'_t = \{(c_2, c_3, c_4, \dots, c_{10}), 0 \leq c_i < \infty, i=2,3,\dots,10\}$$

$$C'_{t-1} = \{(c_1, c_2, c_3, \dots, c_9), 0 \leq c_i < \infty, i=1,2,\dots,9\}$$

$$t=i, \text{ where } i = (1,2,\dots,9).$$

After transformation the mean and variance for C were approximately equal to the same positive parameter: $\bar{C} = 3.1$ and $\hat{\sigma}_c^2 = 3.9$. The random variable, C , was no longer discrete, but continuous. In principle, the restriction on assuming normality in terms of probability distribution then could be removed legitimately. That meant that it was possible to identify a nonnegative function f in space $(-\infty, \infty)$ that would have the property that for the measurable sets B :

$$P\{C \in B\} = \int_B f(c)dc$$

This function is called the *probability density function* (Ross, 1987). Within the context of this research, the assumption of normality was taken with the precaution that the sample size was small ($n < 30$). Although the constraint for normality was lessened, in reality the variable remains a discrete one with a countably infinite number of possible (although no longer strictly integer) values. As an alternative, it was assumed that the independent variable C_{t-1} had a *t-distribution* (Miller & Miller, 2004). Since the independent variable t was fixed, the sum of C_{t-1} and t would also have a *t-distribution*.

The meaning of the regression analysis was that the prediction equation was a straight line such that the sum of squared vertical distances from the observed values (points on scatter plot) to the line was the smallest. No other line would give a smaller (residual) sum than the regression line. β_1, β_2 , and β_3 were the unknown constants to be estimated. In equation (1), it was assumed that the values of C_t and C_{t-1} could be observed. Ordinary least squares (OLS) was used to estimate the unknown constants. The OLS estimates of the constants were those that minimized the sum of square errors. The sum of square errors could be expressed by squaring and summing the following equation over all n observations:

(2)

$$\varepsilon = C'_t - \hat{C}'_t, \text{ where } \hat{C}'_t = \hat{b}_1 + \hat{b}_2 C'_{t-1} + \hat{b}_3 t$$

Several assumptions and consequences, assuming the previous ones are met, should be made. The first assumption of OLS regression was that the equation's independent variables, C_{t-1} and t , were not perfectly collinear. In relation to the model itself, it was assumed that it included all relevant and no irrelevant independent variables (Aldrich & Nelson, 1984). It was also assumed that $\mu_\varepsilon = 0$ and that the error term, ε , was not correlated with any of the independent variables (i.e., that $cov(\varepsilon, C_{t-1}) = 0$ and $cov(\varepsilon, t) = 0$). Recall here, that the independent random variable, C_{t-1} , was introduced into the model to minimize any such associations

among errors. Also $\text{cov}(\varepsilon, t) = 0$ because t was fixed. Moreover, it was assumed that the expected value of C'_t are correctly specified in the following linear form:

$$E(C'_t | C'_{t-1}, t) = \beta_1 + \beta_2 C'_{t-1} + \beta_3 t \quad (3)$$

If all these assumptions are met, then the OLS solutions for \hat{b}_1, \hat{b}_2 , and \hat{b}_3 would be unbiased estimators of the unknown parameters of interest β_1, β_2 , and β_3 .

Using transformed values for C in the sample of RFAs, the following values for the unstandardized regression equation were obtained in SPSS:

$$C_t = .317 - .122C_{t-1} + .681t \quad (4)$$

\hat{b}_2 in words: After adjusting the lagged communication measure for its long-term positive linear trend in mentions of communication across the RFAs, one would estimate a drop (a negative drift) of .122 transformed mentions of communication for every mention of communication in the previous years RFA.

\hat{b}_3 in words: After adjusting our linear trend measure for any short-term non-monotonic variations potentially due to previous years' emphasis (or de-emphasis) of communication, one would estimate an additional .681 transformed mentions of communication for each year since 1995.

Data Analysis

The null hypothesis stated that there was no change in variable mentions over time. The research hypothesis was two-tailed and stated that there was change (either a monotonic drop or increase) in variable mentions over time. In mathematical terms it was expressed as follows:

$$H_0: \beta_3 = 0$$

$$H_1: \beta_3 \neq 0$$

$$df = 8$$

The critical value for t ($\alpha / 2 = .025$, $df=8$) equals to 2.306.

The regression described in equation (4) is an application of equation (1). Generalizing this equation such that it might apply to any of the 21 variables, it was rewritten as:

(5)

$$\hat{X}'_t = \hat{b}_1 + \hat{b}_2 X'_{t-1} + \hat{b}_3 t + e$$

Because the researcher was interested in examining relationships between two variables, t -statistics were used to test for the significance of slope estimates (Salkind, 2004; also see Mertler & Vannatta, 2002; Neuendorf, 2002). The outputs of the regression models for all CA variables are summarized in Table 7. Problematics are listed by Roman numeral, and themes by Arabic numeral (provided in parenthesis to their right). Standard errors are provided in parenthesis to the right of slope estimates. Overall p -values are in parenthesis next to R^2 values. Mean, minimum and maximum for each variable are also shown. The variables in the table are ordered within their clusters (problematics) according to the magnitudes of their R^2 values.

Table 7

Statistics from Regressions of Measures of Emphasis on Measures of Their Short-Term Drifts and Long-Term Trends, 1995-2005

| Problematics/ Themes, X_t | Short-Term Drift, X_{t-1} | Long-Term Trends, t | R^2 | Mean | Min | Max |
|------------------------------|-----------------------------|-----------------------|--------------|------|-----|-----|
| I. Program attributes | | | | | | |
| Provide funding (3) | -.555 (.159)* | .270 (.040)* | .882 (.002)* | 2.6 | 1.0 | 3.2 |
| Sustain changes (6) | -.189(.291) | .444 (.122)* | .791 (.009)* | 4.2 | 2.4 | 5.8 |
| Broaden term agriculture (1) | -.254 (.396) | .165 (.090) | .381 (.237) | 2.4 | 1.1 | 3.2 |
| Define rules (5) | .383 (.431) | -.377(.390) | .282 (.370) | 5.9 | 1.1 | 8.8 |
| Aspire quality (2) | -.113 (.388) | -.266 (.191) | .273 (.385) | 3.1 | 1.1 | 5.5 |

Table 7 (continued)

| Problematics/ Themes, X_t | Short-Term Drift, X_{t-1} | Long-Term Trends, t | R^2 | Mean | Min | Max |
|--------------------------------------|--------------------------------|--------------------------|--------------|------|------|------|
| Leverage institutional resources (4) | -.066 (.432) | .072 (.112) | .068 (.809) | 2.3 | 1.1 | 3.2 |
| II. Targeted outcomes: | | | | | | |
| Build infrastructure (9) | .001 (.322) | .371 (.263) | .268 (.392) | 4.5 | 2.4 | 8.1 |
| Attract talent (7) | -.091 (.123) | .062 (.073) | .257 (.409) | 3.5 | 2.4 | 7.6 |
| Improve curricula (8) | .010 (.284) | -.093 (.157) | .084 (.768) | 3.2 | 1.0 | 6.5 |
| III. CSREES's role: | | | | | | |
| Establish review merit (11) | .468 (.275) | .479 (.208) | .829 (.005)* | 4.4 | 2.4 | 7.3 |
| Communicate (15) | -.122 (.443) | .681 (.322) | .742 (.017)* | 3.1 | 1.0 | 6.2 |
| Maintain program niche (10) | -.655 (.228)* | -.105 (.027)* | .741 (.017)* | 2.6 | 2.4 | 3.1 |
| Develop review criteria (12) | .579 (.379) | -.233(.139) | .686 (.031)* | 7.1 | 4.7 | 8.4 |
| Provide opportunity to share (16) | .458 (.216) | .232 (.092)* | .684 (.031)* | 2.3 | 1.0 | 3.7 |
| Acquire feedback (14) | -.295 (.389) | .592 (.234)* | .609 (.060) | 2.8 | 1.1 | 5.1 |
| Assist institutions (13) | .025 (.251) | .222 (.160) | .244 (.432) | 2.1 | 1.1 | 5.5 |
| IV. PDs' role: | | | | | | |
| Use innovative teaching (21) | .543 (.318) | .969 (.457) | .732 (.019)* | 4.5 | 1.0 | 12.6 |
| Require progress reporting (19) | .553 (.297) | .389 (.239) | .596(.066) | 3.5 | 1.1 | 6.2 |
| Measure program performance (18) | .254 (.392) | .606 (.423) | .547 (.093) | 3.8 | 1.1 | 7.1 |
| Develop project outcomes (17) | -.184 (.398) | .166 (.272) | .073 (.796) | 4.5 | 1.1 | 7.4 |
| Enable creativity (20) | -.201 (.317) | -.081 (.219) | .069 (.806) | 15.3 | 13.0 | 19.1 |

* $p < .05$

Recall here, that the focus of this study was on long-term trends (changes and continuity in program's emphasis) vs. short-term drifts. The assumption was that the long term trends comprised the HEC's theory (i.e., program's underlying mechanism). Hence, the findings of this study were understood in view of this assumption. The section that follows explicates aspects of the procedure that the researcher used to move away from the less-interesting drift-findings toward the long-term (or lack of long-term) trends to form the basis for making preliminary inferences about the HEC's program theory.

Findings

To summarize and interpret the meanings of this study's findings as measurable characteristics of the HEC's program theory, the researcher employed two approaches. The first approach was to look at combined effects (i.e., long-term

trends and short-term drifts). The second approach was to focus on long-term trends, which were presumed indicative of the HEC's program theory consistent changes.

Combined effects

In this study, R^2 measured the combined amount of linear-plus-drift change in emphasis. The researcher's alpha level (i.e., the value at which findings would be deemed statistically significant in two-tailed tests) was .05. Given the assumption that the RFAs in the sample were representative of a larger population of texts, p -values were used to draw inferences about program-related organizational discourse. By examining the variables' statistics the changes in emphasis (linear change and drift combined) were observed among the following variables:

$$1. \textit{Provide funding: } \hat{\chi}_{t,3} = 2.663 - .555\chi_{t-1,3} + .270t$$

A linear increase ($t_3 = 6.7 > 2.306 = t_{0.025,8}$) was accompanied by short-term fluctuations in mentions of the agency's provision of funding.

$$2. \textit{Sustain changes: } \hat{\chi}_{t,6} = 2.803 - .189\chi_{t-1,6} + .444t$$

There was a linear increase ($t_6 = 3.629 > 2.306 = t_{0.025,8}$) in mentions of the agency's interest in sustainable changes.

$$3. \textit{Maintain program niche: } \hat{\chi}_{t,10} = 4.791 - .655\chi_{t-1,10} - .105t$$

A linear decline ($t_{10} = -3.912 < -2.306 = t_{0.025,8}$) in mentions of the agency's maintaining its program niche was accompanied by short-term fluctuations in these mentions.

$$4. \textit{Establish review merit: } \hat{\chi}_{t,11} = .187 + .469\chi_{t-1,11} + .479t$$

There was evidence of linear change and/or drift in mentions of the agency's establishing review merit (i.e., R^2 was significant). However, neither partial slope was

significant, thus precluding determination of the relevant importance of either.

$$5. \textit{Develop review criteria: } \hat{\chi}_{t,12} = 3.917 + .579\chi_{t-1,12} - .232t$$

There was evidence of linear change and/or drift in mentions of the agency's developing review criteria (i.e., R^2 was significant). However, neither partial slope was significant, thus precluding determination of the relative importance of either.

$$6. \textit{Communicate: } \hat{\chi}_{t,15} = .317 - .122\chi_{t-1,15} + .681t$$

There was evidence of linear change and/or drift in mentions of the agency's interest in communication (i.e., R^2 was significant). However, neither partial slope was significant, thus precluding determination of the relative importance of either.

$$7. \textit{Provide opportunity to share: } \hat{\chi}_{t,16} = -.045 + .458\chi_{t-1,16} + .232t$$

There was a linear increase ($t_{16} = 2.531 > 2.306 = t_{0.025,8}$) in mentions of the agency's interest in providing opportunity to share.

$$8. \textit{Use innovative teaching: } \hat{\chi}_{t,21} = -2.218 + .543\chi_{t-1,21} + .969t$$

There was evidence of linear change and/or drift in mentions of the agency's emphasis on the use of innovative teaching (i.e., R^2 was significant). However, neither partial slope was significant, thus precluding determination of the relative importance of either.

Further, the researcher was aware that in case of a small size sample, $n < 30$, she was prone to make the Type II error (failing to reject a false null hypothesis). Failing to reject the null hypotheses means concluding that there was no change in theme mentions. However, in this study accepting that there was no change in emphasis did not necessarily mean that a variable was not emphasized. Means were also used to take a further look at the data. In conjunction with a nonsignificant long-term slope a high value on a variable's mean indicated a consistently strong emphasis (i.e., consistency of the variable's mentions over the study period).

Long-term trends

The HEC's program theory was this study's phenomenon of interest. A phenomenon depends on conditions (Kuligin, Kuligina, & Korneva, 1994). Out of two types of changes in emphasis, the long-term trends were of overriding theoretical interest. Short-term drifts were considered to be mere agency-related momentum (rather than a consistent trend) in RFA language. In contrast, the researcher was interested in the long-term linear trends to extract meaning out of the findings presented in Table 7 from which to produce an explicit description of consistent changes in the HEC developers' conceptions, assumptions, and beliefs about this program. That, in turn, was the purpose of this study.

With this view, the 21 variables were organized in four patterns of thematic emphasis. They included (1) increasing emphasis (IE), (2) decreasing emphasis (DE), (3) consistently high (CH), and (4) consistently low (CL). This division of variables in four patterns of emphasis is shown in Table 8. Variables for which the long-term trend slopes were statistically significant comprise categories 1 – for Increasing Emphasis (with significantly positive long-term slopes) and 2 – for Decreasing Emphasis (with significantly negative long-term slopes). Variables for which the long-term trend slopes were statistically insignificant comprise categories 3 – Consistently High (with high mean) and 4 – Consistently Low (with low mean). It was assumed that when means were high the agency had consistently emphasized those themes over the long-term. Variables' numbers are indicated in parenthesis to the right of variables' descriptors. Variables' means and slopes are also provided in Table 8. Variables in category 1 were sorted from largest to smallest slope. Variables in categories 3 and 4 were sorted by means, specifically largest to smallest means in column 3 and smallest to largest means in column 4.

Table 8
Temporal Patterns in Emphasis among 21 Variables

| Thematic Emphasis | Variables | Mean | Long-Term |
|------------------------------|--------------------------------------|------|-----------|
| | | | Slope |
| 1. Increasing Emphasis (IE) | Acquire feedback (14) | 2.8 | .592 |
| | Sustain changes (6) | 4.2 | .444 |
| | Provide funding (3) | 2.6 | .270 |
| | Provide opportunity to share (16) | 2.3 | .232 |
| 2. Decreasing Emphasis (DE) | Maintain program niche (10) | 2.6 | -.105 |
| 3. Consistently High (CH) | Enable creativity (20) | 15.3 | -.081 |
| | Develop review criteria (12) | 7.1 | -.233 |
| | Define rules (5) | 5.9 | -.377 |
| 4. Consistently Low (CL) | Assist institutions (13) | 2.1 | .222 |
| | Leverage institutional resources (4) | 2.3 | .072 |
| | Broaden term agriculture (1) | | |
| | Aspire quality (2) | 2.4 | .165 |
| | Communicate (15) | 3.1 | -.266 |
| | Improve curricula (8) | 3.1 | .681 |
| | Attract talent (7) | 3.2 | -.093 |
| | Require progress reporting (19) | 3.5 | .062 |
| | Measure program performance (18) | 3.5 | .389 |
| | | 3.8 | .606 |
| | Establish review merit (11) | | |
| | Build infrastructure (9) | 4.4 | .479 |
| | Use innovative teaching (21) | 4.5 | .371 |
| Develop project outcome (17) | 4.5 | .969 | |
| | 4.5 | .166 | |

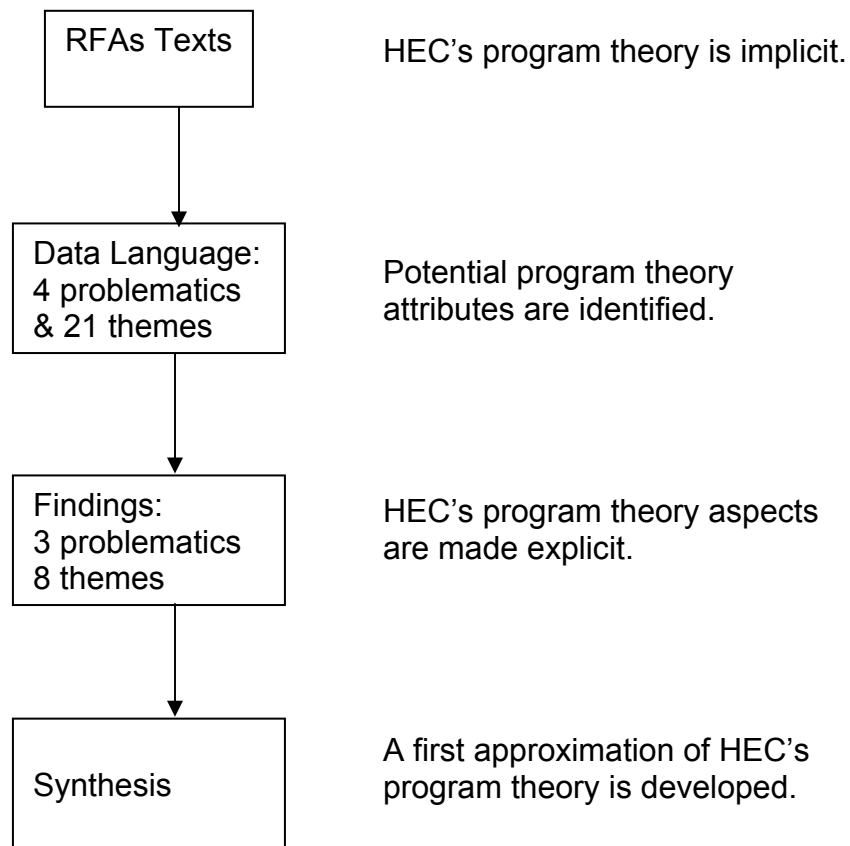
Note. IE = Increasing Emphasis; DE = Decreasing Emphasis; CH = Consistently High; CL = Consistently Low.

The four patterns of emphasis were further used to distinguish among themes to draw preliminary inferences about this program's theory, which was conceptualized within the HEC's sustainability framework. Sustainability implied continuity and consistent changes in the program developers' ideals (i.e., themes or variables) as communicated by the agency to the project directors over the study period (i.e., 1995–2005). Consistent changes were associated with increasing emphasis (IE) and decreasing emphasis (DE), whereas stability was associated with consistently high (CH) emphasis. Hence, eight themes were determined as essential (emerging, declining, or ongoing) characteristics of the HEC's program theory.

Specifically, the agency consistently emphasized (1) enabling creativity, (2) developing review criteria, and (3) defining rules. Continuous increases in emphasis were identified with the agency' interest to (1) acquire feedback, (2) sustain changes, (3) provide funding, and (4) provide opportunity to share. The emphasis on maintaining program niche decreased continually.

The content of the RFA texts was this study's object and the basis for inference for the HEC's program theory. Therefore, it was important to connect the identified eight themes to the RFAs' rhetoric in order to create a close descriptive approximation to the HEC's program theory. Recall here, that it was presumed that the HEC developers' ideals (values about the program) were encoded in RFAs texts. The analytic scheme was developed and utilized to create data language aimed at decoding these ideals from the language of the RFAs texts. It was further assumed that findings based on these data will lead to insights about the HEC's program theory (i.e., the HEC developers' values). This process of reasoning from RFAs' rhetoric to the HEC's program theory is shown in Figure 2.

Figure 2. Process of reasoning from RFA rhetoric to HEC's program theory.



The connection of the eight themes to this study's communication content (RFAs' rhetoric and research interests) is shown in Table 9. The "define rules," "sustain change," and "provide funding" themes belong to the "program attributes" problematic, which signified a *conveying of CSREES's self-introduction (i.e., "who I am") to potential Project Directors (PDs)*. These themes constituted continuity and consistent changes in the HEC's initial idea about social benefits that the program was expected to produce. The "develop review criteria," "acquire feedback," "provide opportunity to share," and "maintain program niche" themes comprised the "CSREES's roles" problematic, which signified a *conveying to potential PDs what practice and services CSREES can provide (i.e., "what I can do for/with you")*. These themes constituted continuity and consistent changes in the HEC's initial idea about practices and services that the program was expected to provide to its stakeholders

or PDs. The theme “enable creativity” was part of the “PDs’ responsibilities”, which signified *a conveying to potential PDs of their responsibilities (i.e., “what you can do for/with me”)*. This theme constituted continuity in the HEC’s initial idea about practices and services that were expected from PDs in return. Temporal patterns in emphasis (from Table 8) and variable numbers are also provided in Table 8 in parenthesis to the right of variables’ descriptors in Table 9.

Table 9

Connection of Eight Themes HEC's Program Theory to the Study's Communication Content

| Program's ideals | RFAs' rhetoric | | HEC's themes | |
|---------------------------------|-------------------------------|--------------------|----------------------------------|---|
| | Descriptors | Problematic | Continuity | Change |
| Program's relation to benefits | "Who I am" | Program attributes | Define rules (CH, 5) | Sustain changes (IE, 6) Provide funding (IE, 3) |
| Practices and service provided | "What I can do for/with you" | CSREES's role | Develop review criteria (CH, 12) | Acquire feedback (IE, 14) Provide opportunity to share (IE, 16) Maintain program niche (DE, 10) |
| Practices and services expected | "What you can do for/with me" | PDs' role | Enable creativity (CH, 20) | |

Note. CSREES = Cooperative State Research, Education, and Extension Service; PD = Project Director; CH= Consistently High; IE = Increasing Emphasis; DE = Decreasing Emphasis.

In summary, the eight themes were used to draw preliminary inferences about the HEC program's theory (i.e., the phenomenon of the study), which was the goal of this study.

Conclusions

A first approximation of the HEC's program theory

The study's premise indicates that the HEC program, which has been in existence since 1990, must have maintained the properties of open systems. This suggests that the agency utilized a consistent grouping of core strategies and variable tactics to meet changing conditions in the program's environment. This premise follows the theory of causal texture of organizational environments put forth by Emery & Trist (1963). The findings indicate that only eight out of twenty one of the developer's ideals (determined in this study) expressed the properties of open systems.

Specifically, three out of eight ideals became core strategies that formed the continuity (i.e., steady core) of the HEC program. These are the program's ability to (1) encourage creativity in project development, (2) implement a peer review process for evaluating proposals, and (3) clearly define the program's rules and requirements for potential project directors (PDs). Further, the findings show that the program made long-term adaptation to changes in its environment by giving increasing (or decreasing) emphasis on five variable tactics. Four out of these five variable tactics were associated with increasing program emphasis on (1) openness for feedback, (2) the areas of funding importance, (3) funding availability in a given year, and (4) opportunity for sharing project results. And one variable tactic was associated with decreasing program's emphasis on its leading position in agricultural education at the national level. Hence in light of these findings, the researcher suggested a description of the first approximation of the HEC's program theory that follows.

The HEC's program theory narrative

The continuity of this program appears to be based on the program's ability to encourage PDs to think creatively as they develop their project ideas in response to identified educational needs (national, state, regional, and international) in the food and agricultural sciences. The "enabling creativity" strategy is the HEC's critical competency on which the other two strategic objectives are built. Specifically, the program incorporates a peer review process as its essential component to (1) evaluate projects that are submitted for funding and (2) identify those with greater potentials to meet agricultural education needs. Further, the program's rules and requirements are well explained for potential PDs that, in turn, defines a programmatic framework and structure within which creative projects can be developed and recommended for funding. Hence, the combination of these three strategic objectives determines the steady core of the HEC program.

Further, to support its strategic objectives (during the study period) the program gives the strongest increasing emphasis with time on openness, namely soliciting feedback from its stakeholders (i.e., anyone who is not directly involved with the HEC administration). It could have been that the HEC's rules and requirements needed reexamination as the program's environment changed, for example the HEC's interaction with, and its meaning to, potential project directors. Stakeholders' comments then could have been used to better explain for what the program was looking in project development and how new ideas should have been crafted to support the program's core strategy on enabling creativity. It could even have been that the obtained feedback was used to improve the program's review process that, in turn, set the parameters for competition, ultimately fostering creativity in project development in order to obtain funding.

The program also gives substantial increasing emphasis with time on sustaining areas of funding importance for funding. It appears that the areas of funding importance are the HEC's "real goals" upon which the program advises the potential project directors to focus while developing their ideas. This emphasis might have served the purpose of aligning project plans for idea development with the

program's expectations for those ideas to reinforce the program's review criteria. The knowledge about what areas the program supports might also have been utilized by the potential project directors to make informative decision about (1) a match of their ideas with the program's areas of interest, and (2) creative ways of conceptualizing their ideas in projects matching the program's areas of importance.

The program also gives considerable but lesser increase in emphasis through the period covered by the study on funding availability in a given year. This emphasis might have been needed to stress the program's fiscal level of commitment to support on-going and new projects in a given year. The availability of funds might have been used to adjust the program's rules and requirements (e.g., what types of projects the program will select to fund, how many projects the program will be willing to support, how much funding the projects can request from the program's funds), ultimately specifying the programmatic framework within which creative projects can be developed and recommended for funding in a given year.

The program also gives considerable, but the least, increase in emphasis with time on providing opportunity for project directors who have received the HEC's awards to meet and share their projects' results. Bringing faculty (PDs) from various institutions and the program personnel together might have been seen as a forum that encouraged dialogue and learning among (1) PDs themselves, and (2) PDs and the program's staff. The agency might also have viewed this activity as (1) a way to learn more about the projects' happenings informally, and (2) the agency's openness for feedback. Hence, knowledge generated as a result of this meeting might then have been used by the program to strengthen its enabling creativity strategy.

Lastly, as one of its five tactics, the program gives decreasing emphasis with time on its importance in agricultural education at the national level. It might have been that over the period of 10 years (from 1995–2005, which is this study's period) this tactic has become less important to the program's main strategy (i.e., enabling creativity). It could have been that during the earlier years of the HEC's development, the emphasis on this program's importance in agricultural education as one of the tactics to support creativity served the purpose of establishing HEC's

credibility. Throughout its development, the HEC program appears to have an established status as the premier federal competitive grants program in agricultural education. Hence, having established the HEC program's niche, it might have been thought that further emphasis in this regard would divert the program's energies from its core objectives of (1) encouraging creativity in project development, (2) implementing peer review process for evaluating proposals, and (3) defining the program's rules and requirements.

In summary, the above explicated core objectives and variable tactics (i.e., increasing or decreasing emphases) comprise the HEC's program theory. This description of the HEC's program theory might be used to guide an evaluator's work with the program staff on its evaluation.

Program theory to guide evaluation

The key role of program theory is to define the contexts of (1) a program's operation and (2) locus for collecting evaluation data (Weiss, 1998). The above provided description of the HEC's program theory suggests enabling creativity as this program's operational context. It further points that the areas of evaluation emphasis include the agency's core strategic decisions and the variable tactics.

To illustrate this point, an evaluator might begin by examining whether or not funded projects have been effective in stimulating innovation and creativity to meet educational needs (state, regional, national, and international) in the food and agricultural sciences. One source of evidence (formal and information evaluation) might be the projects directors' meeting. Attending the meeting once during the duration of the funded project is required by the program. The meeting brings together a diverse group of faculty from various educational institutions. The evaluator might use observations and interviews with project directors to examine the outcomes of this event. The evaluator may also administer a survey to a sample of project directors who attended these meetings to find out whether the project directors meeting resulted in new partnerships and innovative approaches to meet educational needs in agriculture.

The evaluator might also decide to examine whether following rules and requirements and spending federal funds appropriately have had any effects on creativity while implementing the projects. Source of evidence might be (1) annual reports that project directors are required to submit to the agency and (2) interviews with project directors. Another area of potential interest for the evaluator might be to examine activities conducted by the projects, namely the projects fidelity to their original design. Here, the evaluator might again review the projects' reports and/ or conduct one-on-one interviews with the projects directors, for example by phone. These three types of evidence are part of the agency's monitoring procedure. Obtaining systematic information about funded projects' (1) fiscal responsibility, (2) fidelity to the original activities (target areas), and (3) adherence to rules and requirements will aid a better understanding about not only the implementation of projects' activities, but also potential deviations from what has been originally intended and explanations of the reasons for those deviations. The data then could be used to learn about the workings of the HEC's core strategy and modifications that might be required.

Further, the evaluator might examine whether or not feedback has taken place, what kind of feedback the program has been receiving, and how it has been used by the program to sustain its core strategies. The evaluator might use a combination of methods such as (1) reviewing the agency's records with obtained feedback (e.g., who provides feedback, what kind of feedback) and (2) conducting conversations with the program staff. The evaluator might also be interested in looking at the review criteria and procedure to examine its effects on the HEC's ability to enable creativity. The evaluator might interview project directors who received and who did not receive HEC awards. Once the data are collected, the intent of the analysis is to examine the HEC's program theory effectiveness.

Limitations

This study has three methodological limitations, in light of which its findings should be understood. Briefly, they relate to (1) a small sample of RFAs, (2) the RFAs' possible misrepresentation of organizational discourse, and (3) potential inconsistency in coding. What follows is an explication of each of those three limitations.

First, there were only 10 RFAs in the sample. Hence, the values that each variable took were one measurement per year (i.e., the year the RFA was issued). This number of RFAs was sufficiently small that it reduced the *t* statistics' sensitivity (i.e., significance of slope estimates) to the detection of true differences in theme mentions over time and for the rejection of null hypotheses (i.e., no change in theme mentions). Further, because the researcher used $\alpha = 0.05$, she expected to incorrectly reject null hypotheses five percent of the time (or one time out of 20) due to sampling error. In this study the researcher performed 21 significance tests at $\alpha = 0.05$ suggesting that approximately one of these tests would result in Type I error, that is, be declared significant when it really was not. However, five slopes were found statistically significant at the .05 level, strongly suggesting linear changes in theme mentions occurred independent of sampling error.

Second, the researcher used only the RFAs in this study because of the consistency in their format and production in comparison to other formal documents that were collected. Further, the researcher assumed that the sample of the RFAs represented the hypothetical population (i.e., organizational discourse) from which it was drawn. However, the sample of RFAs could potentially have overrepresented those components of organizational discourse that were more closely related to the program and its administrative unit rather than other agency's units (e.g. office of extramural programs).

Third, content analysis is an inquiry that relies heavily on coders' skills. Whether one coder or a team of coders record data, human error still applies. This means that some degree of inconsistency in coding process is always present

(Babbie, 2007). In this study, the researcher coded the data based on her understanding and knowledge about the program.

In summary, the findings of this study are limited in scope. In particular, the study did not address potential meanings of significant drifts or linear trends. In her subsequent research, the researcher is planning to link the findings of this study with the HEC developers' oral history interview data to provide a conclusive description of the HEC program's theory aimed at supporting an evaluation plan for this program.

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CHAPTER 3. ORAL HISTORY NARRATIVES AS THE BASIS FOR CONSTRUCTING A PROGRAM THEORY FOR A FEDERAL GRANTS PROGRAM

The universe is made of stories, not atoms.

(Muriel Rukeyser)

Introduction

There is a great demand today within both the public and private sector for effective and efficient use of decreasing resources especially in light of reduced government funding for many valuable programs despite increasing needs in the society. Accountability has traditionally been an essential attribute of effective resource management. Originated as a bookkeeping term in the 9th century, the meaning of the concept “accountability” has evolved and become a symbol for “good governance” (Bovens, 2005). In the public sector, the meaning of good governance is primarily understood as being in compliance with rules and procedures and being financially accountable. Perrin (2002), however, argues that this is a narrow-minded view of accountability; one that leads to the utilization of simplistic solutions to complex issues. The complex nature of management and evaluation of public resource use requires new perspectives on accountability within which programs are held accountable “for what they have learned rather than for target achievement” (Perrin, p. 11).

Public sector financing of a wide range of programs exists to provide benefits to citizens throughout society. One of the financial mechanisms used by the federal government is the federal assistance system. The federal assistance system represents a substantial share of federal spending, which continues to expand. Public accountability (i.e., openness) and responsible management of federal (i.e., public) funds aimed at obtaining desired results by intended users are the core principles of government interventions, such as programs and policies.

Competitive grants programs constitute one of the largest components of federal assistance funding. A competitive grants program is developed to address social concerns (Bovens, 2005; Schumacher, 2005). The number of concerns is

growing, while the availability of public funding is limited. In the federal funding system, this means that funding for a new program has to be redirected from an existing one. Hence, greater emphasis is being placed on federal grants programs to demonstrate their value and benefits to citizens and society (Perrin, 2004).

Decision making that goes into a federal grants program planning, implementation, and analysis is a complex process that takes place within its authoritative discourse (Chelimsky, 1987). Because choices related to funding programs affect “the lives and well-being of large numbers of our fellow citizens” (Bardach, 2005, p. 11), agency administrators, program managers, and evaluators’ moral and intellectual responsibility for their actions are part of the decision-making process. Thus, grant programs are based on systems of values and perceptions about needs and internalized “institutionalized practices of accounting giving” (Bovens, p. 185).

Evaluation plays a major role in accountability of federal assistance (Perrin, 2002). Evaluation is the tool that helps “provide for programs that are as appropriate, effective, and efficient as possible, so that the greatest possible benefits can be derived from limited resources” (p. 3). Information obtained through evaluation helps shape the future directions of programs. In the current era of economic competitiveness and growing program’s complexity, results-based rhetoric of federal grants program evaluation should address not only “what” is effective but also “why” and “how”. Hence, methodical diversity is needed to render the works of a federal grants program more comprehensibly, namely getting at “why’s,” “how’s,” and “what’s,” ultimately contributing to responsible and responsive ways of the program’s administration. This need is especially important for a competitive grants program that has an established history, but whose performance had not been assessed systematically to the author’s knowledge as of the time of writing.

Evaluation and federal grants programs system

Nowadays, a federal competitive grants program is not only competitive for potential applicants who develop projects for a program’s funds, the grants program

itself competes with other federal programs for its own funding and its value to potential project directors, university administrators, and federal authorities. The competitiveness of the federal grants programs' environment is largely intensified by dwindling scarce resources, such as natural and financial resources, and competing national priorities for effective and efficient use of those resources in meeting people's needs. This situation, in turn, creates a much stronger demand than perhaps ever before for justifying one's actions. And it is evaluation that "gives warrant to action" (Julnes & Mark, 1998, p. 33) in this regard. Julnes and Mark (1998) assert that "evaluation can under gird decisions by policy makers to continue, expand, revise, or curtail programs; by program managers and staff to change program practices; and by potential clients to enter a program or not" (p. 33).

The most classical definition of evaluation is that it is "about determining merit or worth" (Chelimsky & Shadish, 1997, p. xii). A more creative view is that it is a house of many mansions with the room for everyone (Weiss, 1998). Evaluation also refers to a blueprint of a better future or "template for a better future" (Donaldson & Scriven, p. 5, 2003). In today's world, creating each blue print means learning to appreciate the complexity of the program, to see critically what is emerging, to take educated risks congruent with one's objectives for evaluation, to be consciously aware of potential nuances of one's decision making, and to ask not only what something "means" but how it is meaningful. Hence, program evaluation is a sense making of diverse experiences by a diverse group of actors or stakeholders.

The six principles of professional journalism – "who, what, where, when, why, and how" – are relevant for generating a comprehensive knowledge about a grants program, because they are inclusive of various actors' intentions and settings in which they occur (Czarniawska, 1998; Schumacher, 2005). Further, those tenets together form the basis for evaluation that creates a representational portrait of the program by describing and bringing the program's different events into a meaningful whole, within its context (Weiss, 1998).

However, in the federal grants system the focus is predominantly on priori stated results, namely "who, what, where, and when." This view imposes outcome–

based evaluation as a main approach to generate justifiable evidence about federal grant program's performance. Perrin (2001) argues that "performance indicators and evaluation-by-objectives by themselves are rarely suitable for evaluating any program, innovative in intent or not" (p. 5). Focusing on how to evaluate an innovation, Perrin suggests alternative approaches, such as focus on key exceptions, systems model, learning centered and process approaches. A common attribute among these alternatives is an emphasis on not only what works but equally important on what has not worked as intended and what has worked as unintended. In a larger evaluation schema, it is the inclusion of questions "why" and "how" into evaluation design that allows generating this kind of knowledge, ultimately leading to a better understanding of the program's operation. Hence, methodical diversity of federal evaluation involves going beyond preconceived outcomes to seeing the unexpected, and deepening the understanding of evaluation designs (Schwandt, 1991; see also Perrin).

In practice this translates to (a) departing from authoritative mode conceptualizing a phenomenon, (b) focusing on the discovery of underlying mechanism, (c) "elaborating our understanding through multiple levels and multiple metaphors" (Julnes & Mark, 1998, p. 50), and (d) gaining insights into "what it means to live a human life" (Schwandt, 1991, p. 70). To borrow from semiotics, the main implication of the expanded view for examining evaluation practices in federal grants programs is to look not only for surface manifestations but for the "underlying structure that gives meaning to these manifestations" (Feldman, 1995, p. 5). Qualitative inquiry allows generating this kind of insight.

In qualitative inquiry discourse, the logic of knowing is socially constructed, or better stated, jointly re-created by people. "Realities" are the images that people create to express their points of view (Babbie, 2007). Images are brought together to evoke meaning. A federal grants program's inception can be driven by political, economical, humanistic, and other reasons. Yet, regardless of the origin, a program's underlying structure is grounded on its developers' system of assumptions that relate to "who, what, where, when, why, and how" inclusively.

Bringing to life the program developers' images of why decisions were made and how they informed the inception and development of a federal grants program and crafting those within "the narrative mode of knowing" (Czarniawska, 1998, p. 5) are to make sense of program events in relation to the context of what happened. This allows obtaining a reasonably comprehensive understanding of the program's performance.

Program theory–driven evaluation

Program theory (also known as program theory–based and program theory–driven evaluation science) is one of the evaluation methodologies that aids a deeper understanding of the nature of a program. Broadly defined, program theory is an explicit description of "the underlying assumptions about how a program is expected to work" (Rogers, Petrosino, Huebner, & Hacsí, 2000, p. 5; see also Bickman, 1987; Chambers, Wedel, & Rodwell, 1992; Scheier, 1987; Weiss, 1998). Across this wide range of authors and others in evaluation (Chen, 1990; Donaldson & Lipsey, 2006; Rossi, Freeman, & Lipsey, 1999), program theory is understood as "a plausible and sensible model" (Bickman, p. 5) of associated sets of ideas that specify cause–effect relationships. The model is then used to better understand and govern decisions about program activities in order to accomplish a program's goal of solving an identified social problem. Hence, the process of explicating program theory is based on the presumption of the program's beneficial purpose for which it is held accountable (Lipsey, 1993).

Program theory is a process approach to evaluation (Weiss, 1998). The role of program theory in evaluation is "to provide 'how' and 'why' information" (Perrin, 2002, p. 2; see also Louie & Guthrie, 2007). Program theory is also seen as an approach that welcomes multiple perspectives and interpretations. Developed for a particular program, Bickman (1990) nevertheless argues that different theories can be articulated for the same program depending on people's expertise and applied focus and level of evaluation inquiry analysis. The point made is that articulating a

program theory rather than “the best program theory” is the focus of the program theory–based evaluation.

Moreover, the explicated program theory constitutes a program’s analytic story that is comprised of “little logic” or “little (personal) theory” that informs the big story (Weiss, 1998). Little logic constitutes humans’ perceptions that help to identify what is (or was) happening and what to do next (or how and why it was then done). Thus, program theory based evaluation allows learning *what* works, and *why* and *how* things work within the program’s context utilizing a multi-actor perspective, multilevel analysis, and multi–method approach (Donaldson & Gooler, 2002; Leeuw, 2003; Turnbull, 2002). The diversity of program theory’s approaches allows obtaining insight into people’s experiences, views, and assumptions about an intervention and charting of its underlying mechanism and a course for changes that are context–specific.

Program theory has a wide range of applications. Rogers (2005) describes utilizing program theory in evaluation of a complicated and complex national program titled, “Australian Government’s Stronger Families and Communities Strategy.” The program supported 600 local projects across Australia, which had an enormous variation in activities while operating under a unified program goal. To monitor and evaluate the projects’ performance, the development of a common framework was required. Program theory in the form of an “outcomes hierarchy” was used (Funnell, 2000). Rogers claims that the developed theory “helped provide coherence across the Strategy and could be adapted for evaluating particular projects or clusters of similar projects” (Rogers, p. 13).

Program theory is used successfully in policy process and advocacy program evaluation. For example, Coffman (2007) reports using program theory for evaluating the “Preschool for California’s Children Grantmaking Program Strategy.” The goal of the program was to make high quality preschool available for all 3 and 4 year old youth a state policy. Evaluation was aimed to examine the strategy’s progress toward informing thinking about the program, building support, and engaging influential constituents “to bring preschool problems and solutions to the

fore” (p. 6). Coffman argues that “evaluations of advocacy and other promotional efforts that are based on theories of the policy process can help simplify the process to help evaluators intelligibly assess advocates’ actions and their outcomes within it” (p. 7).

Gardner and Geierstanger (2007) describe evaluation of a multiyear “Policy and Advocacy Program” aimed at increasing policymaker support for health clinic funding in California. The authors used program theory, specifically the Endowment’s theory of change, to develop the logic model (defined as anticipated short- and intermediate-term outputs and outcomes) that guided the evaluation. Gardner and Geierstanger argue that substantiating the program’s original hypotheses helped the clinic consortia to maximize “their relationships with decision makers and become a potent voice in the policy arena on behalf of clinics and their patients” (p. 9).

Sullivan, Barnes, and Matka (2002) use theories of change in the process evaluation of a complex, multilevel partnership public policy program titled English Health Action Zones (HAZs). The authors developed several theories to assess the process of building collaborative capacity in HAZs. While addressing challenges in identifying theories of changes, such as wide range of stakeholders and a dynamic nature of partnership, and deriving to consensus, the authors share Gardner and Geierstanger’s (2007) view of a strong relationship between program theory and evaluation strategies for assessing multilevel public policy interventions.

Further, Carvalho and White (2004) describe a “social fund” project case study using the theory-based evaluation. A social fund is a funding mechanism utilized by the Inter-American Development Bank and the World Bank aimed at financing social infrastructure at community level in developing countries. The evaluation focused on local subproject sustainability and institutional development impact. Similar to Sullivan, Barnes, and Matka (2002), having a diverse range of stakeholders with competing views, the challenging question in articulating social funds theory was “whose theory” to use. Carvalho and White utilized two perspectives for articulating program theory. The authors identified theory of social

funds supporters and “anti–theory” of social funds critics. They integrated both views in a community–based theory model. The articulated theory played a key role in planning and designing evaluation main strategies for the evaluation, especially identifying sources for data collection.

Crew and Anderson (2003) utilized program theory to assess accountability and performance of charter schools in Florida. In case of Crew and Anderson’s study, the charter schools had an articulated theory that legislators accepted. Specifically, the theory behind the charter school was that it would advance students academic achievement and improve operations within the existing (public) state educational system. The purpose of the evaluation was to validate the charter school’s theory. Evidence gathered through evaluation did not support the theory. This was the case of evaluation being the program’s theory test (Weiss, 1998).

Grocott, Cowley, and Richardson (2002) address methodological challenges related to evaluating complex interventions in the area of medical care for patients with advanced diseases, specifically producing generalizable knowledge from multiple single case studies. The authors studied the palliative management of malignant wounds. The emphasis was on the performance of dressings to reduce the severity of the wounds’ impact on patients’ daily life. Due to the medical field’s preference for the data that are statistically generalizable, the authors first used a quasi–experimental design to evaluate “outcomes of local wound management and symptom control” to explore individual patient experiences (p. 307). However, the method did not capture adequately the individual experiences of living with a wound and the performance of wound dressings. Grocott, Cowley, and Richardson used an alternative theory–driven methodology to fulfill the study’s objectives and to develop generalizable explanations.

Program theory is one of evaluation field’s main strands (Rogers, Petrosino, Huebner, & Hacsı, 2000). Across all evaluative intentions, program theory informs evaluation design (Weiss, 1998; see also Chen, 1990; Donaldson, 2001). Program theory approach strengthens connection between a program and its evaluation, because program theory–based evaluation forces people to think about and

articulate assumptions behind their actions and decisions. Bickman (1990) claims that, “program theory has the potential to increase the impact and quality of both programs and evaluations” (p. 3).

The most common methods for eliciting and substantiating program theory in evaluation are interviews (e.g., focus groups, surveys, and individual interviews) and a program’s document analysis. It appears that program documents are used to obtain information about the program’s background, while interviews are conducted with participants to address the program’s recent concerns and/or to answer the evaluation’s immediate questions. For example, Christie and Alkin (2003) conducted a study to formulate a program theory for the University of California, Los Angeles (UCLA) outreach program. The study was framed as “a case study of the process of developing and refining a program’s theory within a user-oriented evaluation” (p. 373). The methods used to develop the university outreach program evaluation were document reviews, interviews, and a paper and pencil Delphi survey with the program staff. Documents were utilized to determine the university outreach program’s supporting environment, while interviews were used to identify immediate activities in which staff was engaged. It was the literature (e.g., school reform research, educational theory literature) that was presumed to provide breadth and depth, along with validity in interpretation. These were distantly related documents to the program specific content. How these documents’ contexts and purposes corresponded with the evaluated outreach program’s reality was not discussed in the paper. Yet, Rossi, Freeman, and Lipsey (1999) suggest that such considerations should be taken into account at the time of an evaluation to avoid “self-serving bias” (p.164) that documents often possess.

Evidence obtained through program documents appears to be a method of choice for evaluators to describe a program’s official or historical setting (Crew & Anderson, 2003; Leeuw, 2003). Yet, Lindlof (1995) acknowledges that by themselves documents possess limited significance (p. 208), and only in relation to other data their contribution to the analysis magnifies. When the program has been in existence for an extended time, perspectives of those who initiated and had

knowledge of the program might serve as better validity warrants than information obtained from written texts solely. Interviews with persons having firsthand knowledge and experience need to be used more as evaluation methods to inform the decision about program evaluation versus to serve primarily as evaluators' techniques to informally learn about the program and/or build rapport with the stakeholders prior to conducting an evaluation (Rossi, Freeman, & Lipsey, 1999). After all, evaluation is valued by the meaning it has to people.

Oral history and federal grants programs system

Oral history is the methodology that addresses the meanings that individuals make about their actions (Cockcroft, 2005). It is a qualitative inquiry of collecting first-hand narratives while utilizing the person-to-person interviews. Oral history evidence is not the history. Although not always being distinguished, oral history differs from a life history or a life story study by focusing on concrete aspects of an individual's life or role versus focusing on a person's whole life (Atkinson, 1998). Oral history emphasizes "what someone remembers about a specific event, issue, time, and place" (p. 8). Gordon and Jones (1998) describe oral history as a responsive research method and a "capacious way of thinking about history and memory" (p. 579). Hence, oral history is commenting on particular events in the past aimed at helping to understand the history better (Seldon & Pappworth, 1983).

Oral history is not a new technique. Although its growth has expanded greatly since World War II, oral history has always been important as a means of gathering "eyewitness accounts" (Seldon & Pappworth, 1983, p. 7). Oral history as a qualitative inquiry has been successfully utilized in a broad range of research settings, for example anthropology, education, action research, legal studies, labor movement research, media studies, and women and gender studies to name but a few (Cockcroft, 2005 ; Dunaway & Baum, 1996; Seldon & Pappworth, 1983). Further, throughout the 20th century the federal government supported a large number of oral history studies (Ritchie, 2003).

However, nowadays oral history is neglected by federal government as a scientific method because it does not fit the current federal definition of research as “a ‘systematic investigation’ designed to add to ‘generalizable knowledge’” (Research USA, 2003, p. 27). Yet, Ritchie (2003) argues that there is “a remarkable variety of reasons for establishing federal oral history projects” (p. 77) that includes capturing the memories of first generation of an agency, creating institutional memory, recording “lessons learned,” building organizational learning, and even “assisting with an agency’s response to a crisis” (p. 77).

Oral history “focuses on what someone remembers about a specific event, issue, time, or place” (Atkinson, 1998, p. 8). It allows gaining a person’s reflective perspectives on his or her specific aspects of life through the process of recollecting and sorting events in the past. In the case of a federal grants program, oral history interviews focus on individuals’ experiences with the program and who contributed to the realization of its outcomes during particular stages of problem solving, which the program was charged to resolve. This leads into a comprehensive learning about program’s processes within and across a variety of situations. Therefore, oral history can offer insights into a program’s concrete aspects of operation that, in turn, inform evaluation processes and enrich evaluation findings.

Further, it is the people who possess the program’s intellectual and institutional memories that may not be always adequately recorded or accurately represented on paper. It is through talking to those individuals and learning from their shared experiences that one can obtain a better view of the program than one can find in papers. It is the story that contains rich data. Narrative created from oral history interviews is the program’s authentic story and not the evaluator’s story about the program. As such it helps to develop a more representative program theory.

Oral history and evaluation

Oral history seems important to evaluation in general. For example, in early 2002 the Oral History Project was launched by the American Evaluation Association (AEA) to write the intellectual history of the profession by interviewing individuals

whose work and leadership led evaluation to where it is now. The aim of the project is to build the knowledge base of the discipline. Since 2002 four interviews have been conducted (The Oral History Project Team 2003, 2004, 2005, 2006). These articles contain the field's most important luminaries' views, perceptions, and conceptions about evaluation. Each interview represents a unique chapter and critical milestone of the discipline, in other words its "*what's*," "*why's*," and "*how's*." Thus, oral history is instrumental in charting the discipline's program theory.

However, oral history is not typically utilized in program evaluation practices and research. A search of articles published from January 1980 to December 2007 in *American Journal of Evaluation* and *New Directions in Evaluation* (the two major publications of AEA) did not produce a single article that identified the oral history method as a means of articulating an official or historical view of the program, especially within the program theory inquiries.

Oral history and program theory–based evaluation. Program theory that is well grounded on program actors' personal theories offers two advantages. It tells what is important and what can be safely ignored. It brings various pieces of information into manageable patterns or concepts, thus creating a satisfactory foundation for an evaluation model. Program theory that utilizes oral history methodology creates a more comprehensive social picture of the program's knowledge base (Cockcroft, 2005). The oral history method brings to light the program's original values; what was important, why it was important, and for whom it was important.

The utilization of oral history in a program theory–driven evaluation is especially valuable for designing an evaluation for a program that has been in existence for several years but does not have an explicit program theory. Founding ideas of the program are vital to articulating this program's knowledge. Having a well articulated program's historical view allows assessing changes in people's perceptions about the program over the course of its implementation. These changes can serve as indicators of organizational learning, which is an important

consideration for evaluation of an established program. In summary, the developers' ideas inform and enrich evaluation criteria. It is therefore important to draw on people's memories.

Higher Education Challenge (HEC) grants program

In this study, I focused on the history of the Higher Education Challenge (HEC) grants program also referred to as the Challenge Grants program, specifically on the meaning of this program to the people by whom it was conceived. The HEC grants program is an important program, largely because it is the only federal program that provides funding for projects in agricultural education in institutions of higher education. It is the premier national program that supports basic, applied, and developmental teaching activities in agriculture, broadly defined and related disciplines that are regional, national, and international in scope. The program is administered by U.S. Department of Agriculture (USDA), Cooperative State, Research, Education, and Extension Service (CSREES), Science and Education Resources Development (SERD) Unit.

HEC was authorized by the public law National Agricultural Research, Extension, and Teaching Policy Act of 1977 (NARETPA), amended through 2002. The funding for the program became available in 1990. It is a continuing program, funding for which is appropriated on an annual basis. And as any federal grants program nowadays it is under pressure to demonstrate its results within an outcome-based federal program evaluation paradigm to continue receiving funding.

CSREES has been as actively involved in assessing its portfolio of all programs as at any time in its history. However, the agency's education programs tend to be broader in scope than research and extension programs, and are more difficult to align with a priority strategic goal. New conceptual perspectives to educational program evaluation are needed.

HEC program's knowledge

Sustainability is one of the HEC program's essential attributes. The program has an established history, yet, full documentary evidence does not exist. The knowledge about this program is scattered among its various actors. Hence, constructing the HEC grants program's knowledge (i.e., how it was developed, what was valued, and why) from its developers' views is the first step for designing its evaluation. Approach that aids this understanding is a program theory (PT). PT allows producing "an explicit description of the conceptions, assumptions and expectations that constitute the rationale for the way the program is structured and operated" (Rossi, Freeman, & Lipsey, 1999, p. 156). In other words, PT is concerned with knowledge about the HEC grants program.

When there is little documentary evidence about certain aspects of a program, Rossi, Freeman, and Lipsey (1999) suggest interviewing people who have played a critical role in and have a direct knowledge of specific events is valuable for obtaining factual evidence and interpretation. There is a rich history of interviewing; ultimately various genres of interviews exist that are grounded on their unique methodologies (Fontana & Frey, 2005). Weiss (1998) claims that conceptualization of a study heavily depends "on the central questions that the study has chosen to address, the research design, and the nature of measures and data collected" (p. 272).

Purpose of the study

The goal of the study was to conduct oral history interviews with the HEC developers aimed at making explicit their assumptions about this program's development. The specific objectives were to depict the historical situation within which the program was developed and to provide a description of the HEC program's underlying mechanism (i.e., program theory). I considered that the obtained description of the HEC's theory would inform the development of a meaningful evaluation for this program.

Study's research questions

The study's research questions were:

1. What was the situation that gave rise to the HEC program's development?
2. What were the program developers' assumptions upon which they built the HEC's mechanism for implementation?

This is a single-case study of the oral history of HEC grants program. It is a qualitative inquiry of narrative analysis. The analysis and interpretation are performed by reading the narratives.

Method

By conducting an oral history of the HEC grants program, my intent was to learn about how and why this program was created and what social (i.e., political and institutional) conditions existed so that a description of program theory would represent the HEC's historical context. I was specifically interested in the HEC program developers' personal stories about their concrete experiences of events associated with this program's initiation and realization.

I employed several methodologies in designing my conceptual framework. Specifically, I conceived this study as a narrative inquiry in the tradition of qualitative research. I used oral history methodology to collect stories about the HEC grants program's inception and implementation. I conducted interviews with four participants. After the interviews were completed, I transcribed recorded conversations verbatim. Transcriptions became the narratives that I used in the analysis and interpretation. I then employed a hermeneutics interpretation in literary theory tradition to read and interpret the narratives aimed at understanding the meanings of the HEC developers' experiences and using my understanding to develop a description of this program's underlying mechanisms.

The choice of each methodology was based on a set of assumptions that I developed in light of this study's purpose and research questions. These assumptions are described in more details in the conceptual framework section that follows.

Conceptual framework

The study's main assumption was that narratives (i.e., interviews' texts) are "a guide to meaning" (Straw & Bogdan, 1990, p. 17; see also Czarniawska, 2004). Nowadays narrative (i.e., text) is defined broadly. It includes "any piece of writing or any cultural artifact that has a *permanent* character" (Prasad, 2005, p. 38). Everything in life and, in fact, life itself can be treated as narratives. Czarniawska sees the narrative as "the form of life," "a mode of knowing" and "a mode of communication" (p. 6). Narratives are people's stories produced in a variety of genres, for example life story, oral history, documents, novels, poems, interviews, conversations, movies, plays, e-mail communications, diaries, to name but a few. And genres are the expressions of what is possible within the appropriate modes for "meeting expressive need" (Bruss, as cited in Czarniawska, p. 6).

The need to "express" exists because there is something to say about what one has experienced. Consequently, people's experiences are embodied in their language that becomes the basis of understanding (Crotty, 2003). People make sense of their lived-through experiences through narrative construction (Richardson, 1990). And what becomes available for others via the narrative is the experience's sense, "its meaning," while "the experience as experienced, as lived, remains private" (Ricoeur, 1976, p. 16). This suggests that the sense of purpose or meaning is present in all narratives.

I used a storytelling approach to create the narratives in this study. I chose oral history as one of the genres for collecting stories (Czarniawska, 2004). Oral history accounts allow creating a particular knowledge about a program that is retrospective (Seldon & Pappworth, 1983). Using this methodology, my assumption was that oral history possesses a strong prediction value for future conditions of program operation. People realize what they expect and want. A person's interpretations of experienced events hinge on that person's expectations, beliefs, and values. Thus, I considered it important to seek participants' reflective comments and understand their concrete experiences related to the HEC program situations in order to articulate this program's theory within its historical view. In addition, I

assumed that oral history would help obtain firsthand interpretations and gather additional facts, ultimately improving the understanding of concrete events.

Oral history interviews are conversational by nature; it is an occasion of two persons to speak to each other (Mishler, 1986). And “by speaking to somebody we point towards the unique thing that we mean” (Ricoeur, 1976, p. 16). The experiences (events) about which the participants spoke during the interviews were “the unique things,” namely HEC grants program’s historical accounts. Hence, I considered interviewing the opportunity for meaning–sharing and meaning–understanding (Mishler; see also Denzin, 2001).

I employed a narrative interview protocol (Mishler, 1986). My central purpose of interviewing the participants was to learn about how they perceived, organized, gave meaning to, and understood their roles and their experiences initiating the HEC grants program. The attention was on them telling their stories in their voices and understanding the meanings of recalled events versus giving relevant answers to the questions (Mishler). Hence, applying a narrative protocol (i.e., a story telling) to interviewing the HEC program’s developers, the emphasis was on providing the participants with the time and space to share their experiences.

In this study, interviews were the main source of narratives. I employed hermeneutics interpretivism in the literary theory tradition to read and interpret the narratives (Crotty, 2003; Prasad, 2005; also see Creswell, 2003; Miles & Huberman, 1994). Within the interpretivist approach to qualitative data analysis human activity is seen as “‘text’ – as a collection of symbols expressing layers of meaning” (Miles & Huberman, p. 8). This approach seeks historically and culturally–situated interpretations of the social events that are unique, individual, and qualitative (Crotty). Hermeneutics is one of the three interpretivist streams. The other two are phenomenology and symbolic interactionism. In general terms, hermeneutics “is to exegesis what grammar is to language or logic is to reasoning” (Crotty, p.87).

Hermeneutics originated as a study of sacred texts’ interpretation. Extended to the social and human sciences, nowadays hermeneutics means to understand and interpret any text. Within the contemporary view of hermeneutics, text is

presumed to be free from and can be studied independently of its author (Czarniawska, 2004). The way of hermeneutic interpretation is to understand the whole through grasping its parts, and comprehend the meaning of parts through divining the whole (Crotty, 2003). Hence, employing a hermeneutics tradition meant reading in a way that would bring understanding and elucidate meaning embedded in the text.

Within the hermeneutics of the literary theory, there is a variety of historical approaches to reading the text such as transmission, translation, interactive, and transactional models (Bogdan & Straw, 1990; Crotty, 2003). I discuss in more detail each approach in the section on reading the texts that follows. In general, the four approaches differ in their assumptions by privileging the role of either author, or the text, or the reader in generating the meaning via the text. Yet, Crotty argues that the uniqueness of each approach need not necessarily stand on its own and or be an incompatible option. These approaches offer a wide variety of ways to read and interpret a text.

My way of reading the interview narratives was based on my consideration of knowledge as socially constructed. I consider that different images which people have about the world are equally true. As Babbie (2007) puts it, “there is nothing ‘out there’; it is all ‘in here’” (p. 8). I conceived my reading of the narratives within the interactive model of literary theory. The model emphasizes an interaction between the participants’ (i.e., the authors’) knowledge and perception and my (i.e., the reader’s) knowledge and perception of the HEC program. I presumed this interaction possible because the participants and I shared understanding of the concepts that formed the structure within which their experiences “were encoded – in the case of reading, the text” (Straw, 1990b, p. 59).

In summary, I considered collecting the stories, creating the narratives, and reading the texts as different ways of engaging in a dialogue with participants to elucidate their insights. I regarded my empathy to authorship as the aid to improve my comprehension of the texts (Tierney & Gee, 1990). Further, the texts identified parameters within which I created (i.e., negotiated) my understanding of the

meanings of the HEC events ascribed by the participants (Bogdan & Straw, 1990). Hence, the generated interpretations are the subjects of the research settings only, specifically valid for its particular “time” and “space” (Czarniawska, 2004, p. 12). Below, I am providing a complete description of this research’s settings.

Participants

To conduct oral history interviews, I was looking for persons who (a) contributed to the theoretical foundation and operational structure of the HEC grants program, (b) had experience and knowledge of the program’s concrete events at the agency level, and (c) interacted with the agency’s constituents, such as legislators, land grant system administrators, industry representatives, national scientific communities. My question was, “How do I identify those individuals?”

My task was simplified because this study was a part of a larger research project aimed at articulating a program theory of the Higher Education Challenge (HEC) Grants program utilizing a mixed-method approach. The project received funding from CSREES in the form of an internal Innovation Grant for Fiscal Year (FY) 2004. Our research team included university and agency’s collaborators. The agency’s partners were actively involved in the project’s design and implementation. I traveled to Washington, DC and had numerous conference calls and e-mail exchanges with the agency’s partners to consult about research strategies, brief about the progress, and ask for information. It was the agency’s partners who suggested four individuals as potential participants of the HEC grants program oral history study.

From the agency’s partners I learned that all four individuals had been at the forefront of the program development. They joined the program at different stages of its growth. Each person brought a unique set of skills and experiences needed to accomplish the tasks at hand, for example managing communication with the congressional staff, building relationships with the university–college community, industries, and scientific institutions, setting the program’s administration procedures, creating the program’s official documents’ language, conducting needs

assessments, and disseminating the results. The four individuals worked in various capacities and stayed with the HEC grants program administrative unit for an extended period of time.

I considered the four individuals the “living history” of the program. I assumed that the knowledge about the HEC program was spread among these four individuals. Together, they were part of the same organizational network. All four individuals served in the capacity of the National Program Leaders (NPL), a.k.a. program managers. Individually, each person was responsible for a concrete area of the HEC’s operation (administration) thus contributing to a variety of shared experiences sought in this study (Merriam, 2002). They possessed firsthand knowledge of the program. I considered each person’s knowledge essential and complementary in creating a complete portrait of the HEC’s historical view. The candidates’ willingness to participate in the study was important to me.

Gaining access

It is important to establish a good rapport with the participants prior to conducting actual interviews (Gordon & Jones, 1998; Maxwell, 2005; Yow, 1994). Essentially every book on qualitative research methods addresses making contacts and negotiating research relationships with the participants (Esterberg, 2002; Seidman, 1998; Wolff, 2005). While learning from experiences of established professionals in the field is helpful, the researcher’s personal convictions and strategies also make each research situation unique.

Although I had “easy access” (Seidman, 1998, p. 34) to the candidates’ names, gaining their interest was not a small task. Czarniawska (1998) claims that researchers and participants are not “made of the same clay”; they do not “estimate each other’s trustworthiness and political allegiances” (p. 34) in the same manner. Contacting the candidates and establishing research relationships required planning, thinking through, and reflecting on not only research related issues (e.g., drafting my first communication message, contacting, considering interview strategies, getting

human subject approval, scheduling interviews) but also personal ones (e.g., me being an outsider and a student).

In this study all four candidates lived in Washington, DC. And I was living in Ames, Iowa. Hence, my first contact and attempt to build rapport with the candidates had to be from a distance. I knew that I would not have an opportunity for meeting the candidates in person before the interviews, if they agreed to participate. In addition to commonly study related questions like, “Will the persons be interested in taking the time to participate in the study?” and “Will the persons be willing to share their stories?” I had personal concerns associated with me being a graduate student and being a foreigner who learned English as a second language (e.g., speaking with accent); “Will people be interested in talking to me?”, “What would be their reaction when they hear my voice?”

I drafted my first message to the candidates a few times. A copy of my first communication to each candidate is provided in Appendix C1. In that message I did not ask the candidate to say “yes” or “no”. The purpose of the message was twofold: (1) initiate the first contact (by briefly telling about me, the study, why and how I got the person’s name), and (2) make the candidates interested in a follow up conversation. The communication was strategic. I included in the message a clause that stated that this study had received support from the agency. I hoped that this statement would have some weight in the candidates’ decision to be involved in the study. I also asked our project partner in the agency to review the content of the message for me prior to sending it to the participants.

In May 2004, I began contacting the candidates. My first contact with three candidates was by e-mail and with one candidate was by phone. They all responded favorably to my suggestion to call back and/or further discuss the research and their involvement. I then followed up with a phone conversation with each candidate.

During my follow up call to each candidate, I introduced myself and described the study. We also discussed thoughts and ideas about each person’s potential contribution to the research. Our conversations were warm, receptive, and informative. My accent and doctoral student status did not seem to affect our

conversation flow. Talking to the candidates, I got an impression that they cared deeply about the HEC program. HEC program appeared to be an important milestone of each candidate's professional career. They gave me a few insights about their past involvement with the program. It almost felt like each person wanted me to have a good understanding of his or her specific responsibilities. I later used this information to better prepare for the interviews. The candidates welcomed my research. They agreed to meet and share any experiences that they could recall. Prior to actual interviews, I had several phone conversations and e-mail exchanges with the participants.

I consider these prior-interviews' interactions beneficial to develop a mutual understanding and a good level of trust and comfort with the study. I also used e-mail and fax messages to share additional information by participants' requests and to schedule a day to visit with each participant for interviews.

Interview considerations

Part of my preparation for the interviews involved thinking about the interview strategy. Various forms of interview protocol are used in qualitative interviewing (Patton, 2002; Seidman, 1998). Oral history interviews rely on people's memories (Nevins, 1996). Prior to conducting interviews, I developed an interview guide and sent it to each participant. I had only one session with each participant for an interview. Although the interview duration was not necessarily restricted, I had to be considerate of the participants' time. Being constrained by time, my intent was to make interviews informative. This seemed to have been the participants' desire as well. The participants held administrative and program level managerial positions. They were busy individuals. Hence, making an interview guide available to the participants prior to our meetings was a useful technique for this study that also seemed valued by the participants.

The interview guide consisted of a set of questions aimed at helping the participants recall events and think about related experiences in advance. The interview guide is shown in Appendix C2. Developing the interview guide, I used

questions that would direct the participants' attention to a situation or a time in the program development aimed at setting the stage of our conversation. Questions were related to the specific topics of the HEC's activities.

However, by sharing the interview protocol prior to interviews, I was concerned about being restricted to a "question and answer" session. I purposefully called the list of questions the "interview guide" *versus* interview protocol. The intent was to guide the participants' recalling details about their concrete experiences in the past rather than strictly adhering to the protocol. The interview guide indicated my interest in general. And I was looking for the participants' sharing stories during the interviews.

In addition, I believe the process of jointly constructing the dialogical discourse of interviews begins at the interview planning stage, assuming that there is a considerable level of interest and perceived research value by the participants. Mishler (1986) argues that for an interview to be meaningful interviewer and interviewee have to share language. Planning for interviews, I reviewed the HEC's official documents and summarized each participant's background information to sketch an initial understanding of the program's contexts.

Further, I presumed that sharing the interview guide in advance contributed to the participants feeling comfortable with the interview process. I knew one participant; I had not met the other three participants. The interview was my first person-to-person interaction with those participants. Although my initial interactions via phone, e-mail, and fax were positive and encouraging, following with the interview guide served as a form of reassurance of the study's seriousness and credibility with the participants. In the context of this study, I viewed the interview guide as a starting point of creating the interview discourse.

The interviews were scheduled on July 21 and 22, 2004. I traveled to Washington, DC to meet with the participants for an interview. Interviews were conducted in the participants' offices or outside their offices.

Interviews

To understand participants' experiences, my questioning during the interviews had to be responsive to their stories. Therefore, my role as an interviewer was primarily to listen and to probe. I viewed myself as an engaged audience member of the stories shared by the participants. I felt privileged. I did not interrupt the participants. I used discussant's questions to encourage more telling and initiate recalling additional moments. Examples of discussant's questions were:

- What do you remember the most out of that experience?
- Could you explain a little more about what you mean?
- Could you describe the situation a little bit more?

The usage of the interview guide by the participants was primarily to prepare for the interviews. For example, two participants had assembled a set of printed materials to which they referred while telling their stories in their interview. They let me borrow these documents after the interview. Further, having shared the interview guide prior to the interviews, two participants jotted detailed notes that complemented their stories and allowed narrating a more complete account of the program's activities. Each participant shared a unique story shaped by the person's feelings, emotions, and reflections attached to the events and experiences of establishing the HEC grants program.

Three interviews were conducted on the same day. The fourth was held on the following day. Locations for interviewing were chosen by the participants. By agreeing to meet with me, the participants had to make time in their already busy and demanding professional schedules. No matter how well my research was welcomed, I imposed on the participants' time and space (Maxwell, 2005). What ever place worked the best for the participants, I accepted their suggestions.

An audiotape recorder (compact cassette recorder, DTP 2225W) and SONY HF 90 minute tapes were used for all interviews. The length of each interview varied from 90 minutes to 4 hours. In total, I had over 9 hours (560 minutes) of recordings. The variability in interview time depended on several factors: (1) how much information each participant was able to remember (2) the participant's perception of

the self as a main player of an event, (3) the participant's comfort level of being identified as one of the developers' of the program, and (4) the participant's feeling of exhausting information that he or she was able to recall and satisfaction with the already revealed information.

Not knowing the organization of the participants' offices, I planned for some interference (e.g., phone calls, city traffic noise, and position of the tape recorder) with the recording quality. I did not have an attachable microphone. The tape recorder had a built-in microphone. The tape recorder's location (i.e., distance from the participant) was critical to have a quality recording. Conceptualizing interviews as a shared discourse, I planned not to take notes during the interviews. Arranging times for the meetings with the participants, I tried to schedule interviews to allow some time in between the meetings. It was my personal time (from 45 minutes to an hour) to write summative notes, observations, and reflections of interviewing. I later used these "little personal stories" as my memory checks transcribing tapes. The notes became the literal expressions of my meanings of the interview experiences.

Further, I had a few personal tactics that I used at each interview. Prior to the interview I put a new tape into the tape recorder. I recorded my name, place, date and time of the conversation. I stopped the tape and marked the end of this recorded introduction. This mark on the tape recorder became the beginning of the interview's recording. At the meeting, each participant gave me time to arrange my equipment on the desk. I started recording the conversation as soon as I had my tape recorder out and we sat down. At the beginning, the participant and I exchanged greetings and general comments about the weather, and my trip to Washington, DC. I then asked the participant whether I could listen quickly to the tape to make sure the conversation had been recorded. The participants had an understanding of the research process. This minute or two of me playing back and listening to the tape did not seem to be a bother. In fact, a few times the participants suggested making changes in our sitting. In addition, at the end of each day of two days interviewing, I listened to the tapes, compared my notes, and made additional comments to assure

transcription quality. The quality of the recording was good. I did not have to return to the participants for any clarifications.

At the end of the meeting, I thanked the participant for their time and willingness to share his or her story about the experiences developing the HEC grants program. I told the participant that I would transcribe the conversation and use the narratives for the analysis. I also mentioned that before I do that, I would like to send back an unedited transcript for the review. I asked the participant whether this arrangement was agreeable. Every person welcomed this idea and expressed an interest in reading the transcript.

I considered the completion of the four interviews as the field exiting point. Each tape was labeled with a code assigned to each interview to preserve the participant's confidentiality. The index of codes was available only to me. I kept tapes in a secured, locked place.

Ethical considerations

In qualitative inquiry, the researcher faces not only his or her values, but “the researcher’s responsibilities to those studied” (Silverman, 2001, p. 270). The ethical considerations that I faced related to (a) my decision to maintain the anonymity of the participants’ names, (b) the participant’s confidentiality, (c) the research potential threat to the participants, and (d) the research value to the participants.

First, it was important to me to portray as complete as possible the HEC grants’ program conceptual mechanism that was historically grounded. I knew that the four participants were very close colleagues. I made a decision to not reveal the names of other participants because I wanted each participant to tell me a story in his or her own voice that is not “contaminated” or “influenced” by the voices of others. This was easily accomplished during my communication with the participant prior to the interviews. The participants did not ask whether others would be involved and/or volunteered their colleagues’ names for the study.

However, I discovered that it became a challenge to keep the anonymity of other participants during the interviews. Telling their stories, the participants referred

to their colleagues. When I was asked whether I would be interviewing the other person, I replied “yes” while being concerned that this might change the participant’s story by thinking that I could get a better description of the event from the other person. And it did. There were times when the participant would start describing an event but then suddenly interrupt him/her self by saying that I could ask the other person about it. Or the participant would say that he or she did not really remember the event well and recommend checking with the other person. Respecting the rule “for considering interaction with others” (Maxwell, 2005, p. 85) and valuing the participant’s willingness to share, I did not insist on being told more than the participant willingly volunteered. I tried to learn more about the event from another participant.

Second, I considered my researcher responsibility to protect the confidentiality of the participants. Specifically, I was recording participants’ conversations. Their stories were and will remain private. However, the tapes became public records, namely available to “the scientific community” (Silverman, 2001, p. 162). Nowadays, in all research settings in which people are involved, human subject protection is required, ensuring the participants are protected from any acts misusing their information and making them vulnerable. There is one exception to this rule – and this is oral history studies. Oral history studies “are officially excluded from undergoing institutional review board evaluation” (“Oral history research exempted from federal human subject regulations”, 2003). I proceeded contacting the participants without filing human subjects paperwork.

I was knowledgeable about conducting research that involved people. I completed human subjects’ protection training. Prior to this study, I had been involved in other research projects (e.g., Delphi study, qualitative case study) that required human subjects review. I had only good intentions. I considered research procedure transparency my responsibility to the participants. I shared with the participants my plans for interviews and post-interviews. For example, I asked each participant whether or not they would object to recording the interviews. The participants felt comfortable with this arrangement. We also discussed confidentiality

and their rights to withdraw from the study at any times. In general, I tried to follow the procedure stipulated by the informed consent form.

After I confirmed the participants' interests and arranged meetings in Washington, D.C., I contacted the Iowa State University (ISU) Office of Human Subjects and Research to inform simply the office about my upcoming trip and meetings with the participants in the oral history study. In a conversation I learned that despite oral history' exemption from the institutional review nationwide, internally Iowa State University (ISU) Office of Human Subject and Research required submitting a detailed description of the research procedures, including ideas for questions to be asked. Until this was done I was advised to stop interacting with the participants and proceeding with any trip arrangements related to participant meetings. I immediately submitted required paper work. The study was reviewed by the ISU Institutional Review Board (IRB) and was determined to fall into the category of "not human subject" (G. Austin, personal communication, July 9, 2004). Iowa State University human subject review approval is provided in Appendix C3. I was able to keep my plans to travel to Washington, DC, and meet with the participants.

Next, I did not perceive my study as a potential threat to the participants. I conceived my relationships with the participants as a communication contract for which their voices were essential. My emphasis was on appreciative interaction. The four individuals had the HEC program institutional memory. The program has been in existence for seventeen years (as of April, 2007). Hence, the program developers must have done well to achieve this continuity. Their story telling was seeing the past of the program from its successful present and thinking reflectively on the lessons learned about its future. That is building the case by focusing on what has been done and how to make it better so that the HEC grants program will continue in the future.

Further, I was not a complete stranger or outsider to the participants' world. I worked at a land-grant university. The land-grant system is the agency's main partner. Hence, I developed my relationships with the participants within the historically established institutional partnership, which was a positive environment. In

addition, my participants had advanced degrees. I was a doctoral student planning to become “one of them”. This study was my learning about the research process. I felt support and encouragement from the participants. They were “my superior good.” The mentor-mentee relationship helped in my interactions with the participants.

Finally, I was reflecting on the research relation to the participants. To interest the participants in the study, I had to think about how my research could be a part of their world; namely, to be of value. I knew from the very first interactions with the participants that I was researching the program about which they continued to care deeply. Although I was a graduate student, the study had an established credibility through being supported by the agency’s internal grant. Hence, my “negotiating entry” (Maxwell, 2005, p. 82) to the setting was within the pre-established relationships by the “created bond between me and the funding for the project” and by the “assumed connection between the research and its meaning to the participants.”

In summary, my responsibility to the participants did not end after I exited the field. My research relationships with the participants continued as I was working with their stories (e.g., creating and reading narratives). They affected this study and me. Specifically, my ethical considerations became my positionality that further guided the approaches that I used to complete the study.

Researcher’s positionality

While interviewing I did not ask the participants to articulate the HEC program’s theory. My intention was to develop the program theory from the participants’ stories. This could be accomplished only by being responsive to the research process, open about my assumptions, engaged in research activities, and accountable to my contract with the participants.

Conducting qualitative research to me means understanding existing practices and exploring possibilities (Gilgun, 2005). I value qualitative inquiry’s essential attributes such that reciprocity, reflexivity, and meaningfulness within which

one transforms and is transformed. Reciprocity in interviewing and reading the text is important from two points of view. First, reciprocity determines the conversation's purpose and shapes the actors' (e.g., an interviewee and interviewer) meanings. Second, reciprocity allows negotiating the actors' intentions in the conversation and in the narrative.

As a qualitative researcher I am obligated to be responsible and reflexive about my "assumptions, worldview, biases, theoretical orientation, and relationship to the study that may affect the investigation" (Merriam, 2002, p. 31) to develop trustworthiness. In writing this study, I distinguished the participants' voices and my voice. I chose the first person writing voice as a responsive and responsible writing style for the study (Gilgun, 2005). Further, I stated my assumptions that guided the conceptualization of the study's various stages.

I view the interviews as a relational process. My position is that both interviewer and interviewee bring to the session their perspectives, needs, expectations, experiences, culture, and personality traits, to name but a few. That in turn influences the interview. Hence, interview is a "co-elaborated' act on the part of both parties, not a gathering of information by one party" (Miles & Huberman, 1994, p. 8). I considered that my participants and I were part of the research processes pertaining to conversing, reading, and writing (Tierney & Gee, 1990). Through our interactions we jointly created conditions for conversations. I engaged in conversations with the participants through interviewing and reading the texts. I was an "instrument" of the study (Maxwell, 2005). I was an active listener and reader. In my view, humbleness and sensitivity are essential attributes of an interactive discourse.

Reading about the HEC grants program, obtaining additional information about my participants, getting familiar with the HEC's legislature, and having personal experience with the competitive grants system prior to conducting interviews allowed me to build my vocabulary and to anticipate words, sentences, acronyms, and expressions that potentially would be used during interviewing. Because I shared the organizational language, I was able to understand what I was

hearing during the interviews. The successfully created “speaker–listener interchange” (Crotty, 2003, p. 93) discourse during interviews remained during reading the interviews’ narratives, thus enabling putting myself into my participants’ places to recognize and to interpret what they intended to convey. The research approaches for creating and reading narratives are described in the sections that follow.

Analysis

Transcription

In qualitative inquiry the analysis starts with transcribing the tapes (Silverman, 2001). Transcription is seen as a “graphical representation” of a conversation (e.g., interviews, chats, discussion at the meetings) (Kowal & O’Connell, 2005, p. 248). Transcription begins with the researcher asking, “What sort of features is he or she searching for in his or her transcripts and what approach lies behind this search?” (Silverman, p.166). Transcription requires a different set of skills (e.g., analytical, knowledge of transcription systems) and brings unique challenges (e.g., utilizing complete transcription *versus* “pick and choose,” conversation *versus* discourse analysis). Ultimately, the study’s purpose determines the format and style that a researcher employs to transcribe interviews (Bird, 2005; Kowal & O’Connell; Silverman). To transcribe the tapes I had to decide (a) when to transcribe, (b) who will transcribe, (c) what approach to use, (d) what transcription system (i.e., codes) to use, and (e) who will be the readers of transcripts.

I transcribed the tapes after I completed interviews. I used a tape transcriber (DTP 2742W). I decided to do the transcribing myself for two reasons due to a transcriber’s role and theoretical basis of transcription. In particular, a transcriber does not simply record on paper what he or she hears on the tape (Kowal & O’Connell, 2005). Transcription is not a theoretically neutral process that proceeds “from primary data (the original conversation) via secondary data (the audio or video recording of the conversation) to the tertiary data (the transcription of the conversation on the basis of the audio and video recording)” (p. 249). Transcription

involves conceptual considerations and “people with their particular goals, capabilities and limitations” (p. 250) while attempting to represent people voices in written form.

Kowal and O’Connell (2005) assert that “transcribers, as language users, frequently transcribe unreliably” (p. 251). I chose to transcribe the tapes myself to avoid the subjective perceptions of another individual. I wanted only my decisions in creating the narratives. I also wanted to hear my participants’ and my voices again and gain a new feeling of our conversations. As a researcher, I value intimacy and involvement with the data. In addition, I told the participants that I would transcribe the tapes “as we spoke.” And I felt that it was my responsibility to fulfill this obligation. There was an ethical consideration in this decision as well. In this study, as described earlier, I did not use the consent form. I verbally promised the participants that it would be me and only me who would handle the data. Transcribing the tapes personally was my way of protecting participants’ confidentiality. Further, the focus of the study was on developing a story that had meaning to both the participants and me. It was important to me to stay engaged with my participants at this stage of the research as well.

I transcribed each tape verbatim. While transcribing the tapes I followed Kowal and O’Connell’s (2005) recommendations for the transcription of conversations. That essentially means to (1) transcribe in a manner that the texts will be analyzed and (2) “ensure the unambiguity of notations symbols” (p. 251). In this study, the transcription of each interview included the participant’s words and my words. In my attempt to have the texts representing the participants’ oral narrations of their experiences (i.e., events), I included a few speech marks, like pauses, laughs, silence, and loudness of voices (Kowal & O’Connell; Lindlof, 1995). I simply put words “pause,” “silence,” and “laugh” in brackets, for example [pause]. I did not measure the length of the pause or laugh. And I used symbol ‘↑’ indicating “loud” and ‘↓’ indicating “low” tones of voice. These speech marks were to alert me to changes in the participants’ voices and to render a better understanding of participant speaking intensity while reading the narratives.

It was my own transcription approach. I developed this approach in the tradition of the discourse analysis (DA) that understands the transcription as “a process of creating a written representation of a speech event” (Bird, 2005, p. 229; see also Silverman, 2001). Although “naturally occurring data such as interviews” (Silverman, p. 178) are not favored in DA, the methodology’s (1) focus on language as “the medium for interaction” (p. 179), (2) orientation to constructivism, and (3) consideration of reflexivity suit this study’s conceptual framework.

Readability (i.e., not being cluttered with symbols) of narratives was also an important consideration in deciding on the transcription approach. After the interviews were transcribed, I listened to the tapes and followed the transcripts. I was not an experienced transcriber. By reading and listening simultaneously, I was simply checking the “accuracy” of my transcriptions. I did not delete any passages from the interview transcriptions during this activity. I then sent an e-mail to the participants (1) informing them about the completion of the interview transcriptions, and (2) asking them whether they are still interested in reviewing the narratives. In qualitative inquiry taking data back to the people from whom they were obtained and asking for plausibility is called “member check” (Merriam, 2002). This is one of the strategies used to ensure trustworthiness of the research.

The participants responded positively. I sent them the narratives. However, only one participant reviewed and edited the text. The text went through two revisions by the participant. The participant then approved the final version to use in the analysis. This final version of the narrative had no speech marks (e.g., tones of voice, laughs, pauses, silences). They all disappeared when that participant’s role changed from being author to being reader. After twice reminding the other three participants and not receiving a response, I used the original transcriptions in the analysis.

My sharing the transcripts with the participants was not an issue of seeking the participants “permission” to use narratives in the analysis and interpretation. It was an ethical consideration of shared ownership of the research data on my part as researcher. Prior to the interviews, while discussing the research procedures, I told

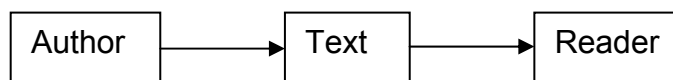
the participants that I would transcribe interviews and use the transcriptions as data in the analysis and interpretation stages of the research. I also “confirmed” this research step prior to the interviews. Working within the research overall contract with the participants, I did not interpret the three participants’ non-response as disapproval of using their narratives.

In summary, the entire interview texts became the created data texts (i.e., narratives) that I used in the interpretation. I was the narratives main reader. I used the participant’s documentary evidence (e.g., collected during the interviews national reports, program documents) as an additional source of information (contextual background) to complement the participants’ stories. The documentary evidence was not textually analyzed.

Reading the texts

As stated earlier, I read the texts within the hermeneutics tradition of literary theory, also in the literature often used interchangeably with literary criticism and literary critical theory (Straw, 1990b). I applied this tradition for two reasons. First, I was interested in learning about the HEC developers’ views, perceptions, and assumptions about this program’s concrete events at its inception (Crotty, 2003). Second, my data were the texts. And the mode of analysis consisted of reading, responding to, reacting to, and evaluating the interviews’ narratives (Straw & Sadowy, 1990; see also Hunt, 1990).

In literary theory, the act of reading and interpreting (i.e., where the meaning resides and how it is knowable [Straw, 1990a]) historically has been understood within the traditional communication model that suggests information flow from the author to the reader via the text (Straw & Bogdan, 1990; see also Crotty, 2003; Shannon & Weaver, 1949). Graphical representation of this process is such as:



Within the traditional communication model, reading is primarily understood in relation to “locus of meaning,” defined as “the place where it is assumed that meaning resided” (Straw & Bogdan, 1990, p. 15). Hence, conceptually the meaning can reside with author, text, and reader (Straw & Bogdan; see also Crotty, 2003). And depending on the locus of meaning, Straw (1990b) distinguishes four “conceptualizations of reading” (p. 50). Specifically, they include (1) transmission, the emphasis is “to understand the text by explaining it in terms of the author” (p. 51), (2) translational, the emphasis is on the meaning that is in the text and “not in some supposition about what the author might have meant” (p. 56), (3) interactive, the emphasis is on “the interaction between author and reader through text” (p. 64), and (4) transactional also referred to “constructionist” (Straw & Bogdan, p. 17), the emphasis is exclusively on the reader’s meaning.

In this study I employed an interactive model of reading the texts. My decision about this model (i.e., approach) of reading the narratives was based on a set of four criteria suggested by Straw and Bogdan. Specifically, these criteria relate to (1) the purpose of reading; (2) knowledge needed for effective interpretation; (3) the locus of meaning, and (4) critical activities. In the remaining parts of this section I explain how considering each criterion in light of this study’s purpose informed my selection of the interactive model of reading.

First, recall here that the purpose of my reading the narratives was to understand the meaning of the HEC developers’ lived-through experiences of this program’s historical events. Hence, in order to develop the program’s theory that was grounded on its historical context through reading, it was critical to assign a meaning to the texts that was “similar” to the ones ascribed to it by the authors (Crotty, 2003). Second, the interactive model suggests that the author and the reader are equally important in reading (Bogdan & Straw, 1990). Within this view what I (i.e., the reader) know becomes important (Straw, 1990a). Therefore, I considered my knowledge about the HEC grants program and the authors as essential for effective interpretation.

The interactive model allowed me to maintain the “speaker-listener” discourse, which was established during the interview. Recall here, when I entered the study, I shared with the authors understanding and experience of working with the competitive grants program, in general and of the HEC program’s current content and contexts specifically. I was familiar with the authors’ terminology (e.g., expressions, terms, acronyms, land-grant system, legislative procedures and regulations referred to during interviewing) because of my work at Iowa State University from 1992-1997 in general, and specific responsibility for external grants program in the College of Agriculture from 2001 - 2007. I viewed transcribed interviews as representing “an agreed-upon set of meanings” (Straw, 1990b, p. 60).

Third, with respect to the locus of meaning, text was a medium that contained the meaning attributed to it by the authors (Bogdan & Straw, 1990). This conceptualization was critical in this study. In the oral history interview context, the interviews’ texts capture the authors’ recollections of meaningful experiences in the past. Hence by reading the narratives in light of the research purpose, my “author–reader–author” contract was to decode the authors’ meaning that was embedded in the text.

In addition, I considered myself as an active reader. I read the interview narratives multiple times to become intimately involved with the texts. Reading was a process of contemplating the authors’ meaning of their experiences. It also involved thinking critically about my interpretation, in other words making meaning of my projected views of the authors (Tierney & Gee, 1990).

Further, my interaction with the authors was via their texts. The act of reading was a negotiation. I did not just absorb the HEC program’s historical events as narrated by the authors. I engaged the authors in a dialogue via the texts by reflecting on what they communicated (i.e., narrated) and why. Thus, narratives became my meaning making as well (Straw, 1990a).

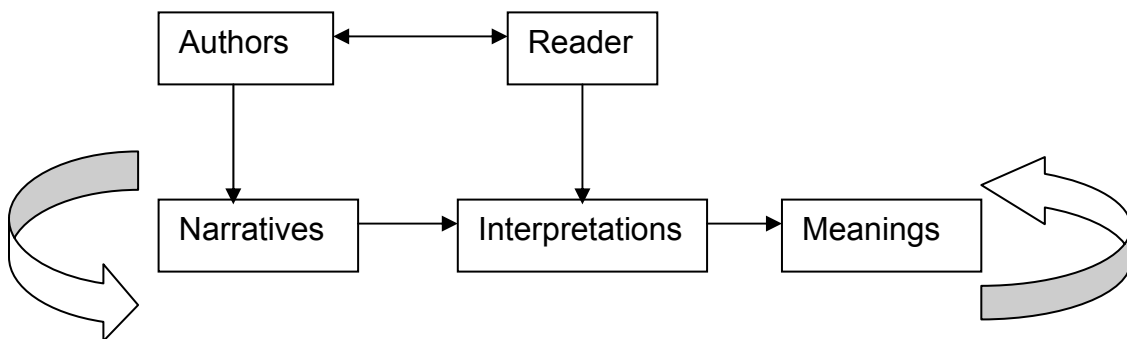
In summary, the importance of sharing knowledge with the authors for meaningful interpretation, being an active reader sensitive to the authorships, and conceptualizing the act of reading as interactive were essential considerations for

designing the readings' critical activities. I considered them critical because they were important in developing my reading ability to create the meaning through literary reading of the authors' narratives. I used a three-phase approach in reading the narratives. I describe it in the text that follows.

Critical activities: Three-phase reading approach

Reading is a multifaceted engagement with the text and the reader's self (Czarniawska, 1998). This position means "negotiating meaning within the context of the world suggested by the text (allowing oneself various levels of involvement with the concepts, characters, events, and settings) and negotiating meaning with the author (as critic, coauthor, observer, or participant)" (Tierney & Gee, 1990, p. 207). Hence, the resulting interpretations become a mediator in this iterative process of negotiating and re-negotiating meanings of the authors' experiences. This study's narratives were a function of the authors' comments of the program's events in light of their experiences. Interpretations are a function of my (i.e., the reader) knowledge and understanding of those experienced events as meanings. Figure 1 shows this view in graphical form.

Figure 1. Meaning construction within narrative discourse.



Consequently, conceptualizing reading as interactive is "essentially *intercommunication*" (Crotty, 2003, p. 108) and not a traditional communication model. Within this view, I adopted three phases in reading the oral history narratives.

That included (1) naïve understanding (i.e., one story), (2) stories development (i.e., the HEC's intentionalities), and (3) created understanding and reflections (i.e., description of the HEC's program theory). In the hermeneutics tradition, the employed reading can be understood within (1) reconstruction (explication), (2) deconstruction (explanation), and (3) construction (exploration) modes of interpretation (Czarniawska, 2005; Reichertz, 2005).

First phase of reading. The first phase of reading was to answer the questions, "What do the narratives say about the HEC program?", "What was the historical context of the HEC's formation?" The goal at this phase was to develop the one story of the HEC's inception by acquiring a sense of the whole. The reading implied examining the meanings of the HEC's events as intended by the authors (Ohman, Soderberg, & Lundman, 2003; Tierney & Gee, 1990). In the literature, this stage is identified with a "naïve grasping of the meaning of the text as a whole" (Ricoeur, 1976, p. 75) or engagement (Bogdan & Straw, 1990). The one story of the HEC's inception became my retelling of the HEC inception.

Second phase of reading. I read the texts a second time. Reading was analytical and purposive. The questions that guided my reading of the narratives at this phase were, "What did the authors hope the HEC would bring about while planning the program?" and "Why did they think that way?" My assumption was that the program's intentions were the results of a series of the authors' actions and motives (Bogdan & Straw, 1990).

I read the narratives sentence by sentence to identify the authors' motives, actions, and rationale for doing what they described as depicted in the narratives. I then tried to make connections between identified episodes of the authors' experiences (i.e., excerpts) within a story telling structure. The key element of a story is a plot that "consists in the passage from one equilibrium to another" (Todorov, as cited in Czarniawska, 2004, p. 19). The story begins with a description of a stable situation, which is disturbed by a problem. The action is then proposed to

re-establish the steady state. The result is a new stable situation. The theme that emerged by telling each story was the HEC's intentionality. I used the authors' words or phrases as the themes' descriptors (Siedman, 1998).

Third phase of reading. The third phase was to bring together my understanding of the HEC historical events (naïve reading) and the HEC's intentions (stories) to describe this program's underlying mechanisms. In this last phase, I tried to answer the questions, "What do I, the reader, think of all this as an evaluator?", "What is the HEC's rationale for the way the program is structured and operated?", and "How can it be used to inform evaluation?" I called this phase created understanding and reflections. My role has changed to become the author of the created understanding.

In this study, I only read the texts, whereas others might read the text and listen to the tapes (Ohman, Soderberg, & Lundman, 2003). I decided to only read the narratives for two reasons. The first reason was related to the methodology within which this study was conceived, namely interpretivism. In this view, the act of reading is to aid a deeper understanding. The second reason related to being consistent in working with the narratives. As described earlier, one of the narratives was revised twice by its author. The author approved use of the final revised version of the transcript for the analysis. The corrected text represented a different form of discourse, namely written text. It became distant from and eventually "had little to do with the original speech" (Czarniawska, 2004, p. 70). In relation to all interviews, I presumed that the text version captured the authors' speech. Hence, I chose to work only with the narratives as the form of discourse. That in turn allowed me to apply my (i.e., reader's) frame of reference to construct a new meaning from what already existed.

My reading in all three phases was methodical; the one that was governed by the study purpose, namely developing a description of the HEC program's theory (Czarniawska, 2004). My findings and interpretations of reading the participants' narratives are presented in the sections that follow.

Findings and Interpretations

Naïve understanding: Challenge Grants program's historical context

Narratives provide historical evidence that gave rise to the HEC program's inception. In the narratives, participants' perspectives appear to capture the program's life cycle (Scheirer, 2005). Participants talked about the problem that led to the Challenge Grants program's legislation (i.e., authorization). They recalled events that were instrumental in obtaining funding for the office of higher education and its programs (i.e., appropriation). Participants described the Challenge Grants program implementation and evaluation activities. Participants viewed this program as an integral part of the educational community in the food and agricultural sciences.

The problem

Prior to 1977, the USDA's primary emphasis was on developing a strong research and extension partnership with the states and land-grant institutions. The educational responsibility at the federal level resided within the Department of Education¹ despite Morrill-Nelson legislation² that proposed a partnership between the USDA and the land-grant university system for food and agricultural higher education. Under the auspices of the Department of Education³, agriculture was defined narrowly as farming (i.e., limited to "production agriculture") and became one of the vocational educational programs.

This marginalized the image of agriculture and had implications for the field's future professional and scientific workforce. First, bright and talented students were uninterested and were often discouraged from pursuing an agricultural undergraduate education by parents and school counselors. Further, the national testing system (e.g., SAT college entrance test) administered by the American Psychological Testing Association included "farming and logging" as the only

¹ Which at that time was an agency in the Department of Health, Education and Welfare.

² 1907 Nelson Amendment to the Morrill Acts of 1862 and 1890 that provided further increased appropriations to land-grant institutions.

³ It became a separate agency, namely the U.S. Department of Education (DoED) in 1979.

agricultural career choices in the 1960s and 1970s. Students who scored high on SAT test (even when they had indicated agriculture as their career choice) received a report indicating that “they were much too capable to enroll in agriculture” (per a participant’s comment)

Second, the enrolled student body was largely male. That in turn substantially limited the enrollment, because women were generally not admitted in many agricultural colleges at that time (e.g., Texas A&M). Third, opportunities for scholarships and assistantships were scarce, leading to low enrollment in graduate schools. Consequently, the demand for graduates surpassed supply. In addition, improvements in curriculum and opportunities for faculty development were also desired. It appears that this situation in the 1970s called for extending the USDA research and extension role to include education. In the participants’ view, public support of the USDA, the agency’s successful partnership with the land–grant institutions in research and extension, and its constituents’ (i.e., land–grant system administrators, college of agriculture deans) effective communications with Congress were all instrumental in transferring the educational responsibility to the USDA.

Authorization

The life of a federal competitive grants program begins with its authorizing legislation. A program’s authorizing legislation defines its parameters, regulates the scope of its activities, and determines the nature of relations between the program (i.e., agency) and its stakeholders (e.g., applicants, project directors, institutions). With the authorization of the Farm Bill in 1977, Congress enacted Public Law 95-113, the National Agricultural Research, Extension, and Teaching Policy Act (NARETPA) that gave the U.S. Department of Agriculture (USDA) the authority for higher education programs in food and agricultural sciences.⁴ This was considered to be a bold and positive move. In this transfer, Congress redefined the term “agriculture” to incorporate a wide range of agricultural and allied disciplines. The

⁴ Section 1417, entitled Grants and Fellowships for Food and Agricultural Sciences Education.

new definition became instrumental in developing higher education programs to encourage collaboration across disciplinary boundaries. Further, the Act put more emphasis on awarding grants competitively that is created competition among as many applicants as possible in response to a program's published notice (i.e., Request for Application [RFA]). Further, competitive procedures were considered to encourage participation for program awards among the highly-qualified (i.e., competitive) applicants.

NARETPA of 1977 authorized within the USDA six areas for competitive grants and fellowships programs to promote and strengthen higher education in the food and agricultural sciences. They included (1) strengthening institutional capacities; (2) attracting students; (3) facilitating cooperation among institutions, (4) developing agricultural programs, (5) conducting undergraduate scholarship programs, and (6) conducting graduate fellowship programs. The first program was the basis for the Higher Education Challenge grants program.⁵ The Challenge Grants program aimed to strengthen the quality of undergraduate education (i.e., instructional programs). Participants believed that the Challenge Grants program was and continues to be the only federal grants program that serves this need (i.e., strengthening undergraduate education in the food and agricultural sciences).

Authorization (i.e., legislative authority) is the first of two main steps of a federal competitive grants program's inception. The second step is the passage of an appropriation bill that allocates funding for the program. Authorization and appropriation do not always occur at the same time. Sometimes, funds are appropriated late in program's life or not at all. To obtain financial support from the federal government, an initiative (i.e., program) has to be for the public good.

In the 1980s the Federal Interagency Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology was formed to address educational challenges with the national goal of having the world's best students by the year 2000. Improvements at the undergraduate level in agriculture were considered essential to the quality of U.S.

⁵ This title came later in the Code of Federal Regulations [CFR], Title 7, Chapter XXXIV, Part 3405.

education. In the participants' views, societal concern about the shortage of students and quality of programs in agricultural education, including the agency–land grant system's (i.e., federal–state) strong partnership were instrumental in starting the USDA higher education programs with the limited financial resources and securing funding for educational programs that became available.

USDA higher educational programs

The USDA, it was noted, was “a new kid on the block” with respect to the development of college and university educational programs. Although NARETPA of 1977 gave the USDA the authority for higher education programs, the legislative authority to administer funds appropriated pursuant to Morrill–Nelson legislation was transferred to the USDA and targeted for the food and agricultural science by the Food and Agricultural Act of 1981.

There were challenges and opportunities establishing the new office of higher education programs at USDA. Participants identified both external and internal challenges. In addition to a narrowly portrayed image of agriculture (i.e., production agriculture), external challenges included (1) tension between USDA and DoED during the transition of the educational responsibilities, and (2) some constituents (e.g., citizens, governmental officials, educational administrators) questioning the USDA's ability to fulfill its new educational role. Internal challenges were attributed to (1) a lack of educational infrastructure in USDA, (2) a lack of funding for establishing the USDA's educational programs office, and (3) the requirement of much work by a few.

In addition, CSREES, to which the educational programs unit currently belongs, did not exist yet. CSREES was created as a merger of two USDA agencies, namely the Cooperative State Research Service (CSRS) and the Extension Service (ES) in 1994 (Public Law 103-354 Department of Agriculture Reorganization Act of 1994). At the time of its establishment (1981) and prior to the merger, the new Office of Higher Education Programs was first housed at the Agricultural Research Service (ARS) Agency in USDA but then moved to CSRS.

With basically no money for office operations and strong pressure to demonstrate the USDA's capabilities to lead educational programs, the new educational office was competing with research and extension units for the same pot of money. This caused some tension in the early stages of the office's development.

However, organizing a new office was described as a collegial effort. The new office was staffed initially with university faculty members who were on an assignment in the USDA (Inter-Governmental Personnel Act [IAP]). This arrangement seemed unusual in the federal agency because most programs were designed and administered by federal employees. Participants commented that in the beginning university staff members were not taken seriously by the federal employees in the USDA. However, the new staff was committed to stay. The office gradually gained credibility and respect by working closely with other offices and agencies in the department, other federal agencies, the land-grant system, industries, businesses, and professional societies.

Having no prior history in administering educational programs in USDA and having limited financial resources was a "blessing in disguise." For example, no one could say how things "used to be," because the agency had at no time prior dealt with higher educational programs. Participants felt they had plenty of opportunities to be creative to accomplish as much as circumstances (e.g., having limited funding, being understaffed) would permit. Working long hours, week-days, and on the week-ends was normal and accepted as such. Participants commented about "being on the road" all the time to raise awareness (among colleges, universities) about the new educational programs office in USDA and to learn about situations in the field. Participants' networking with college deans, faculty, industry representatives, and congressional aids appeared to be essential for establishing the new office and administering its programs.

First accomplishment. To obtain federal support for a program, its funding had to be justified. The office's first accomplishment was a supply-demand study of college graduates. The study was conducted collaboratively with land-grant

universities. The study was initiated and designed by the new office staff (i.e., participants) with the purpose of identifying educational gaps. Participants acknowledged that this study was the first ever of its kind. The study demonstrated the shortage of graduates relative to the existing demand. The study became one of the office's main activities, repeated every 5 years. The results of the first study were used to justify funding for the office, the higher education programs, and activities that further promoted and strengthened higher education in food and agricultural sciences. Specifically, the study showed that strengthening grants and the graduate fellowship program were the two areas of greatest institutional need. The next step was to prioritize, namely decide to which of these two areas federal funds should be obtained first.

Participants believed that one had to be a "realist" to work for the federal agency because changes take time, things do not happen by accident, and relationships are governed by protocol. In government it is much harder to institute a new program than to obtain an increase for an existing one with demonstrated benefits. Participants felt that focusing on progress helped. Being visionary, planning ahead and building coalitions also seemed to be important. Perseverance, diligence, commitment, persuasiveness, and accountability were named as essential attributes to get the job done (i.e., obtaining adequate funds for programs).

Appropriation

Because of the federal government and USDA's primary focus on expertise development (i.e., ensuring an adequate supply of scientists), the first educational program to be funded by the Congress in 1984 was not the Challenge Grants program (the first in the NARETPA's list) but the National Needs Graduate Fellowship grants program in food and agricultural sciences (the last in the NARETPA's list). During the first ten years (from 1981–1990) of operation, the main responsibilities of the Office of Higher Education Programs were to conduct supply demand studies and administer the National Needs Graduate Fellowship grants program.

Challenge Grants program. While it was important to meet the national demand for graduate students, improvements in undergraduate education quality were equally desired. Work on the Challenge Grants program began in 1986 in order to have a request for funding in the agency's 1988 Fiscal Year (FY) budget. The program was finally funded in 1990. The name "Challenge Grants" symbolized a challenge to Congress to support agricultural education and to challenge the system (i.e., land-grant institutions) to make changes. At the beginning of the Challenge Grants program the gap between graduate supply and demand was 20%. The Challenge Grants program's social benefit was contributing to the preparation of scientists and professionals in food and agricultural sciences who were competent and competitive in national and international arenas, ultimately narrowing the gap between graduate supply and demand.

Implementation

Participants noted that in addition to direct congressional funding for the program (approximately \$2.2 million), \$2.8 million was redirected from formula funding under Morrill–Nelson legislation to support the Challenge Grants program. The program's total funding became \$5 million. This amount of funds was considered modest in relationship to the demands of meeting many existing and emerging needs to strengthen institutional capacities in agricultural undergraduate education. Hence, the program was designed to provide only "seed money" to support innovative ideas with strong potential for continuation beyond USDA funding. Further, the program was structured to meet only certain targeted areas. The program's five targeted areas were (1) curriculum enhancement, (2) faculty development, (3) instruction delivery system, (4) experiential learning, and (5) student recruitment and retention.

In addition, the Challenge Grants program became a competitive grants program because of its statutory requirements (NARETPA of 1977 and subsequent regulations). The rationale for the program's competitive nature was to bring additional money for those who were the best and were willing to help themselves.

The hallmarks of a competitive grants program are a Request for Application (i.e., notice) and a peer review system. Further, the program's statute and regulations provided for "cost-sharing" requirement (also known as "matching requirement"⁶). That is financing by a mix of federal and nonfederal funds (Allen, Winchester, & Charles, 2004). The projects for the Challenge Grants program were seen to demonstrate institutional commitment (i.e., matching funds), secure additional state and/or private funds, build cross-disciplinary partnerships, increase collaboration, and foster knowledge dissemination.

Program guidelines. Participants wrote the program guidelines. Because the funding for the program was limited, making the program's Request for Applications (RFA) flexible was important to participants. They stated two reasons for this consideration (1) to accommodate funding changes in the future and (2) to be inclusive of the field's future developments. Flexibility also was believed to permit universities to choose which programs to target to compete for funding and for the agency to decide which program targets to fund. Participants commented that preferences for specific disciplines and rigid definitions in developing the program's language in the RFA were purposefully avoided.

Hence, the concept of flexibility seemed to be this program's way of coping with the constraints of federal regulation and meeting the field's future needs. At the same time, the dynamics of the federal-state relationship (i.e., partnership) appears to eventually conform to the federally mandated regulations. That is, working collaboratively with a broad range of constituents (e.g., universities, business, and professional associations) seems to have been critical in determining the national needs and seeking funds. However, once needs were determined and funds were appropriated, it became the institutions' responsibility to match their interests for

⁶ "In theory, the fiscal lure of Federal grants entices State and local governments into allocating new resources to satisfy the non-Federal match for programs they otherwise would not have funded on their own. While state and local jurisdictions may not be willing or able to fully fund a program from their own resources, they would most likely agree to spend new resources on the same project if most of the project cost were paid by the Federal Government" (GGD-81-7 at 9.) (Allen, Winchester, & Charles, 2004, p. 23-2))

educational enhancement with the program's funding priorities. Participants commented about the need to explain to universities how a competitive grants program operated.

Further, as changes in the field of agriculture continued, flexibility became its own constraint. A main concern was how to prevent the program from being "spread too thin" in an attempt to meet needs that cut across fields in agriculture and allied disciplines, potentially causing the program to lose its identity.

Program's first funded projects. The HEC grants program was intended to encourage creativity in project development. Developers sought to fund projects that brought about a positive change in teaching and learning. Toward this end, there was a written requirement in the RFP for proposed projects to pledge and to convince reviewers and program managers (i.e., participants) that the project would produce tangible, observable results. These desires, combined with the structure of the RFP, produced a first set of funded projects which focused on curriculum development and faculty enhancement, and emphasized a systems approach, ethics, and pedagogy. One of the first exciting funded projects was a mobile laboratory for a school of veterinary medicine, which introduced a new delivery mode. That is "rather than brining clients to a central location, the lab traveled all around the state."

Peer review. The peer review process was an essential attribute of the Challenge Grants program as a competitive grants program. Participants mentioned using faculty in the universities with expertise in the food and agricultural science to competitively review proposals submitted for the program. The review process was seen as a way to keep program knowledge current and as a means to encourage high quality proposals. Peer review also meant a final assessment of projects' potential to succeed. Hence, integrity of the peer review process was critical. Establishing a peer review process was considered to be "learning while walking," constantly improving review procedures and projects' evaluation criteria in the

Request for Applications texts based on experiences gained managing the review panels. Reviewers' constructive feedback was emphasized. Reviewers' feedback was meant to help applicants to improve their proposals for resubmission in future years if not funded in their initial submission. Participants commented about making sure that every applicant received the reviewers' comments. That included both funded and non-funded proposals.

There were also several "lessons learned" from the first set of proposals and the reactions of review panels. Participants commented on the apparent overall weakness in the quality of proposals submitted during the first round, which they mainly attributed to limited experience writing proposals for external funding among applicants. Grant proposal quality constituted one of the program's initial challenges. In order to improve the quality of proposals, the office offered support in the form of workshops on writing strong proposals, which staff themselves conducted in the early years and continued doing throughout the years of the program's implementation.

Evaluation and monitoring

There seems to have been a need and a desire to conduct a formative evaluation of the Challenge Grants program, aimed at developing and improving this program from its early years (Donaldson & Gooler, 2002). Participants recalled proposing a "comprehensive" program evaluation by the tenth year. At the same time, they admitted that it would be extremely challenging to conduct a comprehensive evaluation of the federal grants program since the process would require the approval by the Office of Management and Budget (OMB), in the Executive Office of the President for any forms used and surveys conducted under the public's paper work burden ceiling. Such an approval was not easy to obtain because every department had a ceiling. At USDA, much of the ceiling was allocated to the Food and Nutrition Service for the schools lunch program and the food stamps program. Hence, getting additional "evaluation questionnaires approved by OMB" was considered "an exhilarating experience to say the least."

However, during the early years of program implementation, efforts were made to learn how projects supported by the Challenge Grants program were performing. These efforts were primarily informal and included discussions that occurred during project directors' annual conference and a series of teleconferences with project directors. Even though a formal evaluation of the program was not conducted, a project evaluation plan was given major points in the proposal review process. Further, participants developed a summary of each project aimed at (a) understanding whether the projects were implemented according to proposed plans and (b) keeping financial records of federal dollars spent on each funding area. It appears that continuity of the Challenge Grants program was viewed through its projects' accomplishments. Hence, it was critical to fund projects that demonstrated responsiveness, innovativeness, and deliverables.

Founding culture

Great feelings of enthusiasm, a desire to improve the profession, feelings of comradery with stakeholders (i.e., land-grant system, industry representatives), and making a difference in the life of others (e.g., faculty, students) were in the forefront of participants' descriptions of the program, particularly in the early years. Participants fondly and proudly recalled receiving positive letters, cards, and calls from faculty. The Challenge Grants program was seen to be a "helping hand" for faculty. It was also seen as a way to keep faculty motivated even when their projects were not approved for funding. Participants noted that the program generated many activities that furthered educational and professional opportunities in agriculture.

The memories of participants resounded with a remarkable spirit of collaboration when they talked about the heavy load of responsibilities they carried and the amount of support they received from colleagues in and outside the agency. Narratives also mirrored feeling of togetherness with agricultural educators in universities. People (e.g., various federal agencies' staff and administrators, businesses leaders, and university administrators, and scientists) expressed a great deal of interest and support for the new educational program office in the USDA.

They were eager to help by volunteering personal time and contributing institutional resources.

Program continuity. Working with industries and seeking their input about needs for graduates' skills and education programs were mentioned by participants as critical for the continuation of educational programs. Educating others about agriculture was also considered an important ongoing activity. Attending meetings of professional associations (e.g., National Association of State Universities and Land-Grant Colleges [NASULGC]), traveling around the country, and talking to various stakeholders were also viewed as activities to (1) raise awareness about the Challenge Grants program, (2) build relationships, and (3) learn from these activities about changes in the field. Having advocates (i.e., program champions) convey a strong message about the importance of agricultural education was seen as critical to continued future funding. Media was also credited with playing a key role in promoting a positive agricultural image. In addition, strengthening post-award management, conducting site visits, and organizing a project directors' conference were stressed as future areas for evaluation activities.

Participants regarded the federal involvement in postsecondary education as the breeze that stirred the lake. Participants noted that as long as changes and developments in agriculture continued, there would always be a need for the Challenge Grants program.

Stories development: Challenge Grants program's intentions

The emphasis of reading the narratives at this stage was on explanation, "How was the Challenge Grants program supposed to bring about its effects" (Leeuw, 2003; see also Rogers, Petrosino, Huebner, & Hasci, 2000). Specifically, I was looking at, "What were the program developers' (the authors) intentions that governed their motives and actions?" and "Why did they think that way?" I read the narratives sentence by sentence to identify characters, choices, difficulties, actions, and general developments. I then tried to link these segments within a story format

(logical and chronological structure of course of events) to explain the texts (i.e., narratives) in terms of the HEC program's intentions (Czarniawska, 2004). The description of my understanding and explanation of the Challenge Grants program's intentions is presented and illustrated by quotations from the interview narratives in the text that follows. In this writing, participants mean program developers, ultimately the narratives' authors.

Program's conception: Need for quality of academic programs

While education is recognized as the prerogative of the states by the U.S. Constitution, the federal government has traditionally been concerned about expertise development, such as the production of scientists.

Education generally is in the constitutions as a prerogative of the States, not the federal government. (Paul)

That is true. But, it is important to realize that the states are never likely to focus extensively on graduate education and on producing that level of expertise. And when you stop to consider that the entire Nation eats and that there's a shortage of scientists you can really justify Federal involvement. (Audrey)

Hence, the federal government has always been supportive of research, and the production of scientists has been a realm that the federal government has traditionally moved into. We haven't gone too much into elementary schools or secondary schools. But the production of scientists and the research is a federal concern, stemming from WWII. (Paul)

By the year 1984 there was a substantial gap between supply and demand of scientists in agriculture.

Undergraduate enrollments had decreased from about 135,000 to the low 50s. And that happened in about 5 or 6 years. Enrollments were plummeting and employment demand was far exceeding the supply of graduates. We were only graduating about fourteen Ph.D.s per state each year. And that's not enough, you know? The demand for graduates was so great that they were foregoing graduate schools. Consequently, we were facing serious shortage of scientists. (Audrey)

To increase the number of graduates in the agricultural field, Congress first funded the National Needs Graduate Fellowship grants program. It became the first

competitive grants program in higher education of the USDA Office of Higher Education Programs. The National Needs Graduate Fellowship grants program was based on the student supply–demand study conducted by the office in collaboration with the universities. Its inception was also supported by leaders representing businesses and industries in the food and agricultural sciences. The National Needs Graduate Fellowship grants program focused on the recruitment and education of graduate students to fill positions identified by the supply–demand study as a “shortage of expertise.” The study, in fact, identified two critical needs in higher education in agriculture. They were (1) expertise development and (2) institutional enhancement.

The decision was made early on about what we would seek funding. We had a couple of choices; strengthening grants was a possibility and the graduate fellowship program was also a possibility, because the institutions needed both, at least based on assessments that had been done at the time. We made a decision up front that we would go after the graduate fellowship part. (Joe)

We did that because most often, other disciplines were prepared to outbid colleges of agriculture in recruiting academically outstanding students. Ag didn't have very many recruitment incentives to offer students. There were precious few research assistantships, teaching assistantships, scholarships, or faculty recruiters comparable to schools of law, engineering, medicine, etc. So, the first thing we did was to secure funding for doctoral fellowships. (Audrey)

The program opened the door for many students to receive graduate education in agriculture who later became prominent scientists and leaders in the higher educational agricultural institutions. While the National Needs Graduate Fellowship grants program was an important first step in producing quality graduates in agriculture, there was a growing concern about the quality of educational programs in agriculture that were supposed to train those graduates.

While it was good that we had the fellowships program to help encourage students to pursue graduate education and try to attract the brightest and the best students into agriculture, but where do you get those Ph.D. students? Well they come out of the undergraduate programs. And if those undergraduate programs are not doing modern updated curriculum and

teaching methods and instrumentation and so forth, you're not going to get the high-quality Ph.D. students. (Paul)

And, as funding grew, we set forth to develop a program aimed at strengthening the quality of undergraduate students and programs. One of the challenges was that the quality of undergraduate education was taken for granted. And the future of research and extension was dependent on qualified people. (Audrey)

However, agricultural education at postsecondary institutions remained underfunded and understaffed. Its main focus remained primarily on traditional disciplines in the field (i.e., production agriculture). That, in turn, substantially limited enrollments (e.g., women, outstanding students). In addition, improvements in faculty skills were needed.

This was back in the 80s. Budget cutbacks were a serious reality. Universities had to contend with the undergraduate programs that were dated compounded by a tremendous lack of interest in science. Students were flocking into business, sociology, psychology, etc. Many schools' curriculum primarily focused on farming and many faculty had limited teaching skills. But even those who were outstanding teachers were often deficient in evaluation or assessment of student learning. Improvements at the undergraduate level were essential to enhancing the quality of U.S. education. (Audrey)

And if we didn't do something about it we were going to face serious consequences in the future. (Fran)

Plus we always wanted to get the best students and the best programs. When we were evaluating fellowships, we essentially were looking at the quality of their academic programs. And that's what drove to the challenge grants, because we could see they needed it. (Joe)

Promoting the idea of the Challenge grants program, participants built on their successful experience managing the National Needs Graduate Fellowship grants program. The National Needs Graduate Fellowship grants program seems to have been a logical connection to further expand the USDA education programs. It established the office credibility and allowed participants to justify the need for pursuing the strengthening grants program (i.e., institutional enhancement, Challenge grants program).

We started telling them [agency administrators] about this challenge grants program, then working with the community we talked about it. We thought that we might be able to expand that into a broader challenge grants program system. And that's what we did. We were able to build on that. (Joe)

Encouraging schools to stretch themselves

Participants continuously included the Challenge grants program in the office request for funds since 1986. Considering the challenge to get funds, it was imperative to identify priority needs once funding did occur.

Funding was slow in coming. So, we determined that with such little money, we must first focus on undergraduate education. We persevered. (Audrey)

Participants' perseverance finally bore fruit. The program was funded by the federal government in 1990. The purpose of the Challenge grants program was to improve institutional capacities in undergraduate agricultural education, ultimately strengthening the quality of students so they could compete globally.

It was designed and launched to enhance the quality of undergraduate education. (Audrey)

In other words, it was primarily for instructional programs. (Joe)

The meaning of the program was to challenge, which was two-fold. That is to challenge the federal government to support food and agricultural science teaching programs, thus:

We're going to call it "Challenge Grants." We are going to challenge the Congress to support us and challenge the system to do something. (Audrey)

The program was also intended to encourage faculty getting out of their "comfort zone" with respect to teaching, learning, and scholarship, and challenge them to "go beyond" in their effort to improve quality and quantity (especially in early years) of scientists and professionals in agriculture.

Hopefully we all set our expectations just a little higher than reality might suggest. We tried to push the universities to strive to achieve goals beyond their comfort level. If I say, "I can do this much," that's likely to be what I do. It's important to reach further than you think you can reach even though it

may take you several attempts to succeed. While you don't want to force them to pursue the impossible, you do want to use every encouragement to motivate them to stretch beyond their "comfort level." (Audrey)

Further, the program was seen to bring about change and to foster innovation in project development. The focus was on developing high quality educational programs.

We required an applicant to build a case for particular change. (Audrey)

And we don't want [just] the numbers; we want them [students] to be trained in modern problems, modern issues, current technologies, in fact, in cutting-edge technologies. (Paul)

At the time, the Challenge Grants program was the only federal grants program for which faculty in agricultural education could apply for extramural funding to improve undergraduate programs.

It was probably the only second real competitive pot of money that the teaching community had. (Fran)

Hence, faculty were assumed to be encouraged and enthusiastic to develop their long-desired ideas for projects and to compete for this only available pool of federal funds.

The community of Deans of academic programs, chairs of ag. science departments, and teaching faculty were inspired to learn that the world had not forgotten them. I remember a speaker once quoting George Washington when he was at Valley Forge, trying so desperately to get some money from Congress for food and supplies for his soldiers. Washington simply said, "Is anyone there? Does anyone care?" When faculty feel no one cares, certainly it diminishes their motivation. Even though we didn't get funding initially, just knowing we were trying made quite a difference in their willingness to continue struggling to enhance academic programs. (Audrey)

I remember there was real excitement about the program and real enthusiasm among the communities that were eligible, because this just one was available up to that point. So there was a lot of cooperation, different seminars I went to where folks would talk about things they had been grappling with and they would say, "this could be a vehicle for us" to address these problems or these issues such as the international theme, for example. They knew their students needed this kind of experience because that's where we were going. And so I remember I would make a presentation and

people would respond, “This Challenge Grants program is a real opportunity for us to address these needs. Let’s be sure we write good proposals and let’s be sure we participate.” So, I remember a lot of enthusiasm and a lot of thinking, “This might be the vehicle.” Or “We’ve been throwing this around for a couple of years. But just did not know how to get it started. Well, maybe this is the way to do it.” And of course from there you also want to encourage cooperation amongst the institutions. It’s what you’re going after is some kind of model that can be applied elsewhere. So, we also encouraged that cooperation among institutions that were eligible. (Fran)

It appears that the Challenge Grants program was seen by the participants as a force for change, a stimulus of creativity, a motivation for collaboration, and a venue for advancing agricultural education.

There were many good proposals. Having limited resources, the Challenge grants program could not fund all projects. The ones that were funded generated many activities that resulted in curriculum improvement, faculty development, experiential learning, and ultimately quality graduates. (Audrey)

And the Challenge Grants program was and continues to be our key program for ensuring that the undergraduate education and the faculty that are teaching are absolutely of the highest quality, innovative, meeting current needs and demands. (Paul)

The meaning of the story is that funds provided by the Challenge Grants program supported and encouraged faculty to develop new and creative ideas in project proposals that would improve agricultural curriculum.

Requiring cooperation for long-term commitment

Two sources of funding comprised the Challenge grants program. The first source was a federal appropriation designated directly for the educational activities in USDA. However, these federal dollars were small and slow in coming, as noted by the participant.

At the time challenge grants were put on the table there were very scarce resources for teaching programs in the agency. There was lots of long established money in the agency for research and extension but not very much at all for teaching. And at the time, of course, we had not merged and become one agency with the extension service. (Fran)

Additional resources were needed to support the Challenge grants program activities. At that time, universities received formula funding available under Morrill–Nelson legislation to support faculty salaries in the food and agricultural sciences, curriculum development, and other instructional delivery expenses. However, being under the auspices of the Department of Education:

When Morrill–Nelson funds went to the universities, they could be used for any aspect of agriculture and the mechanical arts. There was no stipulation on how they should be used. So if a College of Ag even got such money, the university typically reduced state funds for ag, resulting in no net increase. (Audrey)

In 1981 legislative authority for the administration of the Morrill–Nelson funds was transferred to the USDA. In order to provide extra money to the schools of agriculture while keeping the state dollars coming, it was decided to make awards for the Challenge grants program on a competitive basis.

While changing to a competitive Challenge Grants Program meant that every school wouldn't get funding, for those that did it would be additional funding. Some suffered, you know, especially those who were not positioned to be competitive. We actually settled on five targets, allowing schools to apply in which ever area they preferred and to compete with other applicants. And it's worked! (Audrey)

Even with the combined resources of these two sources, the program's total funding was still too small to meaningfully address the significant range of problems in agricultural education. The intent, therefore, became one of providing "seed money" for project development.

So, we started the Challenge grants program with a very modest amount, five million dollars, which doesn't go far, as you can imagine. (Joe)

And because the pool of money was so small, the university system recommended (and we listened) that the Challenge Grants Program not be designated to solve all problems. It's too small. Rather, it should be a flag bearer to support prototypes, to provide seed money. (Audrey)

The Challenge grants program's ideal was to see that the projects continue their life after the federal support ended. With only limited resources available to bring about changes, the program's emphasis on seed money type of funding meant

supporting institutions that were willing to improve the quality of their educational programs by committing their own resources and obtaining industries support in addition to the federal funds. In the federal government this commitment is known as “matching funds requirement.” The requirement goes back to Hatch Act of 1887 that mandated the establishment of the State Agricultural Experiment Stations (SAES) in land–grant colleges primarily to initiate and conduct research on state, regional, and national priorities in food, health, and agriculture. The Act authorized research funds for SAES’s on a formula basis (i.e., allocation of funds based on factors such as Census Bureau statistics about each state’s farms, rural population, etc. [Allen, Winchester, & Charles, 2004]). SAES’s were required to provide 100% in matching funds. It appears that the intent of Congress was to require the land–grant system (i.e., state) to generate non–federal funds to be used for expanding agricultural research, extension, and education.

Our small investment alone couldn’t solve many problems. So we tried to determine if there was strong likelihood that a project would continue after USDA funding ceased. The proposal evaluation criteria included determining if money would go to a school willing to help itself and that would try to obtain some private sector or additional state funds to match USDA. (Audrey)

In addition, by moving beyond USDA funding, we mean that at the end of the grant that the activity, whether it’s in the curriculum, in recruitment, in the technology, in the teaching approach, will become incorporated by the university, get institutionalized. (Paul)

Efficient and effective use of the program funds were seen as critical to achieving the main goal of strengthening undergraduate education in institutions. The program’s emphasis on encouraging collaboration among colleges and universities was assumed to foster broader application of new (creative) educational practices that were developed as a result of projects supported by the Challenge grants.

Further, we tried to determine if a project really maximized partnerships with other institutions. We didn’t want to fund several institutions doing the same thing. So partnership among schools was real important, as well as partnerships on campus. We really encouraged partnerships among the different disciplines (business, engineering, etc.), as well as among

departments within the same college. We really encouraged collaborative ventures. (Audrey)

So we're funding a new major or a new curriculum or something and it will continue! And we're finding out that other institutions will also pick it up. So it becomes sustainable two ways. (Paul)

Further, because faculty were presumed to be motivated to develop innovative ideas, the proposed projects became of interest not only to their institutions, but also to outside groups capable of offering funding support. Consequently, projects that were not funded by the Challenge Grants program were in some situations carried out by either their state institutions or supported by others outside the universities (e.g., industries, foundations).

One of the real benefits resulting from this program (and I wish there were some ways to capture all of them) was that time after time after time we received letters and phone calls saying, "We applied for a grant and didn't get it. But the faculty were so committed to the project we had designed that we started anyway. A supporter learned of our efforts and came up with money. Now look what we've done." There was a remarkable amount of activity generated by proposals for projects that were eventually launched without the requested funding. So, a "spin off" effect was one real benefit. (Audrey)

The meaning of the story is that the competitive nature of the program attracted committed applicants and institutions that were dedicated to long-term projects implementation.

Holding true to its mandate

Federal grants program must successfully pass two hurdles; authorization and appropriation bills.

In all of federal programs you need two things. First you need authorization and then you need funding-appropriations. These are the two separate bills. Appropriation bills have to be reenacted each year, whereas the authorizations can stay on the books for a long, long time. (Paul)

The essence of a federal grants program is being true to its authorization bill. There were several essential attributes that the federal competitive grants program had to have in order to conform to its authorization (i.e., being true to its mandate). They

included (1) addressing rationale for its existence, (2) demonstrating responsibility in decision making, (3) managing resources responsibly, (4) adhering to the rules and targets, (5) having integrity, and (6) doing the best possible job.

Federal money was not given *carte blanche*. The concept of responsibility always flows in the grants world. The need for the federal grants program had to be justified.

For example, "Do we want to try for an increase in challenge grants?" Let's justify that would be needed. (Fran)

Moreover, relationships in government follow a vertical chain of delegation of the authorities among an agency and institutions (Agranoff & McGuire, 2003). That is, the federal government passed on the authority to implement legislation (i.e., public policy, program) to one of its federal agencies. In this process, confidence in a designated agency's ability to carry out the legislation's intent was critical.

Eventually Congress and the public agreed that USDA could be effective in the education arena. We had many evidence of success to show that we could make a difference despite very limited funding available. (Audrey)

After assuming responsibility (i.e. inheriting the authority) from the federal government for administering a federal grants program, the program pushed the responsibility on to the grant recipients (i.e., institutions, project directors) who administered awards adhering to federal rules and regulations.

We certainly are accountable for how we manage this money as a project director is accountable for how they use the money. (Fran)

In the federal government, rationale can not be substituted. The rationale for the Challenge Grants program was determined by its authorizing legislation (i.e., NARETPA of 1977).

We had the authority. But the reason that this was so important and the primary goal of all of these really is going back to helping to ensure an adequate supply of society ready graduates. That is the future scientists and professionals that will go into the USDA workforce and become the faculty and researchers in colleges and universities to ensure that that supply is out there. (Paul)

In other words, it was to garner more resources to focus on training the expertise we needed in food and agricultural sciences. (Fran)

Further, the Act defined what areas to fund, how long to provide funding, and who could be supported.

It laid out the basic parameters of what we are doing. So everything has flowed from this particular piece of legislation. As the legislation has been modified and amended and added to over the years, but basically it hasn't changed the intent of the scope. And as you can see from the very first paragraph, the purpose is to promote and strengthen higher education in the food and agricultural sciences by formulating and administering programs to enhance college and university teaching programs in agriculture and natural resources, forestry, veterinary medicine, home economics, and closely allied fields. And we can make grants to colleges and universities and it lists the kind of colleges and universities. And then it lists the various activities that can be done. And number one is to strengthen institutional capabilities including curriculum, faculty, scientific instrumentation, instructional delivery and student recruitment and retention to respond to state regional national needs. That is the basis for the challenge grant program. (Paul)

Identified five areas for the Challenge Grants program funds were seen to be inclusive and meet adequately the needs of the agriculture educational community.

We focused on curriculum, faculty, experiential learning, instruction methodologies, and recruiting. I don't know much you do in an academic setting that can't be included in one of those categories. (Audrey)

Although the legislative authority defined the program's main parameters, program developers further took responsibilities for decisions to support specific areas in a given year based on needs in the field and on total funding that became available.

We do have authority to even fund equipments associated with teaching programs but we haven't always funded that particular area. It covers such a broad area you have to take your small resources and focus them where you find the most need. (Fran)

For example, I also maintained that one of the greatest needs was faculty development. The theory being if you have world class faculty you can't keep the curriculum from getting better. But you can have an excellent curriculum, and without a faculty capable of delivering it, it's just another book or computer program. So, initially we put more emphasis on curriculum and

faculty, and less on other needs such as scientific equipment. Keep in mind, we only had a million dollars and you can't target many areas with only a million dollars. (Audrey)

However, the program-specific decisions had to be made within its scope defined in the legislation.

Still, we try to identify areas of need within the scope of our legislation. That is within curriculum, within faculty development. (Paul)

After all, federal mandate ruled. Case in point, the program did not intend to require 100% match. In the draft of the first Request for Applications, matching was proposed as one of the evaluation criteria. However, this was unallowable by federal regulations.

One thing happened before the first request went out for applications. It concerned matching requirements. We didn't require 100%. We simply required matching funds and provided for weighting points in the evaluation criteria (i.e., for 100% you got 10 points, for 90% you got 9, etc.). However, that was disallowed. We argued that schools should be able to earn some credit for a less than 100% match if that's all they could come up with, especially for a large project. But we were not able to do that. That was certainly unexpected. We had to require 100% match. (Audrey)

Compliance with the authorization rules and regulations was important for the agency, because its reputation was entwined in its ability to conform to regulations.

If you are not really paying attention, the public can cause an outcry, "look at what your USDA funds are being used for." And you can end up on the front page of the paper. And you don't get good press from that, you get bad press. You might be doing wonderful things, but you want to be sure that you are trying to catch every one of these little "what ifs" prior to that happening. Because if that's come out on the front page of the Washington Post and you're going up to Congress to testify the next day that you need more money for the program, it's not good. And plus the Congressional members who make money available for this don't want that. They want to see success stories out there. And we want to see success stories. So it really is important. We're really only trying to make sure that we head off the trouble before it ever comes out anyone's way because we want win-win stories out there. We want the public and everyone to know what success stories we have. Not just the one hiccup we had. Out of 500 grants we might have one problem. (Fran)

Hence, the program manager's role was seen primarily as making sure that funded projects complied with all regulations.

They [program managers] are keeping the agency on the right track on the technical side to be sure that our money is being used wisely and for priorities that we need to address. (Fran)

Similarly, evaluation was considered an important component of program operation.

There was always a need to evaluate what we had done. (Joe)

As I recall we proposed that the Challenge grants program needed a comprehensive evaluation by the 10th year. But at the beginning we really had no staff to focus on post award management and conduct site visit. And that's something that's needed. We just simply didn't have the necessary resources. You can't take funding off the top of a grants program to do those kinds of things. I just kept telling the staff who were worried, "Do the best you can to put money on good projects. And trust that value will be received." (Audrey)

Constrained by resources and protocols, program monitoring was the form of evaluation pursued (Holvoet & Renard, 2003; see also Newcomer, 1997). The program developers made sure that (1) funds were used appropriately, (2) projects were making progress, and (3) the office kept detailed records. Participants developed and retained summary statements of each project in order to have records of funds that had been awarded to support projects in each targeted area.

Each year we would develop a summary of each of our programs as to what we had funded, who got the funds, and what the objectives were in that investment. So, that was one way that we would try to really break it down, as to how much of the money was spent in each of the major areas if I remember this correctly; how much money was for scholarships, how much would have been for experiential learning opportunities overseas, how much went for curriculum development, how much was made available for faculty to use and that kind of thing. If you put all of these summaries that were done each year, I think you'd get a really good global view of what it has addressed. (Fran)

We also read final reports. (Audrey)

Further, the program gave in its Request for Applications some points for an evaluation plan.

Initially we certainly considered a plan for evaluation worthy of major points in the proposal review process. We were convinced that evaluation is not something you work on at the end of a project. Evaluation strategies and mechanisms are something you design at the beginning. You start with “what do you want to accomplish? How are you going to tell if you did or didn’t?” Then you develop a plan to get there. (Audrey)

Moreover, the program also tried to use creative ways to learn about the projects’ happenings. In addition to written project reports, participants used conference calls and initiated a project directors’ conference.

We did a certain amount of evaluation by interacting with project directors. Some 10–12 years ago we initiated annual or biennial conferences, which afforded project directors an opportunity to share results with one another. Was it a formal evaluation? No. But we certainly garnered a wealth of ideas from those discussion sessions as to what proved to be good and bad practices. We kept the conferences small so that we could have in-depth discussions that proved to be very effective in helping us assess outcomes of the program. At that time, we tried to bring in people from OMB and the department’s budget office to give them an understanding of what the program was about and what were some of its impacts. You can’t overlook the conferences as an evaluation strategy, although they didn’t produce any empirical data. The other thing I want to mention is that we had access to a 50 line phone for system teleconferencing. So, we considered a series of teleconferences with Challenge Grant project directors. I think you could learn an awful lot with that type of evaluation strategy. It might be just oral. You see, it’s not easy to get authority to send out questionnaires for evaluating a program. They add to the public’s paperwork burden. Despite the fact that you are trying to assess if a program was a good investment, you still have to obtain OMB approval for any forms used and surveys carried out. And such approval is not obtained easily because every department has a ceiling, and every agency in a department has a ceiling. So, trying to get evaluation questionnaires approved by OMB would be an exhilarating experience to say the least. There are so many barriers. (Audrey)

Program integrity was one of the developers’ management principles. Establishing a program’s integrity constituted one of the developers’ immediate priorities as a way of being trustworthy. The peer review process became the intent

by which the Challenge Grants program's integrity was attained. It was also seen as the program's commitment to learning and improving its Requests for Applications (RFAs).

It was a brand new ground we were breaking. I do well remember that we stayed in the office until 3:00 in the morning the last night of the panel trying to decide what kind of instructions to give the panel the next day that would help us really sift through all of these wonderful proposals and come up with the ones that we could fund. That was a learning experience. It was the first time we had done this. Each year you learned something that continued helping you. And so the next RFA you put together you would think "well, you know, we need a portion in here on this particular aspect" or "this was a question that many of our peer reviewers had." We had probably given clearer guidelines for the applicants as to what we wanted and how much emphasis to put on this. Or ask the right questions of them so that this peer panel could make the assessment. So, it evolves. We were absolutely going to have integrity in the program. (Fran)

Further, the role of the peer review process was seen to provide constructive feedback aimed at strengthening the implementation of projects that were funded. Constructive feedback was also assumed helpful for faculty whose proposals were not funded in improving the quality of resubmitted applications.

We decided to give feedback to those who were successful as well as those who were not, hoping that those who were not then could build on the constructive criticisms and strengthen their proposals and come back in future years, which many of them did. (Fran)

Reviewers' comments helped faculty learn grantsmanship. (Audrey)

The program tried identifying the best experts in the communities to provide this kind of feedback and to identify the best applications.

And they were reviewed by people in the university with agriculture experience. (Joe)

In addition, participants strived for consistency among requirements for quality project development stated in the Request for Application (RFA) and for review of the merits of applications received in response to the RFA aimed at identifying the best performers.

We wanted to be sure that what we had put under the project narrative (what we had asked the applicant to write about) peer panel could then take these series of questions and rate this proposal as to how likely it was to succeed and add some value to what we were trying to accomplish. (Fran)

Moreover, there seemed to be three functions attributed to the peer review process. The first was a mechanism to justify decisions made (awards versus declines). The second was a means to maintain public rapport, in other words, a process to explain the awards decisions. The third was a provision for objectivity or fairness in making the awards/declines decisions. All three were important for a program operating within a highly political discourse.

We wanted to be sure that we weren't swayed by any criticism from those who may not have gotten funded. Often times someone who doesn't get funding might write a Congressman who would then write to the Secretary of Agriculture who would then send us the letter saying "why didn't you fund this most excellent project?" And so you needed to build in an explanation of why it wasn't funded. But then to say, "many very excellent projects were not funded but we just don't have enough money to go around." You did a lot of public relations work there. You wanted to make sure they understood that "look we only have 25% success rate because there are so many good proposals." Maybe some were not up to the par of funding. But you know they were good ideas and they may not have expressed them. Usually you have many, many good ideas there. And if they just improved them, eventually they probably could and did get funded. You also wanted to be sure that you didn't succumb to some of that pressure and try to make people happy. Let's say, perhaps somebody's on the appropriations committee who's from Texas. And so you want to be sure that all Texas proposals get more consideration than say those even from Iowa. So, you didn't want that to sway you at all! You knew there were certain members on the Hill who could help your program if they wanted to. But you didn't want to be swayed by that. (Fran)

To substantiate proposal evaluation criteria, the developers also used the needs assessment studies.

As we reviewed proposals those first few years, we really relied on priority needs that surfaced via studies. We expected an applicant to show they paid attention to some of the studies that had established national need areas. For example, the greatest need was a system approach to education aimed at producing graduates capable of using holistic approach to problem solving. Ethics was a key area. Teaching pedagogy was important – the ability to

develop curriculum, to deliver it, to accommodate different styles of learning, to assess student learning, use of case studies. (Audrey)

The program developers also emphasized the role of feedback as a way of being open and maintaining current knowledge of the program needs. Nowadays, the RFA has a section for stakeholder input from this document. In earlier years of the Challenge Grants program operation, the RFA text did not have this provision. To obtain stakeholders' feedback, participants interacted with various groups of stakeholders by attending professional association meetings.

The Office of Higher Education was extremely involved in the different associations. We were at their seminars. We were part of their discussions. We read the literature that came out of their meetings, various reports. And then we went to the leaders of those groups to ask about their input, "what would be helpful to you in this area?" We may not have documented it as we do today through the stakeholder input comments. But certainly we were involved enough to know and did seek input from the community of what are the priorities. (Fran)

At the same time, holding true to the program's authorization seems to have created some challenges to historically developed strong partnership with the university community. To illustrate this point, the movement to transfer agricultural education from the Department of Education to the Department of Agriculture was lead by the land grant system, which saw the need.

When USDA was first assigned the role as the lead Federal agency for higher ed. in the food and ag sciences back in the 1977 farm bill, it was largely due to the administrators of college and university programs in agriculture, forestry, vet med. (Audrey)

They thought that USDA should be doing something in higher education. There was a perception of need only because some Deans got together and decided we needed to do something. (Joe)

And they had formed a very strong coalition and educated the congress very effectively on the fact that the Department of Agriculture had long had a partnership with the research community and with the extension community; and, it was profoundly evident as you looked across the country that that federal-state partnership had produced very strong systems in both research and extension. (Audrey)

However, in the early years of the Challenge Grants program participants felt the need to explain to the partner–institutions that program implementation had to conform to the overall federal mandate. In other words, priorities at the federal level had to (1) be justified versus desired, (2) serve the public good versus just few, and (3) be targeted specifically versus defined broadly.

One of the other challenges was USDA's partnership with the system to help us set priorities. That required our helping the system understand that when the Federal Government provides support for an initiative, it's essential that it responds to a national need. Two, it must be for the public good. And three, it is important that it relates to USDA's mission. So, we tried to move forward in those areas that had been documented to be a national need and for the public good and where we thought we could generate successful action. (Audrey)

Limited resources, challenging circumstances, and political constraints were understood as essential attributes of the reality within which the Challenge Grants program was developed and implemented. The participants revealed an effort to turn this rather challenging situation into something positive.

I guess I've always felt that if you really make an effort, you can overcome most barriers and minimize most problems. (Audrey)

The participants' effort seemed to be on doing the best job given the federal mandate and in doing that they received no monetary but tangible support from various sources.

We committed to stay. People used to tease us and say, "You're trying to build an empire." We would reply, "Come help us." I've often said because we had no funding, no permanent staff, no real space, I think we received much more help than if Congress had immediately given us 5 million dollars, five staff and said, "Improve agriscience and agribusiness education." By getting numerous different agency administrators and staff interested and involved, I think we benefited tremendously. At that time we would certainly have welcomed Congressional support and funding. In a sense, our deprivation inspired a sense of commitment and loyalty and respect that I doubt we might otherwise have received so readily. Even so, we were in dire need of resources. As I traveled around the country and would tell groups about what we were attempting to do, they would ask, "How big is your staff?" I would respond, "He's about six foot two," and we would all laugh. (Audrey)

What seemed to matter most to the participants was serving the community and making a real difference in people's life.

I learned a lot about how to organize and how to maneuver. Number two, it was working with deans. It was one of the most rewarding experiences I've ever had. They were some of the best people. Those are the two big things that I got out of it. And the satisfaction of knowing that I was doing something good for people. And I was, we were there for them. There were a lot of people that went to school in agriculture that probably wouldn't have gone there if that program hadn't been there. So, we changed a lot. (Joe)

What do I remember the most? The system's enthusiasm. Student after student has written, called, come by at a meeting to share their gratitude for our programs. One of the greatest joys was when we established a peer panel for doctoral fellowships several years ago and two members had been among the first class of graduate fellows that we funded back in 1984. We thought, "Halleluia!" We've actually made progress. (Audrey)

The staff's university experiences prior to serving at USDA and the new territory (i.e., higher education programs) that the agency was mastering were complimentary components of a program designed to serve the educational community. Well our situation was unusual in government, in that we were establishing a new office. We had no infrastructure in place, but we also had no traditional way of doing business that limited our creativity. No one cautioned that they used to do something another way. We had freedom to be creative to a great extent. We really possessed competencies in both education and food and agricultural sciences subject matter specializations. That breadth of competencies is somewhat unusual in government. Many programs are designed and administered by federal staff with very limited relevant university experience. (Audrey)

The Challenge Grants program became the first federal program that supported undergraduate education in the food and agricultural sciences. In the participants' view, it "stirred the pot."

It may well be that federal programs are not needed forever, but they are certainly needed to stir up the pot when there's a serious shortage of scientific expertise. (Audrey)

Maybe more important, this program served as a model and paved the way for creating other higher education grants programs that followed such as the 1890

Institution Capacity Building Grants program, the 1994 Capacity Building Challenge Grants program, and the Hispanic–Serving Institutions Grant program.

If you look back at those days and see where we are today, we have maybe 10 higher education programs focused at Hispanic serving, at 1994 tribal colleges, and also through challenge grants to any school that can provide that type of education. It's quite a portfolio, you know, and it's something to be proud to have been a part of. (Joe)

I personally think it is a real testament that the program has grown and is still here these many years later and going strong. I think program has certainly produced some information that leads others to have confidence in that it is making a difference. This one I think pretty much was strong out of the gate. And we pretty much kept to our same priorities throughout the years. We are still valid. (Fran)

The seeds of the Challenge Grants program have been planted, nourished, and grown on its own turf, namely agriculture. And as long as agriculture exists, the Challenge Grants program appears to be needed.

And since the challenges in the fields of science and the technologies are constantly changing, this program is constantly renewed and constantly needing to continue. It's sort of like in medicine. We're going to fund medicine for 5 years and then stop because there's nothing new. Well, that's crazy, you know. Well, the same thing is in agriculture. If we funded this program for 5 years and stopped. Well, there are new things, new discoveries in science, new technologies new instruments, new ways of doing things, new issues, and new problems. So, its' a program really that I can't see ever should end. Because as long as agriculture and science change and there are new discoveries, we need students and faculty updated and trained in those areas. And that's what the challenge grant program does. So that's what it continues to do. (Paul)

The meaning of the story is that the responsible actions of HEC's management created an effective program administrative culture that produced desired outcomes consistent with the overall mandate and in line with the mission of the program.

Planning strategically

Defining the niche, conducting needs assessment, networking with constituents, and communicating with decision makers were considered essential planning strategies in federal government to obtain and keep program funds coming, which were appropriated annually. It takes “movers and shakers, the administrators of the big agencies, and so forth” (as noted by the participant) to realize and initiative.

Having agricultural education in the Department of Education and defining agriculture primarily as farming appeared to have had an adverse impact on the content of educational programs.

Enrollments in agriculture were going down and the deans of the colleges of agriculture were quite concerned about this. Agriculture higher education programs were at time housed at the Department of Education. And they were focused more on vocational education. The deans of the colleges of agriculture didn't feel that that's where agricultural science education needed to be housed. They didn't think that the Department of Education was doing right for higher education. (Paul)

Generally, it did not address the content of curriculum. It really did not recommend subject matter at the college and university level. (Audrey)

So they got together and sponsored legislation to re-designate USDA as the lead federal agency for higher education in the food and agricultural sciences. And that was accomplished in 1977. And the name of the bill is National Agricultural Research Education and Teaching Policy Act of 1977. (Paul)

The aspiration of the Challenge Grants program appears to have been to return agricultural education to its “turf” (i.e., USDA).

So, basically that was the intent of the program; to make sure that we had graduates in these areas in the future and who better to address that than USDA! Instead of, say National Science Foundation or some other program. When you go to National Science Foundation they support work that's related to food and agricultural sciences. But they are involved in much, much more than that. And so at least at USDA the relevance is just clear. It's like the nose on your face. Why we want to do this, because we know what's needed in our own fields. So it makes sense that USDA would be the champion for these recipients because it absolutely benefits in so many different ways. (Fran)

The “home coming” was also associated with defining agriculture in a way that reflects “true” to the field’s traditions, values, and trends.

Congress defined food and ag sciences as incorporating all of ag, home economics, vet med, and forestry as well as closely allied disciplines. (Audrey)

The expanded definition of agriculture created opportunities for interdisciplinary collaboration. Enrolment for women was opened. In addition, “bright” students began considering agriculture as a college major.

Hence, if ag engineering was in a school of engineering or hotel restaurant management was in a school of medicine, we could still work with them. And so we operated in this basis. Enrollment first started coming back largely as a result of women enrolling in college of agriculture. (Audrey)

The agricultural education landscape was gradually changing. As a result, there were many needs to meet. Some were greater than others. Strategic planning appears to have been of crucial importance to program’s success, specifically as it related to (1) determining programmatic priorities, (2) working with a broad range of constituents (stakeholders), and (3) securing funds.

I focused on the strategic planning effort only because that seems to be the most important in terms of what we were doing. (Joe)

For a program that utilized public funds it was essential to be responsive to the needs of various constituents.

We were absolutely convinced that if we didn’t meet the needs of the community, we didn’t need to exist. (Audrey)

And to determine those needs, needs assessment studies and networking with universities and industries were believed necessary in planning the office’s activities and deciding what areas to support.

We worked on a day-to-day basis wit the university system. We never sit in the office and say, “We shall.” (Audrey)

And we were going around the country to all their meetings and trying to plan the program. (Joe)

We also awarded a cooperative agreement to an institution to work with a coalition of administrators, students, and faculty across the country for the purpose of identifying national needs and priority initiatives. There had been curriculum study after study after study that identified some of the major problems. The major emphasis initially was on curriculum enhancement. That's what the system identified as the number one need. Also, we used many business and industry leaders as well as professional associations. And all were very, very supportive. For example, there were a lot of questions raised such as, "Should ethics be a part of agricultural education?" As we worked with industry, they indicated their greatest need among new graduates (other than communications) was ethics. So, ethics was a second key area. That's how we involved the whole system before we really had any funded grants programs. (Audrey)

Strategic planning in federal government also meant planning ahead and preparing budget recommendations over a period of at least two years. Educating senior officials (i.e., Congress members) about emerging needs in agriculture was an important planning strategy. The agency seemed to rely on its constituents to conduct this activity.

We involved presidents and former presidents of several prestigious land-grant schools in helping educate others. (Audrey)

They would be in Washington. They would all go up to the hill. And that helped a lot. They talked to the staff. They explained to them what they were trying to do and show them the supply–demand study that they took with them. All those kinds of networking are essential. (Joe)

And we need to continue to work on it today. We kind of lost sight of that initiative. (Audrey)

Strategic planning was an effective tool to build the agency's credibility and strengthen its leadership role based on the support of its constituents.

In addition, strategic planning required an intense and broad range of communication. While relying on its stakeholders' support and networking, program developers also worked directly with members of Congress. They also conducted a conference at the White House and worked closely with the National Academy of Sciences.

But initially we had been working hard. We had worked both sides of the aisle. Trust me. It didn't matter what they were [republican, democrats] as long as they'd understand what we were doing and support. (Paul)

For example, curriculum studies surfaced the need to prepare students to work in an international world with multi-national firms like Coca-Cola and McDonalds, and etc. We held a very stimulating national conference on agribusiness education. A former vice president of International Minerals was key to arranging a conference held at the White House with the invitation extended by President Reagan. Even though, it was not a White House conference, it was held at the White House and went far to raise respect for our cause. (Audrey)

Honestly, it made a big difference. And you know those are the best place to get something done in my mind. It's very nice with a lot of big names. And that's what we did. And it worked. (Joe)

Eventually, we got the National Academy of Sciences to conduct some studies on the need to strengthen ag. education. When the academy speaks, the world listens, so that too heightened regard for our efforts. Well, we benefited tremendously from all these different efforts. (Audrey)

Although funding to support educational activities in the USDA was growing, the process was slow.

Amazing it took us about 3 years to get funded. But there had been a lot of preparation before that. (Joe)

The federal appropriation process was a complex political mechanism that had be recognized and considered as participants approached those making funding decisions.

When you go to the hill, one thing you learn is both sides included in their appropriations that same amount, that's what you get. But if one side doesn't include it in, and the other side puts in 10 million, they always split the difference. (Joe)

Both the U.S. Senate and House of Representatives had to vote on or approve all appropriations laws and the funds that would be allocated for grant programs. The President could sign or veto these bills. If an appropriations bill aligned with current presidential priorities, it was likely pass and result in the announcement of a grant

funding opportunity. If it did not align with the President's priorities it was vetoed and sent back to Congress for rewriting.

You do not know, just because you got 5 million this year doesn't mean you'll get it next year. (Joe)

The ability to judge (i.e., identify) people effectively was viewed as an important tactic as program managers sought to create a supportive environment and interact successfully with such a diverse group of stakeholders (e.g., university, businesses, Congress members).

Had a talent for knowing "this is a good one and this one is not one I want to worry about." And that's strategically. Who do I need to work with and who do I have to not worry about. And who do I have to worry about. You know, they may not want to work with us and it could be a problem. And, one should be very good at that, very good. And it's probably good because that was, in a way, that's what was needed. Because, there were some people that didn't like all this stuff. Didn't agree with us and would have tried to get in the way if they had the opportunity. But as it worked out there were enough people that wanted it. That didn't happen. (Joe)

Once funding was appropriated the window of opportunity to make changes and adjustments was usually short. Living in the world of uncertainties (always anticipating), it was important to maintain the program's language flexible. In earlier stages of development, this provision took on greater significance for the program like the Challenge Grants, when demands for resources far exceeded its financial capacities.

Because it's so small, we designed program regulations to be flexible enough to serve us equally well with varying amount of funding: should there be increases in future years. There is very little time to change regulations from year to year. We avoided specific definitions for curriculum or faculty development and we avoided any preference for specific disciplines. We avoided definitions because they limit future needs and interpretations that surface. For example, homeland security would have never surfaced. Bio terrorism would have never surfaced. (Audrey)

And I remember in early days of this program, they really had identified through other seminars and publications that international experiences were absolutely needed as we were going toward globalization. And so this was a great opportunity for them to develop it and provide some experiential learning opportunities for students in these programs. (Fran)

The program's ability to organize, maneuver, engage constituents in the process, identify right people, and think ahead—all became essential. Further, a combination of the program's ability to think strategically and its value to its constituents generated positive results. The importance of the Challenge Grants program was attributed to the fact that no other federal grants program existed that supported projects in higher education in food and agricultural sciences.

There are funds in research, true. But for many institutions this is the only funding available for agriculture teaching, innovations, and improvements and so without it there would be nothing. (Paul)

People (e.g., faculty, administrators, and deans) were eager to get involved and in many occasions to pay their way to assist the program developers in getting things accomplished.

Never did the university system tell us “no” when we called and asked for help. They always responded, “What kind of expertise do you need and where and when?” For example, when we mailed out the report on faculty I watched some 20 associate deans who were in town for a meeting line up in the hall at USDA to assemble and prepare 5,000 publications for mailing. There was a remarkable spirit of collaboration. (Audrey)

I remember. You'll never believe this. But the first year when we brought them together, they actually paid their way to come to us. They paid their own way! We had no money to pay them. You know, like when you review grants for the national research initiative, I'm sure you're aware, you get per diem, you get a stipend even and that sort of thing. But back then we didn't have any money to do that. I had to call these people up and say, “oh please can you help us?” And amazingly most of them did. Most of them paid their travel. (Joe)

Our programs were appreciated by the system. So, faculty at universities all across the country said, “We'll do whatever we need to do to help you develop an effective Office of Higher Education Program and a comprehensive portfolio of programs.” And they truly delivered. I genuinely believe that heeding the systems' guidance and advice about how to organize, design, and administer the programs was very beneficial. (Audrey)

The meaning of the story is that the strategic planning efforts undertaken by the program developers helped to create a supportive environment (i.e., expressed support by land-grant system, industry, scientific community, and congressional

staffers), which led to the realization of its goals despite facing challenges and constraints within the political process.

Demonstrating its worth

Using scarce federal dollars, the Challenge Grants program had to demonstrate its worth and contribution to the public benefit. Hence, focusing on results as a measure of success was important.

Because in today's world, you have to compete for the money and because you had such scarce resources, you also wanted to be sure you measured some impact. So that the next year if you went forward and asked for the same money or more money from Congress, you had something to show them of what they had invested so far. And why you should be getting those dollars versus some other organization. (Fran)

However, it appeared that there was a significant challenge in demonstrating the program's worth since there was no direct way to link the impact of the Challenge Grants program to the overall improvements in both students' learning and in the rise in quality of the higher education curriculum.

The tricky part about those kinds of outcomes [impacts of the program] is that our grant funding isn't total sum of the educational experience of the students. It's just a small part, because the institution tuition and other grants are going into it. But I think we could take some credit. I think, probably the bottom line is -- what's happening to enrollments and what's happening to, again, the supply of graduates. With nearly 15 years of the Challenge grants program experience, can we say that the number of graduates is steady or growing? It is. Are the curricula modern? Are the students studying modern things? They are. Are they going to undergraduate schools and becoming scientists? They are. Are faculty happy and keeping pace? They are. Are the Deans happy? They are. Are the curricula modern and are the students continuing to go and being attracted to that field? (Paul)

The developers envisioned the Challenge Grants program becoming a "world-class program", whose projects would continue beyond initial federal support.

The vision was that we wanted something that could be sustained; we wanted something that could be replicated across the nation. Say if Iowa were to put a Ph.D. program, develop curricula for a certain area; Food Science or something, we would want to make sure it is shared nationally. So that those who are interested in doing it could learn from that as well. Or even, at that

time distance education just started. And so then perhaps you would link somebody in Nevada to a food science program in Massachusetts via Satellite, you know! That was exciting. That was our vision. (Fran)

The Challenge Grants program's long-term goal (its overall contribution to the society) was understood as building up a cadre of qualified scientists and professionals capable of leading the overall development in the field of food and agricultural sciences.

The goal was to strengthen education programs to enable U.S. to produce students that would be first in the world. (Audrey)

In others words, to make sure that we had a cadre of world class scientists who could lead us in our needs for the future. (Fran)

We actually use the term society ready graduates. (Paul)

The specific social benefits of the Challenge Grants program's were (1) updated and modernized curriculum, (2) increased student enrollment (in undergraduate programs), (3) advanced faculty skills, and (4) improved career opportunities for graduates. A major indicator of the program's success was the reduction in the size of the gap between the demand for and supply of graduates.

Colleges have changed their curriculum, more science oriented, more modern, and more relevant for students. Students have seen that. They've been attracted to the new things. They can find jobs, exciting jobs in new fields that did not even exist 25 years ago. The students have responded by enrolling as undergraduates and many of them have gone on to masters and doctoral programs. So our supply has increased dramatically. Now, because the field constantly changes, if we didn't keep improving and changing the curricula and so forth, it would go down again. The gap between the demand and the supply has narrowed; it's about 2%. So it's very close; we think the program has been successful. Now, in the area of faculty development, as more students came from outside the United States, as more minority students entered colleges faculty had to be trained in cultural awareness, sensitivity, diversity. And we did some training grants for faculty awareness in those areas. So it's not just faculty training in specialties but also in students. As knowledge became developed about different types of student learning styles faculty needed to learn new pedagogical techniques to address student learning styles, or developing learning communities. They are more responsive in the area of instructional delivering systems or scientific instrumentation for learning. (Paul)

Other outcomes of the Challenge Grants program were (1) faculty knowing about and expressing interest in this program, (2) faculty improving their grantsmanship skills, (3) deans' feeling happy about the program, and (4) Congress receiving satisfactory feedback.

It used to be we judged success by, "did we have a good number of proposals come in?" Because that would indicate that people were interested in our programs. That the RFA was saying something that people wanted to do. So if the number of proposals went up, then we must be hitting the right areas, generating some excitement. We wanted to make sure that awareness of the program was happening. So, the number of proposals generated was the initial measure of success. Is the word getting out about the availability of this program? Are people responding? Do they find that the program is useful? Then the number of proposals was not enough. What was the quality of the proposals? Over time we gave workshops on good proposals; what we're looking for, what we mean by innovation, what we mean by curriculum development, what kinds of projects are we interested in funding. We continued lots of outreach for faculty, Deans; going to professional meetings, telling them about the program, helping them learn about what good proposals are and how to write them and what are the elements we are looking for. Another measure of success was that the Deans and the faculty who were behind the legislation, especially the Deans of agriculture and of course Community of Sciences and Natural Resources were happy. Were they thinking, in their view, that the program was successful and meeting their needs? And they were! And so we felt, it was. Was Congress happy with the program? Are they getting good feedback? And they were! And they continued the funding and the funding has not gone up a lot, but it has gone up! And Congress continued to add new programs not only just the challenge grants program, but the programs for tribal colleges, for Hispanic serving institutions, Alaska, Native Hawaiians and so forth. Congress thinks we're doing right. (Paul)

One of the developers' rationales for the way the Challenge Grants program operated was expressed as:

Back that, we saw the need, we wanted a program of integrity and we wanted to be sure we were clear to the applicant what we were looking for (what we wanted in the project narrative) and then also to give the panel of experts some values on how they would evaluate that. (Fran)

The continuity of the Challenge Grants program was seen in its (1) relevance to the community (e.g., students, higher education institutions, and businesses), (2) return on public dollars investment, and (3) consistency with its vision.

To measure the impact of our program we have to look at “what.” Why did we start— because enrollments were going down radically. Now, enrollments are going up! I think that's a measure of the quality of the program. The overall impact, probably, is that as much as science is changing, as much as agriculture is changing, as much as traditional agriculture production has become a smaller and smaller part of the total gross domestic product, yet at the same time the number of students going into agriculture is increasing. That says we must be relevant to students and to employers. And I think that's the ultimate measure of us being successful. Now, how can you parcel out the contribution of the challenge grants program from everything else? Well, I think that's almost impossible to do. But, having only 5 million dollars a year for innovative projects, and curriculum, and instrumentation, and faculty development, and instructional delivery, and so forth, that kind of leadership I think does have a major impact. If we're funding the innovative projects, then they are successful because they have developed a new curriculum, they're successful because they have developed a new major and/or minor in a field, and then they get copied by other colleges. I think that does make a major impact. (Paul)

Obviously, I am a little biased, but I do think the program had worked remarkably well, especially when we look at the small amount of money that has been invested in it. (Audrey)

The meaning of the story is self evident from the data provided above. The Challenge Grants program's value was in enhancing undergraduate education, ultimately meeting the demand for and supply of trained scientists and professionals in the food and agricultural sciences.

Staying in constant contact and consultation

Having a spokesperson (i.e., advocate, champion) and staying in contact and consultation with the community (i.e., outreach activities) were viewed as ways to secure support for education at the federal level. Having a champion helps open doors for innovation (Perrin, 2004). The driving force behind the authorization of the USDA higher education programs office had historically been individuals of national

statue who were dedicated and enthusiastic about agriculture and agricultural education, including those who were outside the field of agriculture.

But he [Secretary Watkins of the Department of Energy] was also committed towards science in all fields and was very supportive of the Department of Agriculture's effort to promote education in the food, agriculture, and natural resources sciences. We were also fortunate having enough concerned scientists, business leaders (from food and chemical companies, seed and fertilizer businesses, etc.), USDA agencies like APHIS, AMS, Ag Research Service, etc. who said, "We've got to do something about the quality of students and about the shortage of students. We'll help you." (Audrey)

In the federal system when the expression of one meant the exclusion of the other, having someone of power (authority) who cared for the cause of the program and was willing to take the stand increased the likelihood of obtaining funds.

And we were working very hard to get someone on the committee to stand up and say "we need this." And I think that the final thing that broke was, and it didn't happen on the house side which was amazing, the house did not even include us first. The Senate side included us first. And it was the Senator from Missouri who said "we need this." (Joe)

Also, NASULGC has made the challenge grants its top priority outside the research. And as we reach out to other groups in human sciences and veterinary medicine and forestry and meet with those people, and they begin to see how the program is valuable to them, they will also ask for increased funding for the program because our mission is to support across all of the food and agricultural sciences. (Paul)

Further, champion was seen as a way of improving and keeping positive image of agriculture upon which federal support for higher education depended. At the time the program started, agriculture did not have a good image. Undergraduate education was also taken for granted. Although things have improved over time, there appeared to be a continued need for a spokesperson to enhance the image of agriculture.

There was and continues to be today an image problem. All too, often, the general perception is that agriculture equals farming, which is diminishing and doesn't require a college education. So, the ability to understand that agriculture transcends farming was very limited. (Audrey)

Agriculture is the poor child, the step child in Congress, you know. They didn't give us much attention back then. Now it's a little better, I think. (Joe)

In addition, USDA by itself is sometimes very much under appreciated by the public. If you said I need to train more doctoral students or even undergraduate students in food and agricultural sciences because I think the public and often others even in government think "oh they'll be in out in the field with a tractor" or something. They just don't appreciate the science that's behind it. (Fran)

I would like to see us develop more industry spokespersons. You just can't have too many. When industry expresses a need for particular types of specialists (e.g., agribusiness management, international marketing, etc.) it's not perceived as self-serving. I also think we need more media attention. I was always interested in our trying to find a star as a spokesperson. When I came to town, Bill Cosby had done a great series on science for the National Science Foundation. In his own inimitable style, he asked, "Do you want to be a pioneer? Do you want to go to the moon? Then study science!" Unfortunately, we had Green Acres featuring ag on national TV. And that was the wrong image. We really need some prominent highly respected people to help convey the importance and excitement of ag. science to young people. I often thought we might use some of the sports figures who are interested in nutrition. I just never had time to work on it. Well, that's one of the things that's needed. Until we can convince the world that agriscience and agribusiness education are important, related grants program are likely to remain under funded. (Audrey)

A positive image of agriculture was believed to help attract more academically talented students to pursue education and careers in food and agricultural sciences.

Enhancing the image of ag. careers was of course at the root of our efforts to recruit academically talented and diverse young men and women and still is. (Audrey)

Not only was the positive image needed, it was recognized that the awareness building should start years before high school graduation. School counselors were also seen as playing an important role advising students about career choices.

High school counselors and parents typically did not consider agriculture a stimulating academic or prestigious scholarly endeavor. Many elementary and secondary school teachers were deficient in science and were not prepared to encourage young people to pursue careers in science. And, more and more we have come to realize that you've got to interest a young person in

science by about the third grade. You may “turn them on” later but it isn’t very likely. (Audrey)

In addition, the program’s outreach activities were seen as a way of (1) staying engaged with a scientific community outside agriculture and (2) maintaining current knowledge of the program areas.

We were carrying out national supply–demand studies every five years, serving in such bodies as the Federal Interagency Committee on Science and Education, leading workshops on priority education initiatives, etc. (Audrey)

And we’re in constant contact and consultation with faculty and Deans and colleges around to see what those challenges are and what we need to do. (Paul)

The meaning of the story is that an effective program must stay engaged with and maintain its relevance to its community at large.

Bridging the past with the present

Nowadays (the year of 2004 when the study was conducted), to maintain its relevance to its community, the Challenge Grants program continues building on its tradition of being engaged in a variety of activities with its constituents. The intent of engagement is (1) obtaining feedback, (2) promoting the program, (3) learning about needs, (4) making relevant changes to the program, and (5) conducting self–assessment.

One is the RFA itself. When we publish it we ask for public comments. And that’s one way we get feedback. Is the RFA meeting expectations or not? It’s a public document and the public’s invited to make comments. We make formal presentations at all of the NASULGC meetings, on the board on agriculture, on the board on human sciences, natural resources, veterinary medicine and so forth. So we’re there in the room with the Deans. And we’re presenting our program. And we ask for feedback. And Deans are not shy. They will tell you if you are off course. We do workshops for the faculty about the challenge grant program all the time. And we ask them, “is this being successful?” We get the reports from our current project directors; their annual reports, their final reports–what are they doing. And we ask them for feedback and they tell us. Our peer review panel meetings; the scientists that are educators are evaluating the proposals each year. They give us feedback. We ask for it. They give us feedback on the program, on the quality of

the proposals, on things that they've come across in reading the proposals and they tell us whether or not it's meeting the needs. We get a lot of emails from people asking questions about the program, making suggestions; "can you do this?" "Why can't you do this?" We also get feedback from the other NPLs here in the agency, who are in daily contact, hourly contact with us. And as we talk about each other's programs and what we're doing. And sometimes after talking with them, we might add a new component to the challenge grant program. We get feedback from lots of different sources, in lots of different ways. Plus we get faculty that come into Washington, DC all the time. And they like nothing more to do than to meet with program officers and bounce ideas off if they are interested in their research or in their teaching. And sometimes we have to tell them "yes, we can do that or we're interested." And sometimes we have to say "no, we don't do that." We don't have the funding, or the authority. And sometimes we tell them "oh, that's a good idea, maybe we'll consider that in the future." So, we get lots and lots of guests, also. And we have newsletters. NASULGC also sends out letters to their members. We've had specific sessions at NASULGC meetings on how we might change our programs every few years. We make a major re-examination of what we're doing. We ask them constantly about, "should we have fewer but larger grants or more but smaller grants", "should we put more emphasis on classroom or more on regional collaboration." So we're constantly getting feed back from various sources. (Paul)

As in the past, with many opportunities come challenges. Since the program inception in 1990, the field of agriculture has expanded substantially. Its boundaries are broader (i.e., more inclusive of other fields of science) and in some respect less defined.

When the program started it was basically land-grant, 1862 land grant universities colleges of agriculture period. Agriculture has been more broadly defined in terms of belonging to all facets of life; rural development, post production, value added, natural resources, human sciences, family consumer sciences, food and nutrition and so forth. Since agriculture has changed, the program has changed too. (Paul)

Consequently, the Challenge Grants program now tries to reach out to more disciplines, and more colleges and universities beyond the land grant system. The pool of potential applicants for the program is currently growing. However, this expansion has created a serious concern in relation to the program's total funds, scope, and flexibility.

The funding has gone up a little bit but not anywhere near the rate of inflation in over 15 years, and not anywhere near the rate of program expansion. Flexibility has been a challenge too. Because constantly keeping up with what is new and what is happening, curriculum, scientific instrumentation, faculty, and delivery systems are very broad. Our higher education programs are the broadest programs, cut across all the fields. So, how do we define or keep our program relevant without becoming spread so thin that we're not able to make an impact at all. (Paul)

To recall here, the Challenge Grants program is strictly a teaching program, as stipulated in its authorization. However, the nature of the grants has changes substantially. The current funding trends include multidisciplinary, multi-institutional, multiregional cooperation aimed at leveraging funding resources and promoting knowledge integration. The participants noted that the Challenge Grants program is collaborating with National Research Initiative (NRI), which is the USDA major researcher competitive grants program, to leverage the program's resources in order to maintain its relevance to the agency's mission.

We are trying to make the Challenge grants program more relevant to the broader mission of the agency. So instead of step-child of the agency we are trying to be a real child of the agency. (Paul)

But the Challenge grants program still is the only federal program specifically targeted toward enhancing the quality of undergraduate agriscience and agribusiness education. (Audrey)

Yes. Now, the future difficulty could be that being successful in this effort of integration [research-extension-teaching trend in competitive project development], we would be completely absorbed by the NRI. And since we are [higher education programs unit] such a small part of the portfolio, the agency could quickly lose that. We would be lost. So, that's a future challenge perhaps looming out there. (Paul)

The Challenge Grants program came to be to challenge Congress and its community to build the future. Now, the future is challenging this program.

Created Understanding and Reflections

Recall here, the goal of the study was to provide a description of the Challenge Grants program developers' assumptions about this program's

development aimed at assisting with planning an informed and meaningful evaluation, in line with current standards for conducting program evaluation (American Evaluation Association, 2004). The oral history study was the means toward this end: to depict the Challenge Grants program's historical portrait and to describe this program's underlying mechanisms in view of the developers' experiences.

As with most oral history projects, I have learned and documented more than can be utilized for a single purpose—even one as rich as that for the production of a program theory. Considering the evaluator's need for a parsimonious road map, I have mapped several components of the Challenge Grants program's theory in the form of sequentially logical statements (Weiss, 1998; see also Chen, 2005; Stame, 2004). All together, or in various combinations, the components explain how and why the program was expected to bring about its effects given its historical context (Louie & Guthrie, 2007). An evaluator would be able to use the components as a set of testable hypotheses, toward which data gathering would be directed. The following summarizes only potential points of departure, i.e., the Challenge Grants program's theories. The theories were developed retrospectively to capture the assumptions that went into this program development.

Discussion of the HEC's program theory for evaluation

In light of my understanding of the Challenge Grants program historical perspective, the development of the Challenge Grants program was part of a wider social process of change. This process was initially driven by the growing awareness in society of the weakening position in attracting, recruiting and educating an adequate number of well-educated professionals and scientists to lead the nation's advancements in the food and agricultural sciences. Once this awareness became a believed need within the wider "social consciousness," it released social energy and will for a pioneering effort that was taken by a small team of individuals. This team built coalitions, developed strategies, created infrastructure, identified critical needs in the production of "society ready students," and fashioned a program of action to

strengthen institutional capacities in undergraduate education in the food and agricultural sciences, broadly defined.

Despite the existence of social awareness, validated needs, and the pioneering efforts of a small team of committed individuals, it took more than a decade for the Challenge Grants program itself to become a national priority to stimulate the institutional change process in higher–education. When the program was translated into legislation and finally funded, the basics for achieving social change were in place. But the process further required the development of the program’s right structure and process to release and harness the creative energy and ideas of concerned stakeholders who ultimately were responsible for improving agricultural educational programs and producing enough well–educated professionals and scientists capable to compete globally.

The meaning of the Challenge Grants program’s name is to create a two–fold challenge. The first is to challenge Congress to support agricultural education. The second is to challenge the land–grant institutions to develop high quality educational undergraduate programs in the food and agricultural sciences. The Challenge Grants program’s rationale is to “help to ensure an adequate supply of society ready graduates.” The program was authorized by Congress to provide competitive grants to colleges and universities to promote and strengthen food and agricultural undergraduate teaching programs through:

- enriching curriculum to meet the needs of future professionals and scientists;
- advancing faculty development to better serve students’ educational needs;
- introducing innovative instructional delivery systems;
- expanding experiential learning opportunities for undergraduates, and
- utilizing new strategies for students’ recruitment and retention.

The Challenge Grants program encourages colleges and universities to stretch themselves to provide quality education necessary to produce graduates at the forefront of agricultural science and technology. The program requires cooperation for long–term institutional commitment to continued improvements in undergraduate education to meet the current and emerging changes in agriculture.

In order to achieve its goal, the Challenge Grants program strives to be true to its mandate and be trustworthy given the limited resources and operational constraints. In order to create a supportive environment, the Challenge Grants program stays engaged with and maintains its relevance to the agricultural community. In order to address its overall rationale, the Challenge grants program keeps current knowledge of its areas for funding.

My understanding of the Challenge Grants program developers' motives and actions enabled me to articulate the following theories of change also referred to as chains of positive consequences that emphasize the stakeholders' responses to this program's intentions.

1. The availability of funding through the Challenge Grants program to support the improvement in undergraduate education would stimulate the faculty in universities across the country to develop and prepare well-developed proposals that incorporate their creative ideas. If awards were made, faculty would implement their projects. These projects would then generate many activities resulting in curriculum improvement, faculty development, experiential learning, and ultimately quality graduates.
2. The competitive funding mechanism incorporated into the Challenge Grants program would attract innovative institutions interested in developing programs around the creative ideas of their faculty. These innovative institutions would be willing to support their faculty by committing institutional (state) funding to meet the matching requirement. If projects were funded and implemented, then these institutions would be interested in incorporating these projects' results into their educational activities (e.g., curriculum), that it turn would lead to project institutionalization, and ultimately project continuation after the USDA funding ceases.
3. If faculty receive support from the Challenge Grants program their knowledge in teaching methods and students' learning would be advanced and through gaining new knowledge and skills, faculty would become more responsive in the area of instruction delivery and/or scientific instrumentation for learning.

They would then employ new methods of teaching their courses, leading to better student learning and ultimately resulting in higher quality students, i.e. students that would be highly competitive in the job market.

4. A peer review process would increase the ability of the Challenge Grants program to improve its evaluation criteria, criteria that would be stated in the Request for Applications, so that faculty could prepare the highest quality proposals. The peer review process would then be utilized to identify the best proposals (i.e., applications) out of those received in response to the RFA. Funded projects would then generate many activities resulting in curriculum improvement, faculty development, experiential learning, and ultimately high quality graduates.
5. The constructive feedback of peer reviewers would help to build the confidence and grant writing skills of those faculty who had submitted projects and that were denied funding. Faculty would be interested, rather than discouraged, in resubmitting their proposals. The reviewers' comments would assist these faculty to prepare better proposals that would have a greater chance of funding from USDA and from other external funders. If awards were made, faculty would implement their projects. These projects would then generate many activities resulting in curriculum improvement, faculty development, experiential learning, and ultimately quality graduates.
6. Success stories about projects funded by the Challenge Grants program would create interest among faculty in universities that had not participated or obtained this program's funding. This interest would lead to communication between faculty members at the different universities and the incorporation of developed materials and instructional methods into classes at unfunded universities, which in turn would lead to the overall improvement in undergraduate curriculum nation wide.
7. Networking with a wide range of stakeholders would allow program staff to learn about the needs of the agricultural community. This knowledge would then be used to upgrade the Challenge Grants program's areas for funding.

The program would then maintain its relevance to the food and agricultural sciences. More faculty would then be interested in applying for program funding. More creative ideas would be generated, and if funded, projects with these ideas would result in curriculum improvement, faculty development, experiential learning, and ultimately quality graduates.

8. Because program managers seek out and maintain relationships with a number of champions, a positive image of agricultural education would be created and promoted to potential students, their parents, and school teachers. Because agriculture has a positive image, prospective bright students would be interested in pursuing agricultural careers. Because bright students are interested in agriculture, they would enroll in universities. Because bright students enroll in agriculture educational programs, they would graduate and pursue professional careers in agriculture, ultimately minimizing the gap between supply and demand for graduates.

The role of the theories of change is to assist an evaluator with the development of evaluation questions. The evaluator then can discuss and prioritize questions with the program's staff. In light of the above articulated theories of change I have developed a set of questions that might be useful for an evaluator.

The questions include:

1. Short-term outcomes: What is the quality of the submitted proposals for the Challenge Grants program? What kind of applications (e.g., for what target areas, resubmissions) are received in different years? How many proposals does the Challenge Grants program receive? Who are submitting the proposals (e.g., type of institutions, faculty [at what stage in their careers])? Does the quality of resubmitted proposals improve? Do students' skills who enroll in new courses supported by the Challenge Grants program improve? What teaching and student learning methods are used by faculty supported by the Challenge Grants program compared to methods used prior to support? Does the Challenge Grants program meet the national needs in agricultural undergraduate education?

2. Long-term outcomes: What is the number of graduates with majors in the food and agricultural sciences? What is the number of new majors? Are employers' satisfied with new hires? What jobs are available for students? What jobs do the students take?
3. Project continuation and replication: Are projects supported by the Challenge Grants program incorporated into the institutional curriculum? Do other universities (faculty) learn about and adopt results generated by projects supported by the Challenge Grants program? How do other universities (faculty) learn about and adopt results generated by projects supported by the Challenge Grants program?

Reflective post-note

The narratives for this study were generated from the field of practice. All four participants are educated and still working within the field. They occupy (ed) management positions. Each participant had his or her own set of values within which the story was narrated and within which recalled images continue living after the interviews were completed. Reading and writing were my ways of understanding the participants' stories. In the act of reading, I imposed my views. In other words, I took the authors' images out of their political contexts and re-organized them into a story in my own style within the specific context of this study. And although participants consented to participate in the study, there is a possibility that they may disagree with my understanding of the HEC savvy, if they read this manuscript.

Further, while developing my meaning, I had to distinguish among the authors' voices. For example, the authors' stories were not equal. They resembled the hierarchy of the authors' past relationships, specifically manager-subordinates. I also looked at the same narrative differently depending on the reading question. In the end, I reorganized segments (excerpts) in the authors' narratives to meet the study purpose (i.e., stories development to depict the HEC's intentions). Therefore, it is my, the researcher's, obligation to assume responsibility for the re-created

“authoritative” understanding by attending to my conceptualization of the study and admitting potential disagreements from the participants.

Methodological considerations

One of the considerations related to sending the original transcriptions to the participants. Specifically, I conceived this study as narrative analysis. Although narrative interpretations are grounded on the presumption of “the reciprocity of intentions” (Ricoeur, 1976, p. 16), Czarniawska (2004) argues that sending the transcripts of the interview to the interviewees is a risky procedure because of “distanciation concerns the intentions of the speaker and the inscribed speech” (p. 70). Sharing this view I, at the same time, felt obligated to send the transcripts to the participants because I had made a promise to them that I would do that. This was my decision as a researcher. People came first, and dealing with methodological consequences came second to me.

In addition, oral history relies on people’s memories. While some events might have been remembered accurately, others potentially could have been remembered only vaguely. Further, remembering could be natural, intentional, and/or a trivial process. For example, participants might have taken their experiences for granted and/or thought of events as insignificant. In this case, it is possible that not describing some events was either natural or trivial to them. However, not mentioning could also have been political. Hence, there is always variability in remembering particularities within an event and/or a series of events that took place in the past.

Further, evaluation is the field of exploration into the worlds of others. The ultimate goal of any exploration is “to achieve perspectives on one’s own perspectives taking” (Tierney & Gee, 1990, p. 206). Reading is one of the evaluation essential activities. This activity involves engagement in the world of the program’s text. Reading must be viewed as a negotiation. Within this view, reader–evaluator becomes a co-creator of the program’s meaning “using her own experiences to supply the building blocks for these others worlds” (p. 205). Therefore, the

evaluator's past experiences and knowledge will have an impact on engagement and, ultimately comprehension and interpretation (Chelimsky, 1998).

In conclusion, the HEC developers' values identified within this research meant to inform the program's evaluation criteria and not solely form those criteria. Hence, the meaning generated in reading the HEC developers' narratives in the context of this study can be validated only according to its usefulness to this program (Hunt, 1990). Potential importance of this study for the field of evaluation could be in the detailed explanation of procedures used to describe the Challenge grants program underlying mechanisms, ultimately making the research "more open for scrutiny." Leeuw (2003) argues that this is critical "because mis-reconstruction of policy and program theories is dangerous" (p. 5).

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CHAPTER 4. COHERENT DEPICTION OF THE CHALLENGE GRANTS PROGRAM'S THEORY AND RECOMMENDATIONS FOR EVALUATION

Leeuw (2003) suggests that what is really needed in the field of evaluation, which is practical, is to focus on methods that could be used to articulate “underlying theories when they are not already made explicit by stakeholders themselves” (p. 6). Specifically, what is of interest is the process of how a program’s underlying mechanisms become known by utilizing a particular method. The intent of this research was to meet this need. Specifically, the goal of this research was to construct a coherent depiction of program theory of a competitive grants program by examining commonalities between two theories, which were articulated using two distinct methods conceived as separate studies.

To recall here, the researcher studied the Higher Education Challenge (HEC) grants program, also known as the Challenge Grants program. This is a competitive grants program that has been funded by Congress since 1990. When the study started in summer of 2004 there was no readily available explicit description of underlying beliefs in why the HEC grants program (e.g., availability of funds, employment of competitive funding mechanism, stipulation for matching funds, utilization of a peer review process, interaction with stakeholders, and requirement for attending project directors meetings) would affect outcome (i.e., strengthening higher education capacities). The researcher employed oral history and content analysis (CA) for the purpose of examining the HEC program’s underlying assumptions to support evaluation. At the time of the study, neither method was commonly used in program theory–based evaluation practice.

The objective of the oral history study was to understand the rationale for the way the program was structured and operated in historical view. The emphasis was on *why* and *how* the HEC developers thought this program would bring about improved effects in agricultural education. The obtained description of the program’s theory put emphasis on the responses of the HEC’s constituents (e.g., project directors [PDs], higher education institutions, students) to program’s intentions. CA,

on the other hand, determined the changes and continuity in the program's emphasis during the study period, which was from 1995 to 2005. The focus was on understanding *what* was emphasized over time by analyzing this program's Request for Application (RFA) texts. The produced description of the program's theory speaks to the program's actions. Hence, each description was a different way of conceptualizing the HEC program's theory within each method's specific attributes.

Both descriptions are summarized in Table 1. Column one contains a summary of the HEC's program description obtained in CA. Column three provides a summary of the HEC's program description derived from oral history interviews. In addition, column two highlights commonalities between the two theories. Commonalities were understood as the core aspects of a coherent description of the HEC's program theory. The analysis of the two theories follows.

Table 1

HEC's program theory descriptions from content analysis, oral history, and both studies

| Content analysis (CA) | Both studies | Oral history (OH) |
|---|--|--|
| <p><u>Identified eight characteristics:</u> Consistent emphasis on (1) encouraging creativity in project development, (2) implementing a peer review process for evaluating proposals, and (3) defining clearly the program's rules and requirements for potential applicants. Continuous increase in emphasis on (1) openness for feedback, (2) the areas of funding importance, (3) funding availability in given year, and (4) opportunity for sharing project results. Continuous decrease in emphasis on the HEC program's leading position in advancing agricultural education.</p> <p><u>The HEC's program theory:</u> Three strategic objectives – the HEC steady core: The continuity of the HEC program appears to be based on its ability to encourage PDs to think creatively as they develop their project ideas in response to identified educational needs in the food and agricultural sciences. The “enabling creativity” strategy is the HEC's critical competency on which the other two strategic objectives are built. Specifically, the program incorporates a peer review process as its essential component to (a) evaluate projects that are submitted for funding and</p> | <p>Encouraging “creativity” (CA) ⇔ “stretching” (OH); “Implementing a peer review process” and “defining clearly the program's rules and requirements” (CA) ⇔ “developing a peer review process” and “improving program's procedures” in “holding true to its mandate” (OH). “Openness for feedback” (CA) ⇔ role of feedback in “holding true to its mandate” and “staying in constant contact and consultation” (OH). “The areas of funding importance” (CA) ⇔ focus on specific targets in “requiring cooperation for long-term commitment” and notion of “seed money” (OH). “Opportunity for sharing project results” characteristic of (CA) ⇔ PDs' annual/ biannual conference in “holding true to its mandate” (OH).</p> <p><u>Points where program's principles are captured differently:</u> OH: “requiring cooperation for long-term commitment” is grounded on “seed money” and “matching funds requirement” . CA: “matching funds requirement” is part of “define rules” (see Table B2, p. 207).</p> | <p><u>Depicted six intentionalities:</u> (1) encourage land grant institutions of higher education to stretch themselves, (2) require cooperation for long-term commitment, (3) hold true to its mandate, (4) plan strategically, (5) demonstrate its worth, and (6) stay in constant contact and consultation with its constituents.</p> <p><u>The HEC's program theory:</u> The goal of the Challenge grants program is to strengthen undergraduate educational programs that would enable the US institutions of higher education to produce world class students in the food and agricultural science. To achieve this goal, the Challenge Grants program (a) encourages colleges and universities to stretch themselves to provide quality education to produce “society ready” graduates and (b) requires cooperation for long-term institutional commitment. The Challenge Grants program perceives its role as being true to its mandate and being trustworthy to its constituents. To create a supportive environment, the Challenge grants program (a) stays engaged with and maintains its relevance to the agricultural community, and (b) keeps current knowledge of its areas for funding.</p> |

Table 1 (*continued*)

| Content analysis | Both studies | Oral history |
|--|---|---|
| <p>(b) identify those with greater potentials to meet agricultural education needs. Further, the program’s rules and requirements are well explained for potential PDs that, in turn, defines a programmatic framework and structure within which creative projects can be developed and recommended for funding. The combination of these three strategic objectives determines the steady core of the HEC program. Five tactics to support strategic objectives: The program gives the strongest increasing emphasis with time on openness, namely soliciting feedback from its stakeholders. The program gives substantial increasing emphasis with time on sustaining areas of funding importance to support projects. The program also gives considerable but lesser increase in emphasis over time on funding availability in a given year. Further, the program gives considerable, but least increase in emphasis with time on providing opportunity for project directors who have received the HEC’s awards to meet and share their projects’ results. Lastly, as one of its five tactics, the program gives decreasing emphasis with time on its importance in advancing agricultural education at the national level.</p> | <p>Commonalities:</p> <ul style="list-style-type: none"> • encouraging creativity and innovation; • implementing peer review process; • defining clearly program rules and requirements; • seeking feedback from the community; • emphasizing areas of funding importance (i.e., providing seed money); • requiring matching funds, and • initiating project directors annual/biannual meeting. <p>These commonalities comprise the core aspects of the combined HEC’s program theory.</p> | <p>To capture the developers “little logics”, eight chains of positive consequences are suggested. The chains of positive consequences are shown in Appendix D.</p> |

Note. HEC = Higher Education Challenge grants program; PD(s) = Project Director (s); RFA = Request for Applications.

Analysis of the HEC's program theories from CA and oral history

In oral history study, the researcher identified six essential intentionality's of the HEC's program theory based on reading the narratives of interviews with four participants who were involved with the program inception and implementation. The participants were also called the HEC developers. It appears that the HEC developers attributed the meaning of their experiences to (1) encouraging land grant institutions of higher education to "stretch themselves" to provide quality undergraduate education in the food and agricultural sciences, (2) requiring cooperation for long-term institutional commitment to continued improvements in undergraduate education to meet current and emerging needs in graduates capable of advancing the food and agricultural professional and scientific workforce, (3) holding true to overall federal mandate to be accountable, (4) planning program activities strategically to create a supportive environment, (5) demonstrating the program's worth by meeting the demand for and supply of trained professionals and scientists in the food and agricultural sciences, and (6) staying in constant contact and consultation with the agricultural community at large to maintain the program's relevance.

In the CA study, the researcher identified eight essential characteristics of the HEC's program theory. They included (1) encouraging creativity in project development, (2) implementing a peer review process for evaluating applications, (3) defining clearly the program's rules and requirements, (4) acquiring feedback, (5) maintaining areas of funding importance, (6) determining funding availability in a given year, (7) providing PDs with the opportunity to share their projects results, and (8) maintaining the program's leading position in advancing agricultural education. Further, the first three characteristics were defined as the HEC's strategic objectives that constituted its steady core, whereas the remaining five characteristics were identified as the HEC's tactics that the program utilized to support its three core strategic objectives.

It appears that the two theories express commonality in their emphasis on encouraging creativity and innovation in project development. That is, in the oral history study, the HEC program developers seemed to view innovation and creativity

in project development as the basis for improving the quality of undergraduate education. The “enabling creativity” was assumed by the researcher as the CA theory’s core strategy that constituted the HEC’s continuity.

Further, in the oral history study the HEC program developers felt strongly about acting responsibly and responsively by adhering to the federal mandate aimed at creating an effective administrative culture that would allow the program to bring about its positive effects. Developing a peer review process and designing the program’s procedures appear to have been the main strategies upon which the HEC grants program was built to become a program of integrity and trustworthiness. In the CA study, the researcher identified implementing a peer review process for evaluating proposals and defining clearly program’s rules and requirements as essential characteristics of the HEC’s program theory. The researcher assumed that these characteristics were the two strategic objectives that together with the “enabling creativity” strategy determined the steady core of the HEC program.

Therefore, it appears that the HEC developers’ core strategies designing the program in a way to enable creativity in project development, to identify the best proposals based on the review of merits of applications, and to help potential applicants to develop quality proposals that are relevant to the program’s purpose are captured and maintained in the program’s formal discourse, i.e. RFA as its foundation.

The HEC program developers emphasized the role of feedback as a way of being open and maintaining current knowledge of the program needs. In early years of the Challenge Grants program’s implementation, the RFA text did not have a formal provision for soliciting input from the program’s stakeholders. The program developers sought input by attending different professional associations’ meetings, participating in the discussions, reviewing various reports, and staying in constant contact and communication with the community. It appears that the Agricultural Research, Extension, and Education Reform Act of 1998 required the agency to request comments regarding the program’s RFA to be considered in the development of the following year’s RFA. A clause in this regard was made in RFA

texts. Articulating the HEC' program theory by analyzing the content of the RFA texts, the CA study depicted the strongest increase in emphasis on openness, namely soliciting feedback from the program's stakeholders. The researcher assumed that feedback was used to better explain what the program was looking for in project development to support the program's core strategy on enabling creativity, which appears to be consistent with the program developers' view.

In addition, requiring cooperation for a long-term commitment between (a) federal and state partners and (b) institutions of higher education themselves and outside groups capable of offering funding support, one of the developers' considerations was to keep the program priorities for funding focused on specific targets in order to meet national needs in agricultural education and strengthen the nation's food and agricultural professional and scientific workforce. In the CA's description of the HEC's program theory this position was captured by the researcher as an emphasis on the areas of funding importance. She assumed that these areas were the HEC's "real goals" upon which the program advised the potential applicants to focus while developing their innovative ideas. This assumption appears to be consistent with the program developers' intention.

In oral history, the meaning of initiating an annual or biannual conference of the project directors was to provide an opportunity for the program staff and project directors to interact and share results. The meeting also meant conducting in-depth discussions that were considered to be very effective in helping to learn about the projects' happenings and to assess the program's outcomes. To generate this kind of discussions the conference was kept small. In the CA's description of program theory, the researcher attributed a similar meaning to the project directors' conference.

There are a few points where the two theories capture the program's underlying principles differently. This difference is attributed to the specific nature of each study method. That is in the oral history study the narratives were composed in a story telling genre. It was the researcher who organized the participants' excerpts from interviews to explain the meaning of their experiences in why the program was

structured in certain ways. In CA study, the RFA texts had an established formal structure. Hence, the researcher was constrained by the formal language of the RFA texts in determining the HEC developers' intentions that comprised this program's foundation. Further, the focus of the CA was on "what" was emphasized in the RFA texts versus "why" the emphasis was made.

For example, requiring cooperation for long-term commitment the developers stressed that the Challenge Grants program was to provide a "seed money" type of support for innovative projects that were prepared in response to the program targeted needs. Further, the program developers utilized a competitive funding mechanism and "matching funds requirement" to encourage application for the HEC's awards among the most highly-qualified applicants and to provide "additional funds" to schools that were "willing to help themselves" aimed at sustaining improvements in undergraduate education in the food and agricultural sciences. In the CA study, the matching requirement was one of the descriptors of the RFA language that comprised the "define rules" characteristic of the HEC's program theory (see Table B2, p. 207). The competitive nature of the Challenge Grants program was assumed by the researcher as given by the program definition. The reason why and how the Challenge Grants program became competitive was not explored in the CA study.

Another area where the descriptions of the two theories differ is the meaning of funding availability in a given year. In the oral history study, the participants referred to funding availability in a given year as an outcome of the decision made by the Congress pertaining to the Challenge Grants program annual appropriations. The program implementation in a given year depended on the availability and the amount of funds appropriated. The participants tried to influence the decision by planning program activities strategically, engaging various constituents, and demonstrating the program's worth. At the program level, participants designed the program's language to be flexible in order to respond quickly to potential increases in funding by expanding the areas of priority. But they were not in control of the decision. However, when appropriations were made by the Congress, it became the

program's responsibility to manage the funds. Communicating to potential applicants about the program's fiscal level of commitment, what types of projects are sought, and what level of support is expected was important. Hence, in the CA's description of the HEC's program theory, the funding availability in a given year was captured as the program's increasing emphasis. However, this emphasis was understood as of lesser increase.

Further, the two theories diverge in articulating the Challenge Grants program importance in agriculture educational arena at the national level. In the oral history study, the HEC developers described mentioning and explaining the Challenge Grants program to faculty at various institutions in the program's first years of implementation. Defining the program's niche was critical to obtain and keep program funds coming during the years of its establishment. Participants further emphasized that the program was and remained the only one federal grants program that supported advancement in undergraduate education in the food and agricultural sciences. However, the analysis of the content of the RFA texts showed that the emphasis on the program's importance decreased over time. The explanation that the researcher provided describing the HEC's program theory in the CA study was that over the years the Challenge Grants program had achieved an established status as premier federal competitive grants program. Further emphasis in this regard might not have been needed.

In light of the oral history study, another explanation is that the participants cared deeply about the Challenge Grants program. Developing the program was a memorable professional experience in the participants' lives. In the participants' view the program "stirred the pot." It became a prototype program and paved the way for developing many other higher education programs in the USDA Office of Higher Education Programs. Hence, what one keeps close to the heart, one considers important.

In addition, the participants shared views about the importance of the program's outreach activities that were not in the RFA texts. For example, participants felt strongly about the need for program's champions to promote a

positive image of agriculture as a career path, attract bright and talented students to pursue agricultural education, and obtain an increase in funds for the program. Further, participants emphasized the importance of strategic planning that included defining the program's niche, conducting needs assessment, networking with constituents, and communicating with decision makers. These activities helped to build the HEC grants program structure that was then described in the RFA texts.

In summary, the highlighted commonalities between the two theories were associated with the developers' three core strategies (encouraging creativity, implementing peer review, and defining clearly program procedures) and supportive approaches (seeking feedback from the community, emphasizing areas of funding importance, providing seed money to support innovative projects, requiring the land-grant institutions to provide non-federal funds as part of their commitment to improvement in agricultural education, and initiating project directors annual/biennial conference). The combined description of the Challenge Grants program's theory follows.

Description of the Challenge Grants program's theory

The Challenge Grants program is a federal competitive grants program that was authorized by the National Agricultural Research, Extension, and Teaching Policy Act (NARETPA) of 1977. Funding for this program is appropriated in each annual congressional budget. First appropriations for the Challenge Grants program were made in Fiscal Year of 1990. The first Request for Applications was issued in the same year. The meaning of the Challenge Grants program's name is to create a two-fold challenge. The first is to challenge Congress to support agricultural education. The second is to challenge the land-grant institutions of higher education to develop high quality educational undergraduate programs in the food and agricultural sciences.

It is believed that the shortage of professionals and scientists in the food and agricultural sciences justifies federal involvement in education. The Challenge Grants program rationale is to help to ensure an adequate supply of "society ready

graduates.” The Challenge Grants program is identified as a strengthening grants program. Based on the developers’ assumptions that “modern updated curriculum” produce high–quality graduates and that “high class faculty” make continuous improvements in the curriculum, the goal of the Challenge grants program is to provide funding to strengthen the quality of undergraduate educational programs to enable the US land-grant institutions of higher education to produce world class students aimed at enhancing the professional and scientific workforce in the food and agricultural sciences through:

- enriching curriculum to meet the needs of future professionals and scientists;
- advancing faculty development to better serve students’ learning and educational needs;
- introducing innovative instructional delivery systems;
- expanding experiential learning opportunities for undergraduates, and
- utilizing new strategies for students’ recruitment and retention.

The Challenge Grants program is viewed as the key and only national federal grants program that provides support for the teaching community in the agricultural higher education system. Having program funds available, it is assumed that the faculty would consider the Challenge Grants program as “a vehicle and a real opportunity” to address educational needs and that faculty would be enthusiastic to participate in the program. Hence, the “purpose–in–life” of the Challenge Grants program is to serve as a stimuli and a force of change to encourage land grant institutions of higher education to “stretch themselves beyond their comfort level” by pursuing innovative and creative ideas in project development for the program’s funding aimed at improving quality of educational programs and faculty teaching skills.

Modernized curriculum, increased student enrollment, advanced faculty skills, and improved career opportunities for graduates via the Challenge Grants program’s support for innovative projects in the food and agricultural sciences constitute the “difference” that the program would make if successful. The program utilizes a peer

review process to identify projects that have a greater potential to succeed and add value to strengthening the quality of undergraduate education. It is assumed that the peer reviewers' constructive feedback would assist with the implementation of the projects that are funded and would encourage improvements and resubmission of proposals that are not funded.

Further, the program strives to clearly define its rules and requirements to help potential applicants to prepare proposals that are relevant to the program's main purpose and to assure that the program's funds are "being used wisely and for priorities" the Challenge Grants program is designated to address. Peer review process is used to improve the program's guidelines. It is assumed that the program is accountable for how it manages its funds, while the project directors are accountable for how they use the HEC awards to implement the projects.

In addition, the Challenge Grants program seeks input from the program stakeholders, broadly defined, about specific areas of priorities within the program's identified educational strategies. Seeking input is also a part of the Challenge Grants program engaging with its constituents and securing funding. The assumption is that if the program doesn't meet the needs of the community, it does not need to exist.

Having limited resources available, the Challenge Grants program is not designated "to solve all problems" in the field of agricultural higher education. The Challenge Grants program is meant to provide "seed money" for prototype activities that respond to the program's specific five targets. These targets are defined in the program's authorization act and represent the educational strategies aimed at achieving the Challenge Grants program goal. It is assumed that when the "federal government provides support for an initiative, it is essential that it responds to a national need." The initiative must be for the public good and relate to USDA mission.

Further, seed money is viewed as additional funds for competitive institutions that are committed to innovation and improvements. Considering many challenges faced by agricultural education, these institutions might not have been able to fully fund their innovative ideas from their own resources. However, if federal funds were

available, the institutions would most likely be willing to spend some of their resources to support these ideas. The matching funds requirement is viewed to stimulate increased activity and assure commitment on the part of the land-grant institutions toward continuous improvements in undergraduate agricultural education. Further, the innovative projects that are supported by the Challenge Grants program through the financial sharing commitment with the applicant-institutions are assumed to “become incorporated by universities, namely get institutionalized”, ultimately continue their life after the USDA funds cease.

The program employs the project directors’ annual or biannual meeting as an opportunity to share results with one another. In light of rigorous federal procedures required for any comprehensive evaluation (e.g., survey administration), the value of this event for the program is largely seen as the Challenge Grants program’s self evaluation strategy to gain informal information about “good and bad” practices and to assess outcomes of the program. Obtaining this kind of information requires in-depth discussions. The meeting is kept small intentionally. The meeting is also utilized to raise awareness about the program and its projects’ accomplishments by inviting representatives from the “decision making” influential offices, for example the Office of Management and Budget (OMB) and the agency’s budget office.

Recommendations for evaluation

Based on the above description of the HEC’s program theory, the researcher developed a set of recommendations that might be used for the evaluation of the HEC program in the future.

1. To address the impact of projects on education, the following question could be considered, “Have funded projects been effective in stimulating innovation and creativity to meet educational needs (state, regional, national, and international) in the food and agricultural sciences? A potential place for data collection might be the projects directors’ meeting. During the meeting, an evaluator might have interviews with project directors to learn about their views, expectations, and experiences managing their funded projects. The evaluator might also organize a

focus group with program staff and project directors as one of the conference sessions.

2. Addressing the program impact on innovation the following could be asked, “Do formal procedures (i.e., project administrative and financial requirements) have any effects on creativity while implementing the projects?” Sources of evidence might be interviews with project directors.

3. Faculty’s level of interest in the program is important. The greater interest indicates that the Challenge Grants program is meeting the needs of the education community. The evaluation questions might be:

“What kind of applications (e.g., for what target areas, resubmissions) are received in different years?” “How many proposals does the Challenge Grants program receive?” “Who are submitting the proposals (e.g., type of institutions, faculty [at what stage in their careers])? “

Potential sources of data collection are the agency’s records of proposals submitted for funding, discussions (conversations) with program staff, and interviews with members of the review panels.

4. One of the essential attributes of the peer review process is to send the reviewers comments to not only those faculty whose projects have been approved for funding, but more importantly to faculty whose project have been denied funding. The purpose is to encourage faculty to improve the quality of their projects and consider resubmission of their applications. The evaluator might be interested in asking:

“What is the quality of the submitted proposals for the Challenge Grants program (i.e., based on evaluation criteria and peer review scores)?” “Does the quality of resubmitted proposals improve?” “What percent of funded proposals are resubmissions in a given year?”

Potential sources of data are peer review documents analysis (after reviewers’ personal information has been removed), comparison analysis of projects submitted and funded in different years, and interviews with program staff.

5. At the universities' (awardees') level, learning how many formerly supported HEC's projects from a cohort of projects in a given year have been integrated into the institutional (departmental, interdepartmental, college wide) curriculum might yield useful information to assess this program potential impact on advancing undergraduate education. "How many projects from those projects supported by HEC have been institutionalized?" To answer this question would require designing a study to collect data, e.g., choosing cohorts, sampling projects in each cohort (depending on the number of projects funded), and planning fieldwork.

6. Examining whether or not HEC support (i.e., seed money) for prototype projects leads to the projects' further development (e.g., partnership building among institutions) and obtaining funding from other funding (federal and non-federal) sources (e.g., bigger grants in National Science Foundation) could help determine whether or not meeting the programs intentions of serving as a seed money source was successful. A question to consider could be, "What happens with projects when federal (HEC) support ends?" This kind of retrospective study could potentially assess the return on federal dollars investments in undergraduate education. A potential source of data gathering is to interview the project directors of completed projects.

7. Determining the quality of students who enrolled in courses that had been developed as result of projects supported by the Challenge Grants program could generate insights about this program's impact. The evaluation question might be, "Have the skills of these students improved compared to students who were not enrolled in these courses?" This study will require substantial financial commitment, time, and staff time to design the project, collect and analyze the data, and prepare a report. A related question might be, "Are employers satisfied with new hires?" The evaluator could interview (survey) the employers who hired the students.

8. Examining whether or not innovative ideas supported by the Challenge Grants were integrated into undergraduate educational system nationwide could be useful to assess this program's impact on strengthening institutional capacities. A question to consider might be, "Have other institutions adopted instruction materials

and/or learning modules that were developed as a result of projects funded by the Challenge Grants program?” To answer this question, the evaluator could first review the project reports to learn about what products were developed and then contact project directors who managed those projects to ask if they had shared or been requested to share their materials with other institutions. While interacting with these project directors, the evaluator might also collect the information on any publications and other outcomes that took place after the project’s completion. This information will contribute to the program’s knowledge base about its long-term outcomes.

The above set of recommendations address the HEC’s role in (1) responding to the needs of educational community, (2) stimulating interest in project development, (3) building institutional capacity, (4) improving students’ skills, and (5) encouraging knowledge dissemination.

Further, in light of the above provided description of the HEC’s program theory, the researcher identified a few indicators that might be used to measure the program’s effectiveness. That include:

Outcome 1: Faculty are interested in the Challenge grants program.

Indicator: Number of proposals submitted.

Outcome 2: Faculty’s grantsmanship skills improve.

Indicator: Quality of proposals.

Outcome 3: Projects supported by the Challenge grants program continue after the federal funds cease.

Indicator: Projects are incorporated into higher education curriculum.

Outcome 4: Undergraduate curricula in food and agricultural sciences improve.

Indicator: Number of new majors (minors).

Outcome 5: Graduates skills are improved.

Indicator: Employers' satisfaction with new hires.

Outcome 6: Faculty are keeping pace with advancement in the field (pedagogy).

Indicator: Learner centered approaches to teaching.

Outcome 7: Students are choosing agriculture as a career path.

Indicator: Graduates with majors in the food and agricultural sciences.

Methodological considerations

The development of the above recommendations was based on the description of the HEC's program theory that the researcher articulated in light of the findings of both studies. Further, both studies were grounded on the HEC's historical view, which may not "coincide well with the program reality as it exists at the time of an evaluation" (Rossi, Freeman, & Lipsey, 1999, p. 164). The HEC program staff might have different perspectives regarding how the program is achieving its results. The HEC's program theory obtained in this research might be helpful to identify potential discrepancies and discuss "why", if any, might be the case. Hence, the evaluator is advised to further discuss the HEC's program theory with the program staff to learn about their views on the theory obtained in this study, including developing and prioritizing evaluation questions.

Implications for agricultural education

The HEC program provides competitive funding to higher education institutions to strengthen agricultural education and produce quality graduate students. Maintaining this program is critical to Iowa State University College of Agriculture, in particular, and other colleges and universities in need of funding to improve their agricultural education programs.

Evaluation of the HEC program is essential to identify how and why the program is contributing to the goal set for it. The main premise of this research is

that theory-based approach enhances the quality of evaluation. This research developed a framework for designing a more informed evaluation grounded on the programs historical context and its developers' assumptions of why the program would affect its outcomes. An evaluation based on these research findings will lead to a more comprehensive understanding of the HEC's performance and guide potential improvements in this program, promoting its sustained existence.

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**APPENDIX A. INNOVATION FUND FOR THE COOPERATIVE STATE
RESEARCH, EDUCATION, AND EXTENSION SERVICES, U.S. DEPARTMENT
OF AGRICULTURE**

Project Description

Title: Constructing a Program Theory to Support Program Evaluation of the CSREES Higher Education Challenge Grants Program

Purpose

Greater emphasis on accountability, oversight, and management of public funding is stressed by the federal government today aimed at enhancing responsible expenditure while ensuring receipt of intended results by intended users.

Performance-based funding is the reality within which competitive programs currently operate. The availability of "... timely, technically sound information for legislative oversight, for program management, and for public awareness... ." is becoming crucial (Chelimsky, Cordray, Datta, 1989, p. 25). Evaluation has a pivotal role in this process.

The field of evaluation offers a wide range of theoretical approaches for program evaluation. Yet, argued by Bickman (1987) if used without consideration of the theory underlying the program, most likely they will produce short-term results. Reconstructing Program Theory is viewed as one of the approaches in evaluation to obtain better knowledge on how a particular program performs and what causes its intended and unintended outcomes (Leeuw, 2003). Christie and Alkin (2003) define Program Theory as an explicit model of how the program causes the intended or observed outcomes. It is the model in a sense that indicates the relationship by which program activities are understood to lead to the desired goals (Christie & Alkin, 2003). Under this approach the importance of shared knowledge and perspectives of stakeholders is emphasized.

A logic model that specifies the program flow of inputs, activities and outputs (Leeuw, 2003) implies that the output of a program depends on the input. If this assumption is true, then incomplete knowledge of the state of the program at its theory (conception) could easily translate to uncertainties and incompleteness in the outcomes. In other words, the output of the program is especially sensitive to its

input. Leeuws (2003) argues that while assuming linkages among the input and output, "...a program logic rarely outlines the underlying mechanisms that are presumed to be responsible for those linkages." In contrast, it is the program theory that helps reveal relationships among the project activities and most importantly *how* those activities contribute to its impact that, in turn, leads to the intended and unintended program outcomes.

CSREES is more actively engaged in program accountability and evaluation than at any time in its history. Given the President's Management Agenda, understanding the relationship between what program is actually doing, how what is being done will have an impact, and how that impact relates to intended program outcome (Christie & Alkin, 2003) is pivotal to articulating success and sustaining funding. CSREES education programs tend to be broader in scope than research and extension programs, and are more difficult to align with a specific strategic goal or objective. New conceptual perspectives to program evaluation are needed.

The *long-term goal* of the proposed research is to develop a comprehensive strategy for a theory-based program evaluation. The *objective of this study* is to understand, systematically capture, and articulate a program theory of the Higher Education Challenge (HEC) Grants program in the context of program evaluation as perceived and understood by the prime stakeholders. The *rational of the proposed research* is that engaging the Project Directors (PD) of the HEC Grants Program and the National Program Leaders (NPL) at CSREES in a dialogue of exchanged meanings, lived experiences, gained knowledge, valued assumptions and shared beliefs will enhance contextualized knowledge of the program. It will further provide a much more holistic view of relations to be able to generate a common understanding of what the desired outcomes would look like and signify. The project director of this research is Prof. Bert Lynn Jones, Department of Agricultural Education and Studies. He has extensive experience in research and development of Performance Appraisal Systems, Continuous Process Improvement as a function of Total Quality Improvement, Organizational Recognition and Reward Systems, Whole Brain and Critical Thinking Processes in Adult Learning, Impact Evaluation

and Strategic Management, and coordination of the statewide Extension Program Planning and Evaluation efforts.

To accomplish the overall objective of this study, the following five *specific aims* are proposed:

Specific Aims 1. Conduct both a qualitative, oral history interview with several higher education program “designers” at CSREES and a quantitative, higher education program official documents content analysis to discover the extent of inputs into the program, level of participation, nature of goals and activities, and themes regarding the HEC program concerns, expectations and new directions depicted from documents and interpreted through shared experiences of the program initiators. The underlying assumption is that themes from documents can serve as a credible source of information and help identify challenges of program operations. However, themes from documents do not necessarily reveal founders’ motivations, reasons that guided the program inception. The oral history will help to discover the HEC program designers’ subjective experiences and perceptions and will complement the findings of the content analysis of the official documents.

Specific Aim 2: Conduct an interpretive case study by interviewing the project directors of the HEC Grants projects at Iowa State University (ISU) in order to interpret, describe, and define HEC program theory conditions. The underlying assumption is that the case study, that will employ open-ended question interviews, will engage participants in a dialogue with the researcher and will allow the participants to talk openly about their experiences, feelings, thoughts and ideas related to managing the HEC Program projects.

Specific Aim 3: Conduct a survey using the Delphi technique with a panel of selected NPLs to elicit the panelists’ consensus about conditions that were identified during the interpretive case study, and to generate a listing of activities to each condition. A three round Delphi will be administered. The underlying assumption is that a set of conditions developed as a result of conducting the interpretive case study will benefit from a collective subjective judgment of an independent group of “experts”. Delphi is regarded as the most economical and cost efficient method of

soliciting expert opinion and arriving at the group consensus on the issue of a concern.

Specific Aim 4: Conduct a telephone survey with the Project Directors of the HEC Grants Program nation wide to verify activities and to weight those activities importance to the HEC Grants Program success. The underlying assumption is that soliciting opinion of a larger, diverse group of stakeholders who have no ties with the participants who took part in the interpretive case study and Delphi survey will provide additional context verification of PDs beliefs and engagement in each activity related to the set of conditions.

Specific Aim 5: Conduct a forth round of the Delphi survey with the panelists who participated in the first three rounds of the Delphi survey in order to assess the impact of each activity on the conditions that are assumed to mediate program success. The underlying assumption is that experts' participation in the final stage to determine what activities contribute to the established set of conditions will gain a more trustworthy understanding of the relationship. It will also allow an authentic verification of the researchers' findings on a derived measure of impact of each activity in each condition.

Significance

Program evaluation becomes especially challenging in a functionally integrated agency like CSREES. Even with now dated definitions of evaluation, (i.e. comparing evidence against criteria in order to form judgments), proof remains meaningless without a theoretical basis from which to establish criteria in the first place.

The study demonstrates the importance of articulating program theory in planning and implementing evaluation. Such contribution will expand the overall evaluation knowledge base about concepts and their interrelationships to produce generalizable findings (Bickman, 1978).

Research design and methodology

The proposed research study and related data analysis will employ a participatory research protocol using a combination of quantitative and qualitative methods to capture the complexity and diversity of processes embedded in the program theory of the HEC program (Creswell, 2003). A concept map diagram of mixed-methods design is presented in Figure 1.

Expected outcome

The intended result of this project is charting and articulating the HEC program theory and a HEC program logic model. This project will enhance internal CSREES partnerships between SERD/ Higher Education Programs and OA/Planning and Accountability, and will demonstrate the linkages between program planning, operations, and performance measurement. This understanding will improve the CSREES management of the relationships of the processes of input, throughput and output that make a competitive grants program viable and ultimately result in measurable impacts.

This research will also help clarify the relationships among the crucial activities of a competitive grants program, and how they contribute to the planned and unplanned consequences of the program performance over time. This knowledge will support the CSREES agency mission through enhanced program management, improved requests for applications, and better communication between National Program Leaders, those preparing applications, and funded project directors.

Timeline and key performers

This is a one year project. A timeline that the researchers plan to follow is provided in Figure 2. Prof. Bert Lynn Jones, Professor, Department of Agricultural Education and Studies, Project Director will provide oversight and research directions, and assist with the interpretation of results. Ms. Elena Polush, Graduate

Research Assistant, Department of Agricultural Education and Studies will collect data, conduct interviews and analysis, prepare and present results.

Dissemination

The researchers will maintain a continued interaction and share the progress and the research results of each phase of the study with the CSREES partners to receive a constructive feedback and input from the agency. The researchers will plan to make a final presentation of the research findings at the CSREES. The researchers and their partners at CSRESS will jointly prepare and submit papers for presenting the research findings at the professional meetings of American Evaluation Association (AEA) Association of International Agricultural and Extension Education (AIAEE). Publications in American Journal of Evaluation, Journal of International Agricultural and Extension Education will also be submitted.

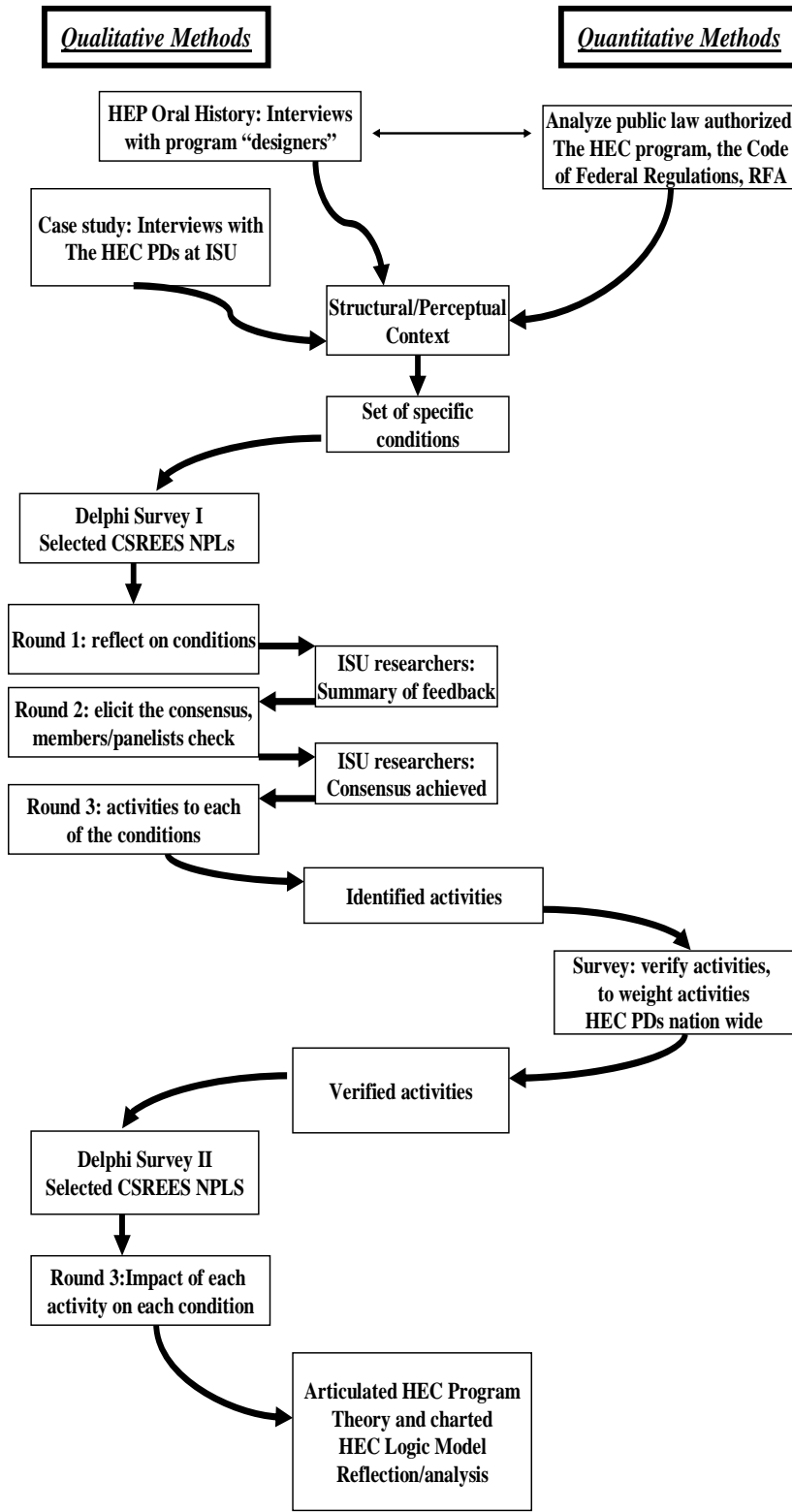


Figure 1: Concept Map of Mixed-Methods Design

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APPENDIX B. CONTENT ANALYSIS STUDY ADDITIONAL TABLES

Table B1
List of Collected HEC Official Documents

| Title | Type | Year | Source |
|---|----------|------|--------------------------|
| CSREES Living Science: Food, Agriculture and Natural Resources Career Brochure, Purdue University. | Brochure | 2004 | Agency personnel |
| National Initiative: A Vital Competitive Grants Program in Food, Fiber, and Natural – Resources Research, National Research Council. | Report | 2000 | Purchased by researcher |
| Employment Opportunities for College Graduates in the Food & Agricultural Sciences: Agriculture, Forestry & Natural Resources, Veterinary Medicine, Purdue University. | Report | 1999 | Agency personnel |
| Start with the Faculty: The Newark Faculty Alliance for Education and Systemic Education Reform, Dennis McGrath and William Van Buskirk. | Study | 1997 | Oral history participant |
| Education through Cooperative Extension, Brenda SeEVERS, Donna Graham, Julia Gamon, and Nikki Conklin. | Book | 1997 | Oral history participant |
| Colleges of Agriculture at the Land Grant Universities: Public Service and Public Policy, National Research Council. | Report | 1996 | Oral history participant |
| Policy Roundtable Series Higher Education And Global Development: The Look of Development Cooperation Ten Years Out: What New Roles for the State, Higher Education, Business and Industry, and the Community? Sponsored by Association Liaison Office for University Cooperation In Development and U.S. Agency for International Development. | Report | 1995 | Oral history participant |
| 1995 Farm Bill: Guidance of the Administration, U.S. Department of Agriculture. | Summary | 1995 | Oral history participant |

Table B1 (*continued*)

| Title | Type | Year | Source |
|---|------------------------|------|--------------------------|
| Investing in the National Research Initiative: An Update of the Competitive Grants Program in the U.S. Department of Agriculture, National Research Council. | Report | 1994 | Oral history participant |
| Investing in Our Future: Science, Mathematics, Engineering, and Technology Education, Federal Coordinating Council for Science, Engineering, and Technology. | Report | 1994 | Oral history participant |
| The Federal Investment in Science, Mathematics, Engineering, and Technology Education: Where Now? What Next? Expert Panel for the Review of Federal Education Programs in Science, Mathematics, Engineering, and Technology. | Report | 1993 | Oral history participant |
| Agriculture and the Undergraduate, Board on Agriculture, National Research Council. | Conference Proceedings | 1992 | Oral history participant |
| Invest in Success. Office of Higher Education Programs, Cooperative State Research Service, U.S. Department of Agriculture. | Brochure | 1992 | Oral history participant |
| By the Year 2000: First in the World, Federal Coordinating Council for Science, Engineering, And Technology Committee on Education and Human Resources. | FY 1992 Budget Summary | 1992 | Oral history participant |
| Research Agenda for the 1990s: Midterm Update of the Strategic Plan for the State Agricultural Experiment Stations and the Cooperative State Research Service, Planning And Budget Subcommittee of the Experiment Station Committee on Organization and Policy. | Report | 1992 | Oral history participant |
| The National Education Goals: Building a Nation of Learners, National Education Goals Panel, and Governor of Colorado. | Executive Summary | 1991 | Oral history participant |
| Focus 1988: Proceedings of a National Symposium Honoring USDA Food and Agriculture Sciences National Needs Graduate | Symposium | | |

Table B1 (*continued*)

| Title | Type | Year | Source |
|--|--------------------------|--|---|
| Fellows, National Research Council. | Proceedings | 1989 | Oral history participant |
| Educating the Next Generation of Agricultural Scientists, National Research Council. | Report | 1988 | Oral history participant |
| Operation Change: Developing Human Capital to Secure American Agriculture, Subcommittee on Strategic Planning for Higher Education. | Report | 1988 | Oral history participant |
| Human Capital Shortages: A Threat to American Agriculture: A National Higher Education Agenda to Develop Scientific, Professional, and Managerial Expertise for a Strategic U.S. Agriculture, U.S. Department of Agriculture and National Association of State Universities and Land-Grant Colleges. | Report | 1983 | Oral history participant |
| Request for Application: Higher Education Challenge Grants program for FYs: | Application Solicitation | FYs: 1995 1996 1998 1999 2000 2001 2002 2003 2004 2005 | Agency personnel Researcher database |

Note: HEC = Higher Education Challenge (HEC) Grants Program; CSREES = Cooperative State Research, Education, and Extension Service; USDA = U.S. Department of Agriculture; FY = Fiscal Year.

Table B2

Themes Used in Content Analysis and Their Descriptions in the RFA Texts

| Problematics and Themes (i.e. data language) | Descriptions (i.e. natural language) |
|---|--|
| PROGRAM ATTRIBUTES | |
| Broaden term agriculture | Means basic, applied, and developmental research; includes extension and teaching activities; encompass agricultural, renewable natural resources, forestry, and physical and social sciences; comprises activities relating to the production, processing, marketing, distribution, conservation, utilization, consumption, research, and development; inclusive of programs in agriculture, natural resources, aquaculture, forestry, veterinary medicine, home economics, rural human ecology, rural economic, community, or business development; related closely allied disciplines. |
| Aspire quality | Serve as models; encourage innovative proposals; proposals focusing on multidisciplinary education programs; proposals demonstrating enhanced coordination; proposals address a single targeted need area; proposals address multiple targeted need areas; proposals may focus on; proposals that are complementary in nature; encourage joint proposals; maximizing the use of limited resources; generating a critical mass of expertise and activity; increasing cost-effectiveness; achieving economies of scale, strengthening the scope; quality of a project's impact; promoting coalition building; likely to transcend the project's lifetime; lead to future ventures. |
| Provide funding | CSREES anticipates; approximately will be available; to fund applications in FY; the amount available for support of this program; the amount available for project grants; available under this program; in FY will be approximately; the total amount for Higher Education Challenge Grants; in FY is approximately. |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|---|---|
| PROGRAM ATTRIBUTES | |
| Leverage institutional resources | To formulate and administer programs in; to ensure a continual flow of; to provide students with; support education that. |
| Define rules | May request funding to support; expenses are acceptable; a grant recipient is required; match funds awarded on; must meet the definition of; grants may be awarded to; an institution eligible under this program; a funded project period should be no less than; a funded project period should be no more than; the maximum total funds are; the maximum funds that may be requested are; projects directed to (. . .) will not be supported; limits on the total funds that may be awarded; organization must have a demonstrable capacity for; organization must have a significant ongoing commitment to; proposals are restricted to; proposals are hereby requested from; intent to submit a proposal forms are; the beginning of the project period shall be; no later than. |
| Sustain changes | Student learning; instruction delivery system; faculty preparation; enhancement for teaching; curricula design; materials development; address the shortage; meet needs of industry; meet needs of academia in. |
| TARGETED OUTCOMES | |
| Attract talent | To attract high-caliber students; to promote the future strength of work force; to attract outstanding students; to increase the participation of students from; to enable students; to encourage students; to pursue and complete degree; to promote food and agricultural sciences higher education; to establish more effective linkages with high school science classes; to broaden awareness of the extensive nature and diversity of career opportunities for graduates; to prepare for careers as; to strengthen student recruitment; to strengthen student retention programs; capable of strengthening; increased skills; improved competencies; racial, ethnic, and gender diversity of the student body. |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|---|--|
| TARGETED OUTCOMES | |
| Improve curricula | To provide the quality of education necessary; to encourage the use of alternative methods of delivering instruction; to increase the quality of and renew the academic programs; improving new curricula; to provide students the necessary experience with suitable, up-to-date equipments; teachers are adequately prepared; teachers are highly motivated; using sound pedagogy; to motivate students to learn, retain, apply, and transfer knowledge, skills, and competencies; addressing the special need of particular groups of students; raising the level of scholastic achievement of the Nation's graduates; solving a higher education problem; extending learning beyond the classroom; incorporating the most recent advances; integrating and synthesizing knowledge from several disciplines. |
| Build infrastructure | Strengthening institutional capacities; maximizing program quality; reducing unnecessary duplication; promoting innovative approaches; broadening exposure to; recognizing and rewarding teachers; improving efficiency in classroom; improving efficiency in personnel resources; stimulating the development of; facilitating the use of exemplary education models; supplement resources; strengthening teaching programs; supporting acquisition of instructional laboratory and classroom equipment; supporting the development of courses of study, degree programs, and instructional materials; supporting the use of new approaches to the study of traditional subjects; availability of instructional instrumentation, facilities, computer services, library and other instruction support resources; the adequacy of institutional resources available; promoting education reform. |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|---|---|
| CSREES' ROLES | |
| Maintain program niche | Specific responsibility to; to strengthen college and university; make competitive grants to; one national initiative. |
| Establish merit review | Peer reviewers may be ad hoc; peer reviewers may be convened as a panel; represented by experts or consultants; qualified by training and experience; give expert advice on; names of the reviewers will not be released to; extreme care will be taken; to prevent any actual or perceived conflicts of interest; will be kept confidentially; reviewers are selected based upon; have training and experience in relevant fields; panelists cannot be identified with the review of any particular application; peer review panel will consider the criteria; peer review panel will consider weights; to evaluate proposals submitted; review panel selected and structured; to provide optimum expertise; to provide optimum objective in the evaluation of proposals; awards will be based on merit evaluation of proposals; evaluated by peer review panels and internal staff review; to review using evaluation criteria; to be reviewed competitively. |
| Assist institutions | Make grants; award administration; access to review information; provide agency personnel's contacts; provide information for; provide instructions; provide relevant (. . .) needed by institutions; provide information needed to apply to. |
| Acquire feedback | To solicit and consider input on; to solicit and consider input from; formulate future RFA's for competitive programs; comments will be considered; comment(s); requested from. |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|--|--|
| <p>CSREES's ROLES</p> <p>Develop review criteria</p> | <p>To receive consideration in the evaluation process; meet requirements to be technically evaluated by a review panel; screened to ensure; meet the administrative requirements; have potential for advancing quality of education; adequately addresses funding priority area; potential for addressing a state need; potential for addressing regional need, potential for addressing national need; potential for addressing international need; effectiveness of evaluation plan; potential for dissemination of the result(s) and/or products to other institutions; utilization by other institutions; soundness of the proposed approach; institutional commitment; institutional capability; innovative focus; multidisciplinary focus; overall quality of proposal; budget and cost-effectiveness; key personnel; proposed approach; cooperative linkages; dissemination plans; time line; plan of operation; evaluation plans; coordination; partnership efforts; continuation plan; product and results; objectives.</p> |
| Communicate | <p>CSREES will acknowledge; there is no commitment by USDA to; applicants are strongly encouraged; communication; comment(s); acknowledgement(s); please contact, acknowledgement will contain, acknowledged in writing.</p> |
| Provide opportunity to share | <p>Attend national Project Directors' meeting; allocate sufficient monies in the project budget to attend a project directors' meeting; to discuss project; to discuss grant management; to discuss opportunities for collaborative efforts; to discuss future directions for education reform; to discuss opportunities to enhance dissemination of exemplary end products/results.</p> |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|---|---|
| PDs' RESPONSIBILITIES | |
| Develop project outcomes | Demonstrate project's impact on; explain the methodology; determine the needs are met; describe data to be collected; describe data to be analyzed; provide an implementation plan for; result in measurable outcomes; ensure measurable outcomes ; impacts are assessed; the expertise and availability of human resources to conduct the evaluation; the adequacy of the evaluation strategy; the outcome assessment designed in such a way; the outcome measures provide an objective evaluation; the individuals involved in project evaluation skilled in; the outcome measures capable of; contain outcome measures; allow for continuous and/or frequent feedback; plan suitable for convincing a peer review audience of the accomplishment; contain a well-designed plan to evaluate results; the quality of outcome measures; provide a plan for evaluating the effectiveness of the end results; provide a plan for. |
| Measure program performance | General information on students; general information on faculty; institutional context; in-depth assessment of activities; standardized academic achievement test scores; grade point average; age; race/ethnicity; gender; citizenship; disability; career patterns; academic standing. |
| Enable creativity | Expand; obtain; work with; learn new applications in; work under; gain experience with; broadly define categories of; demonstrate how; develop new opportunities; utilize new situations; regionalization of academic programs; joint degrees; cross enrollments; faculty sharing; collaborations; address emerging clientele; involve a creative approach; new applications of knowledge; the introduction of new subjects; a creative use; promote. |

Table B2 (*continued*)

| Problematics and Themes (i.e. data language) | Description (i.e. natural language) |
|--|---|
| <p>PDs' RESPONSIBILITIES</p> <p>Require progress reporting</p> | <p>Submit initial project information; submit annual reports; submit summary reports; to be submitted through; to contain information specified in; accompanied by samples or copies of; document how project accomplishments have been; must be submitted to; must be submitted within; to submit summary evaluation reports; summary of project objectives; summary of project accomplishments; a description of; activities undertaken to; partnerships resulted from; collaborative ventures resulted from; future initiatives that are planned; the impact of the project on; data on project.</p> |
| <p>Use innovative teaching</p> | <p>Provide science-based knowledge; project must address; masters degree-level teaching improvement projects only in; move away from; move toward; should have broad-based applicability; beyond a single course; should emphasize; projects must strengthen; projects are restricted to; project must fall within.</p> |

Note. CSREES = Cooperative State Research, Education, and Extension Service; PD = Project Directors; RFA = Request for Application; USDA = U.S. Department of Agriculture; FY = Fiscal Year.

APPENDIX C. ORAL HISTORY STUDY PROCEDURES

C1. First Communication (via e-mail) With Participants in Oral History Study

Date: May 28, 2004

Dear Dr.

I am a doctoral student in the Department of Agricultural Education and Studies at Iowa State University, working under the direction of Prof. Lynn Jones. I am writing in reference to my dissertation research that I am planning to conduct in collaboration with CSREES.

The goal of my research is to understand, systematically capture, and articulate a program theory of the Higher Education Challenge (HEC) Grants Program. The program theory is a model that describes the HEC's conceptual underpinnings. I hope that my research will develop a comprehensive knowledge about the HEC grants program to further guide its evaluation.

The study employs both quantitative and qualitative approaches within a mixed methods design. Specifically, it consists of four methods: oral history, interpretive case study, Delphi survey, and the telephone survey. This research received funding from CSREES in the form of an internal Innovation Grant for FY 04. Drs. Henry Bahn, and Greg Smith are our CSREES collaborators.

As part of the oral history study, I would like to interview several people at CSREES who were involved in authorization and appropriation processes of the Higher Education teaching programs and later the HEC program. The purpose of the interviews is to learn about participants' experiences planning for and instituting the program.

You have been suggested to me as an individual to interview because of your knowledge of the HEC program. I would be happy to give you a call to discuss specifics of the research and my interest in your involvement with the oral history study. I also would be glad to share a copy of the written project proposal.

I will be looking forward to hearing from you at your earliest convenience.

Sincerely,

Elena Polush

C2. Oral History Interview Guide

- What was the purpose behind the HEC grants program from the very beginning?
- What was the surrounding situation at that time?
- In your view, what was the program charged to do in relation to that situation?
- What were the programs perceived needs? (*How were needs identified? How were they justified? What were the critical concerns?*)
- How were decisions made at the start of the program?
- What were the challenges? How were they resolved?
- What role/gap did the HEC grants program intent to fill?
- What was an anticipated (expected) impact of this program? Why did you think that what you planned to do would lead to, have an impact?
- What did you learn? Could you tell me three things that stand out for you, have meaning as it relates to the HEC grants program?
- Given a second chance how might you have differently approached the situation?
- What did you believe would be the best evaluation criteria for the HEC grants program?
- How were decisions made about developing HEC RFA?
- What were the program's relationships with other units in the agency? At what stages?
- What were you looking in the projects? What were the expectations?
- What were the perspectives on relationships between HEC program and its funded projects?
- How and what measures were considered to assess projects' performance?
- What were your thoughts about the program's evaluation?
- What kind of data were you considering to collect?

C3. Iowa State University Human Subjects Review

Date: July 15, 2004

Elena,

As a follow up of our conversation today, Diane Ament, Rick Sharp and myself have determined the study you have submitted for a determination is not human subject. If the project should change please contact us before any changes are implemented. Thank you for your assistance and it is certainly a pleasure to work with you.

With kind regards

Ginny Austin

-----Original Message-----

From: Polush, Elena Y [AEX S]

Sent: Friday, July 09, 2004 2:05 PM

To: Austin, Ginny [PRV/R]

Cc: Jones, Bert L [AGEDS]; hbahn@csrees.usda.gov

Subject: Re: or la history study

Dear Ginny:

Thank you for sharing your concerns. Perhaps, using the word "feeling" was an incorrect choice on my part.

I am researching the Higher Education Challenge (HEC) Grants Program, which is one of the CSREES, USDA competitive grants programs. Specifically, my interest is in what makes the program performs the way it does.

I have obtained legislative documents, which are public and are available on Internet. Documents are regarded as a credible source of information to identify goals and objectives of the HEC program. However, they (documents) do not necessarily reveal reasons that guided the program inception. That's why I am interested in talking to people who were involved in designing and implementing the HEC grants program. The focus of my interviews with those individuals is on

organizational and programmatic issues surrounded the HEC initiation.

Interview questions will be the following (worded similarly):

How and when did it all begin? What was the situation as it relates to the higher education in agriculture at that time?

What was the reason behind? What were the motivations?

Was there a need? What was the need? How was the need identified? How was the need justified?

What was the process associated with the program inception at that time? How were the decisions made?

What were the challenges? How were they resolved?

What role/gap did the HEC grants program intent to fill?

What do you remember the most out of that experience?

What was an anticipated impact of this program? Why did you think that what you planned to do would lead to, have an impact?

What are your stories of pride, accomplishments related to the HEC program?

Given a second chance how differently had you approached the situation?

Ginny, I hope that you will find this information helpful. I will be looking forward to hearing from you.

Wishing you a nice week-end,

elena

At 07:29 AM 7/9/2004, you wrote:

Elena,

Good morning, we are having some difficulty trying to determine if your study is going to need IRB approval regarding the surveys and questions. I have listed guiding criteria of what we will be looking at regarding surveys and questions. I hope this is helpful for you to try and explain to us what your research is about.

Also, when it is mentioned “how do you feel about” regarding something personal and to a greater degree, that may determine the study needs IRB review and approval.

Identifiable private information [through] *Interaction* [that] includes communication or interpersonal contact between investigator and subject. *Private information* includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example, a medical record). Private information must be individually identifiable (i.e., the identity of the subject is or may readily be ascertained by the investigator or associated with the information) in order for obtaining the information to constitute research involving human subjects

With kind regards

Ginny Austin
IRB Administrator
Iowa State University
2810 Beardshear Hall
Ames, IA 50011
515 294 4566 (T)
515 294 7288 (F)

APPENDIX D. CHAINS OF POSITIVE CONSEQUENCES

Encouraging schools to stretch themselves

HEC funds are available to support improvements in undergraduate education



Faculty are motivated to develop creative projects



Projects are funded



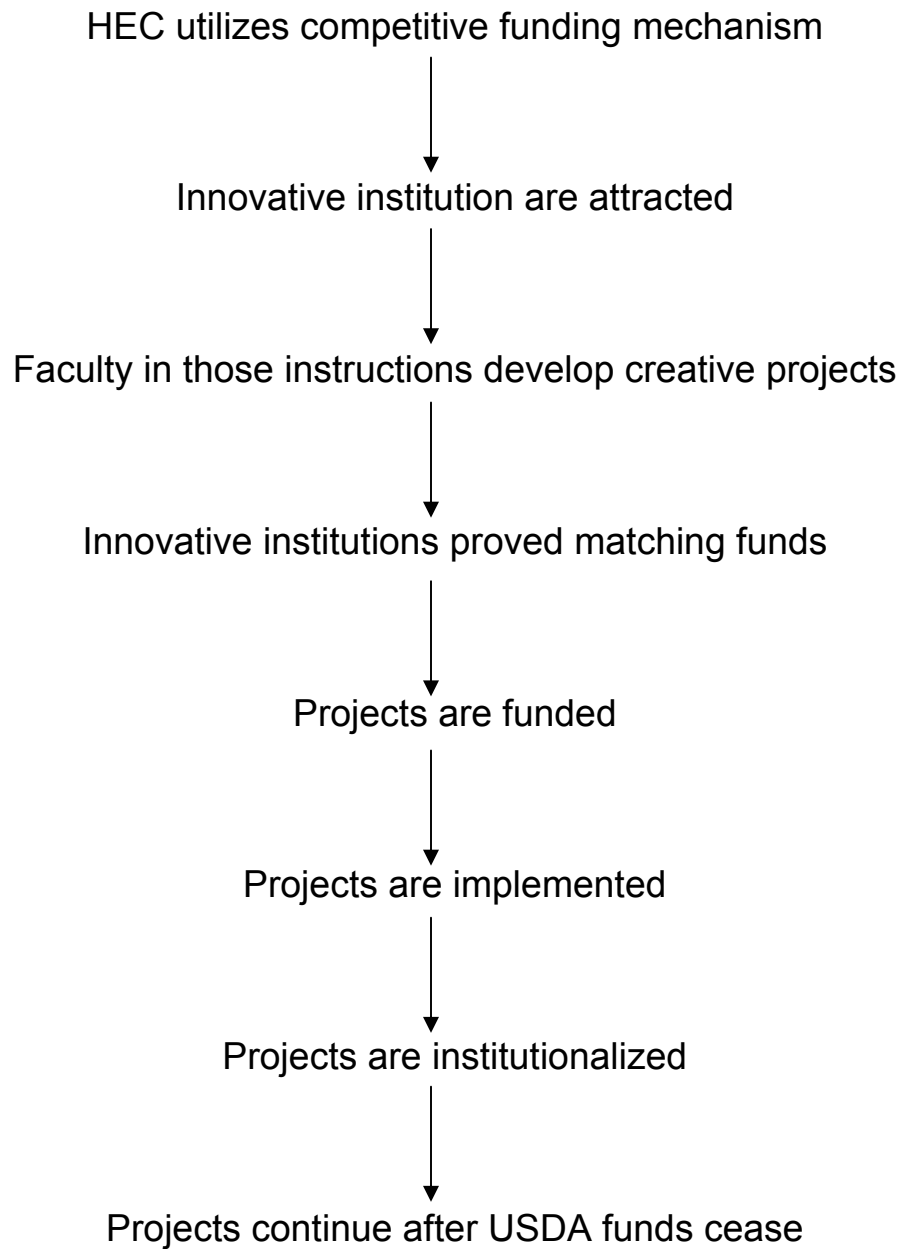
Innovative ideas are implemented



Curriculum, instructional delivery systems, faculty skills, and students' learning opportunities are improved



Quality graduates

Requiring cooperation for long-term commitment

Encouraging schools to stretch themselves

HEC funds are available to support faculty development



Faculty apply for funding



Faculty receive awards



Faculty gain new knowledge in teaching and students' learning



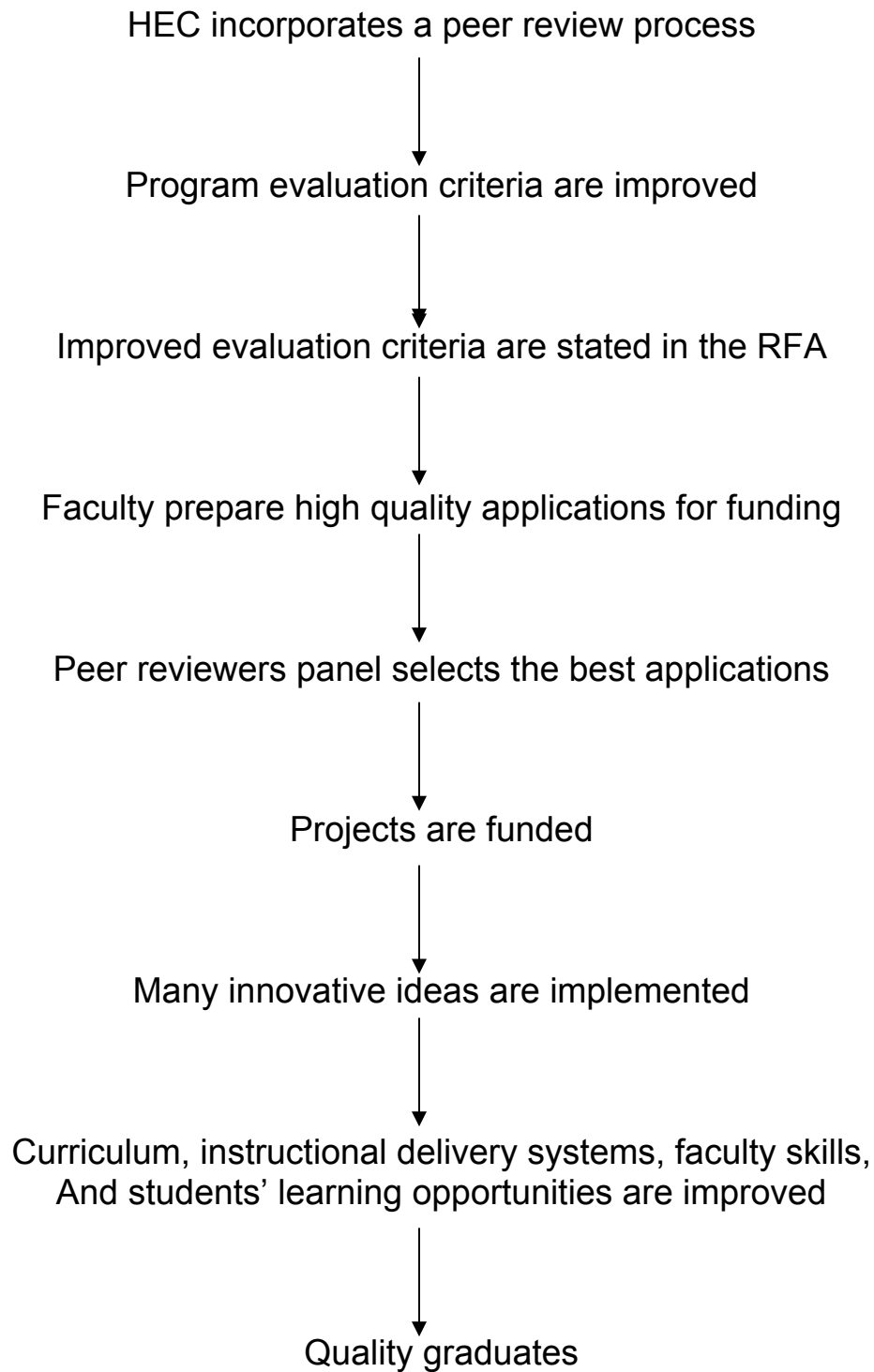
Faculty integrate their new learning into classrooms



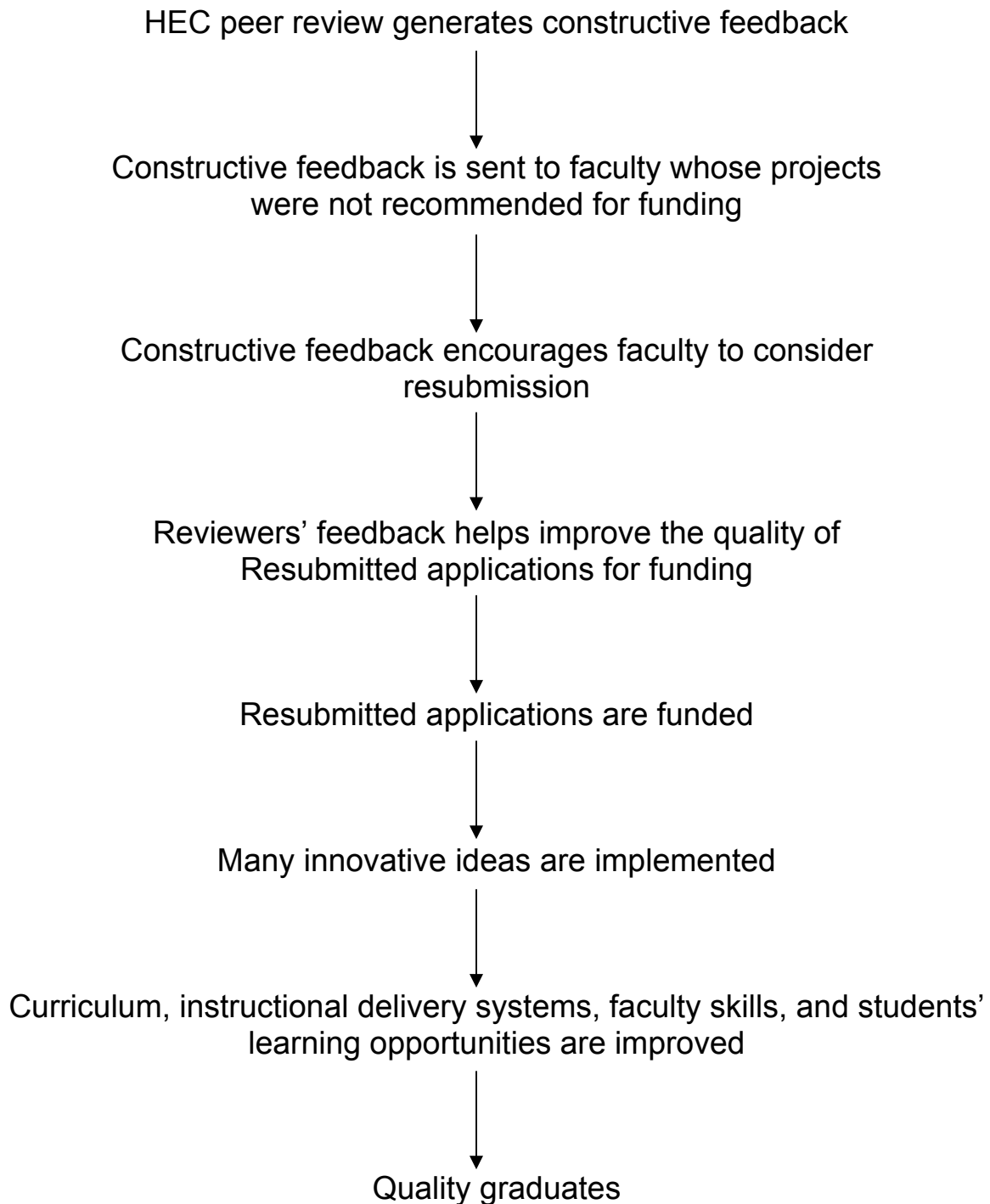
Students' learning and skills improve

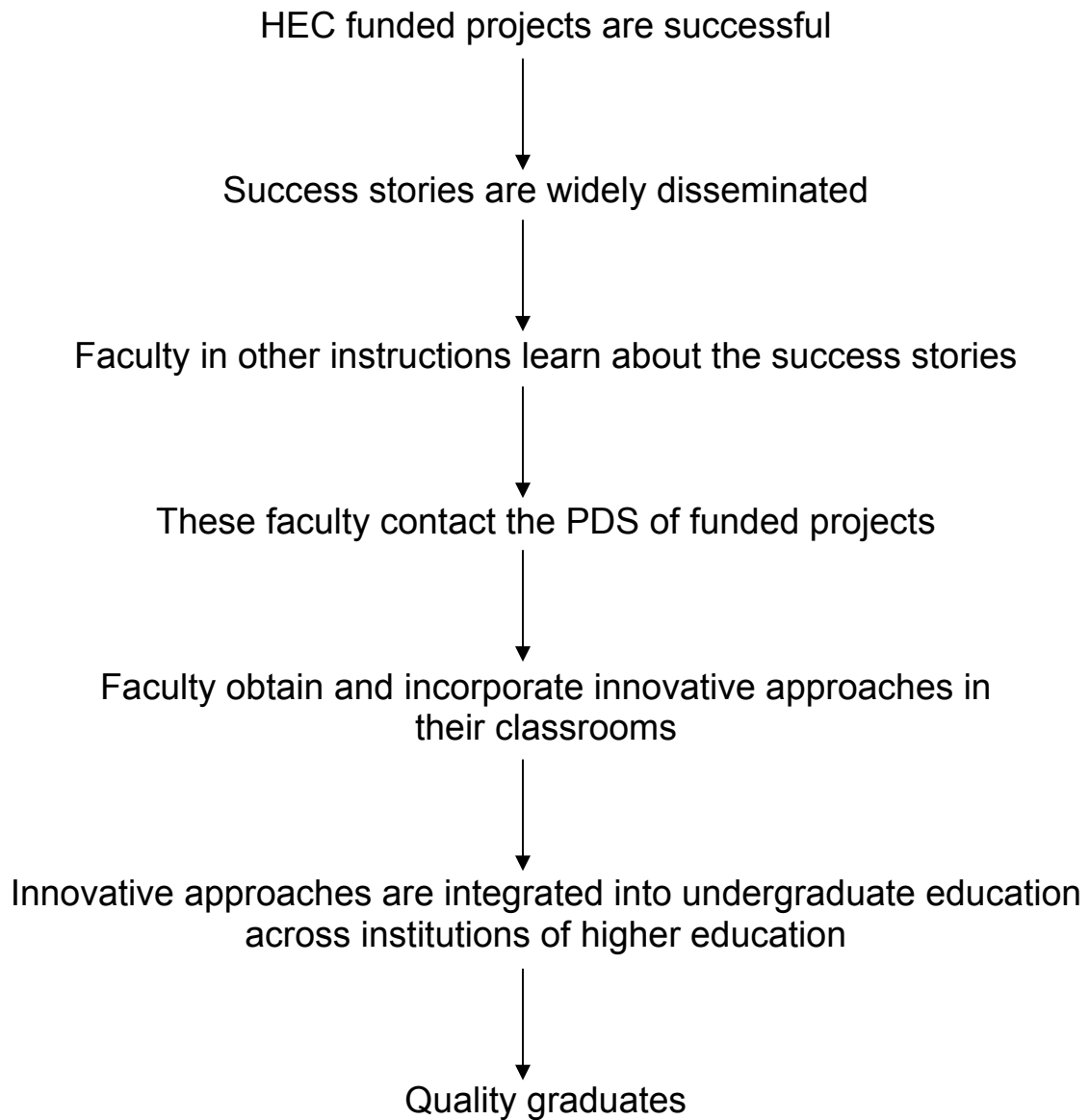


Quality graduates

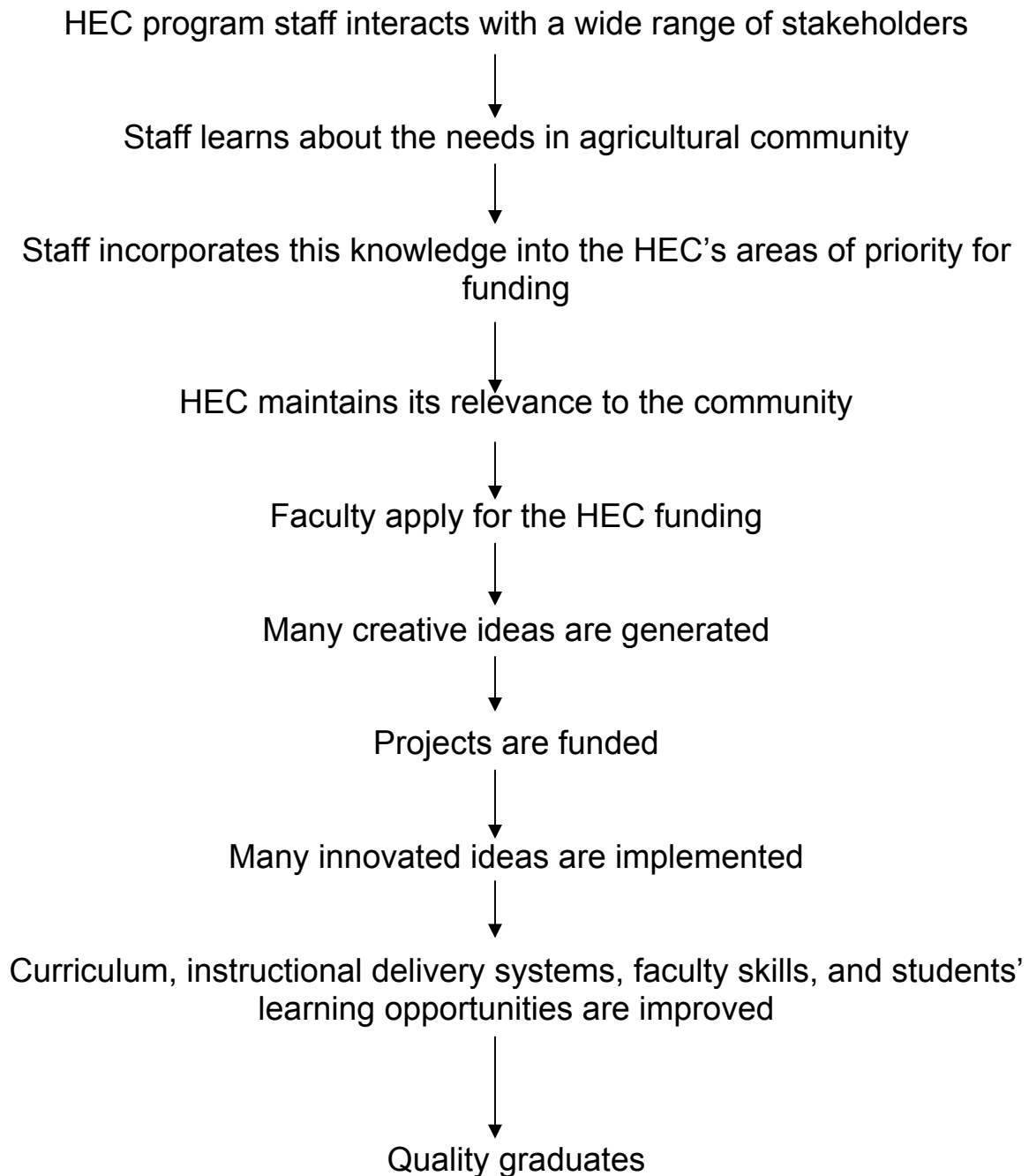
Holding true to its mandate

Encouraging schools to stretch themselves



Demonstrating its worth

Planning Strategically



Staying in constant contact and consultation