The Birth of a University Center at the University of North Georgia: The Use of Complex Adaptive Systems Theory as a Research Model in the Study of a Complex Policy Implementation

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ABSTRACT

The following research study was based on the need to offer a better method for assessing and directing public policy implementations. The foundational issue is the inability for governments at any level to implement intended public policy successfully. The intent of this research was to determine significant factors that affect policy implementation regardless of the outcome. Then to isolate these factors that either led to successful or unsuccessful implementation efforts.

The policy case study used was the building of a regional University Center by two collaborating Georgia universities, North Georgia College and State University and Gainesville College and State University, the UC400 project. Specifically, the case study analysis focused on the implementation of the technology infrastructure, which was part of the overall physical construction of the new University Center. The UC400 project began in approximately September 2011 and was completed one year later, August 2012.

A qualitative grounded-theory analytical method was used in the case study to capture interview and document data. The analysis of the data was done by the use of two models: one known in policy implementation research and the other a new social science model that is rarely used in this type of policy research. The former, contextual interaction theory, analyzes key decision-makers social interaction that occurs during policy implementation. The latter, complex adaptive theory, developed in the biological and physical sciences as a descriptor of the natural world, is used to describe natural behaviors in organized systems. The analysis in this case study uses a combination of both models to identify behavior characteristics found in highly complex implementations. One is a specific analytical assessment model of management behavior,
contextual interactive theory. The other is a much broader organizational analytic behavior model used to understand adaptive group behavior in complex environments, complex adaptive systems theory. The former is used as a subset of the latter. The results of this effort confirmed that these models can be used in conjunction to identify significant factors that produce positive or negative behavior patterns in policy implementations.
# TABLE OF CONTENTS

Chapter I INTRODUCTION ...........................................................................................................1

Problem Statement .........................................................................................................................1
Research Project Description .........................................................................................................2
Significance of the Study ................................................................................................................6
Nature of the Research Method ....................................................................................................9
Definition of Terms .......................................................................................................................12
Theoretical Framework ................................................................................................................17
Scope and Limitations of the Research Study .............................................................................17
Summary ....................................................................................................................................19

Chapter II LITERATURE REVIEW ..............................................................................................21

Research Study ...........................................................................................................................21
Theoretical Premises .....................................................................................................................22
Policy Implementation Research .................................................................................................23
Review of Management ...............................................................................................................31
  Theories of Management ............................................................................................................31
  Evolving Views of Management ...............................................................................................36
  Implementation Management Style ...........................................................................................38
  Complexity-Based Management ...............................................................................................40
Implementation Methods .............................................................................................................43
  Public-Policy Implementation Methods ....................................................................................43
  Information Systems ..................................................................................................................48
A Need for a New Metaphor .........................................................................................................57
Comparison of Research Findings with Existing Research.................................143
Theoretical Implications of Research Findings ..................................................148
Weak Points in Research Findings .......................................................................151
Research Study Findings Validation and Generalized Limitations ......................152
Findings that Support a Practical Heuristic Management Guide .........................155
Further Research Recommendations .....................................................................158
REFERENCES ........................................................................................................161
APPENDIX A: Evolution of Management Theories ..............................................177
APPENDIX B: UC400 Project Interview Form ......................................................181
APPENDIX C: Consent to Participate in Research .................................................184
APPENDIX D: Institutional Research Board Protocol Exemption Report ..............188
APPENDIX E: Letter of Authorization ...................................................................190
LIST OF TABLES

Table 1: Management–Individual Actor Dynamic Relationship Attributes of Complexity-Management Style .................................................................43

Table 2: Agile Manifesto Value Propositions.................................................................57

Table 3: Fundamental Components, Properties, and Characteristics of Complex Systems ......................................................................................................64

Table 4: Phases of Complex Behavior ............................................................................65

Table 5: Grounded-Theory Measurement Structure ......................................................83

Table 6: Concluding Premises and Characteristics........................................................85

Table 7: Case-Study Research Questions .......................................................................86

Table 8: Case-Study Research Questions .......................................................................97

Table 9: Demographic Profile of UC400 IT Project Team ............................................98

Table 10: Complexity/Complicated Attributes ..............................................................110

Table 11: CIT Model of Management Interaction ........................................................113

Table 12: Summary of CIT Model Finding .....................................................................119

Table 13: CAS Characteristics by Segment ..................................................................121

Table 14: CAS Summary Findings ..............................................................................139

Table 15: Management–Individual Actor Dynamic Relationship Attributes of Complexity Management Style ...............................................................156

Table 16: Triggers and Actions .....................................................................................157
LIST OF FIGURES

Figure 1: Contextual Interaction Theory Model .................................................................30
Figure 2: The Evolution of Management Theory .................................................................37
Figure 3: New Program Deployment and Implementation ..................................................39
Figure 4: PMI Basic Project Management Process ..............................................................46
Figure 5: Original Waterfall “Implementations Steps” .........................................................52
Figure 6: SDLC Iteration Methods ......................................................................................54
Figure 7: Various Agile Methods ........................................................................................55
Figure 8: Complex Adaptive System ..................................................................................66
Figure 9: Sample Content Frequency Analysis ...................................................................92
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DEDICATION

To my grandchildren.

Children are the world’s most valuable resource and its best hope for the future.

John Fitzgerald Kennedy
Chapter I
INTRODUCTION

Problem Statement

Over the past 40 years numerous studies have been published addressing the successes and failures of public-policy implementations. From Pressman and Wildavsky’s (1984) seminal 1973 study of a challenged economic development effort in Oakland, California, to the independent studies of Dawoody (2010) and Manna (2011) of the No Child Left Behind policy, they all contain a similar underlying theme that policy implementation has been conducted, is conducted, and will be conducted in highly complex environments. Additional research indicates that the number of complex efforts is increasing and the complexity within those efforts is also becoming very difficult to manage (Hupe 2011; Robichau and Lynn 2009; Hill and Hupe 2009; Dawoody 2008; Medd 2001; Mazmanian and Sabatier 1989). A subset of that research has identified that the behaviors of policy implementers within this difficult environment are contributing to the complexity. This ever-increasing level of complexity is taxing government’s ability to successfully implement policy at any level. This condition has led to significant monetary losses as well as lost opportunities. The intense dynamics of people interacting with other people and groups within a complex environment ultimately influences the level of complexity in implementation efforts which in turn affect the results. Indeed, this scenario is suggestive of a perpetual causal cycle.
This research study was proposed in consideration of these findings. The research clarifies the interpersonal dynamics and group relationships in a complex policy implementation. A selected case study in higher education is the setting. The results of the research help identify critical interpersonal and group behavioral factors and how they relate to complexity. The case-study analysis is an interpretative qualitative study using a grounded-theory method. The results of this analysis are a product of the combination of two behavioral theories. The first theory used to compose the analytical model is based on Bresser’s (2007) and Bressers, Klok, and O’Toole’s (2000) contextual interactive theory (CIT). This theory addresses the behavioral attributes of key actors tasked with managing the implementation effort. These actors can be at different levels of the organization’s implementation structure. The second behavioral theory, complex adaptive systems theory (CAS), is used to evaluate the entire complex implementation environment, including the management actors and the balance of the implementers, individual contributors, and the project groups or teams who develop and carry out the implementation effort (Curlee and Gordon 2011; Mischen and Jackson 2008; Owen 2008; Svyantek and Brown 2000; Sweet 1996).

Research Project Description

The case study used for this research is a technology project completed as a part of the University System of Georgia’s 2012 Consolidation implementation effort. Briefly, the case study consists of the cooperative actions of two neighboring universities, North Georgia College and State University (NGS) and Gainesville College and State University (GS). Together they collaborated with the city of Cumming, Georgia, to create a satellite educational site, University Center GA400 (UC400), to serve not only the city
but also Forsyth County and the surrounding communities. The origin of the collaboration agreement between NGS, GS, and the city of Cumming was the rapidly changing population growth patterns, both actual and projected. United States Census Bureau data predicted the population growth of the county would be 136.7% between 2000 and 2015. This rapid growth was attributed to the location of Forsyth County and the city of Cumming. This area was experiencing an accelerated job growth because a growing number of large and medium companies were locating in south Forsyth County, as well as neighboring Fulton and Gwinnett Counties. Given the growing number of jobs and subsequent population growth, the demographic projections indicated that the student population would grow from 25,000 to 75,000 between 2006 and 2020 (Flynn 2011). Given the current growth patterns and projects, the presidents of both institutions signed a Memo of Understanding (MOU) in 2004 (Gainesville College and State University 2004). Soon thereafter, both NGS and GS collaborated to offer courses in this rapidly growing area, several years prior to the 2012 statewide consolidation effort.

In early 2006, NGS began an MBA program in Cumming. In addition, a nursing program was hosted at nearby Lanier Technical College. GS also began to offer entry-level and general education courses in high schools within the city and county. However, both institutions and the local political leadership recognized that this configuration, although a good start, was not sustainable. In approximately 2010, the mayor of Cumming, H. Ford Gravitt, with leadership from NGS and GS devised a more permanent strategy to deliver educational services in the community. The result of that effort, detailed in a prospectus to the Georgia Board of Regents (BOR), was an agreement by the City of Cumming to set aside a four acre parcel of land adjacent to the GA 400 corridor
for the development of an initial education site and 26 acres for additional development (Flynn 2011). The development would include a new university center building that would allow NGS and GS to offer courses and programs to the citizens of Forsyth County and the contiguous counties.

The city also provided $3 million of seed money to NGS, the lead institution in the construction of the building. With further funding from other organizations and the BOR, the BOR approved the project in early 2011. The balance of that year was spent in architectural work, site planning, and bid management, with groundbreaking taking place in September 2011. At this point, NGS and GS would, as the MOU outlined, implement a collaborative educational program with classes to commence in 12 months. As part of the physical construction, the MOU required the design, construction, and implementation of an information systems infrastructure to be completed by September 2012. Given this task, a joint information technology (IT) project team was created to implement the IT infrastructure.

The initial objective of the joint IT effort was not to implement joint processes or infrastructure to be used by both institutions. Rather, the focus would be independent technology platforms that supported the programs and students from each respective institution, with NGS creating and supporting a common network. Therefore, students would only use desktop and classroom capabilities supplied by their respective institutions. Specifically six classrooms would be outfitted with an instructor workstation, in-class computers, projection equipment, audio-visual controls, and equipment, and selected printers. One classroom would be designated distance-learning capable with high-definition IP-based video teleconferencing equipment. This configuration would
have to support distance-learning needs across both NGS and GS campuses as well as the UC400 University Center, initially to support the NGS Nursing program. The computers in the computer lab would have to be networked to both NGS and GS, again supporting students from either institution. In addition, the IT infrastructure would have to support the University Center Library, testing functions, a business office, student services, and a faculty workroom. To do so would require the joint teams to interface with at least two to three outside vendors to install the fiber backbone services, cabling and other networking requirements (University System of Georgia 2010).

However, this design changed in January 2012 with the announcement from the BOR that NGS and GS would be consolidated into one institution the University of North Georgia, by January 2013 (University System of Georgia 2012). This required an immediate change to the original design on a project that was already on a very tight timeline. This also created increasing budgetary demands, but more significant was the interjection of organizational issues within the respective IT organizations and project teams. As a reflection of the concern and attitude of both the original and the now consolidated institutions, Mac McConnell, North Georgia Vice President for Business and Finance, stated, “This is easily the most complicated $7 million deal we’ve ever done. Our team and our partners at Cumming were committed to make it happen, and with some hard work and open minds, we were able to pull it together,” (Access North Georgia.com 2012, para. 4). The creation of this joint site and specifically the effort to design, build, and implement the information systems infrastructure serve as the case study in this research. Given the above characterization of this implementation effort, the IT project was an excellent case study since it was clearly completed within the context
of a highly complex, dynamic environment, a requirement as noted in the problem statement.

**Significance of the Study**

This study has several significant characteristics. In general, the study supports a renewed interest in the study of public-policy implementation while also testing certain assumptions about the implementation process. The foundational assumption can best be expressed as a research question concerning the identification and understanding of the drivers or influencers that enable implementation success or failure. While the following literature search will note that many drivers or influencers are discussed, two are the most consistently identified, management style and project methodology. A secondary assumption is that the influence of these two drivers increases as the implementation’s complexity increases.

Further, this research will contribute to the joint use of two complementary behavioral models to test these assumptions: the CIT implementation theory developed by O’Toole (2004) and Bressers (2007) and the CAS model to understand the internal dynamics of an implementation team. A subset of CIT will be used to determine the behavioral attributes of the implementation manager(s) other key actors. This behavior set is part of the larger implementation project where CAS will be the primary model determining the behavioral attributes of the whole effort. The two models’ analysis results will be correlated with each other and the combined effect on the implementation results.

In addition to validating and confirming the applicability of the two models as a means to understand the implementation process, the results of this research may provide
a preliminary structure for the creation of a practitioner’s guide. Not only is this last contribution relevant, but it also supports a resurgence of the use of pragmatic philosophy in public-administration research (Harmon 2006; Shields 2006).

Saetren (2005), in addressing the return to public-policy implementation research as a viable and important research area, points out that the research into public-policy implementation faltered during the 1990s for several reasons. First, theoretical notions lacked empirical support. Second, implementation researchers were demoralized because their work was often a study of failure. Last, the continued policy formation debate lacked theoretical creativity by continually addressing whether one approached the issue from a bottom-up or a top-down perspective. Saetren found that while the level of publication and interest in the host domains, political science and public administration, did decline, the level of interest in other areas was increasing. This increase was and is especially true in healthcare, environmental research, and education. Each of these disciplines experienced an increasing amount of research and publications concerning the implementation of policy and, in some limited studies, how public policy can be better understood by use of CIT–CAS models (“Evidence Scan: Complex Adaptive Systems” 2010; Diment, Yu, and Garrety 2009).

As stated earlier, this research makes a second contribution by evaluating a common denominator found in public- and private-sector implementation efforts: the validity of the continued use of a recommended methodology and management style in the execution of policy implementation. The methodology commonly used in the public sector is based on the structured linear method originally defined by Herbert Simon. Simon (1997), in his original 1947 edition of Administrative Behavior: A Study of
*Decision-Making Processes in Administration*, posits a decision-making process that could be adopted by both practitioners and academicians alike. The crux of the process is the use of the scientific approach to develop correct decisions or solutions in public policy. This work is still considered the foundation upon which managers derive and execute the best decisions.

Indeed, in a seminal work on a specific public works implementation, Pressman and Wildavsky (1984) make a similar observation that the optimal implementation methodology is a set of linear tasks managed by professional administrators directing unidentified individuals in the execution to these tasks according to a specific plan. Therefore, while other approaches to public policy have evolved, methods used to plan and manage the execution of policy implementation have not. The study of this combination of methodology and management style is a key part of this research. Indeed, Saetren (2005) and Hupe (2011) not only highlight the resurgent interest in the study of public-policy implementation, but also emphasize the importance of governments making correct choices within the context of how policy is carried out. Their point is that the quality of the policy is no better than the execution of that policy. Therefore, policy implementation is of significant interest to those who have concerns about policymaking.

The last significant aspect of this study is the introduction of complexity into the study of public-policy implementations. While complexity can be found in isolated research areas, such as healthcare delivery and higher education, its use in studying policy implementation in public administration is limited (Saetren 2005). The use of complexity and CAS in this case is limited to a specific aspect of an implementation: the technology component of the UC400 implementation. This component is important given
that today’s complex policy implementation is highly dependent upon the delivery of a technology solution (CIO.GOV 2012). Therefore, the study identifies the level of complexity the technology component created in the execution of the overall policy effort. To determine the complexity level study uses a joint CIT–CAS analytical model to understand the attributes and characteristics existing in this type of complex public-sector implementation in combination with a proposed but supported identification of complexity criteria (Diment, Yu, and Garrety 2009; Johnson 2007; McBride 2005).

The use of the joint CIT–CAS as an analytical model in policy implementation research is a contribution to the renewed interest in policy-implementation research. This contribution is particularly important given the current state of the literature on public-policy implementation. The approach also offers a minor contribution to the knowledge within policy-implementation networking research given that both analytical models conceptually define implementation as a network activity (O’Toole, Hanf, and Hupe 1999). In addition, the concept of individual and group networking is a common theme in the CAS model. Therefore, the following research and subsequent conclusion are presented as a contribution to both the research in policy implementation and the use of a combined CIT–CAS analytical model in the broader area of policy studies (Dawoody 2010; Saetren 2005; O’Toole, Hanf, and Hupe 1999).

**Nature of the Research Method**

The research is a phenomenological qualitative case study using a grounded-theory analysis. Several contributors to case-study research methodology have commented that the case-study method is often more art than science. The very same researchers have also commented that only through the case-study method will the
research more accurately reflect the subtleties of the studied subjects (Yin 2009; Stake 1995; Merriam 2009). Therefore, a very flexible creative method is needed to study the unpredictable and highly varied behavior within a chaotic or dysfunctional environment. While other qualitative methods such as surveys or questionnaires may uncover some of the idiosyncratic nature of dynamic behavior, the interpersonal interview with participants works best to validate the model components in the targeted behavior (Merriam 2009; Yin 2009; Rubin and Rubin 2005; Stake 1995).

The case study, aside from using the grounded-theory research approach, also used the interpretative method to support the use of the CIT and CAS models. This method is important because it is needed for direct and casual interaction with the participants, thus resulting in more precise behavioral analysis. Given the phenomenological nature of the research, the researcher must bracket or apply the *epoche* process in which the observer’s biases are identified to ensure the research effort is unbiased, thus reflecting the true nature of the participants’ and group’s reported behavior (Merriam 2009). In addition, the grounded-theory method was needed because of the organizational environment in which the implementation occurred. The analysis needed to address the metamorphosis of two working cultures into an emergent new culture. Therefore, the method required the collection of interviews and written communications from the team and management. The interviews and document review were coded into the CIT and CAS models as described in Merriam 2009, Mischen and Jackson 2008, Groenewald 2004, and Moustakas 1994.

Finally, the research method is a single case-study design that provided the opportunity to juxtapose two joint implementation teams within the same project.
environment and ultimately in a single organization (Yin 2009; Rubin and Rubin 2005; Moustakas 1994). Again, the juxtaposition is a result of each school’s creation of its own IT team to develop and guide the implementation of its individual system. However, because of a change in the outside environment, namely the school consolidation demanded by the Georgia Board of Regents, the two teams had to merge into one IT organization while completing the project. Therefore, the case will be treated as a single case-study design. Within this design approach, all interview data were collected using an open-ended interview template. No sampling was required because all project participants (key stakeholders, project leads and managers, and individual contributors) were invited to the interviews. The interview template was constructed to address the following items in each interview session.

- Current and past position in the organization.
- Role played and time on the implementation project.
- Description of the implementation process and how individuals worked.
- Overall personal history of the project.
- Personal evaluation of implementation results.
- General behavioral observation of all members during the project.
- Interpretation of implementation directives and parameters.

In general, the participants were allowed to provide a facilitated story of the project from their perspective. In addition, as part of the single case-study design and the grounded-theory method, a project document review and analysis was completed on all provided implementation directives and project materials from organization stakeholders, project management, and team membership.
The data-collection effort consisted of four steps. The first step was the construction of the interview instrument along with the analysis worksheets for the team’s written communications. The second component was the identification and the conducting of interviews with key stakeholders, project managers, leads, and working members of the respective teams. Most interviews were conducted one on one, but the needs of the analysis did require some dual or group interviews. All interviews were transcribed and coded. A third component, conducted in conjunction with the interviews, was a review and coding of any project documentation. As with the interviews, the documents were coded and aligned with the interview categories for evaluation by the CIT–CAS model. The coded data was evaluated using content relational analysis built around the joint model. This analysis helped describe the group behavior along cultural, social, political, and communication lines (Merriam 2009).

Definition of Terms

The first term to be defined is implementation in conjunction with a policy decision, direction, or statement. Mazmanian and Sabatier (1989) offer the following.

Implementation is the carrying out of a basic policy decision, usually incorporated in a statute but which can also take the form of important executive orders or court decisions. Ideally, that decision identifies the problem(s) to be addressed, stipulates the objectives(s) to be pursued, and in a variety of ways, “structures” the implementation process. The process normally runs through a number of stages beginning with passage of the basic statute, followed by the policy outputs (decisions) of the implementing agencies, the compliance of target groups with those decisions, the actual impacts—both intended and unintended—of those outposts, the perceived impacts of agency decisions, and finally, important revisions (or attempted revisions) in the basic statute. (20–21)

This definition emphasizes policy implementation as an extension of the policymaking process.
Hill and Hupe (2009) offer a similar, but much shorter, definition of implementation as a “stage in the policy process” that turns “policy intentions into actions” (7–8). Hill and Hupe do not see a continuum from policy setting to policy implementation, but they do see policymaking as process with distinct steps with implementation as a separate process step.

Palumbo and Calista (1990) further assert the distinction and see implementation “as a series of interactions” between the policymaker and the policy implementer or the targeted audience of the policy. This definition recognizes policymakers and policy implementers as separate actors with separate activities.

O’Toole (2000) makes the same distinction and notes a weak attachment between the intentions of government and those impacted by government decisions. The crux of the issue is whether implementation is an extension of the policy statement or a redefinition of the policy. In other words, that which is implemented is the policy regardless of the original intent (Hupe 2011; Lipsky 2010; Hill and Hupe 2007; Pressman and Wildavsky 1984). For this research, the act of implementing policy is viewed as a separate activity from the actual policymaking process.

The second term to be discussed is complexity as opposed to complicated. While the popular term “complexity” is used to describe a wide range of events or organizational configurations, complexity is used more narrowly for this study. As an example, the nature of complexity will be discussed in terms of continuous levels from noncomplex to highly complex. Williamson’s 2011 work on IT-project success and levels of complexity makes this distinction. First, he describes a low-complexity project as one that has a simple, well-defined solution, a relatively short timeline, minimal external
interruptions, and a very small staff. He classifies these efforts as “complicated or tame” with a low risk of failure. In contrast, many efforts contain a high degree of difficult functionality, have very long timelines, high-risk external influences, and input from multiple individuals or groups from various functional areas. In this latter case, Williamson defines these efforts as “complex” projects or implementations with a higher risk of failure.

Castejón-Limas (2011) and T. M. Williams (1999) categorize complex projects using levels of uncertainty measured by the number of functions to be addressed as well as the number of required feedbacks. The analysis for this study will use leveling as a means to evaluate the effectiveness of various methods and management styles.

In addition to using a mixture of the preceding definitional terms, the proposed study will also include criteria found in Rittel and Webber (1973) and later Conklin and Weil (1998) in the working definition of complex levels. Rittel and Webber and Conklin and Weil conceptually separated problems into “wicked” or tame by identifying additional and more specific classification characteristics. Thematically, these characteristics differ from those provided by Williamson in that the practitioner is unable to see their existence at the beginning of the implementation. However, as these characteristics manifest themselves, the management style of the practitioner and the methods used to direct the implementation will have to change with the level of complexity. Therefore, this research effort used a mixture of these criteria to evaluate the nature and level of complexity within the case study.

The third significant term is complex adaptive systems theory, which is used in this research to address how complex-project group behavior manifests itself. The
fundamental contention is that from current research in the natural and pure sciences—e.g., biology, physics, and mathematics—as well as applied sciences, a new paradigm has emerged that changes how science understands the world. This new research method, CAS, has metaphorically and fundamentally shifted the view of nature from a mechanical to a biological world.

The paradigm shift has also changed the understanding of the nature of human organized behavior as well as how it is studied. The traditional mechanical, metaphoric view of human behavior is the notion that people are part of a larger, structured, linear cause-and-effect industrial machine. This metaphorical view has been the research paradigm of science and social science for the last century and a half. The result of this paradigm has been the use of the reductionist method to understand “how things work.”

Indeed, given this view, a basic assumption in the sciences has held that the whole is equivalent to the sum of the parts in both the description and understanding of an organism, including human activity. Therefore, if one can understand how the parts work individually and in relationship to one another, one can also understand how the whole works. However, the new metaphorical paradigm is biological and predicated on a different understanding of nature and, as an extension, human nature. Therefore, organizations and the behavior of humans within those organizations are viewed as organic, holistic, complex nonlinear systems, constantly evolving through adaptation with unpredictable changes caused by environmental influences. Subsequently, this view makes a different fundamental assumption: The sum of the parts is greater than the whole. Adopting this assumption eliminates reductionist research methods as useful tools (Mischen and Jackson 2008; Wheatley 1999; Sweet 1996; Lorenz 1993; Glick 1987). The
argument is that if the natural world behaves through manifesting organic adaptive 
nonlinear complex behavior and human behavior is part of the natural world, one can 
then conclude that human behavior is just as complex and nonlinear as the natural world. 
CAS theory embraces this new organic metaphor and understanding. Indeed, this 
research is based on the premise that human behavior is organized in this manner and can 
be best understood as a complex adaptive system (Meek 2010; Owen 2008; Cutright 

The next two terms, management and management style, are like complexity and 
widely used with broad popular meanings. Therefore, greater specificity and clarity is 
required to understand their intended use within this study. First, management and 
management style are crucial elements in the implementation process (Hill and Hupe 
2009; Pressman and Wildavsky 1984). Additionally, management style has a significant 
impact on how implementation teams behave (Cats-Baril and Thompson 1995). During 
the case-study analysis, the CIT model will be used to determine the influence of the 
management style and its impact on the implementation teams’ behavior and to the 
results of the implementation. 

The final term is methodology, or the methods used to plan and execute the 
implementation project. Using the CIT model criteria the effective influence of the 
methodology, whether strict or loosely applied, by implementation management was 
evaluated as to its influential effect on an implementation team. The assumption is that 
the type and application of a method is a manifestation of management behavior. 
Therefore, it was necessary to determine the type and application of a method used and
how it was applied to understand the management influence on the implementation team’s behavior and their impact on the overall results (Curlee and Gordon 2011).

Theoretical Framework

This research is based on several theoretical premises. First, implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform. Second, the implementation group’s or project team’s behavior is heavily influenced by a combination of the complexity level, the management style, and the application of a selected implementation method. Third, as the complexity level of the implementation environment increases, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams. Last, the combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging changing individual adaptive behaviors. The case study attempts to validate the existence of complex adaptive behavior within a given complex implementation environment.

To test the above premises the CIT analytical model was first used to assess the influential consequences of management actors’ behaviors. The CAS group behavioral model was then used to identify and evaluate the implementation team’s group behavior. It is the combined application of these two analytical models that contributes to the existing policy implementation theory (de Boer and Bressers 2011; Dawoody 2010; Meek 2010; Bressers 2007; Johnson 2007; O’Toole 2004; McMillan 2004; Sweet 1996).

Scope and Limitations of the Research Study

As with any research effort, scope and limitations are important factors. As previously stated, the research is confined to one policy-implementation effort at a higher
education institution in one state. The identified case-study project has two project teams working on one effort. There was a concern that collecting the required data from the participants on each project team would be impeded by time constraints imposed by the demands of their current workload. However, this limitation never materialized.

In determining the correct sample size of open-ended interviews physical and time–resource constraints were important considerations. However, in this case, all identified participants made themselves available, eliminating this sample limitation. Therefore, interviewing resources were not a constraint given the limited number of identified individuals to be interviewed and their overall availability (Rossi, Lipsey, and Freeman 2004).

As a method to manage interviewing resource constraints, Rubin and Rubin (2005) state that in conducting open-ended interviews a point arises in which no new data is available: the theoretical saturation point. After reaching the saturation point, more interviews would not provide any significant data that would substantially change the findings. This saturation point was later validated by Guest, Bunce, and Johnson (2006) in field work with a sample population of 60 projected interviews. They found that saturation was reached after the first 12 interviews and metathemes or categories emerged after only six interviews. In this research, 13 interviews were conducted and a saturation point was reached by the eighth interview confirming Guest, Bruce and Johnson’s finding.

Last, confidentiality limitations present a significant concern in qualitative case-study research. All possible means were used to safeguard the identity of each participant
in this research effort. Therefore, all data collected will be destroyed after the analysis is completed and published.

Summary

In summary, a grounded-theory single-case-study research method was used to analyze a complex public-policy implementation effort requiring an information technology solution. The focus of the case study was the UC400 project that has become part of the effort to consolidate NGS and GS. The case-study analysis was completed through a combination CIT–CAS model. The discovered project-team group behavior was correlated to the management style and method used to direct the implementation. This comparison was evaluated against the success or failure of the implementation effort, discovering group behavioral attributes that contributed to the results.

The following chapter is a literature review of the research being conducted in the area of policy implementations, theories of management, and implementation methodologies, specifically methodologies used to implement information systems as a component of policy implementation. The last topic to be presented will be an explanation of complexity theory and a proposed model.

Chapter 3 elaborates on the research method used in the case-study analysis. The mechanics of the research are presented as well as a discussion of the application of the interpretative grounded theory. Finally, the chapter presents the application of CIT–CAS model analysis. Chapter 4 provides the results and findings of the case-study data analysis. An evaluation of the results is discussed in the context of implementation policy in the concluding chapter. In addition, the concluding chapter offers further research that
could be pursued based on these results while also offering new thoughts on the direction of policy-implementation methodological research.
Chapter II

LITERATURE REVIEW

An anecdotal definition of insanity attributed to Albert Einstein, “doing the same thing over and over again, expecting different results.”

Research Study

Given the global complexity of many evolving issues that governmental policies must address, the validity and reliability of the current processes for making and implementing policies must be questioned. As policy implementations continue to partially or fully fail, they create an increasing drain on public resources (Andreason, Kielstra, and Kenny 2010). Using these conditions as a catalyst, this research attempts to discover reasons policy implementations fail or succeed. The research used a recent policy implementation at the University of North Georgia as a case study. Specifically, the case study is an information-technology deliverable as a complex component within a larger complex implementation effort. Aside from keeping the amount of research to a practical level, two additional reasons exist for this narrow scope. First, with society’s reliance on computers and their networks, most policy implementations include a technology component (CIO.GOV 2012; Standish Group 2011). In this case, the technology deliverable in the building and implementation of a new university center was critical. A second, much broader reason is technology solutions are identified as a significant cause of the complexity of policy implementations.
Theoretical Premises

- Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.
- The implementation group’s or project team’s behavior is heavily influenced by a combination of complexity, management style, and application of the selected implementation method.
- As the complexity of the implementation environment increases, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams.
- The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging changing adaptive team behavior. (de Boer and Bressers 2011; Dawoody 2010; Meek 2010; Bressers 2007; Johnson 2007; O’Toole 2004; McMillan 2004; Sweet 1996).

The remainder of this chapter addresses five key topics necessary to complete this analytical study:

- An overview of implementation research and current theory, the CIT model.
- A review of management theory, and its use in implementations.
- A review of implementation practices as an organization and IT effort.
- A discussion of complexity level.
- An introduction to complexity and the CAS model.
Policy Implementation Research

The seminal Pressman and Wildavsky (1984) 1973 Oakland study, as well as Lipsky (2010) later 1980 study of street-level bureaucracy, may have launched the original research efforts into public-policy implementations; however, research efforts have fallen off considerably in the intervening 20 years (Hupe 2011; Dawoody 2008; Hill and Hupe 2009; Saetren 2005). From the literature review of policy-implementation research this decline is reflected by the limited number of published research articles in political science and public administration (Saetren 2005). Several reasons may account for the decline, including a lack of interest in pursuing an uncreative top-down vs. bottom-up debate, but more important was that the study of policy implementation became a study of failure (Saetren 2005).

However, since the mid-80s to today, a continual thread of interest from Europe and, to some extent the United States, has emerged, particularly within public administration. Cline (2000) and others stated that this line of implementation research has evolved into a third generation—some would say a fourth generation—of thinking (Schofield and Sausman 2004; O’Toole 2004). First-generation research is identified as inductive case-study research represented by the respective original works of Pressman and Wildavsky (1984) conducted in 1972 and the 1980 study conducted by Lipsky (2010). O’Toole (2004) makes the point that this form of research, while leading to interesting findings and observations, lacked any definitive conclusions useful in creating a better analytical model or theories of the implementation process. The need to develop an analytical model ushered in the second generation of implementation research (Cline 2000; Goggin et al. 1990). The analytical model was seen as a necessary research tool,
not only to understand policy implementations, but also to begin offering practical insight into the policy-implementation process. This level of research produced a plethora of research efforts, models, and implementation factors. Schofield and Sausman (2004), in their introduction to the journal Public Administration special edition “Symposium on Implementing Public Policy: Learning from Theory and Practice,” noted that implementation research is at a stage requiring model relevance. They recommended that the next advancement in implementation research is a synthesis of the models, a “parsimonious” identification of factors (Bressers, Klok, and O’Toole 2000; O’Toole 2004) conceptually borrowing from other disciplines to create not only a sounder analytical model, but also one that can be used by the practitioner. As O’Toole (2004) makes clear, “applying implementation theory to practice has been rare” (311).

O’Toole (2004) and others see the need to develop not only a more deductive analytic model that captures core components of the implementation process as well as pragmatic models based on this theoretical foundation. O’Toole, with Lynn (1996), points out a basic assumption to be embraced by policy implementation research is that “public managers confront ‘a messy reality’ of data observations, opinions, fact, and, not to be missed, human beings” (Lynn 1996, 100). O’Toole’s observation is that the “messy reality” is a manifestation of the complex environments in which policy implementation must be conducted. Lynn (1996) adds that the manager’s “intellectual” responsibility is to understand the nature of the complex, “messy” reality and to develop a means in which to both influence and manage the outcomes. O’Toole and Lynn propose that policy-implementation research must assist the public manager, as well as others who would work in this environment, by developing a
repertoire of analytic models as heuristics, that is, the instruments for experimenting, in a trial-and-error way, with different hypothetical approaches to complex issues and problems, whether they concern the content of and rationale for policies or the institutional and procedural means of accomplishing intended results. (Lynn 1996, 100)

Lynn further defines a “useful heuristic” as creating a set of insightful experiential propositions that can enhance public managers’ insight and their ability to be more effective. Indeed, Lynn makes the interesting point, and O’Toole concurs that the insightful experiential propositions may be counterintuitive.

In parallel to this line of thinking about policy-implementation research, Harmon (2006) and Shields (2006) make a very similar point: in a much broader sense, public-administration research in general has been a philosophical struggle within academic circles with little practical relevance. Indeed, public administration and policy analysis must be relevant since public administration is very much the study of the practical application of governance. With this backdrop, they see the need to use a pragmatist philosophy as foundational to this type of research echoing O’Toole (2004) and Lynn (1996), as well as Schofield and Sausman (2004). Both Harmon and Shields point out that pragmatism as a foundational philosophic and research position is not really that new to the discipline. Faint notions can be seen very early in Simon (1946) when he states in his article “Proverbs of Administration” that “there is no essential difference between a ‘purpose’ and a ‘process’ but only a distinction of degree” (59). Pressman and Wildavsky (1984) made a similar observation. However, the distinction for Simon is a matter of location; the “process” is a low-level organizational activity while the “purpose” takes place at a higher organizational level. However, the point is that Simon is pointing out
that the thinking found in “purpose” and the action found in “process” are really parts of the same organizational action.

In a conference paper presented at the April session of the American Society for Public Administration, Shields (2006) goes on to point out that by using the philosophy of pragmatism—the holistic view Dewey applied to educational philosophy—that the relevance of the study of public administration in practice can be addressed. Indeed, Shields’ whole point is that classical pragmatism should be used to address the “academe/practitioner” divide (5). As a follow-up, Harmon (2006), in Public Administration’s Final Exam: A Pragmatist Restructuring of the Profession and the Discipline, firmly embraces pragmatism as a pivotal philosophy to not only wed academe to the practitioner, but as a means of developing theories that are relevant to the practitioner. In Chapter 4 of his book, “Ends, Means, and the Problem of Managerialism,” Harmon presents Dewey’s holistic theory of resolving the “thinking/doing” dualism as a way to resolve the dualism found in public policymaking which separates the policymaker from the delivery and recipient of the policy. For Harmon, it is the attempt to recast the Ends versus Means debate found in politics and public administration in a pragmatic light, thus there is no distinction; the ends become the means and the justification of the ends is found in the effectiveness of the means. As an example of this application, he states, “by dissolving the temporal distinction between means and ends—by regarding each of the dualism’s moments as mutually creating the other—constitutive rationality thus seeks to dissolve the psychological and moral distance among citizens as makers of policy choices” (84). Thus, for Harmon the
philosophy of pragmatism is, indeed, a sound philosophy for public administration to embrace as a means of establishing meaning and relevance.

In light of this thread of policy and public administration research as a meaningful and pragmatic endeavor, Bressers, Klok and O’Toole (2000), as well as O’Toole (2004) and Bressers (2007), offer as a possible working model of implementation based on CIT. Fundamentally, the theory is “a deductive argument that places emphasis on interdependent action between implementers [actors] and targets, with policy instruments one, but only one, element shaping what happens” (O’Toole 2004, 325). The theory began as a single-actor theory, but has recently been applied as a multi-actor theory (de Boer and Bressers 2011; Owens 2008). However, in contrast with previous theories of implementation, this theory emphasizes the implementation actor’s behavioral influence on the implementation as opposed to a matrix of implementation events (Owens 2008). In all cases, they couch the use of CIT as a possible pragmatic tool for public management to use within their respective organizations.

De Boer and Bressers (2011) make the point as the first assumption of CIT, that “policy processes [inclusive of implementations] are not mechanisms, but human social interaction processes between a set of actors” (67). As a behavioral theory, it borrows from social networking because it focuses on the interactions and consequences between participants in an implementation. The interactions define boundaries formed by communication linkages between the individuals within the network. Those boundaries identify the network configurations and their dynamics (Holland 2012).

According to O’Toole (2004) and Bressers (2007), the theoretical centerpieces of CIT are the characteristics of specific interaction points between actors and participants
in the implementation. The theory proposes to be deductive because it has reduced the number of independent interaction variables in the model to three major characteristics. This reduction was accomplished by an assessment of implementation research findings by O’Toole (1986, as found in Owens 2008). He identified and grouped into three specific core themes the reported variables found in past implementation research: objectives, information, and power. O’Toole explains, “depending on how these combine, one could expect one or another kind of implementation process to ensue, such process in turn linked to other ongoing ones involving the same actors” (325). Later, Bressers (2007) redefined these core themes as core conceptual characteristics to enhance the meaning of the original specific themes; thus, objectives became motivation, information became cognition, and power was broadened to include capacity.

For this study, CIT concepts align well with part of the underlying premise of the research: (i) the identification of behavioral characteristics of policy implementation management actors, (ii) to determine how external forces affected the management actor, (iii) the influences of these management characteristics on the team’s effort that in combination drive the results.

Bressers, Klok, and O’Toole (2000), and later O’Toole (2004), continue to make the point that while CIT is a solid foundation for a deductive third-generation analytical model, it also needs to be developed into a preliminary working heuristic model. In the attempt to make theory into a pragmatically useful model for implementers, management, and participants, the model needs to simplify as much as possible without sacrificing its integrity. The result of this effort to create a useful tool is a simple matrix of vertical core
“circumstances”: the individual participant core concepts of motivation, cognition, and power–capacity, and horizontal external circumstances.

The term “circumstance” is used intentionally: it denotes relative time and process positioning in the context of a complex implementation environment. Also, the term simplifies various possible interaction behaviors. O’Toole states that the participant core characteristics define how individual participants interact and react to the intersection of circumstances producing a conversion or new behavior. As an individual participant encounters external circumstances (e.g., change in policy direction or scope), the core circumstance parameters can be applied to the intersection as a means to understand the resultant behaviors. In most cases, all individual core circumstance characteristics would be present at the point of intersection. O’Toole (2004), as well as Bressers, Klok and O’Toole (2000), point out that as the model matures, it can become a beneficial tool for implementation practitioners as a heuristic instrument to understand individual interaction.

Figure 1 represents a model matrix with an extended explanation of each individual circumstance (Bressers 2007, 12), demonstrating the intersection between the individual-circumstance characteristic and the external circumstance that results in an implementation actor’s behavioral conversion process. The conversion is a mix of the individual circumstance characteristics with the intensity and type of external circumstance. For example, an implementation manager may confront change in a policy directive through unexpected political influence. In this case, the manager becomes cognitively aware of a new reality and is motivated to change behavior because of external pressure, resulting in the use of authority to reevaluate how resources will be
allocated to meet the changed directive. The intensity of the resulting behavior conversion can have a ripple effect and may influence more behavioral changes in both peers and the implementation groups or team.

Figure 1: Contextual Interaction Theory Model

This research intends to use a modified CIT model as a framework to identify and assess the implementation management actor’s behavioral characteristics. The contention is that the CIT characteristics of cognition and motivation are most fully manifested into the management style of the actor tasked with managing the implementation effort.

Awareness of environmental information can have many meanings; however, information takes on environmental meaning as well when it becomes knowledge of the reality of the circumstance, e.g., knowledge of the state of the implementation effort. The implementation may, in the beginning, seem simple, and yet it may be highly complex. The knowledge of the changing nature of an implementation will also define personal interaction and behaviors within the complex environment circumstances. Bressers (2007) adds that motivation includes individual values and objectives but takes on behavioral meaning when articulated in terms of the behaviors used in reaction to the
circumstances. Taking this form, the intersection of cognition and motivation explains how tools and methods will be applied with the intersecting circumstances. Therefore, the characteristic of power and capacity is equally demonstrated in the selection and use of the methods to manage the implementation effort.

This research also contends that the CIT conceptual characterization can be used as a means to understand the influence of management styles and the application of methods. In addition to using the CIT model as a framework, it also uses it as a collaborative, interpretative layer that feeds the CAS model. As O’Toole (2004) and others have noted, the implementation process is becoming more complex; while the CIT model can act as heuristic tool to assess complex interactions, it does not offer the fullest explanation of the behavioral dynamics of the interactions.

*Review of Management*

*Theories of Management.* As previously stated, management and management style are necessary components in understanding the nature of the complex implementation found in the University of North Georgia case study. As the previous material has pointed out how these difficult and complex efforts are managed is as important as any other aspect of an implementation. The managers’ roles, their style, and how they apply techniques and establish sound relationships has a very significant impact on the implementation results. Therefore, the assessment of management theory presented below is necessary in the evaluation of the current state of implementation management.

Wren (2005) writes,
Management is essential to organized endeavors. For a broad working definition, let us view management as an activity that performs certain functions to obtain the effective acquisition, allocation, and utilization of human efforts and physical resources to accomplish some goal. (3)

As do other management theorists, Wren’s (2005) definition combines people and physical items together as resources to accomplish an organizational goal. This observation directly addresses the issues that management of complex implementation projects will have to consider. However, for the sake of this discussion, the focus will be on “the effective acquisition, allocation, and utilization of human effort.” Rosenbloom and Kravchuk (2005) provide a similar definition for public administration: “the use of managerial, political, and legal theories and processes to fulfill legislative, executive, and judicial mandates for the provision of governmental regulatory and service functions” (5). They claim this definition encompasses attributes of both the traditional public administrative “orthodoxy” and the new public administration. Regardless, when comparing that definition to Wren (2005), one sees that goal attainment through directing of people is equally important. The definitions differ in that Wren sees environmental influences as less important, but they are very important in public administration for Rosenbloom and Kravchuk. Nonetheless, both share the notion there needs to be some form of leadership directing an organization to meet a policy or strategic goal.

Further, Rosenbloom and Kravchuk (2005) and Wren (2005) point out that within both public and private sectors current management theory is predicated on a view of human nature. The definition of a theory of management begins with an assumption on the nature of whom the manager is to manage. As an example, in deference to business organizational theory, Rosenbloom and Kravchuk (2005) point out that McGregor’s
seminal organizational Theory X and Theory Y epitomize the crux of this continuing debate in both public and private management theory (McGregor 2006). Theory X assumes that humans are essentially lazy, dislike responsibility and work, and desire to be directed and forced into action. Therefore, this management theory encourages leadership or management to direct people’s activities and hold individuals accountable for assigned tasks: People are units of work. This theoretical view can be seen in the early phases of management theory (see Appendix A).

In contrast, Theory Y assumes human nature regards work as natural; people embrace common objectives and goals as well as opportunities to learn. Therefore, this management theory advocates a different type of leadership and management. First, individuals have unique skills and knowledge, so management’s role is to support and enable individuals in the organization to achieve common organizational goals (see Appendix A). Management must set strategy and establish organizational goals to meet the strategy in collaboration with individuals within the organization.

McGregor’s theories of management establish a line between the process-driven, administrative and bureaucratic, view of management and a more people-enabling supportive management theory, the transformational manager or leader. However, the one commonly accepted foundational concept that did not change in this evolution was that the manager’s role was to direct people within an organization.

As a follow-up to McGregor’s (2006) management theory defining the function of a manager as opposed to the management role and the evolving characteristics of people working in an organization. Drucker (1974) offers one of the best discussions for both. First, he leads off with a discussion of the second definition, which concerns the
characteristics of those who work for an organization. He does so by explaining that at the beginning of 20th century, the United States, like England and Belgium during the previous century, began a socioeconomic shift. This shift was a move from an artisan and agrarian form of work to that of employees working within an organization. Drucker states that this shift created a new social structure within the urban setting: the artisan society became an employee society where the individual value proposition shifted from the value of skills, the artisan identity, to the employee identity where time, not skill, was the new commodity. The employee was valued by the amount of time and potential contribution individuals could “sell” to an employer. In this context, employees lost their ability to value their own work and became dependent on the organization to both value their labor and determine the content of their work.

In parallel with the transformation into an employee society, Drucker (1974) posits that selected members of the organization were then empowered with the responsibility and authority to direct employees. This organizational need ultimately evolved into the manager position. He goes on to state that the term “manager” is a very recent addition to the business lexicon. Earlier, a manager meant simply one that “is responsible for the work of other people” (390). With the advent of more complex and larger organizations, the use of the term “other managers” became more commonplace. These managers, the professional staff managers, were those who only direct their own functional performance. The staff manager managed things and events—e.g., preparation of financial statements, conducted inventories, etc. Those managers could be considered the forerunner of the project manager. However, for the sake of this study, the most meaningful concept of manager is the one responsible for the direction of the employee.
Drucker (1974) also states that even the “people manager” has other management functions that overlap with the staff manager. As an example, each manager has the functional responsibilities to set objectives, organize resources (including people), measure progress and motivate, direct, and develop people. Even with these expanded duties, the manager still retains the foundational responsibility for stewardship in managing people on behalf of the organization. In a bold statement, Drucker sees that the act of management defines and becomes one with the organization. “Without institutions, there is no management. But without management there is no institution. Management is the specific organ of the modern institution. It is the organ on the performance of which the performance and the survival of the institution depend” (6). Drucker is very clear that the term “institution” cuts a broad swath that includes not only business, but also all types of governments and nonprofit institutions as well.

Woodrow Wilson (1886) made a similar observation in regard to administration and governments. He pointed out in his seminal essay The Study of Administration that “the idea of the state and the consequent ideal of its duty are undergoing noteworthy change; [sic] and ‘the idea of the state is the conscience of administration’” (para. 13). Wilson implies to some extent an organic relationship between the state and those who administer state affairs, as does Dewey (2012) in his discussion on a reconstruction of social philosophy. In this tradition, Drucker (1974) also sees an organic relationship between management, the employee, and the institution. The conclusion is that the institution or organization is less of a machine and more of an organism, a view similar to those who later embraced CAS (Dawoody 2008; Mischen and Jackson 2008; Holland 1998; Wheatley 1999; Cutright 1999).
Given this overview of people management and the evolution of the employee, the following will briefly discuss management theories of how one manages employees. Understanding that each theoretical era changes the definition of the management–employee relationship is important. Wren (2005) and Drucker (1974) both see that the discussion addressing this relationship is predicated on four dynamic attributes:

- The first is the environment in which the manager, the employee, and the organization operate.
- The second is situational, specifically, how each of these three agents reacts to situational forces.
- The third is the belief and perception embedded in the culture of the organization and held by management about the nature of the employee.
- The last attribute is how the manager perceives his role as defined by the organization. (Jones and George 2007; Wren 2005)

*Evolving Views of Management.* Drucker (2001) states, “One does not ‘manage’ people. The task is to lead people. And the goal is to make productive the specific strengths and knowledge of each individual” (89). As a foundational theme running through the preceding four dynamic attributes of management, Drucker (2001) lays the bedrock by stating that the purpose of management is not only to direct, but also to lead people. While Drucker’s admonition appears to be fairly recent, he has championed this notion for many years as a significant contributor to the theory of management.

As the accompanying narrative continues, one notices that the notion of leadership in management, as opposed to directing, is becoming a significant attribute of management theory. As the earlier Drucker (1974) stated and in public administration
Rosenbloom and Kravchuk (2005) conceded, management is by definition the directing of employees. Little distinction exists between the public, private, and quasi-public sectors in this discussion. Managing, directing, and leading people are much the same regardless of the organization. What does matter is the nature of the environment in which the organization exists. For example, the management style of a military combat unit may vary greatly from the management style used to run a homeless shelter. However, the same principles and concerns apply; managers must understand human nature and bear responsibility toward those they direct as well as to the organization they both serve.

Figure 2 is a high-level view of the evolution in management theory. This view provides a timeline of each theoretical era and how they have overlapped, borrowing from and pushing forward theoretical themes. Appendix A is a detailed evolutionary explanation of each era’s goals or major attributes.

One significant common thread found in the detailed table outlining the evolution of management theory in Appendix A is the perception of the employee by the organization. First, how employees are referred to changes from the unidentified single units of work to an individual and in some cases knowledge worker. Second, the metaphorical perspective that the employees have moved from the “cog in a machine” to
a “component within an organic whole” is recognized. Additionally, the role of manager has shifted from an enforcer in a strict command-and-control hierarchy directing employees, monitoring performance, and measuring outcomes to that of a facilitative, supportive coach or leader who supports the group in acquiring and allocating resources needed to accomplish the organizational goals. As the often-quoted adage in management literature states, “Managers are people who do things right and leaders are people who do the right thing” (Bennis 1994, 78). Whether attributed to both Drucker and leadership authority Warren Bennis, the statement is applicable here as well. In the beginning, the essence of a manager was doing things right; today, at least theoretically, the manager should be the leader who is independent enough to recognize and do the right thing.

Implementation Management Style. “Theoretically” is the key word in the closing sentence of the last section. In practice, the application of newer theories of the empowered people-focused manager–leader still lags in various areas. A case in point is the topic of this research; the manager’s role has fallen short within the context of strategic and tactical implementation of policy. What has become increasingly apparent in the literature is that the management style and management methods used for formal implementation planning and execution as well as the methods used in technology implementations, adhere to the use of the structured linear methods to plan and execute implementation projects behind the current management theory as seen in the previous section. Figure 3 is an example of the linear structured method used in a sample project implementation. While the literature search does not suggest a commonly accepted policy-implementation model, what is common among those found was a sequential
process workflow with the core focus of the method reflecting a Weberian bureaucratic model of command and control that manages the mitigation of risk.

Figure 3: New Program Deployment and Implementation
Source: TMone 2012.

The combination of management style and method used to execute implementations has become a significant force that ultimately affects the project group’s behavior and the project’s results. A significant legitimating source promoting this method of execution can be found in the literature published by Project Management Institute (PMI). PMI’s primary document is the Project Management Book of Knowledge (PMBOK). This document and the method it promotes are used widely in both the private and public sectors. Given the ubiquity of the method, identifying the management theory exposed by the PMBOK methodology is important.

Section 1.3 of the PMBOK describes the management of a project as follows.

Project management is accomplished through the application and integration of the following process:

1. Initiating
2. Planning
3. Executing
4. Monitoring
According to PMI, managing a project includes the following overview responsibilities:

- Identifying requirements
- Establishing clear and achievable objectives
- Balancing the competing demands for quality, scope, time and cost
- Adapting specifications, plans, and approach to the different concerns and expectations of the various stakeholders.
- Managing risk. (Project Management Institute 2008, 6)

A point of interest in this definition is that it makes no mention of managing or leading the people doing the tasks in the project, as if the management theory the PMBOK embraces has not evolved with the theory of management. The Appendix A table shows that the management of projects or management of implementations is obviously still in the era of administrative management. The irony is that the manager of an implementation project is managing an even more complex effort than operational management; thus, this form of management requires an even greater understanding of the behavior of those doing the work. The manager of this type of highly complex project has to be concerned with many factors, but none are more important than people relationships, communication networks, and the mitigation of external forces. Therefore the management of tasks and processes, while important, may not be the most significant part of the implementation manager’s role as long as successful completion is the goal.

*Complexity-Based Management.* An illustration will draw the threads together and yet make a contrast. The following is an interview with Boston Air Traffic Controller Lino Martins, who recalls what happened on September 11, 2001.
At 9:42am, the FAA gave the unprecedented order to close down U.S. airspace. “We were given instructions,” explains Martins (Boston Air Traffic Controller). “Everybody lands, no one takes off.” There were nearly 4,000 planes in the air over the U.S. at the time. “We all buckled down and did our jobs. We just got real busy and did it,” says Martins. “Once we got all the airplanes down, that was it. We could sit there and [give a] sigh of relief. It’s done.” And done it was. Remarkably, Martins and his fellow air traffic controllers had landed every plane in the nation’s airspace in under three hours, without a single accident. (Yang and Strassmann 2011)

This anecdote is an example of management and management style used in a complex environment, the United States airspace, and how complex behaviors are manifested as new emergent behaviors to accommodate an extreme change in the working environment. What should be noted is that management and leadership did not rely on the need for central control or direction: A clear vision was required and the members within the environment needed to be allowed to self-organize without outside assistance toward a common purpose.

Further, Johnson (2007) and Mitchell (2009) both point to large socioeconomic structures like the global economic markets or the Internet as examples of similar self-directing and self-organizing behavior with no central management to direct and control. Indeed, other than those engaged in carrying out the work, Johnson (2007) notes emergent phenomena can arise without the need for an “invisible hand.” Instead, the collection of objects is able to self-organize itself in such a way that the phenomenon appears all by itself—as if by magic. (Kindle Locations 219–21)

Returning to the air traffic controllers, in addition to the self-organizing capabilities of the actors, they acted on only one simple rule: “Everyone lands, no one takes off.” After that rule was broadcast, every air traffic controller in every airport did what they knew how to do, and they did it well. The air traffic controllers had neither the time to wait for nor the need of a structured plan or central direction. They did not debate
a problem definition. They required no analysis or implementation design discussion, nor any implementation plan or evaluation after the fact. A complexity theory of management needs to recognize this form of natural behavior as a foundational premise. As Drucker (1974), Wilson (1886), and Dewey (2012) all pointed out, the organization, a complex organization, operates organically much as the previous example highlights. Indeed, a highly recognized management dictum attributed to Mary Parker Follett (1868–1933) specifies that the essence of complexity management is really not a new idea; it has roots in the “the art of getting things done through people” with the added insight that the “leader and followers are both following the invisible leader—the common purpose” (as found in Wren 2005, 311). In the vernacular of complexity theory, the common purpose is not the “invisible leader” but is an attractor—it embodies the common purpose around which actors and groups or team will organize. The individual actors of the university-center implementation project were placed in a similar position to those in the example above. Therefore, it is important to comprehend how management, and specifically project management, was executed within this case and how it impacted the project team’s behavior.

Table 1 combines the attributes of the later evolutionary stage of management theory, the Learning Organization, with CAS resulting in six dynamic relational attributes between the individual actor and management that define the nature of a complexity-management style. These six attributes would be considered as a practical core in the development of a complexity-management theory. As O’Toole (2004) and others have pointed out, this is a necessary pragmatic contribution to implementation research. Thus,
the attributes can be used to define rudimentary components in a heuristic practical
implementation-management “tool box.”

Table 1:
Management–Individual Actor Dynamic Relationship Attributes of Complexity-
Management Style

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<td>1.</td>
<td>How the organization defines its own nature.</td>
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<td>2.</td>
<td>The recognition of the environment in which the manager, the individual actor, and the organization operate.</td>
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<tr>
<td>3.</td>
<td>How each of these three agents (management, individual actor, and management method) reacts to situational forces, individually, and as a group.</td>
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<td>4.</td>
<td>Belief and perception embedded in the culture of the organization and held by management about the nature of individual actors and their subsequent behavior.</td>
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<tr>
<td>5.</td>
<td>How management and individual actors perceive their role as defined by the organization.</td>
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<td>6.</td>
<td>Ability to envision collectively the implementation effort.</td>
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Source: Jones and George 2007; Wren 2005; Wheatley 1999.

Implementation Methods

*Public-Policy Implementation Methods.* Only as a tangential theme has there been a focused discussion on the methodologies used to conduct implementations. The implication that the existing literature on public-policy formation applies to implementations appears to flow from the early discussions between Simon’s (1997) scientific decision making and Lindblom’s (1959) science of “muddling through.” The debate addressing public-policy creation and the extension to public-policy implementation has centered on the question of process structure in decision making and problem solving. One result of the debate was the development of spin-off models. However, the foundation of these models was still a sequential process model to formulate and execute policy. An example is the top-down implementation method, where policy directives flow from the policy or decision maker through various layers of government to the person executing the directive. The opposite model is bottom-up
policy, an implementation method in which policy formulation originates from lower implementation levels or peripheral sources and flows upward; this is a network of lower-level participants. Therefore, in the latter model, actual policy is set by what is implemented. When it comes to execution of the policy, both approaches embrace a structural method (Cline 2000; Davis 2007; Mazmanian and Sabatier 1989).

Likewise, Pressman and Wildavsky’s (1984) evolutionary view of implementation success and failure as a chain of causal actions and events from inception of policy until execution utilized the sequential structured approach. However, Pressman and Wildavsky’s discussion of iterative causal events additionally created a continuing separability debate in the literature: the actual relationship between policy and the implementation of the policy. Their point is that policy is constantly being changed throughout the implementation. As an implementation progresses and limitations and obstacles are encountered, the original policy will be modified to accommodate the unplanned events. Therefore, regardless of the original intent of the policymaker the policy implementation is an evolutionary process (Hill and Hupe 2009; Lipsky 2010).

However, the focus on implementation results can be a point of contention. O’Toole (2004) clearly believes that past implementation research has gotten mired down in isolating factors that contribute either positively or negatively to the results of the implementation. Indeed, he suggests moving the focus of research from the results to the quality of the implementation process. Despite this suggestion, implementation literature continues to press the point that implementation success is highly dependent upon a clearly articulated statement of policy requirements and a set of structured plans from
inception to final implementation (de Boer and Bressers 2011; Hupe 2011; Owens 2008; Mazmanian and Sabatier 1989).

As an example, the sequential structure model can be found in the practice of the Department of Defense, who in 2006, published a guide informing all contractors and interdepartmental agencies that the department would use a specific project planning and implementation method called Earned Value Management System (Ernst 2006). This method is also a project-management model and structurally emulates the sequential process approach found in the project-management model created and supported by the PMI. As this example demonstrates, training and applications of these methods are widely used by business and government alike (Budd and Budd 2010; Ernst 2006).

To understand the features of this structured method better, the PMI Project Process map (Figure 4) shows that a significant component of the method is the controlling processes. Clearly the controlling and accountability functions are significant responsibilities within this method. Consequently, the controlling and accountability processes are tightly linked to the implementation (execution) effort. This process view is reflective of both past and current methods of project and implementation management. The management style resulting from this method is the need to control, which reflects the administrative implementation-management style. Significantly, the research shows that, even today, individuals responsible for the implementation of policy projects are trained to use this type of structured method and resultant management style (Budd and Budd 2010; Ernst 2006; PMI 2008).
Starting in the 1990s, some theorists began to challenge the conventional view of the implementation process and methods. Matland (1995) is an example of this more recent attempt to ameliorate the structured approach to a humanistic view of implementation behavior by proposing the ambiguity–conflict model of policy implementations. He identifies four paradigms: “low conflict–low ambiguity (administrative implementation), high conflict–low ambiguity (political implementation), high conflict–high ambiguity (symbolic implementation), and low conflict–high ambiguity (experimental implementation)” (145). In these four paradigms, he acknowledges that each implementation success is dependent on the resolution of the interaction of ambiguity and conflict at a human level, regardless of the method used to implement the policy. While he does not offer a change in how policy implementation problems should be approached, he does recognize that these intra- and interpersonal factors affect the behaviors of those responsible for executing the implementation. More
recently, Hill and Hupe (2009) have renewed Pressman and Wildavsky’s (1984) incongruent implementation theory. The theory states that the greater the number of linkages and dimensional layers, or “thickness,” of the organization within the hierarchy, the greater the negative impact will be on the organization’s ability to communicate and execute a successful implementation. They have recognized that these organizational layers impede or stifle intra-organizational knowledge and social networks; all related to the management of people issues. In fact, for Hill and Hupe, the issue is to use less control and more enabling.

Notwithstanding the focus of this research, the linear structured approach is not always a poor choice. This method has a valid success record in specific, well-defined, and noncomplex implementations—e.g., complicated or tame problems (Williamson 2011; Rittel and Webber 1973). However, this research does take exception with the corollary argument to the linear line of thought: To ensure implementation success, one need only follow explicitly, without deviation, a predefined linear structured set of plans.

In line with this exception, Hupe (2011) clearly states that, in reality, no straight line of execution exists in policy implementations, regardless of the complexity level. He points out that the larger the number of complex level linkages in an organization, the greater the freedom participants must have to act, supporting the more organic approach to organization management.

A second point is the contention that “the thicker the hierarchy, the more the managerial competence and professionalism of public servants in practice will count” (Hupe 2011, 76). His conclusion is a further elaboration of the incongruence of standard implementation theory. These findings indicate that participants who execute policy
implementation in a complex hierarchical organization require a greater level of freedom to act and to use their collective professional judgments to increase the probability of success. For Hupe, the level of complexity is found in the layers of government and administration from policymakers to implementer. His conclusion is the more layers, or the longer the chain of events, the greater the complexity and the greater the probability of failure (Pressman and Wildavsky 1984).

Despite these types of findings, most organizations still adhere to the structured linear method when they implement policies (Curlee and Gordon 2011; Dawoody 2008, 2010). This practice is even more difficult to understand when surveys of public sector directors and managers are taken into account. Their findings show that failed or partially successful implementations had a direct effect on their ability to meet policy mandates (Andreason, Kielstra, and Kenny 2010).

Information Systems. Applying the same line of thought to information systems (IS) implementations, DeMarco and Lister (1999), in a 1989 cornerstone book on software development, wrote, “For the overwhelming majority of the bankrupt projects we studied, there was not a single technological issue to explain the failure …. The major problems … are not so much technological as sociological in nature” (Italics added, 4). While the accuracy of that statement was questioned over the ensuing years, DeMarco and Lister, considered leading theorists in software development and implementation methodology, have never been significantly challenged (Zannier, Chiasson, and Maurer 2007; McAvoy and Butler 2007).

Ewusi-Mensah and Przasnyski’s (1995) later research confirmed DeMarco and Lister’s (1999) thesis by stating they found that the commonly accepted reasons for
information systems project failure, such as economic reasons or technological factors, were not very significant. In fact, the greatest contributors to project abandonment were, “organizational, behavioral, and political issues” (5). Even though DeMarco and Lister’s observations address software development, an extension of their claim rings true in the implementation of the system solutions supporting policy implementations. Much like the earlier policy implementations discussion, the conclusion is that sociopolitical dynamics rather than technology is the crux of project failure. This study takes the premise that the human dimension in IS implementation efforts increases the overall complexity of the effort. In addition, the contention is made that not only is IS implementation made complex by the human element, the combination of administrative and technology components further compounds the complexity of the implementation environment. This is inclusive of people, management, and the methods used.

To review IS implementation methods have been highly influenced by the creative aspect of software development and as such have a checkered history. However, in contrast to policy implementation research, the debatable separability of the policymaker and policy implementer has never been a major issue, thus allowing software development and systems implementation to coexist within the same process and within the same method. As an extension of the comingled process, the terms “development” and “implementation” are generally referred to as a continuous IS process. The reason for doing so is that these two process steps in software development are subject to many external and internal comingled dynamics. As in policy implementation, these process steps usually have to be managed jointly because many complex issues can arise from external and internal sources. These issues can include
deadline change, function changes, vendor performance, and resource constraints.

Additionally, in the software-development methodology or system-development lifecycle (SDLC), these steps are becoming less separable, as will be seen. It is important to make this point: In all methods to be discussed, one common issue can color the entire effort regardless of the method used, the definition target or user requirements. This is similar to understanding the policymaker’s directives or intent. Specifically, the organization’s functional requestors of the technology must be able to articulate clearly what they want constructed. In this case, what does the policy directs is what is needed. In both cases, clarity is important but elusive in practice. However, how the requirements or direction are acquired is a distinguishing characteristic. As the discussion proceeds, this issue undoubtedly becomes a distinguishing attribute between the various methods used in IS implementation.

A classic anecdote in the technology arena describes an end user and a programmer discussing an organizational problem and how a system solution could solve it. However, the programmer starts to “code” or develop the solution before the conversation is over. While anecdotal, that scenario is also reflective of the first software development/implementation efforts: the ad hoc or build-fix method. Simply speaking, the entire build-fix process has no structure. However, it is considered the most fundamental method within the SDLC methodology. If the development effort is simple enough, an ad-hoc approach can be effective. Studies have found that it works fairly well if the requestor or user of the system and the developer communicate directly, the project is very small, and the software has minimal functionality (Pollard and Shane 2014; DeGrace and Stahl 1990). In this case, the behavioral dynamics between the user and the
developer are also simple and singular. This aligns with the past definition of a tame or complicated implementation project.

However, the traditional and conceptually still highly utilized method within the SDLC methodology is the “waterfall approach” (Figure 4). First identified and articulated in 1970 by Winston Royce, Director of Lockheed Software Technology Center, the purpose of this method, as has been pointed out before, is to control the process to mitigate risks. Royce’s experience showed that software development was very difficult to control, thereby leading to a high risk of failure. The objective of the waterfall is to control the cost of later requirement changes. Royce showed the cost of functional change requests to initial system requirements rise exponentially if they are made later in the development process. Therefore, functional requirements must be correctly defined very early in the process (Royce 1970). Therefore, as the illustration (Figure 5) clearly points out, the method is highly structured, sequential, and step dependent. Each step in the process is dependent upon the completion of the previous step. However, most importantly it assumes the targeted users can define sufficiently all the requirements by the second step.

While Royce (1970) stated he believed this approach to be “fundamentally sound” (329), he also did not consider putting this method into practice because he recognized that without some practical modifications, the structural rigidity would put the whole development effort at risk. He clearly recognized that the “waterfall” processes were too sequentially dependent. He also knew disruptive iterations between the sequential steps would also occur. In addition, he knew it would be unwise to assume developers could on the first attempt fully capture all requirements or design criteria correctly at each step for
the next step. Therefore, he built feedback loops to past process step(s) into the recommended method, thereby ensuring a change trail was captured within the system documentation to manage subsequent requirement changes. However, the structural heart of this method is still the foundation of most systems development or implementation methodologies used today as well as the implementation methods previously discussed.

As Royce (1970) recognized, sequential dependency without feedback loops was unrealistic. However, the basic sequential process model is still recognized as essential to both policy- and technology-implementation planning methods. As time went on, methodological changes began to evolve during the mid-80s because of increased organizational demands for quicker technology solution delivery. This evolution not only addressed the delivery issue, but also recognized that earlier and continuous targeted-user involvement was necessary to create the needed functionality (Boggs 2004). Even though technology implementation efforts have historically recognized these needs, policy...
Implementation methods are still struggling with these same issues. What follows is an illustration of the methodological evolution in system development and implementation.

Figure 6 compares some of the changes in the SDLC method from highly structured, as shown in Figure 6-1, to a more dynamic process through the use of iterative loops and prototyping, Figures 6-2 and 6-3. The move to a more iterative method softens the prior process dependence requirement. The iterations permit unanticipated changes in deliverables from the preceding step that must be addressed in the succeeding step(s). As time goes on, the iterative loops between requirements, design, and implementation evolved into the prototyping activity shown in Figure 6-2. The prototyping activity has become highly effective as more flexible development tools have been developed. These new tools allow the developer to create a smaller functional piece of an application without building the fully functional system. With a shorter development cycle and with the targeted end user in the development process sooner, the application(s) can be incrementally parsed into basic functions and developed, tested, and implemented. This change has had a profound impact on development methods (DeGrace and Stahl 1990; Satzinger, Jackson, and Burd 2004).

In Figure 6-3, the spiral approach, proposed before the change in development tools, is an example of the methodology attempting to jettison the linear step dependence found in the waterfall metaphor. The metaphorical change is a spiral showing the ability to “look” backward and continue to check past requirements while the current ones are developed.
The idea was to further mitigate risk because the waterfall method, while developed to control risk also introduced risk given the linearly dependent process steps. Therefore, another risk mitigation feature of the spiral method was that quality issues could be detected and fixed at the level of each incremental delivered prototype. In the waterfall method, validating and verifying is not sufficiently completed until the testing process step for the entire system (Boehm 1988). Regardless of the intent of prototyping and the spiral approach, Figure 6 shows each functional component still goes through a miniature four-step waterfall process: analysis, design, development, and testing (and implementation).

The last group of SDLC methods will be combined under a heading of iterative and adaptive methodologies, more commonly referred to as the agile methodologies. Figure 7 lists some of the commonly used methods within the agile methodologies, which represent significant changes in, not only the technology community, but also the
expectations of its customers, who demanded the adoption of more adaptive methods in software development and implementation.

Figure 7: Various Agile Methods
Source: Leading Agile 2013.

Again, developers increasingly recognized the inherent disadvantage of waterfall-type methods. Not only were they inflexible, they were also time consuming. Neither public nor private stakeholders were willing to wait for systems solutions. The issue was that the demand for technology solutions was increasing rapidly but the ability to deliver solutions was not. The result was that the waterfall-type method was jettisoned in hopes of speeding up the process as well as increasing the quality of the entire product. Again, advancement in development tools and methods enabled a radical change in the entire development and implementation process. Conceptually, the new agile methods were analogous to building a large mansion with each room being constructed separately. Only when all rooms are finished will they be assembled into one structure, but the family room, kitchen, and bathroom can be used as soon as they are completed. These new methods provided the flexibility to create and implement software more quickly (DeGrace and Stahl 1990; Satzinger, Jackson, and Burd 2004).
However, the common core process was maintained: define (planning), design (feedback), develop (implementation), test (testing), and implement. Despite the need to maintain some form of structured workflow, the agile methodologies did recognize the need to address the notion of how development was done by those who did it in relationship to those who wanted it, a major theme of this research. According to Mellor (2005), a loosely collaborative group, the Agile Alliance, convened in 2001 to discuss the emerging “lightweight” methods. Out of that gathering came what is known as the Agile Manifesto. Mellor, as one of the original signatories, insists the foundation of the Alliance is found in the opening statement from the Manifesto, “We are uncovering better ways of developing software by doing it and helping others do it” (18).

Mellor (2005) draws attention to the Manifesto’s four value propositions, which become the cornerstones of the agile methods. The importance of the Manifesto’s value propositions, in regard to this research, is first the rejection of the structured linear method in technology development and implementation and the ability to apply the same critique to the structured methods used in policy implementation. Table 2 lists the four manifesto value propositions and how they relate to new policy-implementation directions. In accordance with the previous discussion of both policy- and technology-implementation methods, the value propositions outlined in the manifesto support the idea that a new adaptive method is necessary for future practitioners. However, a question remains: In complex environments where actor-adaptive emergent behavior exists, can a deliverable be produced without the use of design, develop, test, implement?
Table 2:
Agile Manifesto Value Propositions

<table>
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<tr>
<th>Value propositions</th>
<th>Commentary on implementation methods</th>
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<tbody>
<tr>
<td>Individuals and interactions over processes and tools</td>
<td>Focus on people and how they work, the processes of work.</td>
</tr>
<tr>
<td>Working software over comprehensive documentation</td>
<td>Minimal project documentation that supports a high-level project “map” but not a “detailed” what-is-to-be-achieved tasking.</td>
</tr>
<tr>
<td>Customer collaboration over contract negotiation</td>
<td>Continuous working relationship with targeted customers from beginning to end of project.</td>
</tr>
<tr>
<td>Responding to change over following a plan</td>
<td>Plans are not predictive but need to be adaptive and checked constantly to see if the project is creating the correct “thing.”</td>
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Source: Agile Alliance 2013; Mellor 2005

A Need for a New Metaphor

A conclusion drawn from the above review of standard implementation-management practices is that the resource costs and lost opportunities from partially successful and failed implementations will only increase over time. A second conclusion to be drawn from the literature is that implementations are becoming increasing complex and yet little research has been conducted on determining the level of complexity or how to manage within a complex environment. Given these two conclusions, this research study has suggested an alternative approach. Again, the practical concern of practitioners and researchers alike is how an organization decides on its strategy and general policies as well as how it measures the results of implementing those ideas. As with this research, other researchers have begun to question the accepted approaches to policy and policy implementation through their studies of organizational behavior. Besides public administration research, researchers in such areas as organization theory, higher education leadership, healthcare administration, social policy, and economics have begun to question the foundational premise of how organizations function (Meek 2010; Hill and Hupe 2009; Owen 2008; McBride 2005; Byrne 1998; Wheatley 1999; Cutright 1999;
Sweet 1996). Therefore, this section is a review of a portion of the literature grounded on this new research. This new research takes the strong position that the commonly held foundational views in organizational behavior theory are incorrect, as pointed out by Drucker’s (2001) observation in the previous review of management theory (Johnson 2007; Jones and George 2007; Lewin 1999; Wheatley 1999).

The origin of both the theory of management and the evolution of management methods is rooted in a 19th-century view of Newtonian physical principles. Indeed, Zimmerman, Lindberg, and Plsek (1998) make the following observation concerning management models.

Existing models in economics, management and physics were built on the foundation of Newtonian scientific principles. The dominant metaphor in Newtonian science is the machine. The universe and all its subsystems were seen as giant clocks or inanimate machines. The clocks or machines can be explained using reductionism—by understanding each part separately. (2)

The machine metaphor proceeds to define natural systems as a coordinated whole defined by the sum of its parts. The parts are subject to immutable natural laws of cause and effect. Therefore, once the laws are known, the true nature of individual parts is known as well. This proposition leads to the conclusion that the whole system can be understood by understanding the behavior of the sum of its parts. The metaphor has a predictive conclusion as well. Zimmerman, Lindberg, and Plsek (1998) further explain that the “parts are not seen to have choice of self-determination … the ‘machines’ are simple and predictable.” (2). The conclusion is that a system’s behavior can be predicted by understanding and using the causal laws that define the behavior of the individual parts. This mechanical reductionist view by both the physical and social sciences has become the accepted foundational understanding of organizations (Lewin 1999; Wheatley 1999).
Consequently, this view postulates that organizations are linearly predictable and controllable. This fundamental notion has become a cornerstone in organizational theory as well as strategic policymaking and implementation (Ford 2011; Johnson 2007; Gilstrap 2005; Lewin 1999; Wheatley 1999; Holland 1998; Glick 1987).

However, in contrast, recent social science research has turned once again to the natural and pure sciences for a new metaphor and a new paradigm. Many current social scientists and organizational theorists have begun using a newer, postmodern interdisciplinary paradigm to define not only new organizational structures, but also how policymaking should be conducted in these new organizations, including how policy-implementation theory should evolve (Ford 2001; Byrne 1998; Wheatley 1999). As explained below, the trickle-down effect suggests the creation of a new implementation management style and methods. This overall metaphorical shift is from the machine to a biological organism, a metaphor of nature found in complexity theory (Curlee and Gordon 2011; Meek 2010; Hill and Hupe 2009; Mitchell 2009; Owen 2008; Johnson 2007; Lewin 1999; Byrne 1998; Wheatley 1999; Cutright 1999; Sweet 1996).

Wheatley (1999), one of the first organizational behavioral theorists to adopt this new organism metaphor and paradigm of complexity, generally rejects the linear mechanical view of organized human behavior. The rejection is based on the view that the linear perspective of organizational behavior does not capture the true nature of human group dynamics. The linear notion of human nature is based on the line of thought that the human element in organizations will always act rationally or in its own best interest. Assuming this statement is true, humans would act in their own best interest, which would mean that they would work more efficiently in a highly structured, well-
defined process with minimal risk and optimal reward (Wren 2005). Indeed, a strong
correlation exists between the theory of rational choice and the Newtonian view of
human organizations as fundamentally driven by the physical laws of mechanics.

Wheatley (1999) continues by clearly stating that this view of human nature drove
Taylor’s original 1911 work on scientific management (Wheatley 1999; Wren 2005).
Therefore, the mechanical metaphor symbolically makes the contention that if rational
choice is fundamental to human nature, it follows that people are not only controllable
and predictable in the working environment, but also want to work in a controlled and
predictable environment. People are predictable to the point that they function as
metaphoric rational “cogs” in the efficient machine, pursing rational self-interest and
controllable through incentives. Again, Wheatley rejects this machine metaphor. She
posits that the new biological metaphor more accurately portrays the organization as an
evolving organism. Human behavior is expressed in terms of interactions and
relationships of biological components within a natural organism. This redefinition
challenges many aspects of organization theory, including how people work in evolving
workgroups to execute tasks. Wheatley states, “My own experience suggests that we can
forego the despair created by such common organizational events as change, chaos,
information overload, and entrenched behaviors if we recognize that organizations are
living systems, possessing the same capacity to adapt and grow that is common to all
life” (15). Therefore, human organize behavior is not a linear, predictable, mechanistic
process, but an evolving, unpredictable, nonlinear, biological organism.

Wheatley (1999) was preceded and has subsequently been joined by many others
(Dewey 2012, Hill and Hupe 2009; Lorenz 1993; Glick 1987; Gilstrap 2005; Sweet 1996;
Owen 2008; Lewin 1999; Cutright 1999; Byrne 1998) in the use of this new biological organism metaphor to address the question of how groups of people truly function and how they could function better. The new model emerged from research in evolutionary biology, mathematics, and particle physics and fundamentally differs from the Newtonian view of motion. While celestial bodies may follow Newtonian deterministic laws of motion and Einstein’s theories at a macro level, the smaller particles found in nature can demonstrate unpredictable behavior at the quantum level (Ogborn and Taylor 2005).

Nature at this level is neither as tidy nor as predictable as expected. As a result, one of the first propositions incorporated into new models of human behavior comes from the quantum world. That proposition stipulates that in human behavior, predictable rules are rare; what abounds in the natural world is unpredictable complexity and chaotic events (Glick 1987; Lorenz 1993; Wheatley 1999; Sweet 1996).

As more of the biological and natural science theories are embraced by the social scientists and organizational theorists, a new model has evolved around the notions of complexity science, complex adaptive systems, and chaos. Essentially, CAS states that the natural world and the systems that make up the natural world are replete with nonlinear behavior. Complexity is found not only within a system, but also within the interaction between various systems. A system by definition is the “assemblage of interacting parts” (G. P. Williams 1997, 3). The level of complexity both external and internal to a system defies predictability and is highly susceptible to small initial events that lead to very large changes in the development of a system. Therefore, systems and subsystems are in a constant state of creative motion, creating and recreating behavior patterns and seeking a new order through iterative cycles. As with a biological organism,
a human system naturally seeks a state of equilibrium or homeostasis. However, given
the dynamics of a system’s natural environment, this state is temporary at best. Therefore,
these systems are in a constant state of change caused by environmental forces (Glick
1987; Lorenz 1993; Davis 2007).

The outcome of embracing this new complex organic metaphor is a new
organizational theory that posits human behavior and human group are natural systems
that should exhibit complex biological behaviors (Sweet 1996; Owen 2008; Byrne 1998;
Lewin 1999; Wheatley 1999). To further explain and support the need for a new human
organizational metaphor, Holland (1998) offers his belief that the metaphor is an
extension of the biological complexity models used to explain the natural world. Clearly,
he sees that without a new metaphor, a new human organizational paradigm model would
not fully capture the essence of natural human phenomena. The following section
provides the theoretical framework for the new complexity model or CAS theory applied
to organizations.

*Complex Adaptive System Theory*

Preliminary to any explanation of theoretical constructs of CAS, it is important to
note how this research effort will use CAS differently from the way other researchers use
it. Others have attempted to use CAS as a list of various management strategies that could
be randomly selected and applied to an organization. These strategies are discussed and
presented as adoptable changes an organization can decide to either use or not use
(Curlee and Gordon 2011; McBride 2005; Ford 2011; Owen 2008; Svyantek and Brown
2000; Cutright 1999). While CAS may offer some enticing ideas of how organizations
can be led and managed, the notion that complex behaviors are naturally evolving and
stimulated by changes in the environment is clearly missing. These emergent behaviors are only to be understood and recognized as a whole; they cannot be controlled, led, or adopted. A main premise of this research, and a potential component in a practitioner’s heuristic tool set, is the ability to recognize and understand complex behaviors.

_Theoretical Framework._ Simply stated, complexity theory, in conjunction with chaos theory, forms the foundation of CAS. As presented in the discussion of the new biological metaphor, one theme, the natural world, is composed of evolving complex systems that contain dynamic interdependent relationships or networks of agents (agents can be thought of as actors). The agents’ arrangements and interdependent relationships are noted for their unpredictable, nonlinear behavior. A second theme is that complex systems naturally seek an ordered and stable state (Mitchell 2009; Johnson 2007). Johnson (2007) adds a third theme, stating that a complex system “appears to be ‘alive.’ The system evolves in a highly non-trivial and often complicated way, driven by the ecology of agents who interact and adapt under the influence of feedback” (387).

A fourth significant theme of complex systems noted by Johnson is that, over the course of time, complexity produces disorder and chaos within the system such that an “emergent phenomena can arise without the need for an ‘invisible hand’ … the collection of objects is able to self-organize in such a way that the phenomenon appears all by itself—as if by magic” (210). These emergent phenomena are new self-organizing and self-directing behaviors that can vacillate between order and disorder, in the end seeking a new stability for the system. Last, the dynamics of a complex system and subsequent emergent behavior may stem from initial conditions of the original system or be present
when the system is reacting to a changing environment (Mitchell 2009; Mischen and Jackson 2008; Johnson 2007; Holland 1998; Sweet 1996).

Table 3 presents the themes found in CAS (Mitchell 2009; Johnson 2007). An understanding of these basic themes is necessary for the following explanation of the fundamental phenomenon of complex systems. The themes are general conditions and present in a complex system, but they do not necessarily follow a set structure or predictable pattern.

Table 3:
Fundamental Components, Properties, and Characteristics of Complex Systems

<table>
<thead>
<tr>
<th>Key components of complex systems</th>
<th>Complex behavior characteristics</th>
<th>Common properties of complex systems</th>
<th>Complex adaptive systems theory theorems</th>
</tr>
</thead>
<tbody>
<tr>
<td>The system is a collection of interacting objects, components, or agent networks that is susceptible to initial conditions.</td>
<td>The system, through initial conditions and agent behavior can exhibit emergent behaviors that can be unexpected and extreme.</td>
<td>Collective complex behavior uses only simple rules to organize and direct without the need of a central control or leader.</td>
<td>The system potential is greater than the sum of the agents.</td>
</tr>
<tr>
<td>Agent behavior is affected by memory or feedback that includes competition for resources.</td>
<td>Group emergent behavior will take place without the need of a leader or controlling force.</td>
<td>The agent signals internally and externally to facilitate the system’s information processing. This signaling defines networks and boundaries.</td>
<td>Simple actions by system agents can create a wide variety of new creative adaptive behaviors to bring about a new homeostatic state.</td>
</tr>
<tr>
<td>Agents can adapt their strategies according to their histories or memory.</td>
<td>Behavior is the adaption to feedback or memory of the agents.</td>
<td>All agents display the ability to adapt, through learning or an evolutionary process, to internal and external influence to ensure survival.</td>
<td>The system appears to be “alive” and manifests unpredictable, nonlinear, emergent behavior.</td>
</tr>
<tr>
<td>The system is open and can be influenced by the surrounding environment.</td>
<td>The system will demonstrate both self-initiated orderly and disorderly behaviors.</td>
<td>Systems seeking to establish a state of equilibrium are inherently unstable and will evolve into new states.</td>
<td>The system demonstrates the existence of the “invisible hand,” as Adam Smith proposed.</td>
</tr>
<tr>
<td>Inherent in the emergence of a new state is the existence of an evolving network of agents.</td>
<td>Systems are inherently unstable but will seek a state of equilibrium.</td>
<td>Systems are inherently unstable but will seek a state of equilibrium.</td>
<td>Systems are inherently unstable but will seek a state of equilibrium.</td>
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Table 4 below displays the significant stages in CAS theory. The term “stages” is used because some interdependence exists between the changing states; however, stages may not necessarily be considered sequential. While this list is not exhaustive of the stages in complex adaptive behavior, it is an identification of the significant stages used in the case-study research. These complex behavioral conditions are used as evaluative criteria in conjunction with interactive consequence analysis resulting from the CIT modeling of the management style and methods (O’Toole 2004).

Table 4: Phases of Complex Behavior

<table>
<thead>
<tr>
<th>Complexity stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>Initial condition</td>
<td>More commonly referred to as the “Butterfly Effect,” slight differences in initial conditions can have a significant impact on the evolving adaptive emergent behavior of the agents and the system.</td>
</tr>
<tr>
<td>Emergence</td>
<td>The manifestation of new adaptive group behavior within the system.</td>
</tr>
<tr>
<td>Chaos event</td>
<td>The point at which disorder has evolved to a point of maximum creative behavior and simple behavioral rules are defined to ensure survival of the system. The point of bifurcation when ultimate emergent self-similar behavior will begin.</td>
</tr>
<tr>
<td>Dissipative system</td>
<td>At this stage the natural complex system will begin to manifest a new emergent adaptive behavior that seeks to restore a homeostatic or ordered state.</td>
</tr>
<tr>
<td>Bifurcation points</td>
<td>The stage in the dissipative system in which the system breaks into two behavior patterns, the new emergent behavior and the prior behavior.</td>
</tr>
<tr>
<td>Strange attractors</td>
<td>The behaviors of groups of agents drawn to similar behavioral points. Simple rule sets are discovered within the environment that begins to define new adaptive behaviors.</td>
</tr>
<tr>
<td>Self-similar behavior</td>
<td>The agents develop collective behaviors that follow simple rules of interconnectivity and are replicated in a self-similar fashion until the final emergent new order is stabilized.</td>
</tr>
<tr>
<td>Signal and boundaries</td>
<td>Agents’ information sharing within the context of a bounded communication network based upon feedback.</td>
</tr>
</tbody>
</table>


*Complex Adaptive Systems Theory Concepts.* To explain the concepts behind CAS theory, an implementation case study will be used to illustrate both the concepts from Table 3 and the stages from Table 4. In addition Figure 8 is a depiction of the new behavior patterns found in CAS. The case study is from a public-health–policy initiative.
regarding how a specific public-health–delivery organization managed and implemented an initiative by the use of CAS. Details of the case study are taken from an article by Rowe and Hogarth (2005, 396–405).

The new policy directive was a redefinition of the roles of the community public-health nurses. Traditionally, the delivery organization was broken into two delivery units: the school-nurse program and the home-visit program. The values and objectives of the organization were twofold: to provide universal primary healthcare and assessment and to address inequitable healthcare delivery issues within the community. While the values and objectives were not altered by the new policy initiative, the role of those who delivered these services was. Given the nature of this initiative, the implementation was considered to be very complex. The following is a commentary on the implementation using the CAS evaluative model reported by Rowe and Hogarth (2005).

1. The traditional mechanistic view

The organization could have reacted to the initiative in a traditional fashion,
assigning an organizational review committee to create a tactical plan with both overall and lower-level objectives and a budget directing how the organization would implement the new job-role changes into the organization. A program director would have been assigned to create functional plans, objectives, and tasks with managers and supervisors. The program director would have been accountable to an oversight committee to make timely reports on the progress toward meeting the goals, to review past and pending issues, and to assess resource constraints. The reporting would have been done within the compliance parameters found in the organization’s published regulations and standards. However, this structured process was not followed.

2. Initial condition using the correct metaphor

Given the nature of the initiative and the sensitivity of the issue to the people in the organization, the organization and various functional areas began to react to the initiative prior to any formal implementation announcement. This initiative was considered a large change with serious professional career implications. The organization’s management became aware of what was occurring and adopted an open, participatory structure by first adopting a different view of the organization and the implementation. Jettisoning the past mechanistic perspective, management redefined the organization in holistic terms using a new metaphor presenting the organization as a complex organism. Unsurprisingly, adoption of this new metaphoric perspective forced a change in planning because complex organism behavior is unpredictable. “Expected outcomes were not mapped out in advance; rather it was planned that a future
plan would emerge” (Rowe and Hogarth 2005, 399). Emergence would come through setting expectations and determining needs by means of a “continual process of learning, envisioning, clarifying and experimenting” from all parties: “external stakeholders, practitioners and local people” (399). Clearly, management “did not wish to engineer change but rather create the conditions within which it would emerge” (399). The planning had to be highly flexible to fit the changing conditions of the changing organization. Stated another way, “the organization was making sure everyone was putting a square peg through a square hole, even if that required changing the hole as they progressed” (399).

3. Chaos event and bifurcation point—the start of a dissipative system

in complexity theory, a chaos event comes when the system (organization) reaches a critical point; a point where unforeseen initial conditions and environmental changes, continuous or abrupt, are present to a level that system instability begins to occur. In this case, the nature of the policy initiative continued to cause instability in the organization. Even using an open cross-dialogue, there were still “levels of uncertainty during the process that caused anxiety” (Rowe and Hogarth 2005, 400). At this point, new behaviors and new actor interrelationships emerged. This stage, the bifurcation point is reached becomes is critical; the actors begin to creatively define new rules of behavior to reestablish stability. The system moves into a dissipative state which is a high state of instability. The system becomes both fragile and can become dysfunction if the new behavior is prevented from finding a natural stable point. Any attempt to stifle the emergent behavior will continue the destabilization
process, eventually resulting in nonproductive or dysfunctional behavior, possibly severally hurting or killing the organization (Johnson 2007; Lorenz 1993; Glick 1987).

4. Emergent behavior, self-organization and strange attractors

After new emergent behavior begins, the various actor groups are in a discovery period where they define new more pragmatic and simpler rule sets than those imposed by the original environment. These groups will be self-organizing and will require no external direction to define the new rule sets. The self-organization and rule discovery is done by the attraction to strange attractors such as emerging group norms. A strange attractor can be the behavior of an actor who embodies more favorable and simpler survival attributes, one who attempts to facilitate an agreement among fellow actors to establish a new simpler rule set, or the informal adoption by various actors of new behaviors that reestablish both direction and stability. Regardless, the strange attractor causes synergistic action toward new norms where new behaviors are observed (Mitchell 2009; Johnson 2007; Gilstrap 2005; Svyantek and Brown 2000). Training implementation project managers to recognize a strange attractor and the resultant group behavior is part of the pragmatic heuristic “tools” that O’Toole (2004) proposes implementation research create. In the healthcare delivery case study, self-organization took place during the open dialogues on how the role change would affect service delivery. Rowe and Hogarth (2005) reported this self-organizing group made several decisions addressing the role of minimum healthcare visitors. These groups were not directed to organize but
did so in reaction to the initiative’s impact on the existing organizational environment. These decisions were approved and adopted not only by the originating groups, but also as part of the overall change initiative. Likewise, strange attractors appeared in the form of values and new behaviors spurred by the recognition of how the values could be applied. These attractors began to solidify a new and simple value rule set and also began to form new interrelationships and networks both inside and outside the organization.

5. Self-similar behavior

As new actor groups form and organize around new rule sets, those within the new groups may also take on self-similar behaviors. The new rule set is much simpler to follow, so individual behaviors within the group may become strikingly similar as well. Behavior that deviates from the new group norms is not received well if it threatens the norming activity. This condition seems to exist until stability is reached. However, the significant point is that the self-similar behavior changes not only the behavior of the actors, but also the entire system, thus evolving into a different system altogether (Mitchell 2009; Johnson 2007; Lewin 1999; Holland 1998; Lorenz 1993; Glick 1987). In the case study, the practitioners took advantage of new group behaviors, creating teams centered around like behaviors and norms and like roles to effect the policy change.

6. Networks—signal and boundaries

The emergence of new groups will organize in complex systems, they begin to form new individual interrelationships or networks within the group, with
external groups, or outside the systems. In addition, the entire group can develop similar new interrelationships or networks. Network boundaries are defined by the communication signals they send and receive through means of feedback loops. These networks may redefine the formal organizational structure as well as how the internal functional areas need to change to execute the implementation (Holland 2012; Mischen and Jackson 2008; Lewin 1999; O’Toole, Hanf, and Hupe 1999). This phenomenon became very apparent in the case study as Rowe and Hogarth (2005) found the practitioners and the new practitioner groups developed significant new networks with two new internal and four new external functions, including a new joint community-based network. They go on to note that these new network configurations continue to produce even more emergent behavior and new “work” patterns: “The productive sharing of ideas, work problems, and responsibility for decisions taken, particularly in relation to complex public health issues and ethical dilemmas, has been one of the outcomes of this program” (401).

Four conclusions about the conceptual explanation of CAS and how it can be used as an evaluative model arise:

- If the complex system is prevented from adapting to environmental changes, the system will go into a state of dysfunction that may result in the demise of the entire system (Johnson 2007; Lorenz 1993; Glick 1987).

- Moving from a linear model of change to one that expects unpredictable and challenging outcomes was useful, but it also revealed the high levels of
attention and energy required to prevent the system’s return to previous patterns (Rowe and Hogarth 2005, 404).

- Innovation and new styles of behavior occurred when simple rules replaced multiple regulations, where micro-diversity was encouraged, where attractor patterns were exposed and debated, and where new generative relationships developed (Rowe and Hogarth 2005, 404).

- Tension and apparently irreconcilable differences (the “edge of chaos”) can be very productive in the development of new emerging patterns of behavior (Rowe and Hogarth 2005, 404).

**Determination of Complexity**

The discussion in the previous sections leads to the conclusion that complex adaptive behavior occurs naturally as the environment becomes more complex. However, one can question what complexity is and if a level of complexity can be determined for a complex environment. Simply stated, a tame/complicated issue is a difficult problem or situation that poses questions and requires solutions beyond a given set of knowledge. Other research distinguishes between tame/complicated and complex as a means to separate the recognizable or tame/complicated problem set from the unrecognizable or complex problem set (Williamson 2011). Other distinctions are based on other attributes, such as levels of uncertainty created by the number of elements (functions) of a policy implementation or the types and use of feedback loops within an implementation (Castejón-Limas et al. 2011; T. M. Williams 1999). Miller and Page’s (2007) explanation states complexity “is a deep property of a system, whereas complication is not. A complex system dies when an element is removed, but complicated ones continue to live
on, albeit slightly modified” (9). They make the additional observation that
tame/complicated problems are open to reduction into parts while complex ones are not.
To refine the notion of complexity even further, G. P. Williams (1997) supplies the
following definition of complexity that will be used in this study.

A type of dynamical behavior in which many independent agents continually
interact in novel ways, spontaneously organizing and reorganizing themselves
into larger and more intricate patterns. (italics added, 449)

This definition enables the categorization and differentiation of the complex from
the tame/complicated based on the behavior patterns of the actors and not different events
or the presence of nonhuman items. For example, the possibility of nuclear war is a
complex scenario not necessarily because of the existence of sophisticated weaponry, but
because of the intentions and motivations of human actors.

Characterization of Complexity Level. A 1973 article written by Rittel and
Webber discusses the difficulties of urban planning. That article represents the first
formal use of the term “wicked problem.” Essentially, they characterized a wicked
problem as one that cannot accurately be articulated in a problem statement until the
solution is worked out. Consequently, the problem can only be understood through the
use of an iterative process until the stakeholders declare that what was solved was the
original problem. Thus, a wicked problem and its solution are in a constant state of flux
until those involved tire of the situation or their resources are exhausted. Later, Conklin
and Weil (1998) further refined Rittel and Webber’s characterization of the wicked
problem by attempting to describe the nature and behavior of the problem solver. They
found that the behavior of the successful problem solver shared behavioral attributes with
creative problem solvers. Further, they show that instead of fretting about the iterative
aspects of problem solving, creative problem solvers embraced those aspects and did so with creative behaviors that appeared random. They went on to state this random creative behavior increased as the nature of the problem became “wickeder” or in this case, more complex. Conklin (2008) in his later work also drew the connection between the wicked problem and complexity. Clearly, he saw that wicked problems are just very complex problems.

As an outcome of their findings, Conklin and Weil (1998) proposed at least two wicked problem concepts that will be used in this study to identify complex problems. First, they stated the management of a wicked or complex problem is counterintuitive to the methods used for less tame/complicated problems. These simpler problems or tame problems (Williamson 2011) lend themselves well to the more accepted linear problem-solving methods, problem definition, problem analysis, problem solution, and solution implementation, while wicked and complex problems do not. These simpler types of problems can be clearly articulated with a well-defined vision and solution. The result is a well-executed implementation and the ability to evaluate the overall success of the effort both during the implementation process and upon completion. Conklin (2008, 9–10) noted that these types of tame or complicated problems display six attributes:

1. A well-defined and stable problem statement.
2. A definite stopping point, when the solution is reached.
3. A solution that can be objectively evaluated as right or wrong.
4. Membership in a class of similar problems which are all solved similarly.
5. Solutions which can be easily tried and abandoned.
6. A limited set of alternative solutions.
Behavior of the participants in these tame or complicated problems is static and leads to routine predictable tasking, as if they could be completed in assembly-line fashion. Tasks are done as planned using a standard sequence of process steps. Behavior falls into step with the planned process (Williamson 2011). However, the wicked or complex problem’s nature is quite the opposite and the planned process either does not fit or is eliminated. Using the wrong problem-solving method for a wicked problem only increases the complexity, thereby most likely increasing the potential to failure (Conklin and Weil 1998).

Earlier, Rittel and Webber (1973) were the first to outline 10 characteristics of a wicked problem. Later, Conklin (2008, 7–8) distilled these characteristics down to five that effectively capture the notion of wicked or complex problems:

First, the problem is not understood until after the formulation of a solution. In a complex problem or as the problem’s complexity increases, the understanding of the original root issue is either lost or was not correctly understood at the onset. In this case, when a solution is found, it may not match the original intent but does solve the problem that evolved from the solution attempt. In the case of a public implementation, the final solution may indeed solve a problem that was uncovered during the implementation, but it may not address the original policy intent.

Second, wicked problems have no stopping rule. In these cases an intended solution becomes the focus of the action “to solve.” The solution process becomes more important than the solution itself. In the common vernacular of project management, this is when the project is operationalized. In the case of a policy implementation, the act of implementing becomes on-going and takes on a life apart from delivering a solution to a
targeted public. A definition of completion is usually lacking. The end is unknown and implementation behaviors can become operational and part of the on-going organization.

Third, *solutions to wicked problems are not right or wrong*. The characteristics become interrelated. If, in Characteristic 1, the problem is not understood until something is implemented, then there can be no evaluation as to whether the original policy intent was correct or incorrect. Therefore, given this condition the question of right or wrong becomes irrelevant because the problem is defined by the solution.

Fourth, *every wicked problem is essentially novel and unique*. Reviewing Characteristics 1 and 3, the wicked or complicated problem can only be known by its solution and cannot be evaluated except by the fact it solved a problem embedded in the act of solution Consequently, the wicked or complicated problem’s likelihood of any similarity to any other problem is low. This is especially true if the policymaker is attempting to compare what appears to be like issues at the onset of creating new policy. The solutions to past wicked or complicated implementations do not lend themselves to future comparisons.

Fifth, *wicked problems have no given alternative solutions*. Since wicked or complex problems are unique and their problem is embedded in the solution, it can be assumed that no alternative solutions can be defined until the original solution has been defined. Therefore, alternative solutions may be discovered in a postmortem but cannot be preemptively identified. As has been previously presented in the review of project implementation methods, a postmortem step is recommended. However, this step should also focus on identifying correct management styles and methods in a complex environment as a means of contributing to complex management theory and practice.
These characteristics lead to the conclusion that complex problems, in this case complex implementations, are indeterminate, are unique unto themselves, and follow highly unpredictable paths, similar to comments made by Pressman and Wildavsky (1984). In addition, while researching a very different but difficult policy implementation, Rittel and Webber (1973) also observed, as did Pressman and Wildavsky, that “every wicked problem can be considered to be a symptom of another problem” (165), which also can be considered a tangential complexity characteristic. For this study, these characteristics will be used to identify an implementation problem or project as tame/complicated or complex. Characterization within this study is used to determine how the level of complexity affects implementation participants’ behavior (stakeholders, project members, and targets or end users). If the case-study implementation effort is characterized as tame/complicated, participant behavior will be expected to follow a linear and predictable pattern because of the simpler solution set found in a tame/complicated problem. However, if the implementation effort is determined to be complex, observations should find evidence of complex adaptive behavior (Curlee and Gordon 2011; Williamson 2011; Conklin 2008; Dawoody 2008; Miller and Page 2007; Davis 2007; Cutright 1999; DeGrace and Stahl 1990; Rittel and Webber 1973).

*Definition of Implementation Success or Failure*

The declared policy assumes the correct execution of that policy; thus, the question becomes how to know if the implementation is successful. Professional standard literature—the Standish Group’s CHAOS reports from 1995 to 2012 and the Software Engineering Institute’s Mission-Oriented Success Analysis and Improvement Criteria
reports—generally defines software and general implementation success as meeting three criteria: The implementation meets budgetary parameters, e.g., resources (people or money); It meets the identified timeline; and it meets the required implementation specifications (Standish Group 2011; Alberts, Dorofee, and Marino 2008). All three criteria must be met before an implementation is declared successful. This definition is very disciplined and specific; however, modified versions of these criteria can be found with other characteristics addressing risk, quality standards, and specific policy goals. Nevertheless, using data in the Standish Group’s 2011 CHAOS report along with their three standard criteria for successful projects shows IS projects partially or completely failed 68% of the time (24% are total failures, 44% are partial failures [not meeting one of the criteria]): Less than a third of IS projects were successfully completed. These rates are applicable across both private and public projects. This trend has been consistent for at least 30 years (Standish Group 2011).

While some controversy exists regarding the validity of the criteria or how they are valued (Eveleens and Verhoef 2010), Rossi, Lipsey, and Freeman’s (2004) program evaluation study states implementation failure is “when the outcomes are poor because the program activities assumed necessary to bring about the desired improvements did not actually occur” (79). Therefore, regardless of the structured definition of a successful implementation, meeting stakeholder expectations, including the policymakers and those targeted to use or benefit from the implemented policy, truly determines the venture’s success or failure.

However, meeting expectations may be even more subjective than it seems. The definition of success and failure in policy implementation literature appears to support
this contention. Pressman and Wildavsky (1984), as well as Lipsky (2010), offered a similar view. Pressman studied a federal government policy initiative to bring economic development to an urban area, while Wildavsky asked who makes the tangible decisions in the delivery of government services. In both cases, the researchers concluded that whether one is examining the implementation of a policy initiative or an ongoing daily service, the real evaluation of the policy’s success or failure can only be made by looking at what was completed or what is being delivered.

A further example of the subjective nature of implementation success and failure found in the literature is the concept of an implied “no stopping rule” (Rittel and Webber 1973). Simon (1996) makes a similar observation that success is declared when resources run out or the policymaker or stakeholder is “satisfied” and declares it “good enough.” This declaration of completion is hardly a full admission of success. It only means that the implementation will not be continued and what has been done will either be used or abandoned. While the statement may seem simple, declaring what is and is not successful is diametrically opposed to the accepted methodology used to manage an implementation. In the accepted linear methods, the last step in project completion is closure and assessing if the implementation effort met the original policy goals (Hill and Hupe 2009; Mazmanian and Sabatier 1989).

In the UC400 project, determining if critical stakeholders and the project team consider the implementation a success will be critical. This judgment will be an important evaluative component in the analysis of project team behavior during the execution of the project. The declaration by the stakeholders of the project success or failure will be
compared to the management style used and methodology applied in relationship to the subsequent team behavior.

**Impact on Public Administration Organizational Theory**

In general, the ideas expressed in CAS theory are antithetical to much of the organizational-behavior literature, especially the literature that defines the specific relationships between the individuals or agents within the organization or system. As has been discussed, standard organizational behavior theories, in general, define individuals within an organization as single, nondescript work units. A central theme in the literature is how to establish and maintain a productive relationship between the organization and the people who make up the organization (Jex and Britt 2008; Simon 1997). Again, the provided explanation is a linear, mechanical, and sterile view in which order is assumed and tasking is predictable. Plainly, an ordered and controlled environment is the desired state. This state should be maintained to ensure the actor–participant works efficiently, thereby maintaining the health of the organization. As will be seen, other standard theories have tried to interject a more humanistic understanding of the organization (Dewey 2012), but order, control, and predictability are still the underlying principles. This view is consistent across the literature addressing the public sector (Curlee and Gordon 2011; Wren 2005; Medd 2001; Mazmanian and Sabatier 1989; Drucker 1974).

As previously discussed, Wheatley (1999) has challenged these traditional assumptions, not only calling for the use of the biological organism metaphor, but also embracing the theoretical concepts presented in CAS. Therefore, the new organizational theories using CAS as a foundation concludes that the individual knows what and how to perform; they need a collective purpose to function (Mitchell 2009; Johnson 2007; Miller
and Page 2007; Lewin 1999). However, the complex environment that exists in new evolving global organizations, within both the public and private sectors, requires a better analytic explanation of organizational dynamics. This new explanation contributes to a better understanding of these dynamic attributes, thus defining the new organizational paradigm (Hill and Hupe 2009; Gilstrap 2005; Wheatley 1999; Cutright 1999; Lorenz 1993; Glick 1987).

*Grounded-Theory Research Method*

While several qualitative research methods are available to conduct an interpretative phenomenological research, the one used for this specific study had to meet two specific criteria: prior discipline use and thematic application. Since the purpose of the case study is to describe an IT project team’s behavior during the UC400 project, the question becomes one of applicability to the study of IS subject matter. Both Rodon and Pastor (2007) and Georgieva and Allan (2008) have used grounded theory in their respective research. Rodon and Pastor’s research focused on the behavioral similarities of managers required to implement a specific application across organizational boundaries. The results they found from this effort confirmed the applicability of the research method. Indeed, Georgieva and Allan (2008) have pointed out that grounded-theory techniques are well suited for this purpose because the process of analysis starts with examining interview transcripts and project documentation for key words and phrases that can characterize the attitudes of both stakeholders and users. They further comment that this has become a method used by project managers as a means of positioning the project effort. In the current research, grounded theory was used as an interpretative method, and tagged or coded words and phrases were used to interpret the project team’s
behavior. The derived data is then used in both the CIT and the CAS analytical model to
determine the extent and magnitude of influences amongst the identified actors.

Additionally in this study, grounded theory was also used to capture historical events
within textual material. Given that the UC400 project has been completed, this aspect of
the grounded-theory method suits this case study well (Merriam 2009; Glaser and Strauss
1967).

Instrumentation Measures and Coding. Measures, data collection, and analysis
are highly comingled in grounded theory. Fundamental to grounded-theory research is the
perspective that the measures, while separable to some extent, will be substantively
defined as data is collected. The final measure or level of analysis of this type of effort is
the discovery of categories that inductively lead to derived theories. These theories, as
defined by the grounded-theory method, are analyzed in the context of the joint CIT–
CAS model. Indeed, the nature of a phenomenological case study leads to the evolution
of theories based on the phenomenon being studied. Even though research questions may
be proposed, they are equally susceptible to modification as the discovery process
unfolds. In fact, the scope or breadth of what is to be measured is also to be discovered
within the research itself; thus, data can essentially present itself (Merriam 2009; Glaser
and Strauss 1967).

Given that grounded theory is defined as an interpretative research method, an
interpretive process is naturally built into its structure. The fundamental measurement
structure is contained in Table 5.
Table 5:
Grounded-Theory Measurement Structure

<table>
<thead>
<tr>
<th>Stage of measurement/analysis</th>
<th>Objective of the stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes (open or substantive)</td>
<td>Labels applied to data being collected from interviews, observations, or textual content.</td>
</tr>
<tr>
<td>Concepts</td>
<td>Clusters of like codes that contain similar content that can be grouped thematically.</td>
</tr>
<tr>
<td>Categories</td>
<td>Further grouping of like concepts, again where similar themes are present and will be used to produce theories of or from the phenomenon.</td>
</tr>
<tr>
<td>Theories</td>
<td>The result of the analysis that describes or explains the phenomenon.</td>
</tr>
</tbody>
</table>


*Summary*

This literature review offers a better understanding of the dynamics of policy implementation. Specifically, the review has pointed out that policy implementations are dynamically driven by the relationship between management style and planning-methodology application within the context of a complex environment. As a result, a further conclusion is drawn that the nature and relationship between these three implementation components does significantly influence the collective behavior of the individual actors’ and teams’ behavior, which in turn drives implementation results. Given these conclusions, the above premises were identified. The identification of these premises is vital because they were used to define the case-study research questions and to structure the application parameters of the joint CIT–CAS model. The following chapter addresses the research methods used in the UC400 case study.
Chapter III
RESEARCH METHODS

Overview

The research approach taken is a single case-study method applied to the 2011–12 information systems implementation for the NGS and GS UC400 project. The case-study analysis used an interpretative grounded phenomenological theory. Historical documentation and participant interview data were analyzed using grounded-theory coding levels to identify common behavioral themes within the project team’s group behavior. These themes were used as filters in the joint use of the CIT management decision-maker model and the CAS group dynamic model. The intent of the joint use was the extent and level of adaptive behavior in relationship to the management of a complex project, the method of execution, and the results of the project.

The outline below lists the topics covered in this chapter.

- Presentation of the research questions
- Description of the case study
- Discussion of how the participants were selected and the type of sampling used
- Types of data-collection instruments and coding as well as discussion of validity and reliability of the research method
- Description of the data-collection procedures
- Brief discussion of the analysis method
• Discussion of the research limitations and delimitations

*Research Questions*

The research questions will flow initially from the concluding premises in the previous chapter (see Table 6). However, given that this is an interpretative, qualitative case study using a grounded-theory method, modification to these questions or new questions did emerge during the analysis of the data.

**Table 6:**
**Concluding Premises and Characteristics**

1. Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.
2. The implementation group’s or project team’s behavior is heavily influenced by a combination of complexity level, management style, and implementation method.
3. The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging adaptive team behavior.
4. As the implementation environment’s complexity level increases creating instability within the process, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams. The goal of this emergent behavior is to re-establish a homeostatic and ordered state.

Within a complex environment the following adaptive behavior is expected to be observed:

4.1 One or more initial condition(s) will occur that have significant impact on the stability of the system or process.
4.2 Given both initial conditions and other external forces on the system or process the environment and organization becomes increasingly unstable leading to a state of creative chaos where new adaptive behavior begins to emerge.
4.3 During this period critical decision(s) are made creating bifurcation points where new adaptive emergent behavior is either encouraged or stifled.
4.4 If adaptive emergent behavior is allowed to proceed it will do so around attractors that defines new simpler rules of behavior leading to individual actors adopting similar and self-replicating behavior supporting the creation of a new stable order.
4.5 During the chaos event regardless of the continued existence of emergent behavior new network relationships will be established either supporting more stable system or process or evolving into individual survival behavior.
4.6 The stifling of new emergent behavior ends in a state of systems and process dysfunction.

Given these premises, Table 7 below identifies the specific research questions for this study:
Table 7: Case-Study Research Questions

<table>
<thead>
<tr>
<th>Supporting premises</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.</td>
<td>How did the stakeholders and participants evaluate the results of the project?</td>
</tr>
<tr>
<td>2. Complex environments influence implementation management and project groups’/teams’ behavior and define their interaction as seen through the use of methodology application.</td>
<td>Were there any significant environment factors present, both external and internal to the project; what was the impact on the environment?</td>
</tr>
<tr>
<td>3. The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging adaptive team behavior.</td>
<td>Did any of the external influences affect the behaviors of the project management actors who participated in the implementation? What were the individual actors’ perceptions of the style and level of management?</td>
</tr>
<tr>
<td>4. As the implementation environment’s complexity level increases creating instability within the process, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams. The goal of this emergent behavior is to reestablish a homeostatic and ordered state.</td>
<td>How did the project team’s behavior manifest itself within the described project environment?</td>
</tr>
</tbody>
</table>

Within a complex environment the following adaptive behavior is expected to be observed:

| 4.1 One or more initial condition(s) will occur that have significant impact on the stability of the system or process | Describe any events or external pressures experienced either at the beginning or during the project? |
| 4.2 Given both initial conditions and other external forces on the system or process, the environment and organization become increasingly unstable leading to a state of creative chaos where new adaptive behavior begins to emerge. | What were the trigger points that may have signaled behavioral changes were occurring? |
| 4.3 During this period, critical decisions are made creating bifurcation points where new adaptive emergent behavior is either encouraged or stifled. | Describe any behavioral drivers? If emergent project team behavior appeared, how did project management treat it? |
| 4.4 If adaptive emergent behavior is allowed to proceed, it will do so around attractors that defines new simpler rules of behavior leading to individual actors adopting similar and self-replicating behavior and supporting the creation of a new stable order. | Was there any significant adaptive behaviors displayed by the project team that were directed to establishing new stable organization? |
| 4.5 During the chaos event regardless of the continued existence of emergent behavior, new network relationships will be established either supporting more stable systems or processes or evolving into individual survival behavior. | How did relationships change over the course of the project? |
| 4.6 The stifling of new emergent behavior ends in a state of system and process dysfunction. | What, if any, team reactive behavior occurred in the face of project leadership demands for adherence to a structured project method? |
In early 2011, NGS, in conjunction with GS and the City of Cumming, GA, launched an aggressive project to build and staff a new remote university center within Cumming, Georgia. The Georgia Board of Regents (BOR) approved the project at the start of that year. By September, groundbreaking for the new building officially launched the UC400 project. As part of the overall project, the center had to have a complete technology infrastructure assembled and installed by September 2012. The technology infrastructure consisted of three basic parts: network and network security, classroom and administrative desktop installation, and classroom audio-visual requirements. Given that the original agreement was between NGS and Cumming, NGS took responsibility for leading the entire project, including all aspects of the supporting technology infrastructure. In addition, the original project specified that each institution would share the physical space, but would have assigned classrooms and facilities. While administrative and common areas were to be shared, NGS was responsible for the technology design and installation of the entire center. Each institution’s IT personnel were responsible to their respective organizations for network connectivity and security. Therefore, each university’s IT department worked independently from the other except in a few cases in which interfacing was necessary. Initially, these interface points were few. However, given the size of the design and installation, the one-year deadline and a minimal budget challenged the technology effort.

The first challenge to this collaborative technology project structure occurred four months from the start of the UC400 project. In January 2012, the BOR of the University System of Georgia approved a plan that would pursue a new strategy for student
supportability and cost saving by announcing that eight state universities would be directed to consolidate into four. Two of those identified universities were NGS and GS. The directive gave NGS and GS one year, from January 2012 to January 2013, to merge into one institution (University System of Georgia 2012). The impact on UC400 project was that a collaborative effort became a unified effort: The project was then a merger, and the design would have to change.

While this change created significant duress at the two universities and the overall UC400 project, the IT project teams were directly impacted because the two departments had to merge organizationally while completing the project. The nature of the project required a hard deadline to meet stakeholders’ expectations, especially regional students and the city. However, this unstable condition existed until a significant organization structural event just one month before the completion of the project. The impending but not formalized new organization structure required the project team to not only rethink how the balance of the project would be managed and executed, but how two IT departments with would culturally merge. Therefore, the context of this research case study was this highly dynamic environment and the content is the behavior patterns of the individual actors on the project team.

The following topics present how the research was conducted.

- Participant Selection
- Research Procedures
- Grounded Theory Analysis
- Research Limitations, Delimitations, and Assumptions
- Chapter Summary.
**Participant Selection**

Participants were broken down into three groups: stakeholders, project management, and individual project team actors. The selection of stakeholders was determined by the organization. In the case of the latter two groups, each organization identified reviewed all key individual actors. These individuals were located on both campuses as well as remotely. Purposive sampling was used in the final selection for two reasons. First, the original identification of project participants was based on availability and participation level in the project. However, over time other participants were identified that fit certain topic experience or knowledge. All project participants received an interview request; however, any number less than projected was the result of unavailability or refusal to participate.

**Research Procedures**

The following are the procedural steps used to carry out the research.

1. Prior to the research, two required items were met. The first is the completion of the Institutional Research Board (IRB) process to ensure that the research does not inflict harm of any sort on research participants. The second, a part of the IRB submittal, was obtaining written authorization from the organization permitting the research (Appendices C and D, respectively).

2. Both preliminary and research interviews were held with significant project stakeholders, project managers and project leads to review the research requirements, identify textual material, gather team communication, identify document sources, and identify any additional specific individual contributors. As previously noted, all those who were identified as major contributors or
individual actors in the UC400 project made up total sample and all were interviewed. Besides providing personal observation data the interviews resulted in permission to access textual.

3. Open-ended interviews were conducted using the interview form found in Appendix B, as approved by the Valdosta State University IRB board. In general, the interview form facilitated the capture of the project’s storylines from those who participated on the project. As stated before, the invitations for the individual open-ended interviews were sent to the entire UC400 IT project team; however, the actual number was constrained by participant physical location, time, and saturation (Rossi, Lipsey, and Freeman 2004). As previously noted, according to Rubin and Rubin (2005) and Guest, Bunce, and Johnson (2006), in conducting open-ended interviewing a point arises at which no new data can be provided with additional interviews: a theoretical saturation point. Therefore, the saturation point worked as a constraining factor in the study.

4. As can be seen on the sample interview form in Appendix B, two columns were added in the “Tell the Story” section that allowed the researcher to code or label material during and after each interview. These codes were reviewed against the transcribed version of the interview to ensure internal validity. In addition, and in line with grounded theory, a memo column was added for the researcher to provide commentary about a code or label to facilitate the thematic categorization.

5. Prior to any interview, the participant was asked to sign a consent form voluntarily participate. Confidentiality is a significant concern in case-study
research. Therefore, all possible means were used to safeguard the identity of every participant that provided interview data, documents, or any group session data. Appendix C presents a sample of the participant consent form used in the research. All data collected will be destroyed after analysis is completed and published.

6. Textual and document analysis were coded in a similar fashion as the interview data collection method. This analysis reviewed implementation directives and project materials from organization stakeholders, project management, and team membership as well as intra-team communications at periodic times during the research effort. The textural collection of data was not necessarily concurrent with the interview effort but scattered as the data-collection process proceeded. This process resulted in some follow-up interviews or group interviews.

7. To manage interview and textual data, a software application, QSR NVivo 10, was used to store the coding and categorization. In addition, this application was used to analyze the various relationships between categories and assisted in determination of behavioral characteristics.

**Grounded-theory Analysis**

The data analysis for an interpretative grounded-theory study, as previously explained, is an evolving effort and was driven by the interview and textual coding and categorization effort. Qualitative content-relational analysis is used to capture the relationship between the project behavior found in the UC400 project and both analytical models, CIT and CAS. This effort is necessary to determine the thematic relationship
between the grounded-theory results and theories found in both contextual interaction and complex adaptive behavior models.

<table>
<thead>
<tr>
<th>Flagged Word</th>
<th>Frequency</th>
<th>Weight**</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>open communication</td>
<td>2</td>
<td>-20</td>
<td>0</td>
</tr>
<tr>
<td>work as a team</td>
<td>4</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>neg external pressure</td>
<td>2</td>
<td>-20</td>
<td>0</td>
</tr>
<tr>
<td>loose specs.</td>
<td>2</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>no status rept</td>
<td>1</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>formal rept</td>
<td>2</td>
<td>-10</td>
<td>0</td>
</tr>
<tr>
<td>friendly relationship</td>
<td>1</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>lack of control</td>
<td>2</td>
<td>-20</td>
<td>0</td>
</tr>
<tr>
<td>having control</td>
<td>1</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>level of trust in team</td>
<td>4</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>timeframe meet</td>
<td>3</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>conflict</td>
<td>1</td>
<td>-20</td>
<td>-20</td>
</tr>
<tr>
<td>Close communication</td>
<td>4</td>
<td>-20</td>
<td>0</td>
</tr>
<tr>
<td>lack of confidence</td>
<td>1</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>missed deadlines</td>
<td>1</td>
<td>-20</td>
<td>-20</td>
</tr>
<tr>
<td>informal</td>
<td>1</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>together</td>
<td>1</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>open ended working</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>hurry up pressure</td>
<td>1</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>Change order impact</td>
<td>4</td>
<td>-10</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>-290</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9: Sample Content Frequency Analysis
Note: **Weighting is based on impact a behavior can have on team performance.

**Content-Relational Analysis and Grounded-Theory Results.** Figure 9 is an example of a content analysis based on coded words or phrases. In case-study analysis, the coding does not wait until after all the data is collected. Indeed, the identification of significant content words and phrases and their relationship to derived concepts and categories are iterative and dynamic. For example, after the first interview is completed a transcription is made and coded into emerging categories that describe the group behavior. As the coding continues, analysis that looks for patterns and associations begins to define the concepts and categories. The difficulty in this type of analysis is that
concepts and categories may not be descriptively constant across all project environments; they too evolve. The research becomes akin to stating, “I know it when I see it.” However, the content analysis helps discover and identify comparable concepts and categories.

Research Limitations/Delimitations/Assumptions

Given the openness of grounded-theory research, the method created self-imposed scope limitations. There is and was a tendency to allow the research effort to continue perpetually. For example in this case study there was desire to continue the behavioral analysis beyond the completion of the project as a further confirmation or rejection of the past project behavior. Therefore, there has to be imposed time limitations. A further potential limitation was the political environment in which the study was conducted. Even though the research was historical sensitivity on the part of the researcher has to be shown as to how behavioral patterns are explained without any interpretative implication as to individual interviewee’s motives.

Summary

The qualitative grounded-theory method has a high level of subjective and interpretative evaluation associated with the collection of data, analysis, and subsequent conclusions. However, the research method also provides rigor without imposing restrictions. Given the nature of the UC 400 information technology implementation research area, an interpretative grounded theory was clearly the best fit given past research in this area (Georgieva and Allan 2008; Rodon and Pastor 2007). The following chapter will present the results of the data analysis from the case study at the UC 400 university center. In addition, resultant findings and conclusions will be presented. The
final chapter will offer an evaluation of the conclusions and findings of this study considering the current research into policy implementations using CAS and CIT. The topic of usability of the results and methods in the creation of a heuristic practitioner’s tool will also be discussed in the last chapter.
Chapter IV

ANALYSIS OF RESEARCH RESULTS

Overview

Chapter 4 presents the analysis of the UC400 case study results. Qualitative grounded theory was used in the data-collection and analysis. This method required the use of participant and stakeholder interviews as well as associated documents addressing the UC400 IT infrastructure component of the construction of the University Center building. The research questions presented in Chapter 3 are used as the organizational structure in the presentation of the research results. Integrated in the research questions were specific questions that allow for the application of CIT and the CAS models to evaluate the behaviors of the individual actors and groups.

Below is an outline of the chapter presenting the UC400 research findings.

1. Research question review and profile of data sources.
2. Review of grounded theory analysis.
3. Overview of the UC400 IT infrastructure implementation.
4. Discussion of the final results of the IT infrastructure project.
5. Analysis of the project environmental complexity.
6. Application of CIT model and analysis of management behaviors.
7. CAS-model analysis of both individual-actor and group behaviors.
8. Summation of the case study and the ability to perform the analysis.
Review of Research Questions and Data Sources Profile

This section presents the research questions as identified in chapter 3 and used in the construction of the interview form, Appendix B. As stated previously, the order of the premises/research questions provides the organization of the data analysis. The second part of this section discusses the profile of the interview sample and the documents used.

Review of Research Questions. Table 7 in Chapter 3 (repeated below as Table 8) presented the research questions along with the supporting premises. The premises were conclusions derived from the literature review and reflect the current body of thought as presented in Chapter 2. The analysis will follow the order of Table 8.

A word of clarification, the analysis of the latter half of Premise/Research Question 2 will be combined with Premise/Research Question 3. Using this approach better aligns the categories generated from the grounded theory with the CIT model. In the same manner the analysis of Premise/Research Questions 4 and its sub-questions will be performed by applying the CAS model.

Profile of Data Sources. The combined IT project team from both NGS and GS was made up of individual technical contributors, section leads, and managers from each institution. A total of 17 team members were identified. After discussing the team composition with the current CIO and project manager 13 were then identified as team members who made significant contributions to the project and were members of the team for the entirety of the project. Both the CIO and project manager stated there were periodic contributors that included technicians from both organizations as well as outsider vendors. However, these individuals did not have a long-term perspective on the project nor did they participate long enough to influence its behavioral dynamics.
Table 8:  
Case-Study Research Questions

<table>
<thead>
<tr>
<th>Supporting premises</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.</td>
<td>How did the stakeholders and participants evaluate the results of the project?</td>
</tr>
<tr>
<td>2. Complex environments influence implementation management and project groups'/teams’ behavior and define their interaction as seen through the use of methodology application.</td>
<td>Were there any significant environment factors present, both external and internal to the project; what was the impact on the environment?</td>
</tr>
<tr>
<td>3. The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging adaptive team behavior.</td>
<td>Did any of the external influences affect the behaviors of the project management actors who participated in the implementation? What were the individual actors’ perceptions of the style and level of management?</td>
</tr>
<tr>
<td>4. As the implementation environment’s complexity level increases creating instability within the process, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams. The goal of this emergent behavior is to reestablish a homeostatic and ordered state.</td>
<td>How did the project team’s behavior manifest itself within the described project environment?</td>
</tr>
</tbody>
</table>

Within a complex environment, the following adaptive behavior is expected.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 One or more initial condition(s) will occur that have significant impact on the stability of the system or process.</td>
<td>Describe any events or external pressures experienced either at the beginning or during the project?</td>
</tr>
<tr>
<td>4.2 Given both initial conditions and other external forces on the system or process, the environment and organization become increasingly unstable leading to a state of creative chaos where new adaptive behavior begins to emerge.</td>
<td>What were the trigger points that may have signaled behavioral changes were occurring?</td>
</tr>
<tr>
<td>4.3 During this period, critical decisions are made creating bifurcation points where new adaptive emergent behavior is either encouraged or stifled.</td>
<td>Describe any behavioral drivers?</td>
</tr>
<tr>
<td>4.4 If adaptive emergent behavior is allowed to proceed, it will do so around attractors that define new simpler rules of behavior leading to individual actors adopting similar and self-replicating behavior and supporting the creation of a new stable order.</td>
<td>If emergent project team behavior appeared, how did project management treat it?</td>
</tr>
<tr>
<td>4.5 During the chaos event regardless of the continued existence of emergent behavior, new network relationships will be established either supporting more stable systems or processes or evolving into individual survival behavior.</td>
<td>Were there any significant adaptive behaviors displayed by the project team that were directed to establishing new stable organization?</td>
</tr>
<tr>
<td>4.6 The stifling of new emergent behavior ends in a state of system and process dysfunction.</td>
<td>How did relationships change over the course of the project?</td>
</tr>
<tr>
<td></td>
<td>What, if any, team reactive behavior occurred in the face of project leadership demands for adherence to a structured project method?</td>
</tr>
</tbody>
</table>
According to Guest, Bunce, and Johnson (2006), the acceptable minimum number of interviews is difficult to determine at the start of the research. The generally accepted practice is that interviews or document collection would continue until saturation. This is the point at which any additional interviews or documents would not provide new data (Merriam 2009). In the UC400 case study, 13 of the 17 participants were interviewed (approximately the same number from each institution). In grounded theory, the interviews are coded as they are completed. Categories and theoretical themes begin to emerge with the first interview, creating a data structure around the research premises. Using this approach, most major themes were identified after the eighth interview, suggesting a saturation point, after which few significant new data were gathered.

Table 9 presents the demographic profile of the 13 identified participants. In addition, five stakeholders were identified and three were chosen based on availability. The stakeholders represented joint university leadership, UC400 facility management, and university center management.

<table>
<thead>
<tr>
<th>Title</th>
<th>Number</th>
<th>Gender</th>
<th>Age Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Managers</td>
<td>2</td>
<td>Male</td>
<td>40–50</td>
</tr>
<tr>
<td>Mid-Level Manager</td>
<td>4</td>
<td>Male</td>
<td>30–45</td>
</tr>
<tr>
<td>Senior Tech</td>
<td>3</td>
<td>Male</td>
<td>25–40</td>
</tr>
<tr>
<td>Tech</td>
<td>4</td>
<td>Male</td>
<td>21–30</td>
</tr>
</tbody>
</table>

Each individual was interviewed using the UC400 interview form, Appendix B; in most cases the interview lasted from 45 to 90 minutes. All interviews were conducted in December 2012, approximately 4 months after project completion. In only one instance
was a joint interview conducted due to participant scheduling. Finally, one interviewee requested a phone interview. The interviews were conducted to elicit a behavioral assessment of the individual participant, a peer assessment, and a total project-team assessment. In addition, the interview technique asked the interviewee to present a verbal recollection of the UC400 project along various research-question themes.

In addition to the personal interviews, the data sources also included 68 project documents addressing project agreements, projections, budget issues, status reports, and various other project issues. Also, approximately 122 email messages and documents were reviewed and categorized covering some of the same subjects. These documents spanned from January 2011 to completion of the project in August 2012. The email messages and documents were read for research-question relevance and topics were categorized into the same coding structure as the interview comments. A comparison was performed between the two sources to identify any significant changes in the interpretation of events given the interviews were conducted 4 months after project completion. There was remarkable consistency between the two, giving greater validity to the interview results. However, the email messages were more candid and revealed general attitudes as well as specific concerns with the health of the project and interpersonal relationships.

*Grounded-Theory Method and Analysis*

*Grounded-Theory Research Method.* In contrast to quantitative research, phenomenological qualitative research does not necessarily attempt to prove a hypothesis. Instead, it focuses on finding answers to questions related to a social phenomenon in the hope of gaining a theoretical understanding of the phenomenon
Grounded-Theory Analysis. The selective grounded-theory analysis was conducted as follows. As previously stated in the research methods, Chapter 3, the interviews were conducted by allowing the interviewee to “tell the story” of the UC400 project. While the interview form (Appendix B) was constructed with specific questions to be asked, they were actually used as probing questions. Using this method, the interviewer was able to probe the story line and provide the interviewee the opportunity to address different behavioral aspects of the project. Therefore, a storyboard approach to the interview transcripts and documents created a categorization structure by identifying key words and phrases found in all data sources.

Using open coding helped identify both preset categories and new categories of behavior. The preset categories were aligned with the CIT–CAS model attributes to determine if the data supported the existence of either of the model behaviors. After the
coding was completed, word-frequency and textual-relationship analysis were conducted through the use of the QSR NVivo 10 software.

After the coding and categorization, these findings were used in a contextual analysis to discover emerging themes describing project management and individual actors’ behavior. These emerging themes were then used to draw conclusions and make generalizations about various aspects of the project. This method of analysis was applied in this research to addresses the projects’ complexity level, management interactive behavior, and management methodology as well as to assess individual team actors’ complex adaptive behavior.

Words or phrases used in the analysis are either actual words or phrases used by a majority of the interviewees or they represent a concept that was used by many of them. However, the articulation of the concepts varied and it is the variation that facilitates a fuller understanding of the project behaviors. It is also important to point out that the key words and phrases are used as descriptors of individual and team behavior based on individual perceptions and understanding of the UC400 project environment. Therefore, there is no correct answer, only an evaluation of subjective perceptions of the events that took place between September 2011 and August 2012.

UC400 Information Technology Infrastructure Project Overview

The IT infrastructure project followed the overall UC400 project timeline, starting in approximately September of 2011 and ending with the center opening in early August 2012. The original 2011 plans for the UC400 University Center site defined the technical requirements as supporting seven classrooms and one computer lab. The building and surrounding area were to be supported by a wireless network. In addition, there would
have to be agreement between the two IT organizations as to how the University Center would be supported after the facility was operational.

To fully understand the dynamics of the project and how the interviews were conducted, it necessary to understand that the project year from September 2011 to August 2012 was broken up into at least three segments. The definition and start and end points of each segment are derived as an outcome of how the interview dialogues unfolded concerning project events. As a natural outcome of the storyline interview approach, a project timeline chronology develops. The segments below are the result the collective interview data. As a point of clarification, while one might refer to these segments as phases, this naming convention would cause confusion because the term \textit{phase} is more formally associated with actual milestones within a project timeline. Therefore, for this analysis, the term \textit{segment} will be used.

\textit{First Segment, September 2011–December 2011}. The first segment begins with the start of the UC400 project in September 2011 and extends to December 2011. During this 4-month period, the UC400 project was a collaborative or joint venture between the City of Cumming and the two universities. Since NGS had originally worked with the City and Chancellor’s office to gain approval and fund the project, they were the designated lead institution, which rippled down through the academic, administrative, and, ultimately, the IT organization. The original design from the NGS perspective viewed the UC400 building as an extension of the Dahlonega Campus. Therefore, the technical infrastructure would mirror as much as possible the infrastructure found in any building on the NGS main campus. Additionally, GS would leverage the network capabilities and provide whatever necessary other classroom and lab technology required
by their institution. Essentially, GS would be a “resident visitor.” However, the defining aspect of this segment was that the GS assumptions about the project were different. They viewed the arrangement as more of a joint tenant with the right to ensure that the technology infrastructure was compatible with the required service delivery levels provided at both the main GS Campus and Oconee Campus. This perspective meant that GS expected to have greater say in overall technical design.

Second Segment, January 2012–June 2012. The second segment starts ends with an announcement and ends with another. The first was the January consolidation announcement that North Georgia College and State University would merge with Gainesville College and State University to form a new combined institution, the University of North Georgia, by January 2013. For the IT infrastructure effort of the UC400 project, this added an additional level of anxiety and concern to an already contentious relationship. The two collaborative teams began to see their respective decisions and actions in light of a reorganization of the IT departments into one IT organization, adding an extra dynamic element that would intensify an already heated technology debate.

The second announcement was the resignation of one of the two CIOs. This announcement was to impact the infrastructure final design and its implementation. While it may have reduced some of the reorganization anxiety for some, it intensified it for others. This announcement, while not directly affecting anyone, negatively affected morale, impacting the team’s behavior and how they approached the project, especially the management team.
Third Segment, July 2012–August 2012. This last segment can be referred to as the execution segment. Regardless of all the organizational or individual dynamics, this period was the time the infrastructure for the center had to be completed if it was to be completed on time. As will be seen, these distractions tested the managerial leadership, personal commitment, and individual behavior and could have colored the final solutions. Besides the actual opening of the University Center, the other significant event was a 3-day period when for the first time a large majority of the two teams had to physically work together to install the technology in the new building. The analysis below will point out how this time became a necessary period of stabilization for not only the team, but also the entire IT organization.

**Stakeholder and Project Team Evaluation of the Results of the IT Infrastructure Project**

<table>
<thead>
<tr>
<th>Premise</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.</td>
<td>How did the stakeholders and participants evaluate the results of the project?</td>
</tr>
</tbody>
</table>

Starting with this section, all subsequent section headings will begin with the premise and supporting research questions. As previously outlined in Chapter 2, IT projects typically follow a prescribed criterion that measures a project’s success, failure, or partial completion. However, the criterion is not necessarily rigidly applied by the actual stakeholders of a project. In this case there is a level of acceptance that can come from a bottom-up evaluation by targeted recipients or a discussion by stakeholders. If the intent of the implementation is carried out per the policy directive, then it is successful even if some details may be weak or not implemented at all. In this case, as Simon (1996)
points out, if the stakeholder or policymaker declares it successful, for whatever reason, it is successful.

In the case of the UC400 project, all the stakeholders interviewed declared the entire project including the IT infrastructure component a success. The only criterion used to make this assessment was the ability of the center to host new classes as of the 2012 fall semester. If there were any existing major issues present at start-up, these stakeholders did not mentioned them. About 1 month into the 2012 fall term there were some lingering minor issues the Center Director communicated to the IT organization. However, these minor issues were not considered substantive and, therefore, were not considered part of the UC400 implementation success evaluation. In summary, not only were the stakeholders accepting and supportive of the results, they noted that the IT team was “leading the way on how to work together,” which became a major theme during the IT infrastructure project.

All the IT team case study participants agreed with the assessment of the stakeholders. Even while applying the more rigid set of criteria of on time, within budget, and delivery of the correct user-defined functionality, it was still considered a successful project. However, the definition of success as to quality was not universally shared. As one project lead stated, the project was a success, “Because we opened on time, on budget and, as far as the students and the users were concerned, their experience was a positive experience.” However, as far as the internal success of the project, “behind the scenes, were we successful in project management and in communication? Absolutely not.”
There was a very strong theme through the interviews with the project team actors: Even before the consolidation announcement, the two teams were in disagreement on the design and hardware to be used at the new university center. However, from a university and team assessment, the UC400 IT infrastructure project was successful. The uniform opinion of the entire team was expressed by a team member and echoed by many: “What drove the project at UC400 was the deadline, the love of what we do and the mission of higher education. That’s what drove it,” for example, professionalism and the fact everyone wanted to do a good job.

**Analysis of the Environmental Complexity Level**

<table>
<thead>
<tr>
<th>Premise</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Complex environments influence implementation management and project groups/teams’ behavior and define their interaction as seen through the use of methodology application.</td>
<td>Were there any significant environment factors present, both external and internal to the project; what was the impact on the environment?</td>
</tr>
</tbody>
</table>

As noted in the UC400 project overview, the stakeholders’ and faculty/student users’ needs were simple. They wanted to attend classes at the Cumming site and not be encumbered by institutional distinction. They wanted to attend class, and “the system” should work. As one project team member recalled, “I mean you would ask them and then, this was funny, somebody was asking a student, ‘Are you a Gainesville student, or are you a North Georgia student?’ and he said, ‘No, I go to school here’” in Cumming. However, simplicity breeds complexity; to make that happen, the system had to appear simple on the surface, but in fact it had to connect each student and every faculty and staff member to a specific institution.

Regardless of the apparent technological issue the IT team all felt that the technical aspects of the project were in and of themselves rather straightforward. Indeed,
both teams commented on their past experiences with similar infrastructure projects and pointed out that the technical challenge was not very difficult. If there were project issues, it was the aggressive timeline and budget constraints. However, the project was complex as expressed best by a management team actor:

> What I’m saying is what happened on the surface was two very professional groups of people pulling off a fine facility in a record amount of time with a believably small budget and two completely different cultures agreeing to get it done, but if you were to start looking at the person, the personalities, there were a lot of folks just put in a situation that left them uncomfortable.

The characteristics identified by Rittel and Webber (1973) and Conklin (2008, 7–8)—see pages 74 of Chapter 2—are used as the proposed complexity attributes as well as their definition of a complicated or tame problem. These attributes are used to determine the level of complexity found in the UC400 project. After reviewing both interview and document data, it was found that, aside from the vertical project segments noted above, the project also was bifurcated along a two horizontal thematic lines. While the bifurcation was alluded to previously, the data analysis clearly pointed to the fact that, as a technical project, the UC400 implementation was viewed as only a complicated problem. Even with a tight but manageable budget and time constraints, the technical project was doable. In contrast the project actor’s interview data also clearly identify two horizontal sociological threads running in parallel. The first thread was the carryover from Segment 1, the technical design infighting, which defined the management team’s behavior through most of the project. The second parallel path was the growing and overriding concern about the team’s ability to work together after the consolidation announcement. The unknown of a new organizational structure had a significant influence on both the communication and working relationships between managers and
individual team actors. These sociological threads added to the complexity of the environment, making the technical discussion and subsequent decisions even more difficult. One technical lead described this dynamic as “organizational positioning.”

Technical design decisions across the entire project became moves and countermoves in the pending organizational chess game that dominated most of Segment 2. As the rest of the analysis will point out, it was the sociological aspect of the project, as well as future events, which made the timeline even more pressing and turned the dynamics of the project from complicated to sociologically complex.

Table 10 is the content-relational analysis of complexity used for this case study. The complexity analysis shows the contrast between complexity and complicated attributes. Key word and phrase descriptors used by management and individual actors are aligned with complexity or complicated attributes in the outside columns. The middle columns represent the two thematic threads, sociological and technical.

As the previous Segment 1 description pointed out, the above finding also supports the finding that there were some the initial cultural clashes even before the announced consolidation. This was especially true amongst those who participated in the original project planning. As a general finding, the comments suggest that the technical aspects of the project, while challenging, were not a contributor to the level of complexity. However, it can also be concluded that the impending organizational change created by the consolidation announcement did create a level of sociological complexity that overshadowed and influenced communication and behaviors throughout the entire project. Indeed, in an analysis of the findings, the comingled horizontal complexity threads clearly demonstrate that the inability to concede technical points created an
atmosphere of indecision and leadership crisis. This state of management also created a level of anxiety amongst the individual team actors. The interviewee perception expressed concern that the completion of the project was in jeopardy as well as an individual’s place in the new IT organization. As one team participant commented, “I was not sure we could get it done.” A result of these complex dynamics was a growing sense of urgency amongst the team. It was not until the end of the project that this organizational complexity dissipated to a lesser level.
Table 10: Complexity/Complicated Attributes

<table>
<thead>
<tr>
<th>Complexity Attribute</th>
<th>Organizational Issues</th>
<th>Technical Issues</th>
<th>Complicated/Tame Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The problem is not understood until after the formulation of a solution.</td>
<td>Learn a new culture, new level of communication, Outside forces pushing down on …, Fear of not knowing who is going to be your boss.</td>
<td>Know user needs, Past experience, Had a set project plan</td>
<td>1. A well-defined and stable problem statement.</td>
</tr>
<tr>
<td>2. Wicked (complex) problems have no stopping rule.</td>
<td>Two different cultures, Combine the cultures, Different agenda, Won’t know, We do things different, We are from two very different universities.</td>
<td>It has to be done, Hard deadlines, Can’t let our customers down, We’ve got to do this by the end of the day, so let’s get it done, Fixed dates.</td>
<td>2. A definite stopping point, when the solution is reached.</td>
</tr>
<tr>
<td>3. Solutions to wicked (complex) problems are not right or wrong.</td>
<td>Different strategic views, Had to compromise to get something done, Strong technical views and opinions, What was quality.</td>
<td>Difference of opinion, It worked, Need to succeed, Both designs would work, but which was better.</td>
<td>3. A solution that can be objectively evaluated as right or wrong.</td>
</tr>
<tr>
<td>4. Every wicked (complex) problem is essentially novel and unique.</td>
<td>Never been through this before, Unknown state.</td>
<td>Done similar project before, Both have experience, Knowledgeable staff.</td>
<td>4. Membership in a class of similar problems that are all solved similarly.</td>
</tr>
<tr>
<td>5. Wicked (complex) problems have no given alternative solutions.</td>
<td>IT was leading the way, Who is going to be your boss.</td>
<td>(This point was not addressed by the participants as an acceptable alternative)</td>
<td>5. Solutions that can easily be tried and abandoned.</td>
</tr>
</tbody>
</table>
<pre><code>                                                                                   |                                                                                                                                                      | Faculty and student expectations.                                         | 6. A limited set of alternative solutions.                         |
</code></pre>

In summary the content-relational descriptors identified these actions as indicators that the complexity level was increasing. As the complexity level increased, the environment then became less stable. Again, the increasing complexity level was not technical complexity but a sociological complexity.
CIT Analysis of Management Behaviors and Application of Method

<table>
<thead>
<tr>
<th>Premises</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Complex environments influence implementation management and project groups’ teams’ behavior and define their interaction as seen through the use of methodology application.</td>
<td>Were there any significant environment factors present, both external and internal to the project; what was the impact on the environment?</td>
</tr>
<tr>
<td>3. The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging adaptive team behavior.</td>
<td>Did any of the external influences affect the behaviors of the project management actors who participated in the implementation? What were the individual actors’ perceptions of the style and level of management?</td>
</tr>
</tbody>
</table>

The statement below from one of the team managers captures the overall feeling of how external forces—consolidation, budget, and timeline—all came together to create a prevailing sense of urgency in the UC400 project.

Others might cover it up and not as open to discuss it… the background of the consolidation was a career changing, or life changing, impact for some people and that’s a lot of added stress on top of having to deliver something in this short timeframe with a shorter budget, or lesser budget.

While the IT team was later extolled by stakeholders as a positive vanguard in the entire university consolidation effort, the IT management team’s experience was couched in terms of frustration, suspicion, miscommunication, indecision, positioning, and anxiety. Indeed, the same team manager goes on, “Yeah, I’ve never had to work on a project that had those outside forces pushing down on it.”

As in the previous section, a content-relational analysis format is used in conjunction with the CIT model presented in Chapter 2, page 30, Figure 1. Through the use of the CIT model, the UC400 project data analysis was performed to determine the changing perceptions and behavior of the project-management team. In this analysis, the management team is treated as a single body. This was done to prevent any
misinterpretation of these findings and to ensure that information provided in this study does no harm to the exiting IT organization at the new University of North Georgia.

The CIT model is overlaid on the Table 11 content-relational analysis below. The CIT interaction attributes, motivation, cognition, and power/capacity are listed on the left side of the table. The next three columns represent the three project segments discussed earlier. In addition, each column heading has listed the key identified external forces present during each time segment. Each cell lists representative key descriptor words and phrases from 86% of the management team and individual actors’ observations from the entire team. The descriptor words and phrases describe management behavior at each corresponding interaction attribute.

As in the previous analysis, all descriptor words and phrases are drawn from the data and represent a collective attitude of the project actors, both management and individual contributors. The representative statement in the last row captures the best description of the methodology debate and how it was used during this period. In addition, the cells in the last row provide a summary of the influence the project method had on the project within each respective time segment. The data from this last row will be used as data sources in the application of the CAS model.
Table 11:
CIT Model of Management Interaction

<table>
<thead>
<tr>
<th>Interaction attributes</th>
<th>Project Segment 1 External Influences</th>
<th>Project Segment 2 External Influences</th>
<th>Project Segment 3 External Influences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project Launch technical requirements&lt;br&gt;technical design&lt;br&gt;aggressive timeline&lt;br&gt;budget&lt;br&gt;Collaborative working between two different teams</td>
<td>Consolidation Announcement pending IT reorganization Vendor Mgt delivery performance budget constraints</td>
<td>Project Execution vendor delivery release of building</td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td>project time&lt;br&gt;budget&lt;br&gt;knowledge of customers</td>
<td>project consolidation&lt;br&gt;unclear organization&lt;br&gt;challenged&lt;br&gt;changing budget</td>
<td></td>
</tr>
<tr>
<td><strong>Own goals and values</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External pressures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-effectiveness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cognition</strong></td>
<td>collaborative&lt;br&gt;distinct cultures&lt;br&gt;organization structure&lt;br&gt;difference&lt;br&gt;single design</td>
<td>strained collaboration&lt;br&gt;difficult communication&lt;br&gt;unknown organization&lt;br&gt;personal security&lt;br&gt;begin to compromise&lt;br&gt;anxiety</td>
<td>individual&lt;br&gt;professionalism&lt;br&gt;management unclear&lt;br&gt;leadership at the bottom&lt;br&gt;compromise&lt;br&gt;capitulation</td>
</tr>
<tr>
<td><strong>Interpretations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frames of references</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Observations of reality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity and Power</strong></td>
<td>project leadership is clear&lt;br&gt;adequate resources exist&lt;br&gt;design and experience driven</td>
<td>their way, our way&lt;br&gt;uncooperative&lt;br&gt;unclear shared resources&lt;br&gt;unclear authority&lt;br&gt;vendor management difficult</td>
<td>management not active&lt;br&gt;everyone participates&lt;br&gt;high level of team work&lt;br&gt;leaders less</td>
</tr>
<tr>
<td><strong>Attribution by others</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resources available</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resources accessible</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Generalized comment</strong></td>
<td>For them, right, and they kind of expected us to fit into the project management type approach and we expected them to sort of, you know, have, just communicate in the hallways and have discussions and be able to, you know, deal with last-minute surprises that come up</td>
<td>“Oh, we do project management too, just like you guys do, only we use agile project management,” and I looked at him and I said, “Really? You use agile project management?” They said, “Yeah it’s different than the overly structured way that you all do it.” … “Ok, which agile technique do you use?”</td>
<td>… you kind of got to shoot from the hip, and for the most part it was, “Look, this is happening, what’s your suggestion? Here’s mine,” and willingness to, by all means, willingness to collaborate is another big aspect</td>
</tr>
<tr>
<td><strong>Management conversion through application of methods</strong></td>
<td>Structured project management</td>
<td>Clash of methods</td>
<td>No methods, individual initiative</td>
</tr>
</tbody>
</table>

The analysis points out that the motivation, cognitive awareness of the environment, and the available capacity and power changed as the project progressed. In Segment 1, the collective management teams were both highly motivated and confident
in their independent and to some extent collective knowledge and skill to complete the UC400 project. They were both aware or became aware during this segment that a collaborative effort, while not impossible, was going to be a challenge. The all of the management interviewees who commented on this segment clearly articulated that their respective teams possessed the capacity to execute the project with little to no assistance from the other. The only exception was that assistance was needed in defining each respective user’s requirements.

Given their respective strong articulated position, the early clash over design and method was not a surprising observation. Each would have liked to have done it “their way.” However, given the structure of the project at that time NGS IT was identified as the IT project lead given that NGS was the lead on the entire project. Therefore, there was no real parity between the two organizations and NGS launched the project. During the launch, NGS put forth an early technical design and put in place a structured project methodology. While there may have been room to negotiate at the design level to support the GS needs, it was again expected that GS would work within the technical design guidelines and also adopt the project management standard. The best descriptor of the project-management differences in the management team is found in the following comments from two managers with different perspectives. The first represents the structured view and noted that the other part of the management team “…expected us to fit into the project management type approach… just communicate in the hallways… deal with last minute surprises that come up.” In contrast the ad hoc management contingent saw the structured formality as response impediment to stakeholder needs. Indeed, they both took a firm stance that there method was correct.
During Segment 2, the environment changed with the announcement of the two universities’ consolidation. There was a clear realization that all functional areas, including IT, would have to merge into one organization. However, in contrast to most other functional areas within the two universities, the IT organizations were already chartered to work on the joint UC400 project. The result was that the joint UC400 project in essence became an IT reorganization accelerator since the collective team realized they were both now equally accountable for the project, including its design and support.

The key descriptor words and phrases in the Segment 2 column of Table 11 clearly demonstrate that the interaction characteristics shifted considerably. Clearly during this segment, the entire management team remained focused on what needed to be accomplished. In the course of the interviews all members repeatedly stated that making sure the project was completed in support of the faculty and student was always their primary goal. What did become unclear was how they would do it technologically and organizationally. The growing pressure of budget constraints and later vendor performance issues negatively influenced motivation within the management team.

Motivation was also affected by the awareness that collaboration was becoming even more difficult given the respective management teams’ interactive positioning behaviors. With organizational uncertainty, over 80% of the individual actors felt individuals and groups of individuals were “jockeying” within the project’s management team. As an example of the positioning behavior was a critical assessment of how others would communicate. This was a shared internal perception in and amongst a large majority of the management team that ultimately affected their respective working relationships.
The positioning behavior, as pointed out before, was attributed to the recognition that they all would eventually be one organization. Therefore, boundaries were drawn within the management team and played out in their respective defenses of design specifications and supportability requirements. The universal justification for this behavior was the claim that the others did not understand their respective organizations. However, the explicit descriptors reflected a perceived threat and loss of influence or power in not only directing the strategic technological direction, but also in how a “new” IT organization would be managed in the future. Individual actors as well as the management staff descriptors made it clear during this time that leadership direction and authority were unclear. Like the conflict over technical design, use of a structured method also continued. In interpreting the findings, it becomes clear through the interviews and the written communications that a form of passive resistance set in. Again an example is found in each team’s interview comments about the other as to the level of formality in email communications. While project status reports were appreciated, anything beyond that was critically evaluated for motive as well as content. As a result of the position infighting, a collective perception by individual team actors was project leadership was indecisive and unclear as to the direction of the project. A common theme in the individual interview data was the question of trusting their counterparts. The significant organizational shift that had a direct influence on all aspects of project behavior, including those described above, was the resignation of one of the CIOs.

The Segment 3 column in Table 11 reveals an even greater shift in management motivation, cognitive awareness, and understanding of capacity or power. In a sense, the change can be summed with two concepts, leaderlessness and capitulation. As previously
pointed out the management team was unwavering in their commitment to complete the project on time regardless of the internal organizational issues. This commitment was a strong cohesive element in and for the entire project. With such a short time period left in Segment 3 to the end of the project, motivation of the management team as well as the whole team shifted to a single goal of doing whatever was necessary to complete the project. A carryover external pressure was one vendor poor performance, which contributed to the management team’s behavior during Segment 3. The vendor-performance issue added an even greater sense of urgency. Therefore, an increasing awareness of urgency drove this segment. It demanded that all decisions, pending or otherwise, needed to be quickly negotiated. Any previous strong stances on any topic had to be resolved immediately to complete the project.

Many different individual project actors observed that management’s positioning behavior had significantly collapsed. As one manager pointed out in describing how the issues of the technical design were resolved, it was not “give and take” compromise, but in fact capitulation. The result of the capitulation of members of the management team, however did not necessarily lead to a strong single team leadership; rather it led to a time of leaderlessness. Management flattened to the level of “doers.” This change in behavior was effectively created with the resignation of the CIO, leaving a power vacuum. What is interesting from the findings is that no one attempted to fill the vacuum during this segment. Indeed, from a project-management perspective, the team coordination continued without any need for a strong central leadership. Project management as a control activity was jettisoned. The result was, as one technical lead described, “trench
leadership.” Everyone was expected to do whatever was necessary to complete the project. The concluding result was that project-team management imploded.

The overriding driving force permeating Segment 3 is best seen in a stakeholder’s observations. While the observation makes it clear there was some ability for the IT team to work together during the project life, it specifically addresses a short period of 2 or 3 days in July 2012. With less than 1 month before the building was to open and classes begin, the building was released for occupancy. All final IT setup in classrooms, offices, and labs could be completed. A joint IT team from both organizations had to physically come together and complete the final setup over this 2-to-3-day period. The stakeholder’s comment about those 3 days describes the “trench leadership” that influenced the individual team members’ behavior during this segment.

Getting things to work appropriately trumped everything, and so very quickly that group came together and said, “Getting these things installed, getting this stuff done is the most important thing. We’re not going to get bogged down in how to do it.” I think some of them said, “You set that lab up and we’ll set this lab up, and whatever,” and so I think they kind of just… worked it out amongst themselves and made some compromises.

The summary CIT findings in response to the research questions: Did the any of these factors affect the behaviors of the project management actors who participated in the implementation? and What was the perception by the individual actors to the style and level of management? are presented in Table 12. Using the storyboard style, the summary identifies the main threads in management behaviors during each segment.
Table 12: Summary of CIT Model Finding

<table>
<thead>
<tr>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independently confident of abilities.</td>
<td>Positioning based on impending and unknown change in organization.</td>
<td>Capitulation on positions.</td>
</tr>
<tr>
<td>Strong belief in technical design.</td>
<td>Anxiety and guarded actions.</td>
<td>Leveling of structure.</td>
</tr>
<tr>
<td>Collaboration with high degree of conflict.</td>
<td>Critical assessment of others knowledge and practice of project methods.</td>
<td>Adoption of “trench” leadership.</td>
</tr>
<tr>
<td>Conflicting adherence to project methods.</td>
<td>High frustration in project environment.</td>
<td></td>
</tr>
</tbody>
</table>

CAS Analysis of Actor and Group Behaviors

<table>
<thead>
<tr>
<th>Premise</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. As the implementation environment’s complexity level increases creating instability within the process, it also increases the probability of complex adaptive behavior by groups and individuals within the project teams. The goal of this emergent behavior is to reestablish a homeostatic and ordered state.</td>
<td>How did the project team’s behavior manifest itself within the described project environment?</td>
</tr>
</tbody>
</table>

“got two different cultures trying to meet somewhere.”

This statement from an individual contributor captures the essence of what happened to the entire IT organization. As the interview and document data set was analyzed this became a main theme. In this and the remaining sections of the data analysis, the team behavior over the course of the project will be reviewed and presented using a CAS model. Therefore, the approach taken to address the primary premise/research question repeated above will be through the application of a CAS model. In this section there will be separate analyses of each secondary premise/research question associated with a major characteristic in CAS theory, as seen in Chapter 2 page 65. Following the secondary premises/research questions findings will be the CAS Summary findings, Table 14. As a review, the appearance of complex behavior is determined
through a series of related occurrences, and complex behavior is an evolutionary process from one state of homeostasis to a new one. The new state, however, results in a different system or process. The following analysis will use the CAS model characteristics to determine if the complexity-related occurrences were present in the UC400 project.

Table 13 is an overview of the findings of the discovered complex occurrences and their relationship to the existence of CAS characteristics during each project segment from the entire team, both management and individual contributors. As the analysis proceeds, it should be noted that many of the descriptor words or phrases were used more than once or as a standalone with dual meanings to express related behaviors: e.g., management action and team reaction. In addition, to demonstrate how the CIT results not only overlap, but become part of the complex behavior, two rows are taken from Table 13 and included in the CAS analysis. Therefore, on Table 13, row one, are the segment results of the use of structured project methods as an indicator of management responsive behavior to external and internal forces. Row 2, CAS initial conditions and external influences, are the same as found in the CIT analysis, Table 12. The reason for this inclusion was that no other initial conditions or external influences were discovered as a result of the findings. However, this treatment of initial conditions and external influences cannot be construed as a universal generalization. It is clear different implementation studies could yield a different finding since individual actors or project teams can be subject to independent initial conditions and be influenced by external pressures that exist outside those exerted by management.
Table 13:
CAS Characteristics by Segment

<table>
<thead>
<tr>
<th>CAS Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT Results management</td>
<td>Structured project management</td>
<td>Clash of Methods</td>
<td>No Methods, individual initiative</td>
</tr>
<tr>
<td>application of methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial conditions and external influences.</td>
<td><strong>Project Launch</strong> technical requirements</td>
<td><strong>Consolidation Announcement</strong> pending IT reorganization</td>
<td><strong>Project Execution</strong> vendor delivery release of building</td>
</tr>
<tr>
<td></td>
<td>technical design</td>
<td><strong>Vendor Mgt</strong> delivery performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>aggressive timeline</td>
<td>budget</td>
<td></td>
</tr>
<tr>
<td></td>
<td>budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborative working between two different teams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergence and chaos event.</td>
<td>clashing collaboration</td>
<td>organization</td>
<td>come together</td>
</tr>
<tr>
<td></td>
<td></td>
<td>different</td>
<td>work together</td>
</tr>
<tr>
<td></td>
<td></td>
<td>difficult communication</td>
<td>one organization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lack of trust</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>anxiety</td>
<td></td>
</tr>
<tr>
<td>Bifurcation point and self-similar behavior.</td>
<td>none present</td>
<td>urgency</td>
<td>complete project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>leadership tension</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>clashing collaboration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>compromise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>separate paths</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>completion goal</td>
<td></td>
</tr>
<tr>
<td>The dissipative system and attractors.</td>
<td>none present</td>
<td>single job</td>
<td>direct leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>end goal</td>
<td>slight compromise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>individual compromise</td>
<td>all contribute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>project leadership</td>
<td>do a good job</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not clear</td>
<td>individual</td>
</tr>
<tr>
<td>Dysfunctional behavior.</td>
<td>none present</td>
<td>conflict</td>
<td>none present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>non-collaborative</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>disagreement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>design issue</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>method criticism</td>
<td></td>
</tr>
<tr>
<td>Networks and relationships.</td>
<td>conflict at my level</td>
<td>our team will work together</td>
<td>shared ideas</td>
</tr>
<tr>
<td></td>
<td>our way</td>
<td>anticipation</td>
<td>open communication</td>
</tr>
<tr>
<td></td>
<td>distant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As the table indicates, not all CAS characteristics were present in all segments of the project. This is to be expected as the discussion of CAS theory in Chapter 2 points out that complex behavior evolves over the course of time and events. Regardless of how the
CAS characteristics listed in Table 13 appear as if they fall in a sequential order, they are more trigger driven than a projected series of dependent events. Some dependency occurs between new behavior-driven events; however, the how and what of the dependency is not fully predictable. What is known is that the emergence of these occurrences can and does create triggers for the next evolution of behavior. Given this condition, CAS behavior characteristics were not expected to be present at all times.

*Initial Conditions and External Influences.*

<table>
<thead>
<tr>
<th>Premise</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 One or more initial condition(s) will occur that have significant impact on the stability of the system or process.</td>
<td>Describe any events or external pressures experienced either at the beginning or during the project?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial conditions and external influences.</td>
<td>Project Launch technical requirements technical design aggressive timeline budget Collaborative working between two different teams</td>
<td>Consolidation Announcement pending IT reorganization Vendor Mgt delivery performance budget constraints</td>
<td>Project Execution vendor delivery release of building</td>
</tr>
</tbody>
</table>

As in the CIT analysis, the initial and ongoing external influences are the same. What is important, however, in this analysis is the question whether initial conditions in Segment 1 had a long-term influence throughout the entire project? In response to the question, this statement from a member of the project management team, "original design issue …. expectation were different set the relationship from the beginning” implies the competitive level and power struggle that went on during Segment 1. Indeed this struggle was seen during much of Segment 1. Further findings pointed out that in Segment 1 both members of the management team and individual actors clearly identify with the above statement that each team had very different technical and methodological
expectations. The intensity of conflicting perspectives affected all levels of the project: technical requirements, expectation of working relationship, project ownership, and leadership. The only clear agreement was that the project had a fixed deadline and that both of the respective institutions expected the joint IT team to complete their part of the UC400 project on time meeting each university’s expectation. However, how that was to be done and what was to be done overshadowed the rest of the project.

At the beginning of Segment 2, the consolidation announcement created an additional and significant external influence on both the IT organizations and the project team(s). The effect of this announcement on the initial combative condition is captured to some extent in this statement by one of the IT managers,

Yes. Everything changed. It changed not in function or operation because the consolidation meant nothing really other than the fact that at some point eventually we were going to come together as a single institution, but everything changed in the way of perception and the perception early was a lot of just unknown. No one was talking. There was a consolidation, but what did that mean to us? And I say “us,” we’re talking about IT.

However, even with the implication of a reorganized IT department, the initial combative nature over primarily the network design from Segment 1 did not lessen, but intensified. What will be pointed out later in greater detail is that the combination of these two major influences scaled into intense passive-resistant positioning behavior. Adding to these two intense external pressures, the project began to experience vendor delivery issues that carried over into Segment 3. In combination these influences fed a level of project anxiety found in the project team members as to the completion of the project.

However it is interesting from the interview data is that the entire team described changes in Segment 3. While the “unknown” was still there, the overall team appeared to
set aside these concerns and focused only on completing the job on time to the best of everyone’s ability. That is not saying the initial condition and added external influences were eliminated, but they were mitigated by other internal team behaviors as will be seen below. Segment 3 contained no new external influences since the expected formal announcement of the new IT organization was not released until October, approximately two months after the completion of the UC400 project.

*Emergence and Chaos Event.*

<table>
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<tr>
<th>Premise</th>
<th>Research questions</th>
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<tbody>
<tr>
<td>4.2 Given both initial conditions and other external forces on the system or process, the environment and organization become increasingly unstable leading to a state of creative chaos where new adaptive behavior begins to emerge.</td>
<td>What was the trigger points that may have signaled behavioral changes were occurring?</td>
</tr>
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<table>
<thead>
<tr>
<th>CAS Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergence and chaos event.</td>
<td>clashing collaboration</td>
<td>urgency organization different difficult communication lack of trust unknown anxiety</td>
<td>come together work together one organization</td>
</tr>
</tbody>
</table>

As the premise states, the chaos event is more a series of trigger events than a single event. Therefore, a chaos period can be a series of either related or unrelated occurrences caused by a significant magnification of initial conditions or new external influences introduced into the project. These influences begin to destabilize the system or process environment resulting in new emergent adaptive behavior, a chaos occurrence, in reaction to the destabilized system, the process, or, in this case, the team. During a chaos period, discrete or reoccurring trigger events will continue enabling other occurrences producing a destabilizing ripple effect on a system like the UC400 project team. Again,
the results of these occurrences will be the evolvement of emergent adaptive behaviors as a reaction to the destabilizing events. As the chaos period proceeds, the new emerging behaviors will continue to occur, culminating in the ability to establish a new stabilized system or dysfunctional and destructive random behavior.

Using this definition as a filter in the analysis of the interview data, it is fairly clear that Segment 1 displayed no new behavior and the only significant event was the creation of the project. All team participants provided the same perspective, if all that was expected was the two IT organizations/project teams to collaborate and complete the UC400 project the goal would have been accomplished with little impact on either organization. Segment 1’s clashing collaboration was considered something the joint project team could and would have worked through; therefore, this project segment had no significant events threatening the stability of either IT organization. The result is that individual and team behavior remains effectively unfazed throughout this time period. Indeed, as pointed out in the Segment 1 complexity analysis, the project was considered somewhat complicated but doable.

Segment 2 was a different matter. As an indicator of the level of increasing pressure on the project team, especially the management team, a status update report dated June 22, approximately 7 weeks before the project deadline, reported the project was only 50% completed. In addition, the positioning behavior was continuing and the key descriptor words and phrases were “difficult communications, lack of trust, unknown, and anxiety.” This was precipitated by the additional significant external influence of the consolidation announcement. The consolidation announcement became a
defining event during this segment. Concerning the impact of the announcement on both IT organizations as well as project leadership, a project team technical lead commented,

    The real challenge of course … was a very significant delay in when organizational structure was actually finalized, and that created a lot of uncertainty…You have organizations that didn’t have clear hierarchy between the groups that were working together. So, I think that that caused a lot of issues at a structural level with how the project was carried out.

Added to this was the increasing project delivery pressure from vendor delivery issues, the continued contentions in the IT project leadership, and the uncertain future of the IT organization drove the project to a critical state. Stakeholders at this time commented that the tension between the two teams was apparent and, at times they feared the UC400 project might be in jeopardy if it had continued.

    As a result of these environmental changes, an individual technical actor describes management’s reaction to these conditions and the use of project management methods as follows, “Well, I don’t know, I mean, they kept their structure, they kept their project plans, so I don’t know if they dropped anything like that.” This was a common observation in most of the interviews. During this segment there was an attempt to continue to use the initial structured method. As hypothesized earlier in Chapter 2, as projects come under intense pressure and instability appears, the natural tendency by project management is to continue or intensify the use of the initial structured method. The assumption is that restoring project rigor will also restore order and stability in the life of the project. This behavior was observed in the UC400 project. Further observations point out that the methods discussion was thematically comingled into the technical-design debates. In reaction to management behavior, the following comment by
an individual actor on the team is an indicator that team behavior was changing in reaction to these reoccurring project destabilizing events.

…I think on the ground in the trenches, you know, we all became a lot more understanding of the environment that we were in … so we all sort of learned to relax a little bit, and say, “Ok, well, let’s try this again next week.” So, I think that, you know, if you can look at the situation you’re in and just be a little understanding …

The result was that the individual team actors began to develop peer relationships with members in the other organization, again in contrast to the behavior of project leadership. This was done even though none of the individual team actors was taking any direction from project leaders in the other organization. They knew at some point they had to develop new working peer relationships. This behavior was necessary not only to complete the UC400 project, but also because they knew they would formally all be part of the same team. What the findings point out is that the adaptive behavior created new working networks as a means to stabilize the work environment.

While the first major destabilizing event occurred with the consolidation announcement, the second significant event became a “double-edge” breakpoint in the stability of the project. In mid-June 2012 one of the two CIOs resigned. From the descriptors provided by both members of the management team and the individual actors, this event became initially a destabilizing event but later a stabilizing event. The significance of the changing team leadership role was articulated by one of the stakeholders:

…but if there had been someone who was uncompromising who had been named in that position and had come in and said that, “This is the only way this is going to work and I don’t care what you think,” it would not have worked.
Again, many interviewees saw this resignation as an initial shock but the event also precipitated an emerging positive behavioral change. As observed before the resignation created a leadership vacuum that remained until the formal announcement of a new CIO in October 2012, 2 months after project completion. As a positive tribute to the IT management, there was no indication that the remaining CIO made any attempt to step in and drive project decisions. Nor did others within the existing project leadership teams attempt to do that either. The result of the leadership vacuum was that all individual team actors, including both managers and individual contributors, became self-directing. The individuals did what had been assigned to them. By the start of Segment 3, new adaptive behaviors appeared. Managers that had differed on technical issues expedited project decisions and took sole responsibility to resolve roadblock issues. Individual actors worked directly with their respective teams and peers to execute their parts of the project. In the end, only a remnant of any project management method existed in project status reports. They were still created and provided to stakeholders and the project team to coordinate the activities. However, any form of structured or even informal project methodology appeared to be dropped after the resignation became effective.

_Bifurcation Point and Self-Similar Behavior._

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<th>Premise</th>
<th>Research questions</th>
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<tbody>
<tr>
<td>4.3 During this period, critical decisions are made creating bifurcation points where new adaptive emergent behavior is either encouraged or stifled.</td>
<td>Describe any behavioral drivers? If emergent project team behavior appeared, how did project management treat it?</td>
</tr>
<tr>
<td>CAS Characteristic</td>
<td>Segment 1</td>
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<td>---------------------------------</td>
<td>------------------------------------------------</td>
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<tr>
<td>Bifurcation point and</td>
<td>none present</td>
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<tr>
<td>self-similar behavior.</td>
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As with the last section, a short explanation is necessary. A bifurcation point is usually a single point at which the emerging behaviors begin the evolution toward a restored stability and order. The emergence of new adaptive behavior during the chaos period reaches a juncture where even newer behaviors become apparent in the evolutionary process. At this point in the evolvement, the newer behaviors are not only new, but simple and self-similar behaviors. When this stage begins a bifurcation point is reached and the newest behaviors begin to become self-sustaining. As will be explained further in the next section, the bifurcation point is critical in the evolutionary change of the system or process.

Using this description as the data filter, it becomes clear that this newer form of simple self-similar behavior does not appear until near the end of Segment 2 and the beginning of Segment 3. As discussed previously, the adaptive behavior in Segment 2 followed two threads. First, the management teams appeared to remain in conflict through most of Segment 2. Project communication occurred but was reported as difficult in the interviews. Technology-selection and work-methods discussions remained strained. The second thread was the behavior of the team members actually performing the work. In spite of the conflict in the project leadership, they preceded as well as they could, in some cases without clear directions. As a stakeholder observed about both levels of the project staff and project leadership, “If they were in a meeting together, they would butt
heads, or bump heads a little bit on some things and almost want to dig in their heels on some things.” The same person commented on the individual project actors,

…student techs and some other folks, they would just go to work, and if they were doing something, they’d be like, “Oh, what are you doing there?” “Well, I’m doing this.” “Hmmm well, we don’t do it that way.” “Oh, really? Well, how do you do it?” and they would show them and, “Oh, ok, I really haven’t thought about it, but that would work too.” So, it was almost like these guys were sort of learning from each other…

As a concluding point, the observation went on to state, “Whereas it took a little bit longer for the upper administration of those departments to kind of get there.”

Even though new emergent behavior is seen in the individual actors, reaching the bifurcation point was a significant internal influencer. With the resignation of the CIO and the unfilled power vacuum, the pinnacle of the chaos event period or bifurcation point was reached. The very critical point was that the project team individual actors were able to sustain the new adaptive self-similar behavior. There was no attempt to stifle the new behavior and sustaining this behavior became the critical influencer in the project evolution. Again, this act neutralized the conflict in management. At this point conflict as the key descriptor was replaced by urgency. The emergent behavior described previously becomes even more fundamental. All those interviewed stated that by July 2012, the focus was on completing the project. All project behavior was reduced to the level of execution with few directions. That does not mean no direction was provided; rather, it was “trench leadership,” as one interviewee put it. It was what has to be done to complete the project and nothing else. If anxiety existed during this period as a result of the announcement, it was either overshadowed or repressed in favor of completing the
project on time. The new emergent behavior entering and running through Segment 3 is
captured by these observations from the project team members,

So, you really had two teams that because of the lack of organizational
structure, lack of clarity about how that was going to take place, were being told
to operate together or had to operate together to meet objectives…we will be
coworkers. So we need to get to know each other and we need to either like each
other or work well together.

Indeed, to do your own work and then to work together well became the new value
proposition that drove all team behavior in Segment 3. These are simple self-similar rules
that all followed. The adoption of this new simple behavior and its maintenance became
the project bifurcation point.

The Dissipative System and Attractors.

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<th>Premise</th>
<th>Research questions</th>
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<tbody>
<tr>
<td>4.4 If adaptive emergent behavior is allowed to proceed, it will do so around attractors that define new simpler rules of behavior leading to individual actors adopting similar and self-replicating behavior and supporting the creation of a new stable order.</td>
<td>Were there any significant adaptive behaviors displayed by the project team that were directed to establishing new stable organization?</td>
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<table>
<thead>
<tr>
<th>CAS Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dissipative system and attractors.</td>
<td>single</td>
<td>direct leadership</td>
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</tr>
<tr>
<td></td>
<td>job</td>
<td>slight compromise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>end goal</td>
<td>all contribute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>individual</td>
<td>do a good job</td>
<td></td>
</tr>
<tr>
<td></td>
<td>compromise</td>
<td>individual</td>
<td></td>
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<tr>
<td></td>
<td>project leadership not clear</td>
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The comment below from an individual actor on the project team captures the
essences of the concept of attractors in complex theory and project success.

Well, if you look at UC400, for it to succeed, you know, I think the merit behind,
or what was accomplished, was even despite those challenges the two teams were able, I won’t say efficiently, but they were able to meet objectives.
The previous section used emergent and self-similar behaviors as analytical filters. In this section emergent adaptive behavior is carried forward and used in conjunction with the concept of an attractor. As before, a brief review of complex theory as found in Chapter 2 is necessary to understand the idea of an attractor. While there are various forms of attractors, the one used in this analysis is that of a strange attractor or a point where actors in a system or process will move toward the goal of establishing order in an unstable environment. When this happens, the system is dissipative or needing to establish a new stable environment. The behavior associated with a strange attractor is also defined as self-similar, with a simple rule set and adopted by all actors. In the case of the UC400 project the new individual self-initiated adaptive behavior, as discussed in the previous section, dynamically appeared at the point of bifurcation. It was not the actual CIO resignation, but the events that occurred right after that influencing event; capitulation in the positioning behavior, the collapse of direct project leadership and any attempt to apply a more rigorous project methodology. Project leadership was muted and individual-directed behavior to complete the project became the accepted organizational norm. Therefore, the attractor became the adoption of the simple behavior to do what is necessary to achieve a single goal.

As can be seen from the key descriptor words, Segments 2 and 3 were the only significant segments. The key descriptors in Segment 2 begin to define not only new behaviors, but also the causes of those behaviors. Single, job, end goal, and individual are all rooted in individual responsibility as opposed to a collective decision and action. Coupling this with “compromise” and “project leadership not clear” demonstrates that most if not all of the project actors felt as if they were acting somewhat independently.
This is not to say that working together had ceased but new relationships were being formed around like but simple actions associated with skills and responsibilities. The adoption of the group norm of individual accountability begins to define the attractor.

Segment 3 key descriptors clearly begin to describe the characteristics of three attractors. The first attractor as stated above is that of individual responsibility: all contribute, do a good job, and individual. This can be seen in the comment by one of the project leads, “I just saw a job that needed to get done and we had counterparts we needed to work with, you know, make every attempt to work with as closely with them and communicate with them as much as possible.” The second was a sense of urgency. From the same project lead, “Negative time, with just not a whole lot of time to plan to get things done and, you know, being very apologetic … It just had to get done.” Urgency balanced individual responsibility. Every team actor interviewed saw urgency as a driving force for Segment 3. Therefore, this collective understanding became the second attractor. Last, the key descriptor word, compromise, which had been used in previous segments, took on at least two meanings. First, understanding that using “give and take” compromise to work together was a necessity at all levels. Therefore, the act of compromise became a group norm and a third attractor. However, the second meaning of compromise in Segment 3 was not “give and take,” but defeat. As discussed in the CIT analysis, this negative meaning was shared amongst some of the management team; however, the negative was also the positive as previously discussed. The unfilled power vacuum in project leadership allowed the adoption of the new attractors unimpeded by any directives. Indeed, characterization of the project behavior in Segment 3 closely aligns to the concept in complex systems theory that systems or process, or in this case
project teams, can be directed by an “invisible hand” without need of any central control.

In this case the UC400 project team was in the end attracted to a “common purpose,” which provided the “invisible hand.” As expressed by an individual project member,

I think it was the common goal that we had to have the building up and running by the time classes started. Looking at it strictly from the UC400 point of view, without the consolidation at all, it’s we’re trying to make this happen, regardless.

*Networks and Relationships.*

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<thead>
<tr>
<th>Premise</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 During the chaos event regardless of the continued existence of emergent behavior, new network relationships will be established either supporting more stable systems or processes or evolving into individual survival behavior.</td>
<td>How did relationships change over the course of the project?</td>
</tr>
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<table>
<thead>
<tr>
<th>CAS Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networks and</td>
<td>conflict</td>
<td>at my level</td>
<td>shared ideas</td>
</tr>
<tr>
<td>relationships</td>
<td>our team</td>
<td>will work together</td>
<td>open communication</td>
</tr>
<tr>
<td></td>
<td>our way</td>
<td>anticipation</td>
<td></td>
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<tr>
<td></td>
<td>distant</td>
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I did. I did. I worked with them a good bit because I’m, you know obviously with the consolidation happening, trying to build the relationships with people who will soon be my coworkers… So I did, and I keep trying to look at it as one IT group.

While the above observation by an individual project actor captures the strong sentiment for most of his counterparts, it does not necessarily reflect all. As new emergent behaviors were evolving new relationships and new networks were created, some temporary and others permanent. However, the research findings found that in most cases new relationships and networks were an outcome of the evolving stabilization of the system or process. In the case of the UC400 project, this becomes obvious from the beginning. Minimally the new relationships, however strained, started in Segment 1 and
continued throughout the project. As the key descriptors show—*conflict, our team,* and *our way*—any new relationship was characterized as temporary and guarded.

The Segment 2 key descriptors demonstrate—*at my level,* *will work together,* and *anticipation,* again taken more from the individual contributor’s comments about their working relationships—that they were attempting to establish new relationships. Several comments were made that members of each IT organization had loosely shared knowledge in the past so working together on the UC400 project was not perceived as completely new. Other individual actors on the team shared similar perceptions, “As we’ve gotten through the year, and people have gotten to know each other. I think that it’s that perspective, or that idea has changed and it’s more of a, ‘we’re more like them than we thought.’” This sentiment was carried into Segment 3 as well where the key descriptors are *shared ideas* and *open communication.* It is clear that the findings of the analysis support the idea that the creation of new working relationships and a new organizational network were a signal that stabilization was occurring.

*Dysfunctional Behavior.*

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<thead>
<tr>
<th>Cas Characteristic</th>
<th>Segment 1</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysfunctional behavior.</td>
<td>none present</td>
<td>conflict non-collaborative</td>
<td>none present</td>
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<td></td>
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<td>disagreement</td>
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<td>design issue</td>
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<td></td>
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<td>method criticism</td>
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Legend: 4.6 The stifling of new emergent behavior ends in a state of system and process dysfunction. What, if any, team reactive behavior occurred in the face of project leadership demands for adherence to a structured project method?
A comment by a stakeholder—“if there had been someone who was uncompromising who had … come in and said that, ‘This is the only way this is going to work and I don’t care what you think,’ it would not have worked.”—characterizes how a person’s management style can influence and ultimately affect the delicate balance between a functional and dysfunctional team. *Dysfunctional* in complexity theory refers to the behavior type found when emergent adaptive behavior is impeded or prohibited. Since the adaptive behavior only emerges when a system or process becomes unstable, to stifle this behavior would by definition result in continuing destabilization leading to either total dysfunction or destruction of the system or process. What is interesting from the findings above is that it clearly shows that dysfunctional influences were absent in Segments 1 and 3.

The reason for this result is that in Segment 1 no emergent behavior existed because the project environment was stable and could have remained stable throughout the balance of the project. Again, both IT teams felt very confident that they could independently set up and install the UC400 IT infrastructure with little assistance from the other. The only destabilizing influence was that fact that the IT teams had to cooperate and work together at some level. However, this conflict was mitigated in some respect by fact that one IT team was identified as the project lead. Therefore, they could direct the technology strategy for the new University Center as well as structure the project using whatever method they felt was necessary to meet the project goal.

From both the CIT analysis and the emergent-behavior, bifurcation-point, and attractor analyses, this segment of the project saw a management team at odds. A classic example was that members of the management team observed that communication
between members, while fluid and informative, was also symbolic of their underlying cultural and management style differences. Supporting interview descriptors characterized the content of the communication as either too formal or too casual. Several members of the management team commented that in some cases they saw email communication as a means of holding each other accountable to others by overuse of the copy and reply functions. While the perspective on the style of communication is important, the observation of management behavior by the project team is more important to the causal understanding of a project team’s potential dysfunctional actions.

The key descriptors in Segment 2 provide a better clue about management behavior: conflictual, disagreement as to design and method, and non-collaborative. The individual actors expressed the view that the project leadership was at a stalemate. However, what is important to understand from these perceptions and descriptors is that they characterize project managers and their ability or inability to execute their tasks as individual actors of the project team. A technical project contributor put it this way,

So most of the management that I got was from him, I asked him questions because I didn’t, I couldn’t expect a response from the other team because they’re not really part of the, they’re not the same team, so to speak because they were a different school, different IT organization at the time.

This comment made late in Segment 2 of the project and commonly expressed by members of both teams characterized that any directions as to individual work existed in organizational silos. Therefore, it is clear the key descriptors characterize how the project leadership was not operating cohesively enough to allow individual team members to either communicate or take direction from members of the other IT organization. The result is that if this management behavior had continued, it is doubtful that the emergent
adaptive behavior would have been allowed to continue. Indeed, this same contributor stated that given the state of the working relationship and the remaining time, he actually feared they could not complete the project.

Per the earlier description of the leveling of project leadership, adaptive individual behavior began to emerge to ensure an on-time project completion. However, if this change had not occurred, it is very likely that the team would have begun experiencing random and dysfunctional behaviors more focused on individual survival. As described before, the new adaptive behavior stabilized the project team and created a new working environment that allowed the team to meet the implementation goal. If this new adaptive behavior had been stifled—such as the self-similar simple behavior to be accountable for one’s own work and to work together toward a common goal—then the project could have degraded into destructive behavior. The result would have been not only an incomplete project, but potentially in the long term a weak IT organization.

*CAS Summarization of Findings.* Table 14 is a summary of the findings of the CAS analysis addressing the overriding research question of the nature of complex adaptive behavior in the UC400 project: How did the project team’s behavior manifest itself within the described project environment?

First, stakeholders and project members declared the implementation a success since the University Center opened on time and the IT infrastructure was in place and worked. While there was a unanimous declaration by all the team members that the project was successful, there were some concerns that the quality of the infrastructure was not what it should have or could have been. This underlying opinion was a remnant from the original design disagreements from Segment 1.
<table>
<thead>
<tr>
<th>Table 14: CAS Summary Findings</th>
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<tbody>
<tr>
<td><strong>Segment 1</strong></td>
</tr>
<tr>
<td><strong>Emergence and chaos event</strong></td>
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<tr>
<td>CAS characteristics</td>
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<td></td>
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<tr>
<td>Resulting CAS behaviors</td>
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<tr>
<td><strong>Bifurcation point and self-similar behavior</strong></td>
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<tr>
<td>CAS characteristics</td>
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<td>Resulting CAS behaviors</td>
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<td><strong>The dissipative system and attractors</strong></td>
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<td>Resulting CAS behaviors</td>
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<td><strong>Networks and relationships</strong></td>
</tr>
<tr>
<td>CAS characteristics</td>
</tr>
<tr>
<td>Resulting CAS behaviors</td>
</tr>
<tr>
<td><strong>Dysfunctional behavior</strong></td>
</tr>
<tr>
<td>CAS characteristics</td>
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<tr>
<td>Resulting CAS behaviors</td>
</tr>
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<td></td>
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</tbody>
</table>
Second, the complexity level of the UC400 project was assessed by use of complexity–complicated criteria from by Rittel and Webber (1973) and Conklin (2008, 7–8). It was found to exist, but the exact level could not be determined. However, by use of the complexity–complicated criteria, the findings did determine that the project environment continually increased in complexity. As a result, the increasing complexity level did have significant impact on the management team and individual actors’ behaviors. Lacking was the ability to clearly identify enough detailed attributes of a complex environment from the findings to develop a complexity scale. Establishing a complexity scale is necessary for implementation managers. This tool would allow implementation administrators to better assess team behaviors and make decisions as to how the team should be managed.

Third, the application of the CIT model demonstrated how management style and the use of project methods influenced the UC400 team’s behavior and performance. Through the CIT behavioral attributes of motivation, cognitive awareness of the changing environment, and continual assessment of capacity and power position, it became clear that the management team’s behavior did result in various uses of project methods. The uses were driven by the need to avert a perceived risk on the part of members of the project management team or to control the overall project-team environment. As purposed, these combined influences had a direct effect on individual actors’ behavior over the duration of the project timeline.

This finding also suggests the usefulness of the CIT model as a sound analytical instrument to identify significant management decisions and behaviors that become key influences on the entire team. What is unique in the findings was the ability to use these
identified influences in the final analysis of the complex behaviors operating in a broader project environment. These complex management behaviors could then be incorporated into the larger CAS analysis. Therefore, it is the connection between CIT and CAS analysis that is important in future implementation research.

Last, the CAS model was able to identify the existence of complex adaptive behavior in the UC400 project. This is an important finding to first see the simultaneous existence of these behaviors and the ultimate successful execution of the UC400 project. The result of this finding is support of a secondary contention that adaptive behavior in complex implementation environments must be allowed to find a common ground on which to act, thus establishing a stable environment that leads to successful completion. The finding also supports the contrary position that to stifle this behavior can result in dysfunctional and destructive behavior. Again, this finding also strongly supports the use of a joint CIT–CAS model to isolate various conjunctive and independent behaviors that ultimately influenced the results of implementation projects.

The following chapter will address the significance of this research effort and limitations found, as well as recommendations for further research. There will also be a commentary as to whether this study has significantly contributed to not only policy-implementation literature, but to the creation of a practical heuristic guide for public administrators.
Chapter V

DISCUSSION OF FINDINGS

Significant Research Findings

Significant findings from this research fall into three categories. The first is the application of a set of criteria derived from Rittel and Webber (1973), Conklin (2008), and Williamson (2011) to determine complexity levels within a policy implementation. Using these criteria, a model was developed and used to identify complexity attributes of the UC400 case study. Although the model has limitations it proved successful in identifying whether the project was complex on not. Therefore, it can be concluded from this study that this rudimentary complexity model could, to some degree, provide an evaluation of complexity in the project environment. However, it lacked the sophistication to provide a gradation level and scaling of complexity that is found in this type of project environment.

The second category is the combined use of two behavioral models collaboratively working as an analytical tool to fully understand behavioral dynamics within a complex implementation environment. The two behavior models, CIT and CAS, are used to understand specific management behaviors as well as group behaviors. CIT, a product of Hans Bresser’s longstanding work with other policy implementation theorists (de Boer and Bressers 2011; Owens 2008; Bressers 2007; O’Toole 2004; Bressers, Klok, and O’Toole 2000), describes the sociological interaction behavior of policy-
implementation decision makers. CAS is a much broader behavioral model that attempts to identify and explain group behavior in a dynamic, unstable environment. Aside from the use of the combined behavioral models, the significant findings from the UC400 project use were twofold. First, the CIT model could isolate and explain the project leadership behavior as expected. Second, by using the CIT results in the CAS analysis of team behavior, the combination could isolate specific behavioral relationships between project management and the individual actors on the project team. According to the CIT–CAS joint model, the University Center 400 IT infrastructure project did experience complex adaptive behavior. Thus, the combined CIT–CAS model became a strong analytical method in the study of public-policy implementations.

The last category was the effectiveness and further theoretical support of the joint CIT–CAS model in the results of the study. The joint model did as expected and identified key behaviors and factor attributes that can be used in the development of the practitioner’s “tool set.” As stated before, much of the implementation theory research to date has not lent itself well to this endeavor. As O’Toole (2004) was previously quoted, “applying implementation theory to practice has been rare” (311). Given this fact, this research has been able to reverse the theory-only trend and to begin to provide genuine guidance.

Comparison of Research Findings with Existing Research

The premises used to structure this research were derived from Chapter 2 in the literature review. These premises were then used to define the research questions used in the CIT–CAS qualitative grounded-theory analysis. As the Chapter 4 research results have demonstrated, the findings supported the literature-based premises. However, the
following evaluates specific findings from this research in comparison to the current body of literature.

In 2004, a symposium was held on the direction and relevance of policy-implementation research. Schofield and Sausman (2004) made two points in their review of the symposium’s results. First, the next stage of policy implementation has to focus on the need to produce relevant results that can be used by the practitioner. The second point was that the next advancement in implementation research should include a synthesis of multidiscipline models that do not produce a plethora of independent factors, but rather a “parsimonious” set of relevant implementation factors. The finding from the UC400 research study meets many of Schofield and Sausman’s new-approach needs in implementation research. In addition to policy-implementation researchers desiring a synthesis of models, those working in complexity-systems theory also advocate the same multidiscipline research approach. The use of a combined CIT–CAS analytical model in the UC400 case study squarely meets the synthesizing need for multidiscipline models to describe organizational behavior (Mitchell 2009; Johnson 2007; Wheatley 1999).

The literature review of management theory leads to the conclusion that there may be a complexity-based management style that can be a significant positive influence on a project team working in a highly complex environment. The research findings of the UC400 project confirmed how a combative management style that emulates the administrative and systematic management theory negatively influences a project team’s behavior as the implementation environment becomes more complex. Conversely, the findings also demonstrate that the stifling effect of this style can be reversed or muted to permit independent, creative adaptive behavior as the management styles move to a more
complexity-based management practice. As the literature suggests, a complexity-based management practice accommodates the holistic nature of management and the individual actors on the implementation team. As the UC400 research results highlight, the role of management changes from direction, control, and risk mitigation through accountability to collective participation, support, and risk mitigation through trust.

A parallel theme in this research is the combination of management style and project management methods. From the current literature review, project-management methods can range from highly structured to the agile method in IT. However, the contention in this research is that the project method used and how it is applied is a manifestation of the project manager’s style and reaction to the dynamics of a project environment. To test this contention, the analysis of project-management methods used in the UC400 case was undertaken through the application of the CIT model. The CIT model focuses on the explanation of resulting management behaviors from sociological interactions. In this research, the result of the sociological interaction is management behavior defined by the type and use of a project-management method. Therefore, a corollary contention is that as complexity from external pressures increases within the project environment, project management’s resultant behavior would be an even more intense application of a structured method to control and mitigate risk. The expectation was that the CIT model would identify this behavior. In general, this expectation was fulfilled by the UC400 research findings, substantiating the validity and use of the CIT model in this type of research. In comparison with the current literature on project-management methodology, little has been done to address the impact of misuse of a structured methodology on the project team’s behavior. However, much has been written,
especially in the technology field, about how the type of method used can affect whether or not a project meets customer expectations (Mellor 2005).

The current literature review also clarified that how policy-implementation project managers are trained is a key factor in the development of management styles and how these individuals will use project methods. Current training is founded on a traditional management philosophy that assumes individuals on project teams are task units and that these task units can be linearly planned to execute mechanically. However, this foundational proposition is incompatible with complex implementation-project environments.

The correct metaphorical foundation for project-management training should assume that implementation-project teams, like most human organizations, are much more organic and behaviors evolve in a nonlinear fashion, adapting as the environment changes. Therefore, project management training should recognize environmental changes and adaptive behavior as opposed to linear tasking of work units. However, the research finding did discover and then discuss at some length how both assumptions, traditional linear and organic nonlinear, can work and could have worked in the UC400 project. Therefore, the training of project managers should contain both approaches, linear and nonlinear. However, the significant training point is that project managers who work in complex environments must be able recognize what is happening in the environment and then be able to shift between the two as the environment dictates.

As an example the findings from the UC400 research found, as expected, that as external influences began to increase, the complexity of the project environment increased as well. When that phenomenon occurred, project leadership needed to shift
their management method from a linear view to nonlinear organic view. The research finding demonstrates the inability of formally trained project managers to recognize complexity levels and take appropriate actions to manage adaptive behaviors. Therefore, in contrast to the current literature on project management training, this research suggests a change in implementation-project management training.

As an extension of the previous point about recognizing adaptive behavior in complex environments, the applicability of the CAS model in identifying the existence of such behavior was confirmed in the UC400 research findings. As suggested by Dawoody (2010) and others (Mitchell 2009; Johnson 2007; Wheatley 1999; Holland 1998), policy implementation research needs to develop recognition tools to identify the existence of evolving adaptive behavior. Whether viewing it only as an explanation for floundering implementations or as a correction factor to increase implementation success, the next generation of implementation research must embrace this concept as a sociological phenomenon to be addressed.

Finally, the definition of project success and failure contained in the literature was also reviewed. The research findings supported the current literature’s view that such a definition goes from amorphous to structurally rigorous. The first extreme is based simply on stakeholders’ declaration that the project is successful or unsuccessful, and the second is based on specific criteria on the time, budget, and functionality of the deliverable. The UC400 project visited both extremes because all stakeholders declared success based on the fact that the University Center opened on time; however, they also had specific concerns about the quality of the infrastructure delivered. Regardless, this
study confirms that the definition of implementation success or failure, even though when highly subjective, is still important to determine.

*Theoretical Implications of Research Findings*

Chapter 1 presented four theoretical premises. As a general statement, the current research finding corroborates the possible theoretical soundness of these premises.

1. *Implementation results are a function of the behavior of the complete set of implementation actors and their ability to perform.*

2. *The implementation group’s or project team’s behavior is heavily influenced by a combination of complexity, management style, and the selected implementation method.*

3. *As the complexity of the implementation environment increases, the probability of complex adaptive behavior by groups and individuals within the project teams also increases.*

4. *The combination of management style and applied methods influences the cohesion or dysfunction of group, team, or individual behaviors by supporting or challenging changing adaptive team behavior.*

Given the validation of the UC400 research study’s theoretical premises, the question turns to the influence these findings have at a broader theoretical level. This study attempted to address at least four major theoretical areas. The first concerns the theoretical definition of complexity as it applies to policy implementations. The second area involves the use of CAS analysis in the social sciences. The third area is the validation of current implementation research methods in public-administration policy-implementation theory. Finally, this study addressed how far project management theory
has and should evolve to embrace current organizational theory’s treatment of the complex organization.

The research for this study found no sincere attempt to scale complexity. Many studies reference or state that various policy-implementation efforts are complex or are becoming more complex through observation, insight, or other subjective means (O’Toole 2004). Regardless of the claim through either recognition or declaration, none offered any definitive method of determining the level of complexity within a dynamic environment. The one exception is Dawoody’s (2010) Nexus descriptive model used for policymaking, but it still does not evaluate the extent of complexity in a system (Mitchell 2009; Johnson 2007). However, the UC400 research has borrowed the concept of complexity as a wicked problem, as defined by Rittel and Webber (1973) and Conklin (2008), from organizational theory. Using these criteria, a method of evaluation to determine complexity level is provided to this body of knowledge, but more importantly a possible heuristic toolset is provided to implementation project managers.

CAS has been used in a wide variety of studies in organizational theory and the social sciences as well as public administration (Hill and Hupe 2009; Mitchell 2009; Dawoody 2008; Mischen and Jackson 2008; Johnson 2007; Wheatley 1999; Holland 1998; Sweet 1996). This study is a continuation of that research effort but concentrates specifically on public policy implementation research. However, most of the research studies in public administration have used complex adaptive behavior theory not as a research model, but as an applied theory. In many cases, public administration research has seen complex systems theory as a set of behavioral propositions that can be selectively chosen and applied to an organization (Ford 2011; Cutright 1999). Outside
public administration, this same approach was found in a new publication suggesting changes to the existing project management method (Curlee and Gordon 2011). In the UC400 case, complexity systems theory was used again as an assortment of new organizational behaviors that can be applied at will by a project manager. However, this study took exception to that approach and has used complex systems theory only as an analytical model. The underlying assumption is a reversal of the above notion: In a complex implementation environment, adaptive behaviors will emerge naturally as the environment becomes more unstable. Therefore, adaptive behavior has to be recognized and managed differently. The only management choice is how this new behavioral phenomenon will be managed, not what part can or cannot be adopted.

In combination with the approach to complex systems theory, the UC400 study has attempted to suggest that more is needed to fully understand the dynamics of a complex implementation effort. Using the evolving CIT model developed by Bressers and others (de Boer and Bressers 2011; Owens 2008; Bressers 2007; O’Toole 2000), the findings of the study have not only continued the validation of the model, but have also extended its use. The conclusion from this research is that the CIT model is a strong analytical method to understand decision makers’ or implementation managers’ behaviors and their consequences. However, it does not address the larger behavior issues among the individual actors of an implementation project team. From Simon (1946) to Pressman and Wildavsky (1984) to today, many researchers have found the ultimate results of an implementation are determined by the actions taken by those who do the work. The Bressers CIT model does not address this more fundamental issue. Therefore, this study has combined the CIT analytical model with the CAS analytical model in the
creation of an alternative approach to fully describe and better understand the dynamics of a complex implementation as found in the UC400 project environment. This alternative approach is suggested not only as a new research model, but also as a means to identify key individual implementation behaviors and factors that can be used in the development of a better implementation management theory. Developing a better implementation management theory will contribute not only to the body of theoretical research, but also to the development of practical management tools.

*Weak Points in Research Findings*

Research findings are rarely totally conclusive. Weak areas of the research are those in which the study fails to address a hypothesis or a research question fully. The research findings of the UC400 project are no exception. At least two points were not addressed well in the current findings and could be the subject of further research. The first weak area is the full confirmation of the use of project management methods as a significant influencer of project team behavior. The premise to be tested and the research question used in this study is whether management’s continued insistence on using structured methods significantly contributed to the stability of the project team. Second, would this management behavior lead to project destabilization and the appearance of adaptive behavior? The findings from the UC400 do show that conflicting and apparently indecisive behavior by project management was a key influencer. However, the research did not conclusively find that the use of a structured project method significantly influences team behavior. Therefore, the relationship between the use of a structured project method in a complex environment and the presence of adaptive behavior within the implementation project team should be found.
The second area was the use of the complexity-to-complicated spectrum attributes to determine a gradated level of environmental complexity. However, the use of these attributes in the UC400 study made it possible to distinguish within each thematic thread, technical and sociological, whether the thread was complex as opposed to being simply complicated. Further research should be considered in this area to develop a model that will clearly identify a more accurate degree of complexity. This would be especially true in building a practical toolset for policy-implementation project managers or public administrators.

The last point to make about this study’s weaknesses is actually an observation made by both Lynn (1996) and later by O’Toole (2004). Their point is that many implementation-research efforts have produced results that are too subjective; therefore, singling out key factors that can be used by the practitioners to improve their ability to implement successful projects is very difficult. They see the need for implementation research to be more deductive and less inductive case study findings. Further, they stipulate that if this type of research is to be relevant, it must be based on quantitative results that can be converted into usable analytical tools. Unfortunately, the current UC400 research does not meet this standard because neither analytical model is based on a quantitative foundation. Further research is suggested below to combine the CIT–CAS models to address some of Lynn’s and O’Toole’s admonitions.

Research Study Findings Validation and Generalized Limitations

Glaser and Strauss (1967) and others have reported that the reliability of grounded and interpretative research studies is difficult if not impossible to establish. The reason for this is that the coding, concepts, and categories used in the context of this type of
study come from the content of the phenomenon itself. Thus, taking codes, concepts, and categories from one study and applying them to another would not be advisable (Merriam 2009; Groenewald 2004; Moustakas 1994). To do so would invalidate a study. This caution applies to the use of grounded theory as the research method for the UC400 project. Whereas some of the findings may have applicability in other research, the grounded-theory method would require new research to discover categories from the studied phenomenon. Only at that point can the results of this study be compared with new research findings.

As a result, grounded theory as an interpretative method does not supply the measurements of data; it provides only a structure to collect the data and understand the phenomenon. However, on a comparative level, the resultant situational theories can lead to a generalized theory about similar phenomenological situations (Glaser and Strauss 1967; Moustakas 1994). As in the UC400 study, using CIT–CAS filters for data analysis uncovered theories that can produce generalized understandings of implementation behavior. Therefore, the derived knowledge from this effort is offered as a contribution to a broader policy-implementation theory as well as theories of how a joint CIT–CAS interpretative model can be used.

However, any attempt at externally validating the exact finding of this specific case study would be difficult. Such an attempt would require using the same grounded-theory approach and applying it to an exact copy of the UC400 project setting to establish if the team-dynamics findings could be replicated. Certainly, the inability to control all the variables in a project considerably lowers the probability of replicating the results of this study. As an alternative, the same research CIT–CAS categorization structure from
this study could be used on an environmentally similar but contextually dissimilar project. Such an effort may lead to the identification of team behaviors discovered through the use of the CIT–CAS models that could be correlated to the behaviors found in this research. This would provide a possible validation of grounded theory for this type of research as well as a validation of the CIT–CAS analytical model (Merriam 2009; Moustakas 1994).

Finally, in qualitative research, Moustakas (1994) notes the challenge is to “describe things in themselves” (27). He goes on to caution the qualitative researcher who selects this research method to engage “in disciplined and systematic efforts to set aside prejudgments regarding the phenomenon being investigated” (22). He further cautions the researcher that, “in order to launch the study as far as possible free of preconceptions, beliefs, and knowledge of the phenomenon from prior experience and professional studies,” (22) the qualitative researcher must be “completely open, receptive, and naïve in listening to and hearing … the participants” (22). He concludes that all biases of the researcher should be bracketed, identified, and set aside. The following key personal biases or initial assumptions held by the researcher were bracketed during the research.

- Government policy efforts and their subsequent attempts at implementation have evolved routinely into complex problems.
- Policy implementation efforts that have adopted an IS component as part of the implementation have a greater chance of the implementation being categorized as a complex problem.
• IS implementation may be more difficult in the public sector than in the private sector based on the argument that management in the public sector is more difficult than in the private sector because of political considerations.
• More enhanced categorizations of success factors for implementation efforts can be deduced from the research.
• The traditional structured approach to implementation, especially on complex projects, will continue to fail; thus, a new method is required for all problem sets.
• CAS is the best theoretical construct to explain the dynamics of these types of complex implementation efforts.
• Applying the CIT–CAS model to an identified implementation effort will result in greater insight and development of a better implementation methodology.

While these cautions are reflected throughout the literature on interpretive grounded theory, they become both a limitation and a delimitation in a genuine study (Groenewald 2004).

**Findings that Support a Practical Heuristic Management Guide**

Table 1 of Chapter 2 (page 43 and repeated below as Table 15) outlined the expected relationships in a complexity management style. The reason for using it again is, as previously stated, the attributes on this table are suggested core attributes in the creation of a practical heuristic guide for public administrators. Using this as a guide, the question is whether any contribution was made by this research.

Comparing the complexity management style attributes to the current UC400 findings indicates that the management staff from each organization may have been able
to consider these attributes within the context of their own groups, but not for the other organization. The debilitating power of this inability became acute after the consolidation announcement. To have done so would have run counter to each manager’s own perception of power, control, and self-preservation. The implied question is whether any project manager or public administrator placed in a similar dynamic and changing environment could have done better. However, the case can be made that emphasizing these attributes in implementation-project management training could mitigate negative and destructive team behaviors in future project implementations.

Table 15: Management–Individual Actor Dynamic Relationship Attributes of Complexity Management Style

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>How the organization defines its own nature.</td>
</tr>
<tr>
<td>2.</td>
<td>The recognition of the environment in which the manager, the individual actor, and the organization operate.</td>
</tr>
<tr>
<td>3.</td>
<td>How each of these three agents (management, individual actor, and management method) reacts to situational forces, individually, and as a group.</td>
</tr>
<tr>
<td>4.</td>
<td>Belief and perception embedded in the culture of the organization and held by management about the nature of individual actors and their subsequent behavior.</td>
</tr>
<tr>
<td>5.</td>
<td>How management and individual actors perceive their role as defined by the organization.</td>
</tr>
<tr>
<td>6.</td>
<td>Ability to envision collectively the implementation effort.</td>
</tr>
</tbody>
</table>

Source: Jones and George 2007; Wren 2005; Wheatley 1999.

In addition to embracing and understanding the above attributes, the project manager or public administrator must also be able to recognize and react appropriately to external influences, such as the ones found in the UC400 project case study. These external influences are inherent in almost all complex projects, destabilizing the project environment and precipitating the emergence of complex adaptive behavior. Therefore, a project manager or public administrator needs not only to maintain a more strategic view during increasing complexity, but also to identify and react appropriately to
environmental triggers. Therefore, assuming this is the case, it is important to identify the environmental triggers and action(s) to help the project manager or public administrator successfully direct a project team in this type of environment.

Provided below from the CIT–CAS study findings (Table 16) are a few triggers and follow-up actions that could be added to a practical toolset for future project managers or public administrators of complex projects.

Table 16: Triggers and Actions

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Actions</th>
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</thead>
<tbody>
<tr>
<td>New pressures and feeling of insecurity or threat.</td>
<td>Conduct self-assessment.</td>
</tr>
<tr>
<td></td>
<td>- Evaluate management style.</td>
</tr>
<tr>
<td></td>
<td>- Personalize and use the above attributes to personally evaluate project view.</td>
</tr>
<tr>
<td>Initial conditions of the project change as external influences vary.</td>
<td>Using the complexity criteria provided, periodically assess the complexity level of the project.</td>
</tr>
<tr>
<td>Changes in complexity level</td>
<td>Assess the value of any project management methods and change when necessary.</td>
</tr>
<tr>
<td>Team behaviors at the individual level</td>
<td>Enable the team members to self-prescribe corrective actions.</td>
</tr>
<tr>
<td>- confusion in direction</td>
<td>Evaluate against methods and change methods to accommodate the team.</td>
</tr>
<tr>
<td>- understanding in role</td>
<td></td>
</tr>
<tr>
<td>- resistance to direction</td>
<td></td>
</tr>
<tr>
<td>- communication between levels and peers</td>
<td></td>
</tr>
<tr>
<td>Team behavior shows initiative in solving workflow and completion issues.</td>
<td>Allow and support individual creative behavior.</td>
</tr>
<tr>
<td></td>
<td>Assess project risk, maintain a safe work environment for the team, and allow the team to work in a different pattern or at a different pace.</td>
</tr>
</tbody>
</table>

Coupling the above two suggestions with an improved complexity-scaling model would allow the project manager or public administrator to anticipate changes in team behavior and to take appropriate action. In fact, this approach allows the project manager or public administrator to practice proactive management as opposed to reactive management, the style common to highly complex environments. In summary, a new heuristic tool for the project manager or public administrator would include training in
strategic and tactical complexity-management practices, environmental trigger recognition and action, and complexity-level scaling.

**Further Research Recommendations**

The following section includes recommendations for further research. As stated previously, the complexity-scaling model used in the UC400 research was a first attempt at bringing together two different sets of complexity leveling criteria. From what has been uncovered, neither had been used as scales before to measure the intensity of a working environment. While it is proposed that this initial approach was successfully used to some extent, this approach’s lack of any sophistication also has to be pointed out. Therefore, if complexity is to be used in future policy-implementation research, further research on the scaling of complexity is suggested. This work could not only be done in further policy implementation research but in other disciplines as well. Indeed, work on the scaling of complexity could be done as a joint public–private effort. Since the purpose is to be able to identify complexity and the intensity within organizations, this type of joint effort would contribute to the totality of this research. It would also make it possible to understand if there are any differences in the nature of complex between the public and private sectors. The results of this work should not only enhance next-generation research, but also provide a body of practical information that can be used by implementation project managers and public administrators.

In conjunction with this work, the joint CIT–CAS model that adequately described and identified significant behavior factors in the UC400 project needs further validation as an analytical model. Therefore, using the joint model in a similar implementation effort, not as a static model but solely as a study focus, is suggested. A
first step and an extension of this effort, further research in the use of the joint model could be done in other parts of the University System of Georgia’s consolation effort. It is also suggested that the joint model be used beyond the higher education sector to other public sectors. As an example most of the pioneering work on the CIT model in public administration has been done on environmental policy implementation and the CAS model in healthcare delivery. It is, therefore, suggested that the joint model also be considered in further research in both of these policy sectors to expand the existing work as well as other policy sectors.

As the research results point out, a significant factor in an implementation project is the cultural aspects of the environment and the project team. Therefore, employing this qualitative approach in future research to capture cultural characteristics is recommended, but it is also recommended that various cultural markers be identified by quantifying significance and the strength of these markers at points in time. However, the goal is still to identify a critical set of attributes that can be practically used in managing policy-implementation efforts; therefore a mixed research method would also be recommended to achieve both goals. Doing so would meet both the theoretical and practical goals pointed out by O’Toole (2004) and others.

The above recommendation may appear to contradict Lynn’s (1996) and O’Toole’s (2004) admonition to become more quantitative, but it does not. Work in complex-systems simulations has produced interesting findings predictive of complex behavior in changing environments. Therefore, data produced from a phenomenological ethnographic application of the joint CIT–CAS model could be used in the creation of predictive implementation models in changing environments.
The summation of recommended further research in policy implementation can be condensed to an effort that has been echoed throughout this work and the current literature. The single point of focus throughout the UC400 research is the development of a practical heuristic toolset that can be used by the practitioner. Again, to parrot O’Toole’s (2004) observation, “applying implementation theory to practice has been rare” (311).
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%296%3A1%3C53%3ATPOA%3E2.0.CO%3B2-J (Accessed October 24, 2010).


APPENDIX A: Evolution of Management Theories
EVOLUTION OF MANAGEMENT THEORIES

Columns *a* to *c* are dynamic attributes: (*a*) environment and situational forces together, (*b*) cultural beliefs and perceptions about human nature, and (*c*) the understood role of management by the manager. The rows demonstrate how they have evolved through the eras. (Jones and George 2007; Sheldrake 2003)

<table>
<thead>
<tr>
<th>Phases in management theory</th>
<th>Main themes</th>
<th>(a) Environment and situational forces</th>
<th>(b) Human nature</th>
<th>(c) Role of manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-modern era</td>
<td></td>
<td>Organization in a state of war</td>
<td>Need to win</td>
<td>Command and control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combat and protect against outside</td>
<td>Self-sacrifice to win</td>
<td>Organize and control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>influences</td>
<td>Maximize self-interest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific management</td>
<td>Goal—Efficiency</td>
<td>Organization as a machine.</td>
<td>Employees are part of process.</td>
<td>Organize—create best fit to task for people</td>
</tr>
<tr>
<td></td>
<td>- Job specialization and division of labor</td>
<td>Protect the process from disorderly influences</td>
<td>Ability to complete tasks</td>
<td>Measure performance</td>
</tr>
<tr>
<td></td>
<td>- Study people performing assigned tasks</td>
<td></td>
<td>People part of a mechanical process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Default to the assembly line process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative management</td>
<td>Goal—Create a highly efficient and effective organization.</td>
<td>Organization still mechanical</td>
<td>Employees are only measured on ability to perform</td>
<td>Authority and control</td>
</tr>
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<td></td>
<td>- Theory of Bureaucracy</td>
<td>- Use of hierarchy to define position power</td>
<td>Need to be treated equal</td>
<td>Accountability</td>
</tr>
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<td></td>
<td>- Rules of behavior</td>
<td>- Imposition of regulation and control</td>
<td>Subordinate self-interest to the common interest.</td>
<td>Maintain order</td>
</tr>
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<td></td>
<td>- Clear tasks and roles</td>
<td>- Hierarchy built on authority</td>
<td></td>
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<td></td>
<td>- People are treated equal to their station.</td>
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<tr>
<td>Phases in management theory</td>
<td>Main themes</td>
<td>Environment and situational forces</td>
<td>Human nature</td>
<td>Role of manager</td>
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<tr>
<td>Behavioral management or human relationship</td>
<td>Goal—Motivation of employees to perform and commit to the organizational goals. - Knowledge and experience should lead, not position in organization. - Power and authority is fluid. - Performance affected by management style. - Management behavior more important than expertise of tasks.</td>
<td>Period of evolvement from command and control to fluid organization - Professional manager appears as opposed to administrator.</td>
<td>Self-directing - Self-initiating - The worker responds positively to attention not tasking</td>
<td>Role model - Supportive - Behaviorally trained to motivate employees</td>
</tr>
<tr>
<td>Theory X</td>
<td>- Maximize control rules. - Heavy monitoring of activities.</td>
<td>- Lazy - Dislikes work - Will not initiate work</td>
<td>- Control - Monitor - Organized around SOP</td>
<td></td>
</tr>
<tr>
<td>Theory Y</td>
<td>- Open organization. - Decentralization of authority. - Worker satisfaction determined by work setting.</td>
<td>- Will do what is best for the common good - Has self-control - Potential</td>
<td>- Provide work environment that promotes self-initiation - Delegate authority - Provide resources</td>
<td></td>
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<tr>
<td>Theory Z</td>
<td>- Based on Maslow’s Hierarchy of Needs. - Employee teams can self-manage work.</td>
<td>- Have to have basic needs meet - Self-actualizing - Want to work together for common good</td>
<td>- Motivate - Understand needs - Provide resources - Create loyalty and trust</td>
<td></td>
</tr>
<tr>
<td>Management science</td>
<td>Goal—Use of quantification to maximize profit and minimize utilized resources</td>
<td>Organization runs on statistical analysis - Focus on planning and allocation over tasking - Move to empowerment</td>
<td>Not addressed specifically except as part of the resource pool - Components in a self-managed work team</td>
<td>Versed in statistical control - Utilize information systems - Command and control over resource planning and allocation</td>
</tr>
<tr>
<td>Comprised of Quantitative management</td>
<td>- Operations research - Total quality control - Management information systems</td>
<td>- Individual managers greater control over planning and allocating resources. - Organization run on statistical control and information systems.</td>
<td>-</td>
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<tr>
<td>Management science Comprised of Quantitative management Operations research Total quality control Management information systems</td>
<td>Goal—Use of quantification to maximize profit and minimize utilized resources</td>
<td>Organization runs on statistical analysis - Focus on planning and allocation over tasking - Move to empowerment</td>
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<td>Main themes</td>
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<td>(b) Human nature</td>
<td>(c) Role of manager</td>
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<td>Organizational management</td>
<td>Goal—Strategic Planning with focus on external environment and completion open/close system - Address positioning in a global market. - Market research. - Better utilization and allocation of resources. - Mechanistic structure distinct from organic structures that are adaptable with authority decentralized to maximize organizational response. - Contingent theory—the organization structure is defined by the environment, is adaptable, flexible and mobile</td>
<td>Planning focused outward toward community placement Human allocation becomes important Organizational decentralization View of organization as dynamic and organic not a static structure. Knowledge worker rather than skilled worker</td>
<td>Collaborative Adaptable to changing situations and environments Empowered</td>
<td>Direct and lead in planning resource needs and allocation. Provide open environment</td>
</tr>
<tr>
<td>Learning Organization</td>
<td>- Organization as an organism with the capacity to enhance its capabilities and shape its own future. - Organization that understands itself as a complex, organic system that has a vision and purpose. - Uses feedback systems and alignment mechanisms to achieve its goals. - Values teams and leadership throughout the ranks. - Five disciplines: • System thinking • Personal mastery • Mental models • Shared vision • Team learning</td>
<td></td>
<td>- Social being - Desires to communicate and collaborate - Seeks behavior that supports the common goal</td>
<td>- Coach - Maintain shared vision - Facilitates learning opportunities - Knowledge worker</td>
</tr>
</tbody>
</table>

180
APPENDIX B: UC400 Project Interview Form
UC400 Project Interview Form

S. Northam Research—2012/13

Valdosta State University

Implementation Name: North Georgia University—University Center Implementation.

Implementation Project Team Description: _____________________________________

Name ____________________________________

Position_________________________ ____________

Implementation

Role________________________________________

Months on Project ________________________________________________________

Tell the Story: provide a history of the project from your perspective, the tasks, and the players, levels of communication, behaviors, attitudes, alliances, and combat.

<table>
<thead>
<tr>
<th>Overview questions</th>
<th>Code</th>
<th>Memo</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, describe the objectives of the overall implementation from your perspective</td>
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<tr>
<td>Describe the tactical objectives of the project.</td>
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<td>How did you know if you succeeded with your part or with the project?</td>
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<td>Were there any significant roadblocks or major concerns from your perspective?</td>
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<td>In your opinion, was the project successful? Why?</td>
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</tbody>
</table>

Project Environment and Project Stability

Probes—Describe any change in the project as it went on—Describe morale changes in project personnel

Probes—Describe any changes in management or project management style—Were there enablers and detractors? What was the impact and who were they? Describe your overall perspective of team behavior—Congenial, combative, professional—as the project environment
Project Mgt Style and Method

Probes—Did a PM review processes exist? How were they conducted? How were they used?—How often and overall opinion of their effectiveness?

Where there other processes used throughout the project, e.g., status reporting, meetings?

In general, how effective was the project method? What impact did it have on the project team?

Describe the management style. Was it effective?

Did the management style impact the behavior of the project team, how?

Who did you comm. with the most—communication most horizontal or vertical—were you in a communication wheel? A node on the outside or a hub? Did behavior of team support communication linkages? Was there social communicator?

Did informal network hubs develop.

Emergent Behavior and New Stability

Probes—Describe any evolvement in personal behavior or team behavior as project environment changed.

Was there any unstated or informal goals or objectives that emerged during the course of the project? If yes, were they provide to the team, to yourself.

General comments or observations:

How did you know the project was completed?

Opinion of the closure of the project—Has your opinion of the project changed since completion or after this interview?
APPENDIX C: Consent to Participate in Research
Valdosta State University
Consent to Participate in Research

S. Northam Research

You are being asked to participate in an interview research project entitled “The Birth of a University Center at University of North Georgia: The Use of Complex Adaptive Systems Theory as a Research Model in the Study of a Complex Policy Implementation of Administrative Processes and Technology,” which is being conducted by Stephen W. Northam, a graduate student at Valdosta State University.

The purpose of the project is to study group behavior in a dynamic project environment. You are being asked to participate in an interview with the researcher which is expected to take an hour to an hour and a half and will be scheduled at your place of employment at your convenience. Additionally, you may be asked to participate in a follow-up group discussion. The individual interview and group discussions will focus on your experience with and perceptions of the process of implementing the North Georgia University—University Center. Private information about you will not be solicited.

The individual interview will be recorded and then transcribed but you will not be identified in the presentation of the research. The group discussion will consist of no more than six participants and will be recorded and transcribed as well. The voluntary guidelines for the group discussion will be the same as those set forth in the individual interview. In either case your participation is voluntary.
You must be at least 18 years of age to participate in this study. Your participation in the interview serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

**Assurance of Confidentiality:** Valdosta State University and the researcher will keep your information whether shared in an individual interview or group confidential to the extent allowed by law. However, in the group discussion the researcher cannot ensure total confidentiality of information shared in this more open setting. However, each participant in the group discussion will be asked to agree that information shared will not be disseminated beyond the group discussion.

Members of the Institutional Review Board (IRB), a university committee charged with reviewing research to ensure the rights and welfare of research participants, may be given access to your confidential information. All individual one-on-one interview and group discussion data will be summarized in a collective presentation of individual and/or group responses. In addition, individual interview and group discussion data will be identified to the implementation but not to individuals. After the project is completed and submitted all individual interview and group discussion recordings and documents will be destroyed. Only summarized presentation of the data will be shared with the hosting organization and presented in the final research submission.

**Voluntary Participation:** Your decision to participate in this research project is entirely voluntary. If you agree now to participate and change your mind later, you are free to leave the study. Your decision not to participate at all or to stop participating at any time
in the future will not have any effect on any rights you have or any services you are otherwise entitled to from Valdosta State University.

Questions regarding the purpose or procedures of the research should be directed to Stephen W. Northam at 317 501 4559 or swnortham@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.
APPENDIX D: Institutional Research Board Protocol Exemption Report
Institutional Review Board (IRB)
for the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER: IRB-02183-2012
INVESTIGATOR: Stephen Northern

PROJECT TITLE: The Birth of a University Center at the University of North Georgia: The Use of Complex Adaptive Systems Theory as a Research Model in the Study of Complex Policy Implementation

INSTITUTIONAL REVIEW BOARD DETERMINATION:
This research protocol is exempt from Institutional Review Board oversight under Exemption Category 1. You may begin your study immediately. If the nature of the research project changes such that an exemption is no longer applicable, please consult with the IRB Administrator (irb@vanguard.edu) before continuing your research.

ADDITIONAL COMMENTS/SUGGESTIONS:
Although a note requirement for exemption, the following suggestions are offered by the IRB Administrator to enhance the protection of participants and/or strengthen the research proposal:

☐ If this box is checked, please submit any documents you receive to the IRB Administrator at irb@vanguard.edu to receive an updated record of your exemption.

Thank you for submitting an IRB application. Please direct questions to irb@vanguard.edu or 229-259-5045.

Signed: John Gray
Date: 12/22/12

Barbara H. Gray, IRB Administrator

Revised: 12/01/2017

189
APPENDIX E: Letter of Authorization
November 29, 2012

To Whom It May Concern:

Mr. Steve Northam’s research proposal related to the University Center (CA400) has been approved by the Office of Academic Affairs. Mr. Northam has been granted access to university personnel for interviews and files related to the development of the Center for focused research purposes. Mr. Northam has not been granted access to any student data or records as part of his research focus. Research studies are approved for one year beginning on the date of approval. If additional time is needed to continue data collection, he must notify the university within thirty days prior to the approval expiration.

Please let me know if you have any questions regarding this matter.

Dr. Richard H. Oates, EdD
Associate Vice President for Academic Affairs
North Georgia College & State University
Dahlonega, GA 30597