

Beyond the City Lights: A Multiple-Case Study of Successful, Experienced
Secondary Science Teachers in Rural Schools

by

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A DISSERTATION

Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy

Major: Educational Studies
(Teaching, Curriculum, & Learning)

Under the Supervision of Professor Julie Thomas

Lincoln, Nebraska

October, 2017

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Beyond the City Lights: A Multiple-Case Study of Successful, Experienced
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University of Nebraska, 2017

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Recruitment and retention concerns for teachers, particularly in rural school districts and in science, fill the daily news and research literature. The shortage of STEM workers is also another concern as well. Then why do nationally recognized secondary science teachers remain in rural schools with lower salaries, increased responsibilities beyond teaching content, and multi-preparations, stay in those schools? How do they overcome challenges in their schools?

This multiple case study focuses on Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) awardees who have taught secondary science in rural school districts 10 years or more. Eight rural PAEMST high school science teachers were identified in Nebraska and the six contiguous states; four consented to participate in this study. Interviews of these teachers and a colleague, principal, and or students were conducted to answer the research questions.

Using a lens of resiliency, similarities were identified that show how these teachers overcome adversity and thrived in their rural school and communities. Resilient themes that emerged from this study are adaptability, autonomy, collaborative, competency, connectedness, problem-solvers, and resourcefulness. Common themes of success for teaching in rural schools for the four teachers were autonomy and relationships. Common themes of challenges for teaching in rural schools were diversity,

funding, professional isolation, and teaching assignments. These characteristics and strategies may help schools with their recruitment and retention of teachers as well as teachers themselves benefiting from hearing other teachers' stories of success and longevity.

PREVIEW

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I dedicate this not only to my parents, Jack H. DeVore and Ruth E. Caldwell DeVore, but to the hundreds of rural science teachers who not only persist, but thrive while providing their students with meaningful education and life-long learning skills.

Author's Acknowledgements

I am indebted to my committee chair, Dr. Julie Thomas, for her patience, guidance, editing expertise, encouragement, and friendship. I would not be writing this without her support and belief in me as a researcher and scholar. Of course, I would not have had the honor of working with her without the persistence of Dr. Jon Pedersen, who regularly reminded me that he had funding for graduate school. His unwavering belief in my abilities led me apply to graduate school at University of Nebraska-Lincoln. Once here, the financial support from Dr. Mark Griep's NSF grant working with Nebraska Indian Community College provided me with fiscal support as well as the opportunity to keep my foot in the classroom. Dr. Griep's trust and support in carrying out his grant goals were essential for my own mental well-being as well as his patience with my stories of life in the hinterlands of Nebraska. Dr. Larry Scharmann, gave me a semester of much needed philosophical discussions to enrich and deepen my understanding and love of learning. His quiet support and encouragement were always wrapped with a smile, a twinkle of his eyes, and kindness. Dr. Stephen Swidler, rounded out my committee and provided a check-and-balance of my methodology and rural research. His support albeit from afar was welcomed. Thank you, committee members for your questions, support, and encouragement these past three years.

I would be remiss not to mention the support of my graduate student peers who also provided much needed laughter, exercise, life adventures, and discussions, academic and personal. Thank you, Lyrica Lucas, Aaron Musson, Ana Rivero, Amy Tankersley, and Tina Vo (alphabetical order) for keeping me grounded.

I would also like to thank my extended science family especially for their support during this journey as well. Their gifts of time, laughter, and knowledge provided an outlet for curiosity as well as a much-needed respite from the rigors of focused coursework, research, and writing: Susan German, Steve Rich, Ken Rosenbaum, Christine Royce, Janice Thompson, and Jean Tushie, thank you for being there almost any time and day (alphabetical order)! Thank you, Dr. Krista Adams, Dr. Beth Lewis, Hank Miller and Janyce Woodard, for your friendship, professionally and personally (alphabetical order)!

I certainly would not have accomplished this research and degree program without the support of my family: my sister, Caroline Carey, who called frequently to ensure my safety and sanity; my daughter, Allie Lockley, who did the same as well as providing a half-way house for travel and meetings; my mother, Ruth DeVore, who provided much needed mental and spiritual support; and numerous nieces and nephews who entertained me with their adventures virtually when I felt far away from home.

Last and not least, my husband, Roy Wedding, deserves much thanks and love, for staying in Colorado to keep the home fires burning, patiently awaiting my completion and return. His undying faith in my abilities, my goals, and me are only surpassed by his patience and love.

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The Warren F. and Edith R. Day Dissertation Travel Award provided partial travel support for this research.

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PREVIEW

CHAPTER I

Introduction

Reading the news headlines, one develops the feeling that there is an increasing shortage of teachers across the United States of America (USA). For example, Clark County Schools (Las Vegas, Nevada) needed almost 1,000 teachers as they began the 2015-2016 school year and the state of California was short 21,500 teachers (Partelow, 2015). While this is a concern for all school districts, imagine how this teacher shortage affects the nation's rural school districts which make-up about one-half of all school systems in the USA.

Rural school systems lack the glamour and glitter of those in large, urban areas and draw from a much smaller pool of potential teachers. Rural school systems are often located in isolated communities defined by a smaller population of qualified teachers. Additionally, these rural systems often provide limited community resources and suffer high-need designations in terms of fiscal resources and classroom equipment. Finally, rural school teachers likely face social and professional isolation where they assume multiple-class preparation duties, responsibility to teach outside of their disciplinary areas, and limited opportunity to access the membership benefits of professional associations or attend professional development sessions in their content area. (Monk, 2007; Thomas & DeVore-Wedding, 2016).

The current focus on science, technology, engineering, and mathematics (STEM) and the education for STEM employment also highlights teacher shortages in STEM content areas. In pK-12 public schools, STEM is often taught by science and mathematics teachers; if there is a need for more STEM employees, these teachers can be lured away from teaching to earn higher, industry salaries (Goodpaster, Adedokun, & Weaver, 2012).

STEM careers require STEM-educated personnel. Secondary science teachers with a content degree (and pedagogical knowledge as well), provide an excellent employee pool—particularly when one compares the differences between salaries in STEM industry and STEM education (Atkinson, Hugo, Lundgren, Shapiro, & Thomas, 2007; Carlsen & Monk, 1992; Monk, 2007; Oliver, 2007). Rural teachers are particularly susceptible since they often receive lower salaries than teachers in urban regions and larger school districts (Goodpaster, Adedokun, & Weaver, 2012).

Particularly in the case of science teachers, if the working conditions in rural schools are less than ideal, then why do teachers stay? How do rural science teachers manage the isolation and shortage of resources? It seems science teachers who choose to stay in rural schools can find opportunity to thrive. In fact, some rural science teachers have received distinctive science teaching awards at the national level, such as the Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) recipients. How do these teachers not only persist but gain recognition as award winning teachers?

The bulk of the research literature on teacher shortages focuses on teacher recruitment and retention practices within the first five years of a teacher's employment in terms of both quality and effectiveness of instruction as well as fiscal repercussions (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Falk, 2012; Gray & Taie, 2015; Phillips, 2015). Narrowing the focus to rural teacher recruitment and retention, there is a shortage of recent literature, particularly regarding secondary science teachers (Collins, 1999; Arnold, Gaddy, & Dean, 2006; Monk, 2007).

Induction and mentoring programs for novice teachers (rural and non-rural schools) frames another concern in the literature (Henry, Bastian, & Fortner, 2011; Luft, Firestone, Wong, Ortega, Adams, & Bang, 2011) though there remains little research on those teachers who do stay, especially those who teach in rural school systems. Coladarci's (2007) insistence on the need for more rural science education research has gone unheeded. It seems, rather, researchers have chronicled the successes of rural teachers over the last century and, due to concerns related to the teacher shortage, the research thrust has shifted from veteran teachers' retention to novice teachers' retention (Carlsen & Monk, 1992; Stern, 1994; Yarrow, Ballantyne, Hansford, Herschell, & Millwater, 1999; Luft et al., 2011; Wong & Luft, 2015). This research trend defines the gap in the recent literature reporting on the status of rural science education in the USA and 20% of the current pK-12 students in the United States who depend on rural school systems (National Center for Education Statistics, (NCES), 2013; U. S. Census, 2015).

Rural school systems have been criticized for their (a) high-need, in terms of fiscal and physical resources (Goodpaster et al., 2012), (b) isolation from amenities (such as universities and industries) (Hadfield, 1992), and (c) less experienced, less-knowledgeable teachers (Carlsen & Monk, 1992; Monk, 2007; Oliver, 2007). How do teachers, particularly science teachers, both continue and succeed in rural school environments? This was the intent and focus of this dissertation study.

Statement of the Problem

The problem addressed in this study was two-fold: Why do nationally recognized secondary science teachers remain in rural school systems and how do they manage the limitations of their unique working environment? This study sought to understand what

it was about a purposefully selected group of secondary science teachers that enabled them to remain and thrive in rural school systems.

Purpose of the Study

The purpose of this study was to understand the career histories of successful, veteran science teachers in rural schools using a multiple case design resulting in a multiple case study. For purposes of this research, *successful teachers* were defined as nationally recognized, *veteran teachers* were those with ten or more years' experience, and *rural schools* were defined as schools with a population of 1,000 or fewer students.

Research Questions

This multiple case study was guided by two central questions and three associated sub-questions (Creswell, 2014).

Central Questions

Why do nationally recognized secondary science teachers stay in a rural school environment?

How do nationally recognized secondary science teachers, who have taught in a rural setting for at least 10 years, describe their own success and longevity?

Sub-questions

1. How do these teachers describe any challenges to their success and longevity?
2. What are the common, emergent themes related to success and longevity of the participants?
3. What unique, traits defined the success and longevity of each participant?

Conceptual Framework

A pragmatic perspective provided the foundation of this research plan--where my quantitative, positivist training connected with my constructivist teaching background and blended into my working research philosophy. This paradigm did not commit to any one philosophy, giving me the freedom of choice to do what “works” (Creswell, 2013, p. 28).

In this dissertation research, I engaged the lens of resiliency to help me understand the success of veteran science teachers in rural schools. Looking at teachers who persist encompasses more than just “sticking it out” but incorporates qualities of resiliency: “enabling teachers to respond positively to challenging circumstances which they may meet over the course of a career” (Gu & Day, 2007, p. 1302). Since the current research literature focuses on novice teacher retention, shifting the view to veterans and longevity, moved my literature review beyond persistence to also consider teachers’ ability to adapt to challenging circumstances as in resiliency (Le Cornu, 2009). According to Bobeck (2002), resiliency of teachers--the ability to adapt to varied situations--increased their competency to overcome adverse conditions vital to a teacher’s success, persistence, and retention.

Science teachers, particularly, those in rural schools with multiple daily preparations, need more than persistence to succeed over many years. As Gibbs and Miller (2014) explained, resiliency explains this phenomenon: resiliency depends on the resources available to teachers that enable them to overcome negative circumstances. Resources that resilient teachers draw upon include support from colleagues and administration, from friends and family, and from the non-teaching community (Bobek,

2002). Teachers with personal traits of altruism and strong self-efficacy also display strong resiliency or the ability to increase their resiliency over time (Malloy & Allen, 2007; Beltman, Mansfield, & Price, 2011). Given this perspective, multiple researchers determined resilient teachers are happier and more effective as teachers (Gu & Day, 2007; Beltman et al., 2011; Pretsch, Flunger, & Schmitt, 2012).

Some researchers have studied the effects of teaching resilient skills to pre-service teachers and early-career teachers to increase their success and retention (Huisman, Singer, & Catapano, 2010; Beltman et al., 2011; Doney, 2013). Though, rural science teachers have not been the specific focus of such research, Malloy and Allen (2007) reported on a rural school that adopted a resiliency culture that resulted in improved teacher retention. These teachers expressed their satisfaction in the teaching assignments, felt their voices were not only heard but encouraged to speak out, and wanted to continue their employment in this district (Malloy & Allen, 2007).

Definition of Key Terms

Defining a school or school district as rural was not easily done given the wide variety of definitions found in the literature (Coladarci, 2007; Oliver, 2007; Goodpaster et al., 2012; Avery, 2013). According to the National Center for Education Statistics (NCES) rural schools include those schools with less than 1000 students which are (a) located 25 miles or farther from an urban center (another conundrum of classifications) or, (b) situated in a school district designated as rural by the state department of education and or, (c) in a town classified as rural by the town's state (U. S. Census, 2015). The U. S. Bureau of the Census (2015) defined urbanized areas as regions with 50,000 or more people and urban clusters as regions with 2,500 or more people. Conveniently then, rural

would be anything not classified as urban or urban cluster (U. S. Census, 2015). Rural schools then would be schools that are in classified rural areas (The Rural School and Community Trust, 2013). The Small, Rural School Achievement program (SRSA) uses the following criteria to identify rural school districts:

- Total average daily attendance is less than 600 students;
- District is in a county with a population density under 10 people per square miles; and
- Every school in the district is in a community defined as rural by the Census Bureau (The Rural School and Community Trust, 2013).

For the purposes of this study, a *rural school* was defined as a school with less than 1000 students, in a town identified as rural or remote by residents and/or governmental agencies, and is at least 25 miles from an urban center.

Longevity was defined as ten or more years of employment in a rural school district. Teachers are often labeled as novice the first five years of their teaching tenure (Wong & Luft, 2015) and up to 50% of teachers leave the profession within the first 5 years of employment (Ingersoll & May, 2012), but teachers who stay ten years or more have made a commitment to schools and teaching.

Success was defined as recognition outside of the local school and community, such as state teacher or leadership awards, national awards such as PAEMST or national organizations' awards. National board certification, active participation in state, regional, or national education policies and leadership will also be considered.

Delimitations and Limitations of the Study

In this dissertation study, I chose a multiple case study method to look for common themes across participants with a common background, despite their own unique circumstances and environment. Emergent, common themes from this study could assist rural school districts not just recruit teachers, but retain science teachers that demonstrate similar characteristics and perspectives on teaching science in a rural school system. Rural school districts could provide professional development and training based on these common themes as well for all teaching staff.

The PAESMT served the common national recognition award for success. The PAEMST website provided a list of teachers who have won the award since 1983. In this dissertation research, I limited the study area to the state of Nebraska and its six contiguous states: Colorado, Iowa, Kansas, Missouri, South Dakota, and Wyoming (National Science Foundation (NSF), 2016). The PAEMST website provides the awardees names and school district where the awardee is currently employed (NSF, 2016). After identifying these states' secondary science PAEMST awardees, I visited each school's website to determine if that school district fit the definition of rural.

The scope of this study was limited to four individual teachers to allow me to review teachers' perspectives on their own longevity and success in a rural school system, observe the teachers in their classroom, and interview their supervisors and colleagues. This approach made my study practicable within the time and fiscal constraints.