

Sponsoring Committee: Professor Nancy Hale  
Professor Susan Feather-Gannon  
Professor Gregory Ramsay

AN INVESTIGATION OF PRIMARY AND SECONDARY TEACHERS'  
BELIEFS IN THE USEFULNESS OF DATA-DRIVEN  
DECISION-MAKING

Salvador Contes, Jr.

Submitted in partial fulfillment of the requirements for the degree of  
Doctor of Professional Studies in Computing Studies in the  
Seidenberg School of Computer Science and Information Systems  
Pace University  
2016

ProQuest Number: 10253765

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10253765

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

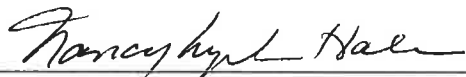
All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code  
Microform Edition © ProQuest LLC.

ProQuest LLC.  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106 – 1346

Copyright © 2016 Salvador Contes, Jr.


We hereby certify that this dissertation, submitted by Sal Contes, Jr., satisfies the dissertation requirements for the degree of Doctor of Professional Studies in Computing and has been approved.



Prof. Nancy Hale  
Chairperson of Dissertation Committee

12-23-16

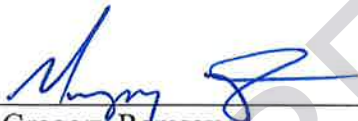
Date:



Prof. Susan Feather-Gannon  
Dissertation Committee Member

12-23-16

Date:



Prof. Gregory Ramsay  
Dissertation Committee Member

12-23-16

Date:

Seidenberg School of Computer Science and Information Systems  
Pace University

I hereby guarantee that no part of the dissertation which I have submitted for publication has been heretofore published and/or copyrighted in the United States of America, except in the case of passages quoted from other published sources; that I am the sole author and proprietor of said dissertation; that the dissertation contains no matter which, if published, will be libelous or otherwise injurious, or infringe in any way the copyright of any other party; and that I will defend, indemnify, and hold harmless Pace University against all suits and proceedings which may be brought and against any claims which may be made against Pace University by reason of the publication of said dissertation.

A handwritten signature in black ink, appearing to read "S. Neely", written over a horizontal line.

Signature

12-23-16

Date

## ACKNOWLEDGMENTS

I would like to acknowledge the contributions and support I received from several people.

Thank you, Dr. Laval Wilson and Mr. Jose Carrion, for your support and allowing me to conduct my research. Both of you offered invaluable assistance and insights as distinguished and experienced leaders. Thank you to the Poughkeepsie City School District staff for taking valuable time out of your day to participate and complete my surveys.

Thank you, Dr. Hale and Dr. Feather-Gannon, for your willingness to advise me and assist me in developing my survey instrument. Both of you helped without hesitation and were willing to offer recommendations that allowed me to advance in my research.

To my Pace University professors and classmates, thank you for your guidance and wisdom. I consider myself fortunate to have had such a dynamic group of individuals by my side.

To my parents and sisters, thank you for constant support. You have showed me that the bond of a family is critical to success in life.

Finally, to my wife, Tracey, and my daughter Ariana, with your love and support, I have reached this milestone. As my rock and foundation, I have completed this journey.

## TABLE OF CONTENTS

ACKNOWLEDGMENTS	iii
LIST OF TABLES	vii
ABSTRACT	ix
CHAPTER	
I    RESEARCH OBJECTIVE	1
Problem Statement	9
Purpose of the Study	13
Research Questions	16
Definition of Terms	18
Limitations of the Study	19
Significance of the Study	19
Summary	20
II    REVIEW OF THE LITERATURE	22
Assessments	22
Data Use	26
Data-Driven Culture	30
Summary	33
III   METHODOLOGY	35
Research Questions	35
Research Design	37
Sample and Population	38
Instrumentation	42
Treatment	45
Analysis	46
Summary	46

continued

IV	PRESENTATION AND ANALYSIS OF DATA	48
	Research Questions	48
	RQ #1 Findings: How do teacher's beliefs in the use of state assessment data in their instructional practice relate to school level and teaching longevity?	52
	School Level	52
	Teaching Longevity	53
	RQ #2 Findings: How do teacher's beliefs in the use of other yearly assessment data in their instructional practice relate to school level and teaching longevity?	54
	School Level	55
	Teaching Longevity	56
	RQ #3 Findings: How do teacher's beliefs in the use of common periodic assessment data in their instructional practice relate to school level and teaching longevity?	58
	School Level	58
	Teaching Longevity	59
	RQ #4 Findings: How do Teacher's beliefs in the use of other periodic assessment data in their instructional practice relate to school level and teaching longevity?	60
	School Level	61
	Teaching Longevity	62
	RQ #5 Findings: How do teacher's beliefs about acting on data relate to school level and teaching longevity?	63
	School Level	64
	Teaching Longevity	65
	RQ #6 Findings: How do teacher's beliefs about support systems relate to school level and teaching longevity?	66
	School Level	67
	Teaching Longevity	68
	RQ #7 Findings: How do teacher's beliefs about data-driven culture relate to school level and teaching longevity?	69
	School Level	70
	Teaching Longevity	71
	Summary	72

continued



V	CONCLUSIONS, RECOMMENDATIONS, AND SUMMARY	75
	Research Questions	75
	Findings	77
	State Assessments	79
	Other Yearly Assessments	79
	Common Periodic Assessments	80
	Other Periodic Assessments	81
	Acting on Data	81
	Support Systems	82
	School Data-Driven Culture	83
	Recommendations	83
	Summary	85
	BIBLIOGRAPHY	87
	APPENDICES	92
A	The National Institutes of Health (NIH) Certificate	92
B	Permission to Use Survey	93
C	Permission to Conduct Survey	94
D	Teacher Survey Consent form	95
E	Data-Driven Decision-Making Teacher Survey	97
F	Constructs and Survey Items	122

## LIST OF TABLES

1	School District Teacher Qualifications (2009-2012)	40
2	Demographic Information for Population of Teachers	41
3	Respondents' Demographic Information by Level	42
4	The Relationship Between Teacher's Beliefs in the Use of State Assessment Data to Inform Their Instructional Practice by School Level	53
5	The Relationship Between Teacher's Beliefs in the Use of State Assessment Data to Inform Their Instructional Practice by Teaching Longevity	54
6	The Relationship Between Teacher's Beliefs in the Use of Other Yearly Assessment Data to Inform Their Instructional Practice by School Level	56
7	The Relationship Between Teacher's Beliefs in the Use of Other Yearly Assessment Data to Inform Their Instructional Practice by Teaching Longevity	57
8	The Relationship Between Teacher's Beliefs in the Use of Common Periodic Assessment Data to Inform Their Instructional Practice by School Level	59
9	The Relationship Between Teacher's Beliefs in the Use of Common Periodic Assessment Data to Inform Their Instructional Practice by Teaching Longevity	60
10	The Relationship Between Teacher's Beliefs in the Use of Other Periodic Assessment Data to Inform Their Instructional Practice by School Level	62

continued

11	The Relationship Between Teacher's Beliefs in the Use of Other Periodic Assessment Data to Inform Their Instructional Practice by Teaching Longevity	63
12	The Relationship Between Teacher's Beliefs About Acting on Data by School Level	65
13	The Relationship Between Teacher's Beliefs About Acting on Data by Teaching Longevity	66
14	The Relationship Between Teacher's Beliefs About Support Systems by School Level	68
15	The Relationship Between Teacher's Beliefs About Support Systems by Teaching Longevity	69
16	The Relationship Between Teacher's Beliefs About Data-Driven Culture by School Level	71
17	The Relationship Between Teacher's Beliefs About Data-Driven Culture by Teaching Longevity	72
18	Constructs and Survey Items	122

## ABSTRACT

Data-driven decision-making (DDDM) has increased in schools and districts at a rapid pace. The teacher's role in DDDM has changed due to the increased accountability requirements set by the federal government. The purpose of this quantitative research study was to examine the relationship among teacher's characteristics and teacher's beliefs regarding the use of DDDM in their instructional practice. The study investigated the types of data teachers find most useful in making instructional decisions, the ways teacher's make decisions based on the data and its support systems, and the data-driven culture of their individual schools. McLeod's (2006) Statewide Data-Driven Readiness Study: Teacher's Survey was used to assess the teacher's beliefs about the data-driven readiness of their schools.

This study addressed teachers in a small urban school district in the southern portion of New York State. The data for this quantitative study was collected via an online survey sent to 329, K-12 teachers. Each teacher responded to a five-point Likert scale indicating to what degree they agreed or disagreed with statements on three constructs 1) assessments, 2) data, and 3) data-driven culture. The constructs were further divided into seven factors that were analyzed to determine the relationship between New York state assessments, other yearly

assessments, common periodic assessments, other periodic assessments, acting on data, support systems, and data-driven culture.

The findings indicate that teachers that participated in the study believe their schools utilize data to make instructional decisions. Statistical significances were found in the cross tabulation analyses. Further analysis did indicate that there is a significant correlation between primary school and secondary school teachers when comparing high-stakes assessments. The research also indicates that teachers are using data to inform their instructional decisions to the degree that is it useful. Lastly, the research indicates that teachers need to be provided with access to the data, its' support systems and provided professional development on how to analyze the data more effectively.

## CHAPTER I

### RESEARCH OBJECTIVE

President Lyndon Johnson's Elementary and Secondary Education ACT of 1965 (ESEA) was authorized to fund professional development, instructional materials, resources to support educational programs, and promote parental involvement. One section, Title IV of ESEA, created a series of research centers and regional educational labs. According to the Report of the President's Task Force on Education in 1964, these labs and centers were intended to "speed the dissemination of improved methods and practice." The Task Force on Education stated that it recommends quality education for every child (Leuchtenburg, 2009).

The National Commission on Excellence in Education of 1983 (A Nation At Risk, 1983) was a published report that all children *"regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself."* The report listed several

indicators that have been documented demanding that as a country, our nation is responsible to providing our youth an “excellent education.”

The Improving America's Schools Act of 1994 (IASA) included provisions and reforms in (a) extra help to disadvantaged students and holding schools accountable; (b) charter schools; (c) impact aid; and (d) education technology and other programs. Section 2208 of IASA, called for the focus “on teaching and learning in the core academic subjects.”

The No Child Left Behind Act of 2001 (NCLB) is based on stronger accountability for results, increased flexibility and local control, expanded options for parents, with an emphasis on teaching methods that have been proven successful. Due to complexities of NCLB, many districts, schools and educators are challenged daily with high-stakes accountability. High-stakes, standardized assessments have been utilized to demonstrate students’ levels of proficiency towards achievement of a variety of state standards, serving the purpose of summative evaluation or accountability (Guskey, 2005).

NCLB requires that all districts and schools collect, analyze, and report student performance and assessment annually from kindergarten to twelfth grade. The law further extended the use of evidence in education by mandating the use of scientifically based research in NCLB programs, effectively mandating the use of data in making basic decisions about K-12 education (Kohlmoos, 2005). Results can also be used for important information such as grading, evaluating

program effectiveness, or determining if a school or district has made Adequate Yearly Progress (Chappius & Chappius, 2008).

A school that fails to make adequate yearly progress (AYP) for two consecutive years is placed on improvement status. A school that makes AYP for two consecutive years is removed from improvement status for the subject and grade in which it was identified (New York State Education Department, 2008). School accountability status for New York State is determined by four “phases” 1) Good Standing, 2) Improvement, 3) Corrective Action, or 4) Restructuring. If a school is not in Good Standing, a “category” of Basic, Focused, or Comprehensive is identified for each measure of which the school is accountable (New York State Education Department, 2008). Accountability measures for schools at the elementary/middle level are English Language Arts (ELA), Mathematics, and Science; at the secondary level, they are ELA, Mathematics, and graduation rate. Generally, the school’s overall accountability status is its most advanced accountability phase and its highest category within that phase (New York State Education Department, 2008). A school in any year of the phase (that is not Good Standing) that makes AYP for the measure remains in the same phase/category the following year. An identified school that makes AYP in the identified measure for two consecutive years returns to Good Standing (New York State Education Department, 2008). If a school is identified with the phase of a category, within the following year, it cannot move to a lesser category in that phase.



Each school district with one or more Title I schools and each Title I charter school designated as Improvement (Year 1 and Year 2), Corrective Action, or Restructuring must make Supplemental Educational Services available for eligible students in the identified Title I school(s). A school district with one or more schools designated as Improvement (Year 2), Corrective Action, or Restructuring must also provide Public School Choice to eligible students in identified Title I school(s) (New York State Education Department, 2008).

NCLB, and most state accountability systems, share three common features: 1) Goals: Establishes common expectations for student performance, 2) Assessments: A system that objectively measures the achievement of goals, and 3) Incentives: Strategies, both financial and administrative, to motivate students and teachers to increase effectiveness by maximizing efforts (Stecher, Hamilton, & Gonzalez, 2003). While federal and state policies have tended to emphasize the value of standardized achievement test data, they have not necessarily encouraged the use of multiple sources and types of data, nor do they provide capacity building in data use (Kerr et. al., 2006). The National Assessment of Educational Progress reported, that our “Nations Report Card,” “proficiency” rates in 2014, “were below 50 percent for every racial and ethnic group, in both reading and math, in both fourth and eighth grade. The exceptions? Asians, in all subjects (51-64 percent) and whites in fourth grade math only (54 percent).”

Accountability systems required and mandated by states depend on the perceptions that motivation and awards are valued by incentives. The proponents of such an approach argue that schools will aspire to demonstrate achievement in order to avoid negative press, keep local autonomy, and to avoid sanctions imposed by the state and federal authorities (Wienbaum, 2005). The purpose behind NCLB is to increase student achievement in every subgroup identified. The goals of the system embedded in the standards of the curriculum must be used to guide teachers and administrators in instruction. Correspondingly, standardized tests are used to measure the students' attainment of the standards. Improvement on the standardized tests for all students results in rewards to reinforce effective behavior, whereas poor performance results in sanctions and implementation of strategies that will modify ineffective practice (Goertz, Duffy, & Carlson-LeFloch, 2000). Through NCLB, the expectations for states, local educational agencies (LEA), and schools is that all students are expected to meet or exceed state standards in reading/language arts and mathematics by 2014. Given the short turn around, schools and districts fear that the 100% proficiency in ELA and mathematics deadlines may not be attained as stated by NCLB (Kamenetz, 2014).

The decision to publish disaggregated data on standardized test scores did not result in the increased awareness for educators that were anticipated. Politicians hoped to create a "culture of inquiry" so that educators would look to change their classroom practices to create a new community of teaching and

learning. This community would attempt to avoid assumptions made by educators when looking at data. The challenges such as access to data in a timely manner, analysis and use of data, and opportunities to design and implement effective and targeted strategies to close the achievement gap, failed to account for these assumptions. In their study of impact of NCLB in California, researchers O'Day, Bitter, Kirst, Carnoy, Woody, Buttles, Fuller, & Ruenzel (2004), suggest that the effective use of data to inform pedagogical practice is at best sporadic, since many educators lack skills, expertise or the capacity to analyze, interpret, and use DDDM to bring about changes that will result in improvement of student achievement. In addition, RAND Corporation researchers (Marsh, Pane, & Hamilton, 2006) observed that when teachers do not have access to data nor to data systems, they often do not have the capacity to formulate questions, analyze results, select benchmarks, and develop solutions.

Datnow, Park, & Wohlstetter (2007) stated that educators will use data on student progress to inform decision-making. Districts and schools are examining the results of the annual state assessments with eagerness and are using them to make decisions such as evaluating progress towards goals, judging the benefits and weaknesses of a particular curriculum, or monitoring student performance (Datnow et al., 2007).

When associating and understanding DDDM, you can find similar trends outside of education. In 2013, Economist Erik Brynjolfsson and his colleagues from MIT and Penn's Wharton School conducted a study of how DDDM affects a

firm's (not solely education, but a company as a whole's) performance. They developed a measure of DDDM that rates firms as to how strongly they use data to make decisions across the company. They show statistically that the more data-driven a firm is, the more productive it is—even controlling for a wide range of possible confounding factors. And the differences are not small: one standard deviation higher on the DDDM scale is associated with an increase in productivity (Provost and Fawcett, 2013).

Utilizing DDDM and timely data from formative assessments, teachers can alter instruction to fit the needs of students (Halverson, Prichett, & Watson, 2007). Teachers can use this data to better inform them if their students are mastering the standards. Additionally, teachers may utilize the data to assist them in creating lessons that strengthen students understanding of concepts and skills. Therefore, students are given opportunities to grasp the correct concept and/or skill prior to developing any poor habits and/or false impressions. Teachers can also use their students' data to find the standards their students have mastered and tailor their instruction to challenge the students on these standards (Leahy, Lyon, Thompson, & Wiliam, 2005). Utilizing these components, educators can strategize and implement differentiated instruction; a teaching theory, based on the premise that instructional approaches should vary and be adapted in relation to individual and diverse students in classrooms.

Data from formative assessments are useful for examining student progress and instructional planning and data can also lead to understanding the

causes or reasons why a student may not be progressing (Heritage & Yeagley, 2005). Using various types of formative assessments such as anecdotal records, attendance, and health records, educators may better grasp why students are not progressing and/or developing, as they should. The use of data over a period of time and results measuring specific outcomes would allow a greater understanding of the development of student's performance.

A key aspect in formative assessment is how DDDM is used in schools with an increase in low-level students. According to Black and Wiliam (1998), studies have shown that low achievers receive the most benefit from DDDM and that it causes the range of achievement to decrease. Students who are taught by educators who utilize DDDM have a higher rate of students decreasing the achievement gap. In addition, Black and Wiliam, as referenced by Leahy et al. (2005), have "...found that students taught by teachers who used assessment for learning achieved in six or seven months what would otherwise have taken a year" (p.1). In other words, students achieve at a higher rate in comparison to other students being taught with the use of DDDM.

Overall learning assessments, if chosen or created with viable connections to the design of personalized classroom instruction, can enable educators to "address standards accurately, identify instructional weaknesses, and diagnose individual student learning problems" (Guskey, 2005, p.32). Consequently, formative assessments are able to bring value to educators' data-based instructional decisions. This is by no means the only list of quantitative and

qualitative indicators as a resource. Research also points to indicators on the complexity and the comprehensiveness of data; the extent to which schools and districts support the needs of their staff (Weinbaum, 2005).

Information from other assessments, measures of student engagement, previous programmatic interventions, and other data are needed for teachers to design appropriate instructional interventions (McLeod, 2005). A single assessment, whether formative or summative, is not as reliable as multiple assessments in order for teachers to assess student understanding. Data-driven teachers need to be savvy consumers of summative assessment data, such as yearly state tests. They must understand when and how the data can, or can't, inform teacher practice (McLeod, 2005). Further research built on the McLeod's DDDM body of work include studies: a) Relationships among principal beliefs about data-driven decision making, principal and school characteristics, and student achievement in elementary schools (White, 2008), b) Examining the applications of DDDM on classroom instruction (Yao, 2009), c) The impact of professional development in data based decision making on the teaching practices of educators (Harris, 2011), and d) DDDM teacher's use of data in the classroom (Moriarty, 2013). Each of these studies shares a commonality in the evolving role of the teacher in the use of data.

### Problem Statement

Given the rise of district and school accountability, the teacher's role has changed in regards to the use of classroom data. As the teacher's role becomes

more complex, and they become more involved in the alignment of curriculum with standards, increased analysis of student performance data, and being part of a professional learning community, the emphasis of DDDM has become increasingly more vital and its implementation more urgent. There are many qualitative studies in regards to the relationship of DDDM and student performance, but few quantitative studies that target the teacher's use of DDDM. These studies also do not address the role of the teacher in an urban school district nor do they focus on a teacher's years of service and the school grade level they teach.

A look at a small urban school district in southern New York will be the focus of this study given its demographics and the current state of the use of DDDM. The high school in the district has been labeled a "School in Restructuring - Year 2." A School Restructuring (Year 1) that does not make AYP on the accountability measure for which it was identified is considered a School Restructuring (Year 2) for the following year, if it continues to receive Title I funds. Schools that were required to develop a restructuring plan during the previous school year and that failed to make AYP last year must now implement their restructuring plans at the beginning of the school year (New York State Department of Education, 2009).

The high school has also been identified as a "Persistently Lowest Achieving (PLA)" school. Schools that are identified as PLA during the 2009-10 school year will be required by Commissioner's regulations to implement a

school intervention model as approved by the Commissioner. Failure to successfully implement an intervention model could subject schools to revocation of registration. Schools that successfully implement a turnaround or restart model; or that improve results sufficiently to no longer meet the criteria for identification as PLA; will be removed from registration review (New York State Department of Education, 2010). The high school achieved the PLA status after failing to achieve a 60% graduation rate for the “All Students” group in its 2002, 2003, and 2004 graduation rate cohort.

One elementary school in the district has been labeled a “School in Need of Improvement – Year 2.” A School in Need of Improvement (Year 1) that does not make AYP on the accountability measure for which it was identified is considered a School in Need of Improvement (Year 2) for the following year, if it continues to receive Title I funds. Once identified, schools that continue to receive Title I funds and did not make AYP the next year are required to continue to provide public school choice and must also offer eligible students supplemental educational services. These services are provided outside of regular school hours by an organization selected by the parent from a list of qualified providers approved by the State Education Department (New York State Department of Education, 2009).

The other four elementary schools and the middle school are labeled “In Good Standing.” The district’s overall accountability is “In Good Standing” for English Language Arts (ELA), Mathematics, and Science and is a “District in