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MID-WESTERN EDUCATIONAL RESEARCHER

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Cleveland State University

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Co-Editors

Mary K. Bendixen-Noe
*The Ohio State University,
Newark*
email: bendixen-noe.1@osu.edu

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Indiana University
email: kmetcalf@indiana.edu

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MWER Publication Address

Mary K. Bendixen-Noe
The Ohio State University, Newark
1179 University Dr.
Newark, OH 43055
Phone: (740) 366-9469
Fax: (740) 366-5047
email: bendixen-noe.1@osu.edu

MWER Subscription & MWER Membership Information

Jean W. Pierce
Dept. EPCSE
Northern Illinois University
DeKalb, IL 60115
Phone: (815) 753-8470
Fax: (815) 753-9250
email: jeanpierce@aol.com

Do State Content Standards Make a Difference?

An Illustration of the Difficulties of Addressing that Pressing Question

Elizabeth Dutro
Cleveland State University

Abstract

This article discusses the complexities surrounding the relationship between state content standards and student achievement. Drawing on interviews and document analysis, this paper describes one case of how the embedded contexts of state, district, and an individual teacher's experiences interacted around state content standards in literacy. Student test scores improved, but what led to that improvement is not easily determined. This case reveals that what appears to be an ideal outcome of adopting standards in curriculum planning is really much more complicated, involving district initiatives, curriculum adoption, shifting district demographics, and the individual expertise of teachers.

Soon after her state officially approved its current content standards in literacy in 1998, Donna, a first grade teacher, found a copy of the standards in her school mailbox. She and her colleagues were required to post the literacy standards in their classrooms and were urged to use them in their planning. When I asked Donna what impact she felt the standards had on her students' experiences in literacy, she talked about their usefulness in planning, how the standards have provided focus and organization to her school's literacy curriculum. She also began to describe other steps that her school and district had taken over the past three years to address slipping standardized test scores in reading: a before and after school book club for struggling readers, a new curriculum, teachers moving into new positions as "reading coaches" to support colleagues' literacy teaching, and a new arts magnet program at her school. Reading scores in Donna's district have risen; but, due to what factors? When the state looks at the increased reading scores in Donna's district over the past few years, do they see a standards success story?

What impact are state content standards having on student learning? This is a difficult question on many fronts. First, state content standards are relatively new and research has, thus far, focused more on evaluating the standards themselves and how teachers and districts interpret and implement them, than in their impact on student learning. Second, tracing the role that content standards play in teacher practice or improved student performance on standardized test scores is extremely difficult. Districts, schools, and teachers are involved in many overlapping efforts to improve practice, and student learning and content standards may play a more or less prominent role in that process. Third, it is becoming increasingly difficult to talk about content standards apart from standardized assessment. As my colleagues and I discovered in a recent interview study with teachers, talk about standards inevitably becomes talk about standardized assessments and issues of accountability (Dutro, Collins, and Collins, 2002).

Yet, as Valencia and Wixson state in their review of research on literacy standards and assessment, "the pressure is mounting on educators to show results in terms of achievement. Future researchers will need to address the challenge, finding meaningful ways to document student achievement while at the same time understanding the process of change and the contexts of schools" (2000, p. 39, 40). Given the time and enormous financial resources that continue to be expended on the development and implementation of content standards, reports on student achievement will indeed be watched with anticipation. However, as research on current and previous reform movements has shown, state, district, and teacher-level issues interact in unique ways that make it difficult to ascribe change to any one element (e.g., Cohen and Ball, 1990; Goertz, Floden, and O'Day, 1995; Spillane and Jennings, 1997).

This article describes one case of how the embedded contexts of state, district, and an individual teacher's experience interacted around state content standards in literacy. Student test scores improved, but what led to that improvement is not easily determined. These stories reveal that what appears to be an ideal outcome of adopting standards in curriculum planning is really much more complicated. This case is not meant to address every relevant aspect of reform activity in the state and district contexts. Rather, I present the interrelated events and decisions that impacted this district and, seemingly, one school's improved scores on a state test, to illustrate the factors at play in many schools' attempts to boost student achievement in the context of standards-based reform. Also, although I speak of the content standards movement generally, my primary focus is on literacy standards and curriculum. I will argue that examining the content and interpretation of state content standards is important, but existing research and the exploration of the case I present here point to the difficulties of determining whether any one piece of the systemic reform puzzle is working to improve learning and opportunities for students or their teachers.

The Content Standards Movement: Recent Past and Present

For almost a decade content standards in key subject areas in the K-12 curriculum have been the focus of much attention by educators, policy makers, and politicians. Starting with the Goals 2000 federal legislation in 1993, national professional organizations and individual states have been engaged in constructing documents that outline what students should know and be able to do in each subject. These content standards are meant to be the roots of systemic reform. According to this model, once a set of content goals was agreed upon, instruction and assessment would grow to support and assess the learning of those goals. By the late 1990s, 49 of 50 states had completed or were in the process of completing state content standards in literacy and assessments that aligned with those standards.

What Makes for Exemplary Standards?

As might be expected, finding consensus on what constituted crucial and appropriate content was difficult. Further, it was not just broad content that these documents fixed to paper, but ideas about when particular content should be introduced and in what detail (Wixson and Dutro, 1999). Soon after many states had completed their content standards, various groups and organizations began to “grade” the state standards. As Valencia and Wixson have recently discussed, this grading was inconsistent and was heavily influenced by the perspectives and ideologies of the groups doing the measuring (2002).

However flawed these reports have been, though, many states have undertaken major revisions of their content standards in response. Further, some of the documents being heralded as exemplary models of literacy content standards have been just those documents that have been criticized by literacy educators and scholars as being too detailed and prescriptive. For instance, the California state literacy standards have been critiqued for being highly specific and leaving little room for district flexibility (Wixson and Dutro, 1999; Valencia and Wixson, 2001); yet, that document is used as one of three model documents by ACHIEVE, an organization that consults with states in the writing and revising of content standards. Although much of the recent controversy around current reforms in education involves the uses and abuses of standardized assessment, content standards, too, continue to be the focus of much debate and concern. By the very virtue of fixing a particular set and sequence of subject matter content to the page, they hold enormous weight. They become the tangible definitions of what counts as acceptable and appropriate foci of curriculum and instruction. Far from being neutral documents, the standards often reflect the controversies and ideological clashes occurring around subject matter in particular states.

The Dynamic Relationship Between Macro and Micro-level Reforms

Of course, content standards are only one element of systemic reform. The impact of macro-level policies, such as state content standards, is dependent on numerous micro-level issues such as district decision-making, teacher beliefs, and social dynamics among school staff (e.g., Spillane and Jennings, 1997; McGill-Franzen and Ward, 1997; Spillane, 1996; Standerford, 1997). For instance, McGill-Franzen and Ward analyzed the understandings of 21 teachers from 4 New York districts who were each involved in district-level professional development efforts around literacy and social studies content standards and assessment. Even in the context of these shared district-level professional development experiences, teachers in each district had widely disparate understandings of content standards in literacy and varied expectations for how the standards might impact their classroom practice. These differences seemed related to how much accountability pressure felt by teachers and how much authority they felt they had over instructional decisions. This and other studies confirm the importance of examining the dynamics that interact in particular contexts to shape understandings and results of reform efforts, including reforms involving state content standards.

In the case of California, the focus here, the nature of the content standards in literacy are closely related to curriculum adoptions, politics around subject matter (particularly reading), and district and school accountability. I chose to showcase California here for two reasons: one, it is one of the states that colleagues and I are focusing on in two separate, ongoing studies related to literacy standards, so I am familiar with the state context (Dutro and Valencia, 2002; Dutro, Collins, and Collins, 2002); two, California’s content standards have received much national attention (both positive and negative) and many of the politics surrounding systemic reform have been played out provocatively in the state.

Below, I describe state and district contexts related to content standards in literacy and other curriculum-related areas that impact the experience of Donna, an elementary teacher who has particular expertise and interest in literacy. A crucial aspect of these stories is that Donna’s school went from being labeled a school at risk three years ago to being honored by the state in 2002 for its improved test scores. Following the case descriptions, I discuss several of the factors, including and related to literacy content standards, which may have impacted this school’s increased scores on the state test. I also point to theories of discourse and positioning as fruitful means through which researchers can continue to unpack the many issues surrounding content standards and their impact on the lives of teachers and students.

The California Context

California developed its current literacy content standards in 1998. Reading, writing, and speaking and listening stan-

dards and benchmarks are included for each grade level, K-12. As researchers have pointed out, California's literacy standards are highly detailed, leaving little room for interpretation or adaptation at the local level (Wixson and Dutro, 1999; Valencia and Wixson, 2002). The state is currently piloting a new standardized assessment based on the state standards. The new test includes items drawn from the SAT-9 (the assessment that has been in use for several years) that have been determined to align with state standards, as well as some items created to address particular state standards. All California students in grades 2-11 are given the state test each year. As reported in *Education Week*, students in California spend more hours on average taking state tests (7.25 hours in fourth grade) than students in any other state (national average of 6.02 at 4th grade) (2001, p. 26). California publishes report cards for districts and rates districts based on test performance. In many districts, school test scores are published in local newspapers and/or on the internet.

The state has recently adopted two commercial literacy programs for use in the state. Districts have a choice between Open Court and Houghton Mifflin. Even prior to the adoption, many districts across the state have mandated Open Court for literacy instruction. This is significant because Open Court is best known for its systematic phonics instruction in the early grades. Perhaps more than any other state, California's political climate surrounding literacy, particularly reading, has been phonics-driven. Conservative foundations, most notably the Packard Foundation, have provided increased funding to select districts if they adopt Open Court. Additionally, the state passed legislation requiring that all literacy-related professional development paid for with state funds had to include specified topics or approaches to reading instruction, with an emphasis on word-level skills (AB-1086). Further, Proposition 209, passed in 1996, which outlawed bilingual education, increased concerns of many educators for how the states' many ESL learners were faring under state policy. These moves have created strife and controversy around reading instruction in the state.

The District Context

Mooretown Unified Schools is a small district in California. It has two elementary schools, one middle school and one high school. The students in the district are predominantly white and many are poor, with close to 70 percent qualifying for free or reduced lunch. Mooretown is surrounded by several other small to mid-sized public school districts. Because there is school choice in the larger metropolitan area, competition among districts can be fierce. Mooretown district publishes the scores of each of its schools on the internet and parents often use these scores when considering where to purchase a home.

One of the elementary schools in Mooretown, Franklin Elementary, is at a disadvantage in this competition because of the higher levels of poverty in its surrounding neighborhoods. The superintendent has been strategic in devising ways to draw parents to his district and, in particular, to

Franklin. For instance, the district developed a magnet program in the arts and housed it at Franklin. This has both increased the overall numbers of students at Franklin and drawn more middle-class families to the school.

About four years ago, when the current state content standards were first developed, the district increased its focus on state content standards, particularly in literacy and mathematics. The superintendent wanted state content standards posted in each classroom and asked teachers to use the content standards in their planning. The district ensures that each teacher is provided with a full set of content standards and expects that principals will monitor their active use by teachers.

Donna's Story

Donna works at Franklin elementary school in Mooretown. She has taught for 31 years, 15 of those in her current school. She has taught all elementary grades over the course of her career and currently teaches in the primary grades. Her school has historically not posted high scores on the state mandated assessment and four years ago was designated a "school at risk." Donna remembers the increased emphasis on content standards that began at about that same time. As she described, "when we have our grade-level planning meetings, the standards are right there."

Also four years ago Donna's district was awarded a 3 year grant by a private foundation to fund the implementation of the Open Court program in literacy. A significant amount of money was provided to be used for materials, professional development, and funding for two "reading coaches" who would attend state-level training in the Open Court program and support all teachers in their district in implementing the program. Donna, who was well-respected by both administrators and fellow teachers, was asked to be one of the reading coaches and, after much soul-searching, she agreed and left the classroom for three years.

Donna describes her experience as a reading coach as the most significant professional development experience of her career. Usually fearful of public speaking, she learned to be comfortable providing inservice training to teachers from her own district as well as others in the state. She says that she has a much fuller understanding of the issues of teaching and learning in early reading. Although she began her position feeling somewhat ambivalent about Open Court, she was soon a strong supporter. She emphasizes that it is a great program if teachers implement it in its entirety. She worries that some will neglect the literature and writing process aspects of the program because, as she explains, "those are not the aspects that receive the most attention." The move to adopt Open Court was controversial in her district, and she and the other reading coach caught the brunt of their colleagues' criticisms. Donna describes the stress of having to deal with negative reactions from her fellow teachers. Her awareness of the controversies surrounding this particular reading program grew during her three years of leading her school in its implementation.

At the same time that the district adopted the new literacy program, Donna's school also implemented other supports for reading, including a before school reading "club" and after school tutoring program for students with low scores on district and state reading assessments. In addition, the district revised its report cards to "align" with state standards in math and literacy. This year Donna's school was recognized by the state as one of eight schools with the highest gains on the state assessment. Donna is now happily back in the classroom.

Discussion

As Table 1 illustrates, the standardized test scores in reading have risen dramatically in Mooretown over the past few years. In discussing the relationship among factors that may have led to increased success on standardized test scores at Donna's school, I will focus on state content standards in literacy, curriculum, student demographics and accountability. Because these factors are so interrelated, I do not discuss them separately.

Table 1
SAT-9 reading scores in Mooretown (percent of students performing at or above the 50th percentile)

Grade	1998	1999	2000	2001
2	53	59	78	74
3	55	52	71	73
4	37	58	55	73
5	45	49	61	62

At the urging of the superintendent, the state content standards in literacy were used proactively by the teachers in this district. Donna described the standards as being very helpful as she and her teacher colleagues engaged in long and short term grade-level planning. Donna and other teachers from California tend to see the content standards as more central to their day-to-day teaching life than teachers from other states. As my co-authors and I have conjectured elsewhere, this could be a function of accountability at both the state and local level (Dutro, Collins and Collins, 2002). For the most part, teachers in California also tended to be more anxious and concerned about their own accountability for their students' test scores. In states where teachers talk less anxiously about accountability and standards, the standards appear to be used less proactively in planning and instruction. Although Donna does speak positively about the role that content standards play in planning, she also expresses concern in conversations about the responsibility that teachers bear for student achievement in her district. It is impossible to know the extent to which Donna and her fellow teachers attend to the standards out of a sense of "we'd better or else. . ." but certainly the content standards have played a proactive role in their planning for instruction over the past few years.

In talking about the California literacy standards, Donna also emphasizes that the Open Court curriculum is "aligned"

with the content standards. California clearly agrees, as it has recently adopted Open Court as one of two reading options from which districts may choose. This also means that for teachers who believe or are told that a particular curriculum is aligned with state content standards, teaching that curriculum *is* teaching to the state content standards. Therefore, Donna's talk about the role that the state literacy content standards played in her teaching was often talk about the Open Court curriculum. So, although the teachers at Franklin use the state standards document explicitly in their long-term planning, the use of the required curriculum appears to stand in for the state standards for the bulk of instructional decision-making and daily practice.

The new curriculum was not the only change experienced by Franklin students over the past few years. Because of concern for students struggling with reading and the districts' overall push to raise test scores in response to Franklin's designation as a school at risk, the teachers organized additional instruction for struggling readers both before and after school. These sessions involved primarily small group and individual instruction in both decoding and comprehension and were open to students in all grade levels. The state's emphasis on school accountability and its designation of certain schools as "at risk" arguably motivated Franklin staff to take proactive steps to work even more closely with struggling students. On the other hand, the pressures of high-stakes accountability exact a cost in teacher stress, retention and increased instructional time devoted to test preparation (Dutro, Collins and Collins, 2002; Kohn, 2000). Donna argues that the move to implement extra instruction for struggling readers was as much a result of ongoing concern for students and the schools' increased awareness of literacy learning (as a result of the curriculum adoption and her work as reading coach), as accountability issues.

Like many larger districts, Mooretown has made attempts to balance the demographics across district schools. In this small district, it is only the elementary schools where this is an issue. Soon after Franklin was designated a school at risk, the superintendent decided to house a magnet program for the arts in that school. The program began with one kindergarten classroom, adding a first and second grade in the past two years. The plan is to continue the program until a K-5 program is available. Families apply to have their children assigned to the magnet classrooms and, indeed, many of the middle and upper-middle class families moving into the area have applied to the program. Because older siblings also enroll in the school, this move has shifted the demographics in the entire school. Although the shift is relatively modest, it is one more factor in Franklin's evolution over the past few years.

Conclusion

This case is an example of the many factors at play in the current reform context. So, what of content standards? I believe that examining state content standards documents

and their use is important. These documents do work to concretize particular ideas about literacy learning, ideas that will be used as the basis for instruction and for the evaluation of teachers' approaches. The documents provide insight into the kinds of learning experiences that will be encouraged and valued in a state. Perhaps most importantly, the standards should eventually reflect the content that is measured by state assessments. If instruction is indeed aligned to content standards and standards are aligned to the assessment, then increased student achievement should, in theory, follow.

However, it is clear that the documents in themselves reveal only one small piece of the story. States emphasize the importance of their content standards and districts may echo this concern in their messages to teachers. Yet, it is often the adopted curriculum that drives instruction. Further, most certainly factors such as accountability, politics, supplementary instruction for struggling students, and demographics at the local level also influence student achievement. Even further, as it stands "student achievement" is almost entirely determined by performance on state assessments. This ever-increasing emphasis on testing and its role in student retention and high school graduation continues to be criticized by many educators.

It is impossible to discuss the current reform context without using terms that are contested and open to interpretation. These include "achievement," "standards," "accountability," and "assessment." All of the factors influencing change in Mooretown are dependent on how the language of reform is interpreted and acted upon. An important move in research on standards and related reforms is to draw on frameworks that facilitate a close look at the multiple and overlapping discourses of policy at all levels of implementation and how those discourses position teachers and children, the people who are most directly affected by these policies (e.g., Foucault, 1977; Davies and Harre, 1990). Research that examines the language of policy in this way is increasing (Hill, 2001; Luke, 1998). We may never be able to directly answer the question "What impact are state content standards having on student learning?" but we can continue to closely examine the ideas and actions within standards-based reforms that impact children's experiences and opportunities in schools.

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Lesson Study with Action Research: Is the 4-Column Writing Method 4 Real?

Martha A. Keeney
Solon City Schools

Donna Snodgrass
Cleveland Municipal Schools

with

Susan Paganelli, Jevonne Smith, Kathy Quinn, Amy Krane,
Beverly Jacobs, Peggy Toaz, Vicky Ansberry, Lauren Shultz, Eve Kehoe,
Kristyn Craven, Barbara Neuin, and Tebra Stepnicka
Solon City Schools

Carolyn Bruce
South Euclid-Lyndhurst City Schools

Abstract

Action research is designed with the express intent of assisting educators in assessing the effectiveness of their building and classroom practices. Lesson study helps teachers use ongoing collaborative peer-insight and feedback about student responses to instruction to develop high quality lessons. Middle school teachers from an outer ring suburb of Cleveland, Ohio, combined lesson study with action research to determine whether the four-column writing method improved student responses to extended answer questions such as those found on the Ohio Proficiency Test. Results indicate that fifth grade students instructed using the 4-column writing method performed significantly better than those receiving other traditional writing instruction employed in the building.

Introduction

Nationwide teachers are challenged to help students meet state standards. Most states have developed high-stakes accountability linked to performance assessments (Snodgrass and Salzman, 2002). High stakes tests, like the Ohio Proficiency Tests, signal to stakeholders the effectiveness of teaching and gauge the success of a particular school district by this single measurement. In Ohio, the results of the tests appear in district report cards with school districts delineated in the newspapers by rank order.

Ohio fourth and sixth grade proficiency tests have had content area science, mathematics, reading and citizenship extended-response items embedded in them since they were first administered. Extended-response items require the test taker to construct a written response to a prompt. Item analysis reports from the Ohio fourth and sixth grade proficiency tests show that students consistently are weaker in answering extended-response items in the content areas than answering selected-response items in these same content areas. Therefore, it appears that students are in need of explicit instruction in responding to extended-response items. This is particularly true in the areas of science and mathematics on the proficiency tests. Participants in this study chose to focus on helping middle-school students improve their ability to respond to extended-response items in the area of science. In the science portion of the *Ohio Fourth and Sixth*

Grade Proficiency Tests students are expected to interpret graphs, diagrams and brief science narratives.

The issue of creating a conceptual framework to assist Ohio students to successfully respond to extended-response items takes on new urgency with the roll out of the new Ohio Graduation Tests (OGT). The OGT is the first high school level test in Ohio that requires that students answer constructed response questions in the content areas. With the expectation that present eighth grade students (the class of 2007) will be expected to pass Ohio Graduation Tests in order to graduate from high school, teachers are faced with finding ways to help students pass extended-response items in the content areas. Mastery of content alone in mathematics, science and citizenship will not be enough for a student to graduate from high school. Students must learn to successfully answer extended-response items or to demonstrate their abilities to *think on paper*.

To this end, a group of fifth and sixth grade teachers in collaboration with their assistant principals and university personnel embarked on a yearlong school-based investigation. This project melded action research and lesson study practices to identify and implement an instructional method that would improve middle school students' capacity to respond to extended-response items in science. Ultimately, through lesson study practices, the 4-column writing method was selected for use as a strategy for students to use as they approached these testing conditions. This paper reports on the results of this investigation.

Research Questions

For purposes of the present study, the authors focused on the following research question:

Is there a significant difference in the quality of extended-response writing in science of 148 middle-school fifth grade students who were instructed using the 4-column writing method versus 160 middle-school fifth grade students who were instructed using other writing methods traditionally employed in the middle school building?

Overview and History

In answering the research questions, the authors looked at the confluence of several lines of inquiry. First, lesson study provided a protocol in which teachers could engage in order to bring theory into practice. Second, action research informed the research design and data collection. Finally, research on writing for thinking provided a further foundation upon which teachers could build their practice as they addressed the issue of helping students write for extended response items.

Lesson Study

Lesson study and action research practices parallel and augment each other in a number of essential ways. At the core of both methods is a focus on educators using authentic student performance as feedback to evaluate the effectiveness of their own practices. Lesson study helps teachers use ongoing collaboratively peer-insight and feedback about student responses to instruction to develop high quality lessons (Stigler and Hiebert, 1999). In essence, lesson study follows a series of steps that engage teachers in what they already do but in a more systematic manner. That is, they engage in the recursive nature of teaching by planning, teaching, reflecting on their teaching, and applying the lessons learned to new lessons. One of the major differences, though is that another teacher will observe the teaching of the lesson. Because the lesson was collaboratively planned, the focus of the observation is not on the teacher, as in traditional evaluation of teachers' practices, but is on the lesson itself. While "Lesson study programs require that teachers get together to plan instruction, to observe what happens when it's implemented, to analyze what went wrong, to come up with ideas for improving it, and try doing it again in their classrooms" (Willis, 2002, p.7), action research moves one-step beyond lesson study by employing empirical and scientific techniques to help teachers evaluate the impact of the lessons on student performance.

Action Research

Action research is designed with the express intent of assisting educators to assess the effectiveness of their building and classroom practices. Action research uses methods of inquiry, which make research techniques valuable to classroom teachers (Calhoun, 1996; Herndon and Fauske, 1994;

Mills, 2000; Salzman, Snodgrass and Mastrobuono, 2002). To that end, "Action research is a method of inquiry by which teachers investigate the effectiveness of their instructional practices by engaging in a wide range of scientific activities that can be readily and practically applied in classroom settings" (Salzman, Snodgrass and Mastrobuono, 2002, p. 2).

Writing for Thinking

The ability to communicate clearly and effectively in writing is a skill that is necessary for students' success in school and life (King and Kotman, 2001). Graves (1983) and Calkins (1994) discovered that students do engage in a process when writing. "This process, however, is a nonlinear process because it is not one that students follow straight through from start to finish. Instead, it is a series of stages such as brainstorming, drafting, revising, and editing that students involve themselves in again and again" (King and Kotman, 2001, p.6). The challenge to teachers preparing students to respond to extended response items like those found in the Ohio Proficiency Tests is helping students to answer questions that are embedded in conceptually difficult content and thought processes and respond to those questions via the writing process. Extended-response items are often not problems of writing, but problems of thinking on paper. The 4-column writing method appears to lend itself to this challenge because it provides a conceptual framework for students to identify the question, focus on the task, identify the needed information and extend or connect one's thoughts through writing (Wolf and Wolf, 2002). A summary of the 4-column model for writing is as follows.

Using the 4-Column Method

In tackling extended-response questions, students may use the 4-column method to read the question critically, think through a plan, and write an outline for an answer prior to writing their final draft. The 4-column model is intended to be used as an organizer only, not the written response students submit. It overtly models the processes students should develop as a means to answering extended-response items. The process should become a "habit of mind" rather than an activity one goes through to begin writing. However, students will/may have to practice the habit before it becomes a natural process for them. For students to be able to write to extended-response prompts, they must be able to:

- ✓ Read Critically
- ✓ Think Critically
- ✓ Write Critically
- ✓ Make Authentic Connections/Extensions

Table 1 presents a summary of the 4-column writing method.

Research findings show that teaching students strategies for understanding new information in content areas is effective. Students who have had explicit guided practice in rereading, creating associations, determining superfluous information, drawing upon prior knowledge and summarizing techniques improved students' test results (Friend, 2000).

Table 1
Summary of the 4-Column Writing Method

1 Know	2 Do	3 Facts/Content	4 Depth/Breadth
Subject/Topic or Prompt	Processes	Level of Proficiency	Connections/Extensions
What's this question about?	What does the question ask me to do?	What is the specific information I will use to answer all parts of the question?	How does this question relate to other things? How can I make my answer better?
<i>Students write what the topic of the question is about in this column (focus on the prompt).</i>	<i>Students note the power verbs in the prompt and other key words that indicate the number of times something has to be done.</i>	<i>Students focus on content information to bullet in this space to guide their final response.</i>	<i>Students make specific connections to previous knowledge related to this topic.</i>
Students look at critical vocabulary in the prompt to set parameters for this first step.	Students stay focused on what the prompt asks them to do.	Students move to a higher level of proficiency because of completeness of response.	Students demonstrate knowledge beyond what the prompt asks.

Writing across the curriculum has been successfully incorporated into many content area classrooms. Effective teachers have prepared students by guiding them through pre-writing activities to aid in understanding of key concepts, helped expand questioning techniques, provided opportunities to develop conceptual knowledge through informal conversation, and shaped comprehension through teaching students to reorganize class notes. The act of writing is an act of thought (Murray, 1985). One may not know what one has thought until it is written. Writing in the content areas has been shown to improve students' higher-order thinking skills (Sorenson, 1991). When school wide writing across the curriculum was implemented studies indicated students' writing showed variation, was more complex and indicated mature vocabulary (Sorenson, 1991).

Evidence of "poor comprehension and writing skills are often due to an individual's inability to understand text structures." Students have difficulty organizing material from expository text. The implementation of graphic organizers was designed for specific content that students were learning and the organizational pattern of the text.

Teachers modeled the thinking processes used in graphic organizers and discussed specific strategies students should use to elicit information from the text (Fisher, 2001).

The middle school teachers, who were study participants, were motivated to learn together. They felt that the most powerful and effective results would best be realized if together they developed the lesson plans, taught and then analyzed the lessons. Lesson study produces gradual but continual improvement in teaching (Stigler and Hiebert, 1999). The teachers over a period of six weeks would teach a lesson and meet to review "how the lesson went." Analyzing both the teachers' practice and lesson plans challenged the teachers to improve both delivery and lesson plan design. Teachers sharing classroom practices and analyzing "what went wrong" in an effort to improve have proven to be valuable (Willis, 2002).

Methodology

Participants

Three hundred and eight students in the fifth grade from a suburban middle school were divided into control and experimental groups using intact team groups. One hundred sixty students were in the control group, and 148 in the treatment group. Existing data were used to determine initial equivalence between the intact groups. Groups were compared in four areas: age and The Ohio Fourth Grade *Science, Reading* and *Math* Proficiency Tests. Between group comparisons revealed that on average subjects in the treatment group were 1.04 months older than subjects in the control group, as shown in Table 2. (Control group mean age equals 131.67 months; treatment group mean age equals 132.71 months.) As shown in Table 2, the initial mean proficiency scores in science, reading and math were higher for the control group than the treatment group (control science = 236.98, treatment science = 229.98; control reading = 228.34, treatment reading = 223.99; control math = 244.57, treatment math = 239.55). The mean age difference between the two groups was not statistically significant. Although the difference in mean scores between the two groups was apparent on the three proficiency tests (science, reading and math) the research team decided to proceed as planned using intact groups and adjust statistically for initial differences later, if necessary.

Instruments

Two parallel, teacher-made writing prompts were developed for extended-response questions closely matching those found on the Ohio Sixth Grade Science Proficiency Test. Both questions were administered as pre/post tests in a counterbalanced fashion to compensate for lack of alternate form reliability between questions. See Appendix A for copies of the writing prompts and Appendix B for copies of the scoring rubrics.

Table 2

A Comparison of the Control and Treatment Groups' Initial Mean Ages in Months and Standard Scores on the Ohio Fourth Grade Science, Reading and Math Proficiency Tests

TREATMENT STATUS	AGE IN MONTHS	SCALED SCORE FOURTH GRADE SCIENCE OPT*	SCALED SCORE FOURTH GRADE READING OPT*	SCALED SCORE FOURTH GRADE MATH OPT*
CONTROL GROUP				
Mean	131.67	236.98	228.34	244.57
N	158	158	158	158
Std. Deviation	3.950	46.812	40.115	47.300
EXPERIMENTAL GROUP				
Mean	132.71	229.98	223.99	239.55
N	146	148	148	148
Std. Deviation	3.988	45.389	40.047	46.522
Total Mean	132.17	233.59	226.24	242.14

*Ohio Proficiency Test

Research Design

Early in the study, teachers divided the research duties so as to collaborate as a collective group in the study. For example, one group conducted the review of literature on lesson study, action research, the 4-column writing method, and writing in the content areas from the submission of relevant literature from all members. Once the articles were read, shared and critiqued; the articles became a part of the background knowledge of the group. Another group developed the questions and anchor papers based on the Ohio Proficiency Test Scoring Guide. Yet another group was responsible for developing the lesson plans for the experimental group (see Appendix C). The 4-column method was chosen as a foundation for the lessons to assist students in analyzing the content and text structure of the question (see Appendix D.) A final group was responsible for data collection and analysis. To assist teachers in the research process, university personnel were included as collaborative research experts. One university participant served as a content area expert in writing for thinking, the other university participant functioned as a research facilitator. Once the pretest was administered, papers were collected and redistributed for scoring. Teachers scored the papers with no knowledge as to whether they represented control or experimental groups. Next, teachers began instructing the experimental group of students with the exemplar lessons developed in the 4-column method. Four of the lessons were taught in the balanced literacy language arts classes, and four were taught in science classes. Students in the experimental groups were also encouraged to use the 4-column method in other appropriate circumstances. Throughout this process, the teachers came together employing lesson study techniques to process what was working with the lessons and what needed to be changed.

All students were administered one of the questions as a pretest. For the post-test, the same prompts were used. Since the study participants could not assure prompts of equivalent difficulty for the pre and post tests, the prompts were administered in a counterbalanced fashion, with each group taking an opposite form of the test as a post-test, as shown in Table 3.

Table 3

The Administration of Forms A and B of the Pre and Post-Tests

Assignment of Alternative Test Forms	PRETEST	POST-TEST
Treatment Group One	Form A	Form B
Treatment Group Two	Form B	Form A
Control Group One	Form A	Form B
Control Group Two	Form B	Form A

Results

Table 4 shows the mean pretest scores of the treatment and control groups on the pretest. The mean pretest score for the 160 control group students was 1.25 as compared to a mean pretest score of 1.03 for the 148 students in the treatment group. The standard deviation for the treatment group was 1.049 with a standard error of .086; as compared to a standard deviation of 1.116 with a standard error of .088 for the control group.

Table 4

Comparison of Treatment and Control Group Mean Scores Obtained Using the Four Point Rubric on the Pretest

Category	Number of Students	Mean Score	Standard Deviation	Standard Error
Treatment Group	148	1.03	1.049	.086
Control Group	160	1.25	1.116	.088

Table 5 shows the statistical comparison of the pre/post tests using a two-tailed independent t-test. Results show that there was no statistically significant difference in the pre test means ($p < .072$). There was however, a statistically significant difference in the post test means ($p < .000$). Data were analyzed for equal and unequal variances. Analysis of the t-test for equality and inequality of variances shows that subjects in the treatment group performed significantly better on the post-test than did the control group. This difference is not likely to have been caused by chance.

Table 5
Comparison of Pre and Post Test Scores of the Treatment and Control Groups Using an Independent t-test

DESCRIPTION	t-test for Equality of Means		
	t-value	df	Sig. (2-tailed)
PRE			
Equal variances assumed	-1.803	306	.072
Equal variances not assumed	-1.807	305.914	.072
POST			
Equal variances assumed	5.677	306	.000
Equal variances not assumed	5.659	298.604	.000

Figure 1 shows the graphical relationship between pre and post-test means for the treatment and the control group. On the pretest, the mean score for the treatment group was 1.03, as compared to the mean score of 1.25 for the control group. The post-test mean for the treatment group was 2.39, as compared to a mean of 1.62 for the control group. The difference between the treatment and control group means are not statistically significant at the $p < .05$ level (actual p value was $p < .072$). Figure 1 shows that although the treatment group's mean score on the pretest was lower than the control group's score, the treatment group's mean score was significantly higher than the control group on the post-test.

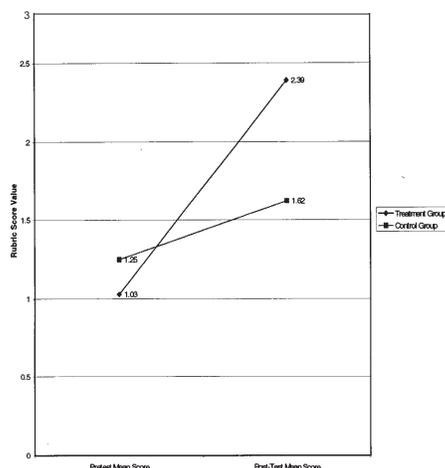


Figure 1. A comparison of Pre and Post-Test Mean Scores for Treatment and Control Groups

In addition to the statistical analysis of pre-test and post test means for the treatment and control groups, the research team decided to survey students to see whether they perceived this particular method as having value for them. After completing the lessons and collecting data, the research

team randomly selected and surveyed 46 fifth grade students from the treatment group using the *4-Column Student Survey*. The survey consisted of the following three questions:

In what ways was the four-column method helpful to you?

In what ways was the four-column method not helpful to you?

Would you ever use this method? If so, when would you use it?

The results indicated that 20 students would use the four-column method in the future, 22 students would not, and 4 students were indecisive. Many of the students found the method to be helpful because it made them focus on the question and organize their thoughts. One student stated, "The four-column method helped me organize my thoughts and focus on the question. When I thought I didn't know the answer, the four-column method allowed me to see my ideas written out and figure out the answer to the question."

Students who indicated they would not use the four-column method again thought that the graphic organizer took too much time to complete, and the various columns were very confusing. One student wrote, "It wasn't helpful at all because it kept on getting me confused on what to write on my final copy. It got me frustrated because I couldn't think straight with all the questions. It takes a lot of time so it would be hard to use when being timed."

Of the students who indicated they would use the four-column method again, many thought that this method would best help them on important tests, such as the *Ohio Proficiency Test*. However, a large majority expressed concerns about not having enough time to complete all of the sections of the test.

Discussion

The data indicate a significant difference in performance between students who are taught traditional *building-tested* writing methods and students receiving instruction on the 4-column writing method when answering extended-response type questions in science. Furthermore, it is apparent at this point that different individuals teaching the exemplar lessons have generally similar experiences (successes and challenges). It appears as though there is evidence to support the theory that teachers can target improvement of student learning through systematic improvement of lessons brought about by professional and collaborative dialogue around those lessons. Continued learning opportunities are being explored to further examine preliminary findings.

One primary difference between action research and traditional laboratory research is that action research makes no direct attempt to design a study that's results can be generalized to other settings and populations. However, we do think that other districts with similar populations might try to replicate our methods and results. We would assist them and would be interested in their results.

We found that designing grade-appropriate science writing prompts was more challenging than we initially anticipated. We discovered that if we made the writing prompts too easy, everyone got high scores. If we made the writing prompts too hard too few children could answer them. We struggled with this issue and in the end, we felt we had made the items too hard. As a result of the items being too difficult, we believe that we might have masked an even greater difference between the performance of the treatment and control groups. We will apply what we have learned here about the development of prompts in our future day to day work with students, as we will with our future research. This is just one of the ways that we began to see the relevance of research issues in our daily teaching.

In conclusion, the results of this study suggest that 4-column writing methods significantly increases fifth grade students' ability to respond to extended-response items, such as those items found on the Ohio Proficiency Science Tests. Additionally, they also suggest that lesson study and action research processes augment each other. Lesson study provides a means for educators to refine and improve their instruction. Action research provides educators with a means of evaluating the effectiveness of the instructional practices they have developed and implemented. Teachers can find their own reality in data when provided with a framework for action research and time for collaboration. Lesson study provides a vehicle by which teachers explore and refine methods of instruction within their own particular setting. By using action research to test the effectiveness of these methods, teachers are empowered to be professionals using a process of inquiry to improve student learning. There are several key elements to keep in mind when planning such a study:

- ✓ A collaborative environment needs to be maintained throughout the study. This requires a facilitator (project director) who is skilled in group-dynamics. We believe that this facilitator should be a school-based administrator or supervisor.
- ✓ Each and every member of the group (teachers, administrators and university personnel) needs to be recognized and validated as an equal partner.
- ✓ Trust is essential for success. All participants must feel safe to express their opinions.
- ✓ Support from central office administration is essential to provide time and resources necessary to conduct a quality effort.
- ✓ University and school-based partnerships are valuable. They provide school-based staff with supplemental content knowledge and research skills. The partnerships provide university staff with a means to engage in authentic research studies and promote professional research and scientifically grounded content skills.
- ✓ Commitment from each member to follow the study through from beginning to end is essential.

- ✓ Site-based research should be encouraged within and between school districts and institutions of higher learning.

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APPENDIX A

FIFTH GRADE PROMPT #1

Students were given a diagram depicting an aerial view of the American Falls and Horseshoe Falls. Included in the diagram were solid lines depicting the present positions of the two falls along with dotted lines indicating the positions of the Horseshoe Falls over time (1678, 1764, and 1842). Students were given the following prompt:

Study the diagram below. Niagara Falls consists of two separate falls: American Falls and Horseshoe Falls. The lines indicate the location of the falls at that time in history. Explain why the American Falls eroded at a different rate than the Horseshoe Falls, why the shape of Horseshoe Falls has changed over the years and predict the shape and where the Horseshoe Falls will be in 50 years.

FIFTH GRADE PROMPT #2

Students were given a table labeled “Seed Germination Levels”. The table consisted of two columns labeled “Percentage” and “Kind of Seed”. Within each column were nine groups of seeds along with their corresponding germination level. Students were given the following prompt:

Germinate means to sprout, or to begin to develop. Seed analysts tested the seeds listed in the table below. State factors that may cause variations in the rate of germination and explain why farmers find this information useful.

APPENDIX B

Science Rubric

Extended-response

Extended-response items are scored on a 4-point scale using the following criteria:

4

Contains an effective solution

Shows complete understanding of the concept or task

Thoroughly addresses the points relevant to the solution

Contains logical reasoning and valid conclusions

Communicates effectively and clearly through writing and/or diagrams

Includes adequate and correct setup when required

(A four-point response may go beyond the requirements of the item.)

3

Contains minor flaws

Indicates an understanding of the concept or task

Communicates adequately through writing and/or diagrams

Generally reaches reasonable conclusions

Contains minor flaws in reasoning and/or knowledge, or neglects to address some aspect of the item

2

Indicates gaps in understanding and/or execution

Contains some combination of the following flaws:

An incomplete understanding of the concept or task

Failure to address some points relevant to the solution

Faulty reasoning

Weak conclusions

Unclear communication in writing and/or diagrams

A poor understanding of relevant scientific procedures or concepts

1

Indicates some effort beyond restating the item or copying given data

Contains some combination of the following flaws:

Little understanding of the concept or task

Failure to address most aspects of the item or solution

Major flaws in reasoning that led to invalid conclusions

A definite lack of understanding of relevant scientific procedures or concepts

Omits significant parts of the item and solution or response

0

Indicates no scientific understanding of the concept or task

APPENDIX C

Lesson plans for 4-column method

Lesson 1. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items through large group discussion.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads
(On the chart paper, the teacher should prepare a blank 4-column template, and display it from the beginning of the lesson.)

Procedure:

1. The teacher tells the class the lesson's objective: We are going to be learning a method for improving our responses to extended-response questions/essays.
2. The teacher says to the class, "I am going to put a question on the overhead to which I want each of you to respond." Teacher shows the question to the class and reads it aloud.
3. The teacher asks, "What is the question about?" Once discussion has taken place, the teacher fills in the first column, and students do the same on their templates.
4. Next, the teacher asks, "What does the question ask you to do?" Teacher should direct the discussion to focus on the important verbs in the question. Then, the teacher fills in the second column, and the students do the same on their templates. (The second column information should be numbered according to the amount of tasks requested.)

Example:

1. Cloud Type 1. _____
2. Cloud Type 2. _____

5. Teacher will explain to students that numbering the tasks will create a rough outline to guide responses.
6. Once the second column is complete, the teacher will ask, "What is the specific information I will use to answer all parts of the question?" After discussion (which should focus around content), the teacher will model bulleting information under each numbered task from column 2.

Example:

1. Cumulus Cloud
 - Sunny days
 - Fair weather
 - Dark and thunderstorms
2. Stratus Clouds
 - Low clouds
 - Light rain or drizzle
 - Can form low to the ground as fog
7. Give students time to fill in their templates (as you do on the chart paper).
8. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the infor-

mation you have identified. Briefly bullet or list what that information is in column 4." The teacher will model this process by writing information in the 4th column of the chart. (The students are making connections!)

Example:

- Cloud types may be affected by mountain ranges or bodies of water
- Cloud cover may affect temperature

9. The teacher closes the lesson by telling the students that they now have an outline to use to structure their answers to extended-response questions.

Lesson 2. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items in groups of 4.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads

Procedure:

10. The teacher tells the class the lesson's objective: We are going to continue learning about the 4-column method to improve our responses to extended-response questions/essays.
11. The teacher refers back to the chart paper from the first lesson and reviews the 4 columns.
12. The teacher divides the class into groups of 4. Each group receives 1 sheet of chart paper, a set of markers, and 4 blank templates.
13. The teacher says to the class, "I am going to put a question on the overhead to which I want each group to respond." Teacher shows the question to the class and says, "I want someone in your group to read the question aloud. Then discuss in your groups what the question is about."
14. Then, the students will write on their blank templates what their group decided the question was about. One person from the group must write the answers on the chart paper. (Steps 4 and 5 should take about 5 minutes)
15. Next, the teacher asks, "What does the question ask you to do?" The students discuss the question in their groups and fill in the second column of their blank templates. One student from each group must fill in the second column on the chart paper. (The teacher should remind students to look for verbs and to number the tasks.) The teacher should walk around and check for understanding. (5 minutes)
16. Once the second column is complete, the teacher will ask, "What is the specific information you will use to answer all parts of the question?" Each group discusses the question (which should focus around content), and the teacher should remind students to bullet information under each numbered task from column 2. Students fill in the third column on their templates, and one student from each group must fill in the chart paper. (5 minutes)

17. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the information you have identified. Briefly bullet or list what that information is in column 4." The teacher will remind students that they are making connections! Students fill in the 4th column on their templates, and one student must fill in the chart paper. (5 minutes)

18. The teacher calls each group up (one at a time) to share their charts.

Lesson 3. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items with a partner.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads

Procedure:

19. The teacher tells the class the lesson's objective: We are going to continue learning about the 4-column method to improve our responses to extended-response questions/essays.

20. The teacher refers back to the chart paper from the first lesson and reviews the 4 columns.

21. The teacher divides the class into pairs (Think, Pair, Share). Each pair receives 1 sheet of chart paper, a set of markers, and 2 blank templates.

22. The teacher says to the class, "I am going to put a question on the overhead to which I want each group to respond." Teacher shows the question to the class and says, "I want someone in your group to read the question aloud. Then discuss with your partner what the question is about."

23. Then, the students will write on their blank templates what their group decided the question was about. One person from the group must write the answers on the chart paper. (Steps 4 and 5 should take about 5 minutes)

24. Next, the teacher asks, "What does the question ask you to do?" The students discuss the question with their partners and fill in the second column of their blank templates. One student from each group must fill in the second column on the chart paper. (The teacher should remind students to look for verbs and to number the tasks.) The teacher should walk around and check for understanding. (5 minutes)

25. Once the second column is complete, the teacher will ask, "What is the specific information you will use to answer all parts of the question?" Each group discusses the question (which should focus around content), and the teacher should remind students to bullet information under each numbered task from column 2. Students fill in the third column on their templates, and one student from each group must fill in the chart paper. (5 minutes)

26. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the information you have identified. Briefly bullet or list what that information is in column 4." The teacher will remind students that they are making connections! Students fill in the

4th column on their templates, and one student must fill in the chart paper. (5 minutes)

27. The teacher calls each pair up (one at a time) to share their charts.

Lesson 4. Individual practice with the 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items individually.

Materials: overhead projector, blank 4 column templates, and questions on overheads, notebook paper

Procedure:

28. Today, you will be using the 4-column method to structure and write a formal response.

29. The teacher passes out blank 4-column templates to each student. The teacher tells the students that they will use notebook paper to script their final responses.

30. The teacher projects the question on the overhead.

31. The students are to record on the templates in each of the columns the appropriate information.

32. Students should write their final response on notebook paper.

33. Explain to students that they are not to help each other with their responses.

34. Allow 20 minutes for students to complete the question.

35. Randomly have students share their responses to the prompt.

Lessons 5-8. Individual practice with the 4-column method (Science)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items individually.

Materials: overhead projector, blank 4 column templates, and questions on overheads, notebook paper

Procedure:

36. Today, you will be using the 4-column method to structure and write a final response.

37. The teacher passes out blank 4-column templates to each student. The teacher tells the students that they will use notebook paper to script their final responses.

38. The teacher projects the question on the overhead.

39. The students are to record on the templates in each of the columns the appropriate information.

40. Students should write their final response on notebook paper.

41. Explain to students that they are not to help each other with their responses.

42. Allow 20 minutes for students to complete the question.

43. Randomly have students share their responses to the prompt.

Delivering Standards-Based Professional Development Online

Evangeline Newton
Ruth Oswald
Denise Stuart
University of Akron

Introduction

For four years, the Ohio Department of Education has sponsored the Summer Institute for Reading Intervention (SIRI), an intensive professional development workshop for Ohio elementary school teachers. Teachers participating in SIRI receive cutting-edge literacy instruction and resource materials. Originally developed as a way to assure success of the “fourth grade guarantee,” an initiative that could have prevented fourth grade students who did not pass the reading portion of the Ohio Proficiency Test from going into fifth grade, SIRI has evolved into one of the most comprehensive and popular state-supported professional development programs in the nation. To date, over 17,000 pre-K through grade eight classroom teachers from across the state have participated in Level I or Level II SIRI workshops (Ohio Department of Education, 2001). The purpose of “SIRI: At Work In your Classroom” is to provide web-based follow-up support for SIRI alumni who are implementing instructional strategies they learned in the summer workshops. Through three one-semester-hour courses, “SIRI: At Work” participants read, use web resources and discuss what they have learned with other teachers on a flexible schedule and in a variety of settings.

The project was originally conceived by Dr. Susan Zelman, Ohio Superintendent of Public Instruction, who saw the potential of electronic instruction to support classroom implementation of the new English Language Arts standards in Ohio schools. Standards-based instruction has been a goal of Ohio schools since 1997 when the Ohio Board of Regents and the Ohio Department of Education appointed teams of twenty to develop standards for six content areas, including the English language arts. These teams were charged with the task of developing “common expectations” that aligned what students should know and be able to do when they have completed high school. After a lengthy draft and revision process, ELA standards were officially adopted in December 2001. (For further information on this process, refer to http://www.ode.state.oh.us/academic_content_standards/acsprocess.asp).

Every teacher in the state has received both a hard and CD-Rom copy of the new ELA standards. A massive campaign to support teachers and school districts in implementing standards-based instruction is currently underway.

Moreover, classroom teachers are also being asked to develop their ability to integrate and use technology in instruction, as well as for their own learning. A recent survey found that more than 80% of K-12 teachers in the U.S. did not feel well prepared to use technology in their classrooms (U.S. Department of Education, 1999). Undoubtedly, this is

largely due to insufficient staff development, since school districts in the U.S. spend, on average, only 20% of their technology budget on staff development (CEO Forum, 1999; U.S. Department of Education, 1996).

“SIRI: At Work” is an effort to respond to these multiple needs. This article reports on the development and implementation of Guided Reading, the first online course in the series. After a description of the conceptual framework behind the courses, we will provide results from an analysis of demographic and participation data collected during the Guided Reading course. Finally, we will share insights about online professional development based on our experience.

Review of Background Literature

In recent years, online learning has become a method of delivery for professional development. An emergent body of research is identifying features of effective online professional development that parallel many findings in earlier research on traditional inservice education. Richardson and Anders (1994) summarize necessary qualities in professional development processes including long term programming, adequate support, follow up and opportunities for continued collegiality. Turbill (2001) discusses the importance of creating a culture in which there are certain enabling factors that support learners. This model for learning consists of time for reflection, sharing classroom experiences and responses to readings with peers. Also included are opportunities to try new classroom instructional strategies, to use a variety of media, and to collaborate with other professionals.

In describing her own experience developing an online course, Turbill (2001) discusses the importance of several concepts including the need to organize content in a predictable structure that facilitates navigation. She suggests maintaining a balance between required reading, activities and time to “talk” online. Students have an active role while instructors participate by mediating and facilitating. Turbill (2001) notes that the instructor’s role in online learning is compatible with principles of constructivism.

Schrum (1992) makes a case for teachers becoming more proficient with technology and thus ready to integrate the use of technology in their own teaching. As participants relate their experiences, characteristics of online learning emerge. Because there is no face-to-face contact, participants report being more open, frank and honest online. They enjoy the perceived “freedom” that online talk gave, suggesting it was easier to talk without knowing each other. And they especially appreciated immediate responses from instructors; many expected this to occur daily.

Mather (2000) reviews four examples of online professional development workshops integrating technology and standards-based curriculum. All feature application and sharing of projects. In Florida participants complete ten application modules over a year and share their work in text and digital video. In New York, participants work through six weeks of demonstration, communication, readings and application. In Hawaii work occurs through three modules where an average of 160 hours are spent per module. Another New York site develops a Mentor Center where teams of four or five build online communities. Participant feedback indicates that the benefits of online learning include the organization and layout of the course as well as its convenience, given the lack of on-site resources. Challenges center on missing face-to-face interaction, struggles with independent work in a nontraditional class setting, and the pressure of deadlines to complete the work and course.

Recent research has evaluated the effectiveness of online professional development with important and consistent findings emerging (Turbill, 2001; Levin et. al, 2000; Mather, 2000). Ronau and Stroble 's (1999) study of electronic community through email summarizes five critical components that create, sustain or inhibit an electronic network. There must be a meaningful *purpose* for networking, hardware and software *access* is essential as well as *support* for problem solving that includes appropriate, thorough and active training. It was student *experience* with technology that allowed them to persevere. Interestingly, the authors find that "for technophobic users, a poor system is not better than none at all (p. 51)." The final component, *richness*, addresses the quality and structure of interaction and information. The study concludes that, "the more information the electronic medium conveys the greater the richness of the message (p. 52)." The authors envision New Knowledge that includes a "dynamic link to multiple sites that changes as the students' needs dictate (p. 52)."

What is Quality Online Instruction?

Levin, et al., (2001) conducted a two-year evaluative study looking for evidence of quality online instruction and effective online learning. Their survey of 26 program participants identified key findings about the course and its impact on teaching. Dimensions of effective online instruction were: 1) relevant and challenging assignments; 2) coordinated online environment, including ease of access and a clear schedule of activities; 3) adequate and timely feedback, i.e., teacher and student interaction; 4) a rich environment for student-to-student interaction and lastly; 5) fostering flexibility in teaching and learning through use of synchronous and asynchronous communication.

Weinberger (2000) also reports findings from research on graduate students' perceptions of their experiences with online learning. Most students in this study said they selected an online course because of the content and convenience of online access, since they lived far from the site of the course offering. They identified strengths of online

coursework in two areas: the reading and writing assignments and the interaction with peers. Interestingly, students noted significant differences in their own literacy practices, specifically in the way they read since enrolling in the course. They described the challenges of juggling work with online study (time issues) and of a lack of library resources.

Several studies addressed specific affective issues related to online learning. White (2000) stresses the need to write messages in online courses that had a personal and interpersonal feel to them, considering the affective aspect of online learning. Lewis (2000) describes the difference between face-to-face and online communication. Online communication leads to more "filling in the blanks," to more hostility and anxiety, more misunderstandings, more inhibition. He suggests the acronym WRITE: Warmth, Responsiveness, Inquisitiveness, Tentativeness, and Empathy as a guide to online communication. Bischoff (2000) outlines issues for success and overcoming barriers. Of key importance is that all parties understand their roles. Participants complained about lack of feedback from instructors, but Bischoff (2000) reminds that participants could not see the behind-the-scenes work being done! She suggests the use of public messages as a way to talk and adds that preparation for structures of online learning is important.

Conceptual Framework for Online SIRI Workshops

In developing the conceptual framework, we considered what current research had identified as significant features of successful online learning. The courses were specifically designed to support classroom implementation of the English Language Arts standards. Topics of the three courses, *Guided Reading*, *Strategic Readers and Writers: Comprehension*, and *Word Study*, were selected because they represent core instructional issues that have been the focus of past SIRI workshops. Content of the courses also cover five essential components of early reading instruction identified by the National Reading Panel (2000). The theoretical framework of the courses is consistent with the Ohio Literacy Initiative (1999) and direct links are made between instructional practices and the OLI framework.

Reading assignments are drawn from SIRI I texts and supplemented with additional online resources. Participants have an opportunity to deepen their understanding of the topic by revisiting their texts. They analyze and apply ELA standards that relate to the course topic. As they access and explore electronic resources, participants learn computer-based inquiry methods that have direct application in the classroom. Consequently, "SIRI: At Work" uses technology to support the standards movement through its instructional delivery system and through project assignments.

Providing Models of Exemplary Classroom Practices

In designing the courses, we considered feedback from former SIRI participants as well as our experiences as SIRI instructors. In conversations with former SIRI students, two

concerns were consistently raised that we addressed through technology. First, SIRI alumni said it would be helpful to visit the classroom of a teacher who has already implemented SIRI instructional strategies. Seeing the strategies “in action” would support their own implementation efforts. An opportunity to talk directly with an expert classroom teacher would allow them to learn from someone else’s experience.

We met this need for firsthand experience by designing each course around four model Ohio teachers. We asked regional literacy leaders to nominate former SIRI participants who were successfully using SIRI instructional strategies in their classrooms. We observed several outstanding classroom teachers whose students performed well on standardized assessment measures, including improved Ohio Proficiency Test scores in reading. Ultimately, we selected four teachers whose classrooms provided a socioeconomic and cultural diversity that resembled Ohio demographics. Two teachers were in traditional first and fourth grade classrooms and two were in multi-age first-second and third-fourth grade classrooms. The four teachers allowed us to spend one day videotaping their classrooms during reading instruction. Each teacher also answered questions about the theory behind h/her instructional practices and shared insights on classroom management issues in a videotaped interview. One of the main activities in each course module is to view video clips of these four classrooms and then share observations and questions about the model teachers’ practices through threaded discussions. Through the video clips, an online professional development workshop is able to meet a need that conventional workshops could not by offering a visit to a real-live classroom.

Creating an Online Community

Second, former SIRI participants said that they miss the community of other teachers with whom to share experiences, questions and ideas. In fact, as SIRI instructors we have found that one of the most powerful features of these workshops is the opportunity for teachers to meet and share within and across school districts. Perhaps this is not surprising, since abundant research on the educational change process and on successful professional development experiences underscores the importance of a shared experience in a supportive learning community (Darling-Hammond, 1997; Turbill, 2001).

We met this need by delivering the courses through a WebCt framework. WebCt is widely used on our campus. Because it has clear instructions presented in an online tutorial, WebCt is particularly well suited to novices in electronic learning. Each “SIRI: At Work” course includes a syllabus, an introductory module and five content modules. One module is released to participants each week. Each module emulates the structure of a good reading lesson, with before, during and after reading activities. Before Reading activities prepare participants, “during reading” provides a narrative with reading assignments, embedded online resources and a visit to the model teachers through video clips. After reading activities involve written response to the mod-

ule content, including the video clips. Each module has a bibliography of traditional print resources and a webliography of electronic references.

We further met the need for online community by providing a variety of interactive activities. Participants regularly use threaded discussions to share experiences, raise questions and exchange ideas about what they were learning. They build online conversation through direct response to each other’s posted comments. They develop projects (e.g., lesson plans) that are also shared and posted, so that course participants can learn from each other as well as from the texts and online resources used during course assignments.

An ancillary course goal is to increase teachers’ comfort level with the use of technology. We meet this goal through reading and writing assignments that rely on electronic resources. A featured site is the Ohio Resource Center for Mathematics, Science and Reading (www.ohiorc.org). ORC maintains a state-funded web site that identifies and connects high quality electronic resources to Ohio’s ELA standards. Course participants are required to develop a standards-based lesson plan using ORC’s rubric guidelines. Technological support is provided through the online WebCT tutorial and a “Help” desk staffed by university personnel.

Data Analysis

Although the SIRI: At Work courses were not widely advertised, the first twelve sections filled quickly. Each section (K-2; 3-4) was limited to twenty students, or a total of forty students for both sections of the same topic. Not surprisingly, most participants were from counties in northeast Ohio, but some represented counties in other parts of the state.

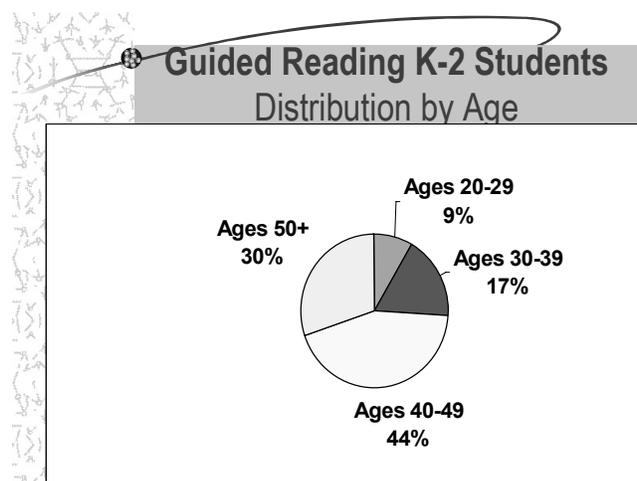


Table 1. Distribution by Age

Demographic data are based on two sections of the first Guided Reading courses, offered during the spring 2002 semester. Over two-thirds of the students were K-2 classroom teachers. As evident in Table 1, a majority (74%) of students enrolled were veteran teachers over 40 years old.

This was surprising, given that most of these teachers would not have had formal computer training or online coursework as high school or college students. In fact, we quickly discovered many participants were novices at online learning. Survey results showed that only one student out of the entire group had previously enrolled in an online course.

Patterns of access are also interesting. During the five-week course, students made a total of 11,010 visits to the site. This represents an average of 408 hits per student. Table 2 summarizes visits to specific web page categories. Academic content is represented by the category of "Content Pages," "Reading Posts" and "Posting." As the Table indicates, the greatest number of hits occurred in the academic content pages. Logistical and technological information is represented by "Homepage" and Organizer Pages." The large number of hits in these categories may reflect the nature of self-directed learning required in online coursework.

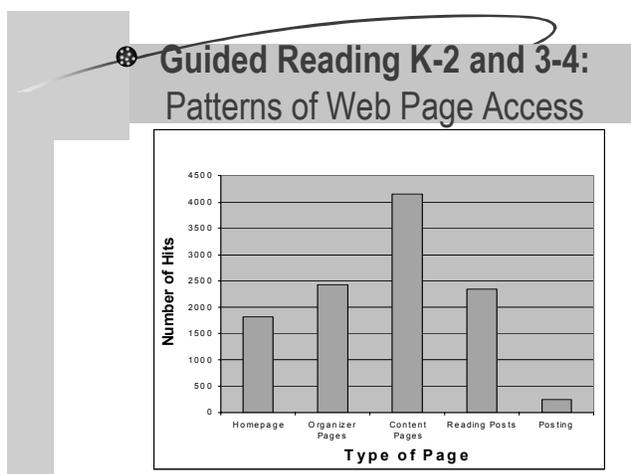


Table 2. Patterns of Web Page Access

Table 3 shows that students visited the web site most frequently during the day, although evening hours were also popular. Students spent an average of 10.5 hours online and we can tell from the time spent per page that many students typically printed the web pages. Since 12 contact hours are

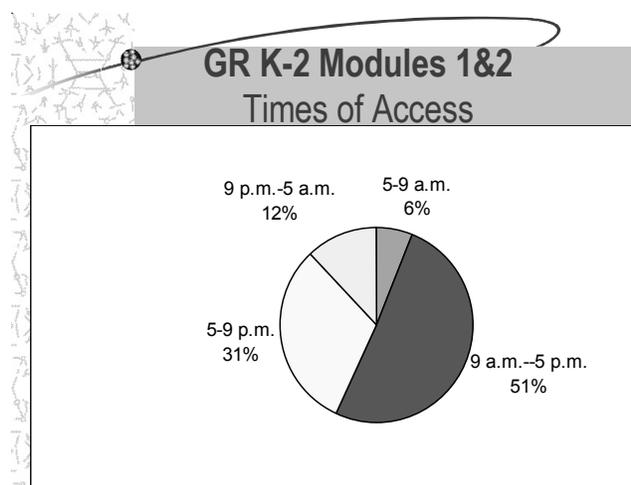


Table 3. Times of Access

required for a traditional class, the number of "contact" hours seems appropriate.

The frequency of participation in online discussions is very interesting. The Guided Reading course had 8 threaded discussions where participants posted responses to assignment questions. They could also engage in ongoing discussion by responding to the comments of others. In addition to the eight required responses, the average ratio between original and follow-up posts is 1:4. Table 4 offers insight into the varying approaches to these discussion opportunities by highlighting the discussion patterns of four students. While Student 3 responded to colleagues more frequently than she posted original comments, Student 2 chose not to participate in ongoing discussions. Students 1 and 4 have response patterns that are typical of most students in the courses.

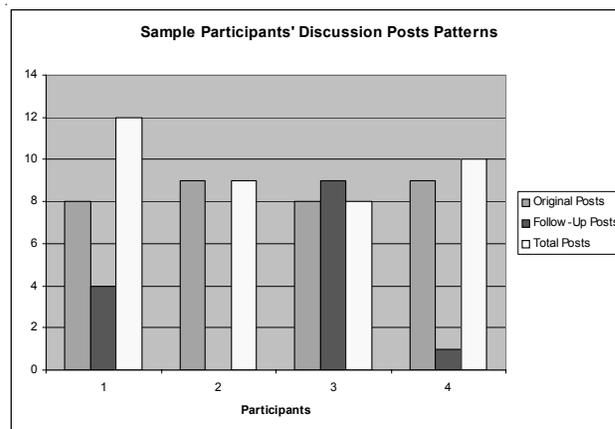


Table 4. Sample Discussion Post Patterns

Following is an example of an electronic conversation posted on the discussion board. The prompt is to write about something participants found interesting, surprising or confusing in the model teachers' use of assessments. The first teacher comments on the video clips and relates what she has seen to her own practice. Over several days, this prompts a question from one teacher and a comment from another:

Message no. 109 Posted by "X" on Sun Apr 14, 2002 11:09

I thought the conversational "day" journal interesting. I heard about this method during SIRI but had not "talked" to anyone who had used it. It was interesting to hear Jim and Connie share thoughts about it. It would definitely [sic] help assessing writing strengths and weakness but I don't understand how it assesses reading.

I prefer reading with students in small groups or individually and can gain so much about the student's strengths and weaknesses from this method but must also use pencil/paper assignments and tests to assess for grades. Our school requires letter grades in Reading/English/Spelling.

Message no. 141 Posted by "Y" on Fri Apr 19, 2002 12:59

What grade do you teach that requires letter grades in all those areas? I was curious. I teach second grade and we still use checks and “S”s...do you find it hard to give a child that young a letter grade???

Message no. 145 Posted by “Z” on Fri Apr 19, 2002 15:54

Each school district is different. In some you get letter grade in all areas in first grade. In our district letter grades begin during the third grading period. Your lucky if you only have to give S’s etc in second grade. It is all year.

Each threaded discussion has similar examples of short, informative conversations among participants. While studies of the depth, breadth and value of these interactive conversations are beyond the scope of this article, it is worth noting that threaded discussion provides an opportunity to create an electronic community that can support professional development through sustained dialogue.

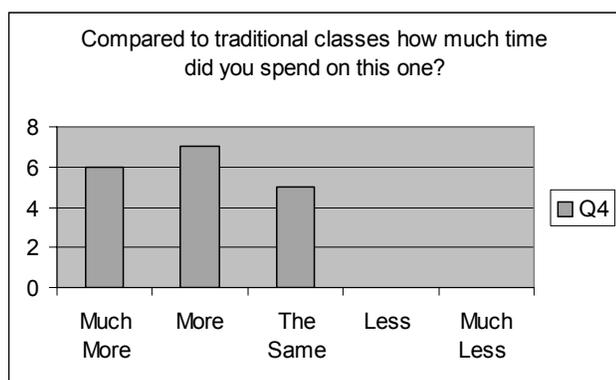


Table 5. Time Spent Compared to Traditional Classes

Discussion

As noted in Table 4, participants also reported spending more time meeting course requirements than in a traditional course, but this did not seem to upset them.

Despite the heavy time commitment, participants indicated a high degree of satisfaction with the course in their anonymous final evaluations. Perhaps this was because participants were able to make direct and immediate connections between their online coursework and professional responsibilities. One teacher explained:

I am finding the course manageable (very important while teaching all day to have the opportunity to work from home on my time schedule) as well as very motivational. When I took the SIRI class this past summer, it was a wonderful introduction, but I was overwhelmed with all the material and despite having had good intentions to reread it, there was always something that had my immediate attention. With the pacing of the on-line class, I am able to

read all material and then use it in my class that week. I really feel that I am growing as an educator!

The overall positive response to course content supports Hancock’s (1985) observation that “The bottom line is this:

If the content on the network isn’t interesting and important to the participants, they won’t participate” (p. 242).

Certainly the flexibility offered by the online structure and the opportunity for ongoing electronic dialogue appealed to some of the participants: “I really liked working on my own time and chatting with other teachers.” Another wrote, “I liked it and thought it was excellent for fulltime teachers and mothers like myself. I was able to stay after school and come early and read without interrupting my whole night.” Some participants, however, expressed a conflict between appreciating the flexibility but missing the face-to-face contact. One wrote, for example, “I enjoyed the course immensely and felt it was successful. The only part I missed was meeting my colleagues in person.”

The greatest challenge expressed by participants in the course evaluation related to technology. One student aptly observed that, “Technology is as temperamental as working with a difficult child at times. You embrace it but still struggle.” Another student, “I did not have the appropriate knowledge to operate the computer nor did my computer have all the software needed to run the program.” As noted earlier, only one participant had ever enrolled in an online course before their experience with SIRI: At Work. Consequently, the challenges they faced were not surprising but do underscore Bischoff’s (2000) cautions that “Preparation for structures of online learning is an important element to overcome barriers to success.”

Another challenge was connected to the culture of online learning as some of the participants did not seem to understand the self-directed nature of online learning. Several comments related to the desire for more contact with the instructor. In a study of student perceptions of their online learning experiences Weinberg (2000) noted that students reported challenges, such as juggling work with online study (i.e., time issues) and a paucity of accessible library resources. We found some participants reporting similar time issues but expressing appreciation for the extensive use of hypertext and online resources woven throughout each module. One student remarked, “I really like having all readings online.”

Implications for Future Research

The initial cycle of “SIRI: At Work” is almost complete and we are continuing to analyze data. Data analysis will focus on our two original goals: 1) to build on earlier SIRI workshops through a focus on core instructional issues; and 2) to nurture technological literacy so that participants will incorporate electronic resources as they plan instruction. We also plan to study the threaded discussions using “t-units” to explore their syntactic and semantic complexity. These stud-

ies may provide useful insights into the promise of online professional development.

As we enter the twenty-first century, the resources of technology appear to hold great promise for supporting ongoing professional development that most teacher educators believe is needed to sustain innovative and quality classroom instruction (Darling-Hammond, 1997; National Reading Panel, 2000). Leu (2000) expresses this well: "The connectivity that characterizes literacy on the Internet permits all of us to learn from one another in ways never before possible. As a result, the more members of the literacy community that enter these worlds, the more insights we can bring to central issues of instructional practice" (Leu, 2000, p. 5). One of our students reflects this spirit, summarizing hopes for the future in her course evaluation comments:

I am singing the praises of this type of learning. I feel like I could work on my own time, try the strategy in my classroom as I was reading and writing about it, and felt like I really had time to understand the concepts... Now the trick is to get more of these approved by my district for credit... Thank you for your time putting it together... let's hope to continue this online learning!

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Seeing Standards: Schools' Built Environments and the Standards Movement

Kristien Marquez-Zenkov
Cleveland State University

Abstract

This article describes the broad consideration of educational standards that occurred in a pre-service language arts methods course in a public, urban university context. This deliberation over standards was rooted in an urgent community concern about the school facilities in the university's home city. It utilized photography and a focus on standards evidenced in the "built environment" of city schools to allow a cohort of teacher candidates to consider the nature and specifics of the current emphasis on standards that is increasingly a part of every educational context. These methods allowed these teacher candidates to "see" the ways that a broader range of standards are played out in the aesthetics and designs of schools, classrooms, and other educational environments. This essay suggests that such methods might provide teachers with concrete tools for engaging their students with community concerns and an explicit means to uncover "standards" that may limit teachers and students in order to address the democratic education purposes of public education.

Introduction

Early in the fall of 2000, the gym roof at Cleveland's East High School collapsed onto the basketball courts below, sending an unequivocal message to the Cleveland Municipal School District (CMSD) and the city of Cleveland. Fortunately, only three students sustained minor injuries as a result of the roof collapse, but Cleveland and the CMSD no longer had a choice about addressing the schools' facility needs. In the months following, Mayor Michael White and the Chief Executive Officer (CEO) of the District, Barbara Byrd-Bennett, formed an ad hoc citizen's council (the Facilities Assessment Commission) that called for broad public input at several summits held around the city.

These roundtables offered a chance for residents to vent frustrations, express fears, and contribute ideas about the state of the city's schools. Underlying all of these sentiments and ideas—and brought to light by this sudden focus on the construction and maintenance of the schools—were some of these citizens' most basic "standards" for public schools. This article uses the definition of a "standard" as "a level of quality or excellence that is accepted as the norm or by which actual attainments are judged."

This city schools' crisis also provided a compelling opportunity for students in my language arts methods course to make sense of the educational "standards movement" (Ross, 1999) and to articulate their own foundational pedagogical goals. Using a concentration on urban architecture and the "built environment" (Lippard, 1995; Guilfoil, 1992), these future teachers engaged in several stages of a standards development process through which they attempted to "see" the standards of existing urban public schools by studying the conditions of the several city school buildings and structures in these schools' neighborhoods. Studying the

images of community, school, and classroom environments gathered in three photo essays (using 35 mm color film, 35 mm black and white film, and digital photos) allowed these future teachers to distinguish the standards for city schools represented by the schools buildings' designs, maintenance, and potential renovations—and then to consider these in relationship to those they encounter outside of school.

Instead of merely adding one more list of standards that they were supposed to consider in their lesson planning, this project enabled these pre-service teachers first to see and articulate existing standards, as evidenced in the buildings and the use of spaces within them, and then to select the professional standards that they believed were most important to their teaching practices. This arts-oriented standards generation and consideration process was rooted in what might be public education's first standard—its role in civic education (Counts, 1932; Cremin, 1951; Dewey, 1966; Gutmann, 1987; Lazerson, et al., 1985; Parker, 1996).

The Standards Movement

From preschool teachers to university professors, educators across the continuum must consider a burgeoning bank of standards in their professional practice (Meadmore, 2001; Ohler, 2001; Wise and Leibbrand, 2001). As an example, when planning this language arts methods course for future middle school teachers at Cleveland State University, I took into account at least a dozen lists of "standards," "objectives," "outcomes," and "goals" (Blum, 2001; Fritzberg, 2001; Ross, 1999). These began with the university's College of Education teacher education outcomes, the National Council for Accreditation of Teacher Education (NCATE) program standards (NCATE, 2002), and those of the Interstate New Teacher Assessment and Support Consortium or INTASC (INTASC, 1992).

As well, the list of foundational outcomes had to include the defining principles of middle school education (Beane, 1993) as articulated by the National Middle School Association (NMSA) and the content standards of the National Council of Teachers of English (NCTE) (IRA/NCTE, 1996). I also considered the NMSA program standards for middle level teacher preparation jointly approved by NMSA and NCATE (Swaim and Stefanich, 1996), the “core propositions” of the National Board for Professional Teaching Standards (NBPTS) (NBPTS, 1994), the NBPTS literacy/language arts standards for middle school students (NBPTS, 2002, 2001), and the draft standards for reading professionals developed by the International Reading Association (IRA) (IRA, 2001).

Given the Ohio teaching licensure requirement that middle school teachers have two subject area concentrations, these future teachers also attended to the content standards of the National Council for the Social Studies (NCSS), the National Council of Teachers of Mathematics (NCTM), or those of several science educator professional organizations (e.g., National Science Teachers Association). Finally, when these future teachers entered the doors of Cleveland area schools for field experiences—completed concurrently with my methods course—they learned of districts’ general academic standards for all students, found in their classrooms the recently adopted state of Ohio language arts curriculum standards (ODE, 2002), their specific districts’ language arts standards, and their mentor teacher’s ideas for professional, academic, and behavior standards for student teachers and children.

And if the sheer number of standards lists to consider were not enough, recent attempts at condensing these overlapping inventories into more coherent and manageable assessments and catalogues are paradoxical. For example, prior to their formal entrance into the teaching profession, these students will eventually have to pass at least three levels of PRAXIS exams (ETS, 1995), whose standards are “reflected in” both the INTASC and our College’s outcomes. Educational jargon describes these three sets of standards as “aligned”: the reality is that they overlap and diverge in nearly incomprehensible ways. In another example of these misguided attempts at standards sense-making, the National Council for the Social Studies recently eliminated its “advanced certification program” in favor of the National Board for Professional Teaching Standards certification program, which is endorsed by two dozen other professional associations. What is portrayed as an attempt at focusing on a more manageable number of standards has actually resulted in a dispersal of one standards catalogue amongst many organizations—many of which, of course, already have developed their own standards (Helms, 1999).

Standards, professionalism, and civic purposes

Understanding one’s educational ideals is a professional reality, but the profusion of these lists has ceased to represent an attempt to formulate a common vision for educators.

It embodies an effort by professional associations and government organizations to keep or expand their pieces of the educational pie. The effect of this outbreak is to shield the grand ideas of public school curriculum from the apparently detrimental influence of classroom teachers and teacher educators (Apple, 2001; Vinson, 1999).

Rather than empowering classroom teachers to develop curricula that is consistent across contexts and that prepares K-12 students for any assessment they might encounter (from a real world event to a standardized test), these lists are reducing curricular planning to a laundry list of dumbed-down bullet points that leave no room for critical thinking, creativity, or the civic purposes that are the foundational goals of public education. The result is a threat to the public’s ability to “define their own interests and desires” (Ross, 1999, p. 444)—their standards—for public schools.

This standards glut both largely ignores the civic purposes of public education—by failing to address these goals sufficiently—and runs interference for any intelligent, professional democratic process in which teachers might engage. Because these bullet points arrive in the form of “standards,” which suggest a closer relationship to laws than to curriculum objectives, teachers are first faced with a *work* intensification: that is, they are given more tasks to complete, but less time and fewer resources in which to complete them (Hargreaves, 1992). As well, they are faced with a *moral* intensification: they are given more laws to follow, but no time to comprehend these additional ethics, to judge their validity, or to determine how or why their work reflects these values (Lappan, 1997).

These introductory ideas constitute my teacher educator critique of the standards movement. But what sense are my students—future middle school teachers—making of this movement? And how might I guide my students’ efforts to sort through these standards and focus on goals that address the foundational purposes of public education? This article presents highlights of one answer to these questions, describing a standards consideration and development process that took shape through the intersection of one city’s school buildings crisis and the standards future teachers literally saw—through the use of photography—in these structures. These questions, the photography projects that were used, and the standards these students settled on all became a part of my challenge to the current content and direction of the standards movement. And, one hopes, part of a critique these new teachers will take into their classrooms.

Photography and “seeing standards”

In the early weeks of this course, as a part of our standards generation process, my students gathered literally hundreds of standards and outcomes from professional organizations, government bodies of education, school districts, and buildings. These afforded a substantial overview of many relevant curricular guidelines that educators traditionally consider when standards are discussed. While this

first stage of our semester-long process gave students a visceral sense of the burden that building a standards-based curriculum has become, it also gave these future teachers a wealth of standards ideas from which they began to choose.

The second—and perhaps more compelling—step in this standards generation process relied on the long history of aesthetics in education. For generations, educational philosophers have confronted incomplete, anti-democratic notions of the purposes of educational institutions by appealing to aesthetic ideals and tools (Dewey, 1966, 1980; Egan, 1992; Greene, 1988) and their potential utility in what Dewey describes as “intelligent” environment of schools (Dewey, 1966, p. 19). Grounded in these aesthetic principles, practitioners have used a wide array of arts methods and media to engage K-12 students and teachers in enacting the democratic ideals of this nation (Willis and Schubert, 2001).

Appealing to the solid foundations of this aesthetics work for my language arts methods class, I required my students to use photographic tools (Collier and Collier, 1986) and a concentration on the built environment of the city schools and neighborhoods (Guilfoil, 1992; Lippard, 1995) for a lens on the standards upsurge. The built environment is any physical element of an educational space over which human beings have exerted or might exert control. Contemporary arts educators recognize that the design, maintenance, and aesthetics of such environments continually shape relationships between people in that environment and that human inhabitants and occupants are inherently part of built environments, rather than being merely users or invaders of such environments (Lippard, 1995). Intended to provide students with experience with arts-based language arts strategies and to help them see a potential range of standards from which they might choose for their future classroom practices, these projects included a color photo essay focusing on the features of urban community buildings, a black and white photo essay highlighting the features of city schools, and a digital photo essay concentrating on the features of urban classrooms.

For the “Community Photo Essay,” I asked students to use one color roll of pictures to show the buildings, institutions, resources, and qualities of their fieldwork school’s community. With this photo project, they were expected to depict the physical, design, and aesthetic features of the various community buildings that their students use or might encounter on the way to and from school. These features included a vast range of community elements—from parks and community centers, to a cemetery bordering one school’s asphalt playground, to local small businesses, to boarded-up buildings.

Similarly, the “School Photo Essay” called upon students to pay attention to the physical, design, and aesthetic features of the various school spaces that students use, through a minimum 24 pictures roll of black and white film. The highlights of these photos were the contrasts students couldn’t avoid: brick structures were clouded with genera-

tions of soot and soil, and ornately-tiled hallways were slowly crumbling under generations of feet.

Finally, the “Classroom Photo Essay” project required students to concentrate on the physical, design, and aesthetic features of the various classroom spaces that their students use, documented with a digital camera and a minimum twelve digital pictures. These photographs exhibited some of the same qualities seen in the community and school photos—aging and sagging structures built with high quality materials—but these also showcased the ongoing life of the buildings. While these photos revealed that school and classroom structures were deteriorating, the care with which teachers and students still went about their school business was evident as well.

After completing the first two photo essays, the class visited the photo archives at the city’s public library, where they had access to more than a million photos—many showing decades-earlier perspectives of the same buildings students had photographed. There they studied their photos for the standards these structures and features suggested, and then compared their photographs and the represented features with historical images from the 20th century. To keep track of the qualities of these structures and the standards for public education that they suggested, I provided them with a simple T-chart:

Photo Essay T-Chart			
<ul style="list-style-type: none"> • What are the key features of the structures in each type of photo? • What standards for teaching and learning does each of these features represent? 			
Community Photo Essay Pictures	School/Classroom Photo Essay Pictures	Photo Archive Pictures	Standards Represented

One of the photographs (Figure 1) Tammy took was of what originally was the parking lot and playground of her fieldwork school. For a variety of reasons—some of them having to do with the maintenance of the building—the front entrance was no longer used. Rather than entering through a portico and a windowed, two-story atrium, students now entered through two modern security doors into a poorly lit hallway.



Figure 1.

Viewing these photographs of their communities, schools, and classrooms, my students completed T-charts with observations about the features of these spaces and the standards these represented:

School/Classroom Photo Essay Pictures	Standards Represented
<ul style="list-style-type: none"> ▪ Rear entrance replaced front entrance ▪ Unpainted, rotting window frames ▪ Gymnasium windows are bricked over 	<ul style="list-style-type: none"> ▪ Schools are not economic priority ▪ School security is a concern

Students' use of photographic tools enabled them to begin to recognize how standards were implied in the very structures of their urban classrooms, schools, and communities. As a result, the bank of potential standards for these future teachers' curricula and pedagogical practices broadened to emphasize the relationship between their teaching practices and the built environment of the school and community, and the impact of the community and students' lives on school curricula:

- 1) Establish a safe, creative, and comfortable atmosphere in the classroom and school
- 2) Establish and work within a "community," both in the school and the classroom
- 3) Be open to learning from your students
- 4) Choose topics that are meaningful and of interest to the students
- 5) Honor cultural, ethnic and religious diversity
- 6) Promote extracurricular activities
- 7) Create a versatile classroom design
- 8) Set up room to be "user friendly"

Through other course projects, students described the standards for schools that they perceived in their own K-12 school experiences. From a list of several dozen potential standards that the class generated in the first three weeks of the course, students eventually settled on seven "Personal Professional Objectives" that they believed both the course projects and their own middle school language arts curriculum should address:

- 1) Celebrate and build on your strengths
- 2) Respect
- 3) Take risks
- 4) Pride
- 5) Communicate effectively with a variety of audiences
- 6) Participate in your own learning
- 7) Focus on where you are headed and where you are from

Discussion

Throughout the remainder of the course, students reflected on both fieldwork and course projects in light of these objectives. In completing the final portfolio assessment process for this course—as well as course surveys, individual artifact reviews with this author, and final interviews—these future teachers again considered what standards meant to

them professionally and which ones they perceived as the future focus of their own teaching. Evidence from these sources indicates a significant shift in their understandings of standards, their perceived roles in choosing or developing these standards, and the content of the standards they believed should be the emphasis in their classrooms.

Through the standards consideration process this class utilized, Tammy came to understand better that "standards are not only for the students, but [also] for the teachers. They must be a model." Sherrell was especially articulate about her newfound understanding of ubiquity of standards:

I would have to say that I was enlightened to the fact that we express our own standards both personally and professionally by the way we treat our students. The standards we use to instruct the students do not just come from a written document that a bunch of professionals put together. They come from our personal values and beliefs about how we want to educate our students, and what type of expectations we place on them.

These future teachers identified a range of standards as most important in their classrooms. Eve listed "students actively participating" and "respect" as the non-negotiable goals of every lesson she would teach. Dena explained that her "biggest" standard for her own teaching practice would be to ensure that her students were "comfortable with writing, enjoy writing, become big dreamers, and be able to tie writing and reading into everything that they do."

In addition to the content of the standards they would concentrate on in their own classrooms, the larger question of this project concerned the *process* of standards development and the larger purposes of public education. When asked what effect the "seeing standards" project and the standards generation project might have on their future teaching practices, Dena described how engaging in a standards consideration and development process with her own middle school students might not only be a useful example of a civic procedure but increase students' ownership and academic achievement:

I think one thing that it could do is give students things to strive for. If you say, 'This is what we're going to be doing and this I'm going to expect of you.' And if they create it, it's kind of like the behavioral management program that you always hear about—have students help in creating it because they're that much stricter on themselves. So if you as a class create your standards, they might achieve those and go well beyond what you have laid out in the first place.

The standards these future teachers emphasized were both short on curricular specifics and long on general ideals. At least in part an outgrowth of an arts-inspired generation process, the evidence of this study suggests that these professional objectives were ones to which these teachers were personally and professionally committed and that they

are likely to use in some form in their own classrooms. At the very least, their understandings of standards was expanded and their recognition of teachers' and students' places in the development of standards was broadened.

As well, this process provided these future teachers with numerous opportunities for discussion, debate, reading, and writing—the basic skills of language arts—and required that they engage in the very activities they might utilize in their own classrooms in the future, and in their lives as citizens of this nation. By beginning to identify many of the assumptions usually made about the built environments of our city schools, these future teachers engaged in a form of democratic decision-making and began to apply a newfound environmental responsibility. These projects required students to consider a broader range of perspectives than the current standards movement typically allows, and this active consideration of a broad range of perspectives is at the core of this nation's democratic ideals.

Perhaps the value of standards cannot be captured by a single set of educational goals—or an exhaustive collection of such sets. Perhaps, instead, the value of standards is in the intelligent, collaborative, ethical selection process through which educators focus on intelligible, meaningful, manageable, and assessable goals. In our nation's current educational context, with an additional set of standards pushed upon educators seemingly every day, having the tools to engage in such a process may be the primary skill that teachers and students at every level require.

Rather than a greater professional responsibility to engage in the thoughtful process of standards selection and standards-based curriculum development, educators today are being handed an array of glorified checklists that further “teacher proof” the curriculum. The grandest—and the first—goal of public education is its role in preparing citizens of this nation. As numerous other commentators (e.g., Johnston and Ross, 2001; Marcello, 1999) have noted, it is already time to take a look at the legacy of the standards movement and ask if it will be remembered for the positive effects it had on this objective.

Teachers' and students' everyday roles in the standards movement and in this pursuit of public schooling's highest ideals have been grossly underestimated. Rather than considering only the effects that teachers can have on constituents' support for existing standards (Ross, 1999), their curriculum and pedagogical practices should incorporate a process of standards generation. The physical and aesthetic state of our cities' and city schools' built environments can help them *see* how to do this.

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Assessing Faculty Salary Compression: An Application of Two Methods

John W. Fraas
Ashland University

Abstract

This study presents the use of two methods to determine whether compression existed in the salaries of the faculty employed during the 1999-2000 academic year at Ashland University, a private university in the mid-west. One of the methods assessed salary compression by determining whether the variable representing the faculty members' numbers of years of experience served as a negative suppressor variable in a regression model. The other method examined salary compression by statistically testing the mean difference between the predicted and actual salaries of junior faculty, where the predicted salaries were obtained from a regression model that assumed they were senior faculty. The application of these two methods to the university's faculty salaries for the 1999-2000 academic year, which produced results suggesting faculty salaries were not compressed, may serve as a guide for other institutions.

Toutkoushian (1998) defined faculty salary compression as "an unusually small salary differential between faculty with different levels of experience" (pp. 887-88). This study, which uses this definition of salary compression, presents the application of two methods designed to determine whether faculty salaries reflect compression. The two methods were applied to the salaries of the faculty employed during the 1999-2000 academic year at Ashland University, which is a private university in the mid-west. This presentation may assist institutional researchers who review and assess university faculty salary structures.

In one of the methods used to analyze faculty salary data, which was proposed by McCulley and Downey (1993), an evaluator is interested in determining whether the variable that contains the faculty members' numbers of years of experience acts as a negative suppressor in a regression model. McCulley and Downey expressed the view that evidence of salary compression exists when the years-of-experience variable produces a negative suppressor effect. In this study, the process suggested by McCulley and Downey is presented as a three-step procedure.

In the other method, which was proposed by Toutkoushian (1998), a five-step procedure is used. These five steps lead to the statistical testing of the difference between predicted salaries and actual salaries of junior faculty, where the predicted salaries are obtained from a regression model that assumes they are senior faculty. The claim of salary compression is supported when the mean difference between the predicted and actual salaries is significant. The following sections present the application of these two methods to Ashland University's faculty salaries for the 1999-2000 academic year.

Salary Compression

One issue facing university administrators and faculty today is whether their salary structures reflect a condition in which the differentials between junior and senior faculty

salaries are small or even nonexistent. Toutkoushian (1998) states the most cited reason for the existence of this condition is universities adjust salary offers to new faculty, as a means of reflecting labor market conditions, while failing to adjust the salaries of their own senior faculty. Numerous articles addressing salary compression (see Blum, 1989; Botsch and Folsom, 1989; Fraas, 1993; Heller, 1987; Jennings and McLaughlin, 1997; McCulley and Downey, 1993; Mooney, 1991; Snyder, McLaughlin, and Montgomery, 1992; and Toutkoushian, 1998) indicate this issue is of importance to a number of universities.

The American Assembly of Collegiate Schools of Business (1990), Blum (1989), and Snyder, et al. (1992) suggested the existence of salary compression may lead to a number of undesirable employment conditions for faculty. These undesirable conditions include reduced morale, higher complaint levels, and less willingness to serve on committees. In addition, senior faculty confronted with salary compression face two employment choices. They can either seek employment at other universities to increase their salaries or receive less pay in order to remain and work at the university. Blum noted the faculty who choose the latter of these two alternatives encounter a financial cost, which has been labeled a "loyalty tax."

Administrators also face undesirable consequences when operating with a salary structure that reflects salary compression. In addition to possibly creating tension between junior and senior faculty members and the exodus of quality faculty, salary compression may lead to legal action. As noted by Toutkoushian (1998) "salary compression . . . is a form of discrimination, arising from institutions compensating junior and senior faculty differently for the same characteristics" (p. 88).

Salary Compression Assessment Methods

Two different methods, which utilize multiple regression models and correlation values, were used in this study to evaluate whether Ashland University's faculty salaries reflected compression. Table 1 contains a list of the variables used by

both methods. The data for the nine-month faculty salaries (Y_1) and the natural logarithm value of the nine-month faculty salaries (Y_2) served as the criterion variables. Four different pieces of faculty information constituted the predictor variables for the various regression models. Each faculty member's years of teaching experience at four-year institutions of higher education were recorded (X_1). Whether or not each faculty member possessed a terminal degree was noted (X_3). In this variable a value of zero indicated the faculty member did not possess a terminal degree; a value of one signified the faculty member did possess such a degree. Each faculty member's academic rank (X_2) and academic area (X_4 , X_5 , X_6 , and X_7) was also recorded.

Table 1
Variables Included in the Regression Models

Symbol	Description
Y_1	Nine-month base faculty salaries for the 1999-2000 academic year
Y_2	Nine-month natural logarithm values of the faculty salaries for the 1999-2000 academic year
X_1	Years of teaching experience at institutions of higher education
X_2	Academic rank (Full Professor = 4, Associate Professor = 3, Assistant Professor = 2) ^a
X_3	Academic degree (Terminal Degree = 1, Non-terminal Degree = 0)
X_4	The College of Business Administration (Member = 1, Nonmember = 0)
X_5	The College of Education (Member = 1, Nonmember = 0)
X_6	The College of Humanities and Sciences - The Science Division (Member = 1, Nonmember = 0)
X_7	The College of Humanities and Sciences - The Humanities and Applied Sciences Division (Member = 1, Nonmember = 0)

^aInstructors were not included in the analyses.

Three points should be noted regarding the variables used to represent the academic rank and academic area. First, a faculty member's rank was represented by a 4, 3, or 2 with the values indicating whether the faculty member was a full professor, associate professor, or assistant professor, respectively, due to the linear nature of the mean salary levels of these academic ranks. Second, the academic areas were represented by a series of four dummy variables. Each of these four dummy variables represented one of the following four areas: (a) the College of Business Administration; (b) the College of Education; (c) the College of Humanities and Sciences—The Science Division; and (d) the College of Humanities and Sciences—The Humanities and Applied Sciences Division. Third, only three of the four dummy variables representing the four academic areas were included in any given set of predictor variables due to the fact that they are linearly dependent.

Suppressor Effect Method

One of the methods, which is referred to as the Suppressor Effect Method in this study, was proposed by

McCulley and Downey (1993). They expressed the view that evidence of salary compression exists when the years-of-experience variable produces a negative suppressor effect. As noted by McCulley and Downey, an evaluator is interested not only in determining whether the variable that contains the faculty members' number of years of experience acts as a suppressor variable in a regression model designed to analyze the variation in faculty salaries, but also whether the suppressor effect is negative. The Suppressor Effect Method can be completed in three steps.

In the first step the evaluator determines whether the salary data provide an initial indication that years of service may be acting as a suppressor variable. According to McCulley and Downey (1993), an initial indication is revealed by the existence of the following two conditions: (a) The years-of-experience variable has a positive correlation with the salary variable, and (b) the years-of-experience variable receives a negative regression weight in a multiple regression model designed to analyze the variation in faculty salaries. It should be noted that an important component of this step is the identification of an appropriate set of predictor variables. The appropriate set of predictor variables for one university may not be the appropriate set for another university. Thus evaluators must identify the appropriate sets for their universities.

If the evaluator concludes from the results of the first step that the years-of-experience variable may be serving as a surrogate variable, a second step is used to determine whether a suppressor effect does exist. McCulley and Downey (1993) suggest using a linear combination approach proposed by Tzelgov and Henik (1991) to determine if years of experience is producing a suppressor effect. To utilize this approach, a criterion variable, a suppressor set of variables, and a predictor set of variables must be identified. A correlation value is calculated to measure the degree of linear relationship between each of the following: (a) the predictor set and the criterion variable [r_p], (b) the suppressor set and the criterion variable [r_s], and (c) the predictor set and the suppressor set [r_{ps}].

These correlation values are substituted into an inequality, which is labeled Inequality 1, to determine whether a suppressor effect exists. Inequality 1 is as follows:

$$\frac{1 - r_{ps}}{k} > 1 - (r_p)^2 \quad [\text{Inequality 1}]$$

where:

r_{ps} = The correlation value between the predictor set and the suppressor set.

k = Ratio of the correlation values of the predictor set and the suppressor set

with the criterion variable (r_p/r_s).

A suppressor effect is judged to exist if Inequality 1 is true (Tzelgov and Henik, 1991).

A third step is needed to determine whether the suppressor effect is negative. If a suppressor effect is judged to exist in the previous step, McCulley and Downey (1993) recommend a decision rule presented by Tzelgov and Stern (1978), which was based on the definition of a negative suppressor variable provided by Darlington (1998), be used to assess whether the suppressor effect is negative. The correlation value for the predictor and suppressor sets (r_{ps}) and the reciprocal of the k value are substituted into an inequality, which is labeled Inequality 2 to determine whether the suppressor effect is negative. Inequality 2 is as follows:

$$r_{ps} > 1/k \quad [\text{Inequality 2}]$$

A suppressor effect is judged to be negative if Inequality 2 is true.

Application of the Suppressor Effect Method and Results

To illustrate how the three steps of the Suppressor Effect Method can be used to assess faculty salary compression, the data recorded for the Ashland University faculty employed during the 1999-2000 academic year were analyzed.

Step 1. Two variables were examined in this first step. One of these two values is the correlation value between the years-of-experience variable (X_1) and the faculty salaries variable (Y_1). The correlation value for these two variables was positive and statistically significant ($r = .59, p < .001$). The other value is the regression coefficient for the years-of-experience variable obtained from a multiple linear regression model. The regression model used in this study, regressed Ashland University's faculty salaries for the 1999-2000 academic year (Y_1) on to a set of predictor variables. The set of predictor variables included the following: (a) years of teaching experience at institutions of higher education [X_1], (b) academic rank [X_2], (c) academic degree [X_3], and academic area [X_4, X_5 , and X_6]. The regression coefficient for the years-of-experience variable obtained from this model was positive and statistically significant ($b_1 = 297.48, p < .001$). Since the correlation between the years-of-experience variable and the faculty salaries variable was positive and the regression coefficient value for the years-of-experience variable was also positive, it did not appear years of experience was serving as a suppressor variable.

Step 2. In spite of the fact that the results of Step 1 did not suggest the years-of-experience variable was serving as a suppressor variable, the procedures delineated in Step 2 were completed to demonstrate how they would be handled. The criterion variable, the suppressor set and the predictor set were identified. The criterion variable consisted of faculty salaries (Y_1). The suppressor set consisted of one variable, which was the years-of-experience variable (X_1). The predictor set of variables consisted of the following: (a) the terminal degree [X_3], (b) academic rank [X_2], and academic area [X_4, X_5 , and X_6]. It should be noted the predictor set consisted of the same predictor variables as the model used in Step 1 except for the years-of-experience variable.

The correlation values measuring the degree of linear relationship between the predictor set and the criterion variable (r_p), the suppressor set and the criterion variable (r_s), and the predictor set and the suppressor set (r_{ps}) were .89, .59, and .65, respectively. Substituting these three correlation values into Inequality 1 produced the following result:

$$1 - \frac{.65}{.89} \not> 1 - (.65)^2$$

$$.57 \not> .58$$

Since Inequality 1 is not true for these correlation values, evidence of a suppressor effect is absent.

Step 3. The lack of evidence of a suppressor effect negates the need complete this step. To demonstrate how this step would be conducted, however, the values for r_{ps} (.65) and k (.89/.59) are substituted into Inequality 2 as follows:

$$.65 \not> \frac{1}{.89}$$

$$.65 \not> .66$$

Inequality 2 is not true for these correlation values. Since the Suppressor Effect Method did not reveal years of experience served as a negative suppressor variable in the analysis of the faculty salary data, evidence of compression in the faculty salaries for the 1999-2000 academic year was not revealed.

Residual Salary Method

Toutkoushian (1998) proposed a procedure researchers could use to determine whether salaries are overly compressed. In this article, this procedure, which is referred to as the Residual Salary Method, is presented as a five-step procedure. The first step of this procedure requires the evaluator to specify a salary model. It should be noted Toutkoushian suggested each value contained in the criterion variable, which consists of the faculty members' salaries, be transformed to a natural logarithm value. The second step requires the evaluator to distinguish junior from senior faculty members. In the third step, a regression model is constructed and analyzed for the senior faculty members only.

The regression coefficients obtained from the model analyzed in the third step are used to predict the salaries of the junior faculty members in the fourth step. As noted by Toutkoushian (1998) "these values [predicted salaries] show what each junior faculty member would be predicted to earn if they were compensated for their qualifications in the same way as senior faculty" (p. 92). When the difference between the actual and predicted salaries of a junior faculty member, which is referred to as the residual value, is positive, that faculty member is receiving a higher salary than the regression model would predict for a corresponding senior faculty member. On the other hand, when the residual value is negative, the junior faculty member is receiving a lower salary

than would be predicted for a corresponding senior faculty member.

The fifth step requires the evaluator to determine if the mean predicted residual for the junior faculty group is significantly different from zero. When the mean residual value is positive and significantly greater than zero, the salaries paid to junior faculty are, on the average, greater than what would be predicted from the senior faculty model. Such a result would provide evidence of salary compression. The claim of salary compression would not be supported, however, when the mean residual value is not significantly different from zero.

Application of the Residual Salary Method and Results

The five steps of the Residual Salary Method were applied to the data recorded for the Ashland University faculty employed during the 1999-2000 academic year.

Step 1. In each regression model analyzed by the Residual Salary Method, the criterion variable consisted of each senior faculty member's salary for the 1999-2000 academic year transformed to a natural logarithm value (Y_2). It was determined the following predictor variables would be used to analyze the faculty salaries: (a) years of teaching experience at institutions of higher education [X_1]; (b) academic rank [X_2]; (c) academic degree [X_3]; and (d) academic area [X_4 , X_5 , and X_6].

Step 2. Exactly who should be identified as a junior faculty member is open to debate. Snyder, et al. (1992) suggest junior faculty be restricted to only newly-hired faculty. In the study conducted by Toutkoushian (1998), junior faculty included faculty members who were assistant professors with less than three years of seniority at the institution. In this study, three different lengths of employment served as the bases for generating three junior faculty groups and three corresponding senior faculty groups. The junior faculty groups consisted of faculty members newly hired by the University for the following contract periods: (a) Group 1—1999-2000 academic year; (b) Group 2—1999-2000 and 1998-1999 academic years; and (c) Group 3—1999-2000, 1998-1999, and 1997-1998 academic years. The faculty members not identified as junior faculty were classified as senior faculty. Thus, three corresponding senior faculty groups were formed.

One point should be noted with respect to the various lengths of service used to identify junior faculty members. To avoid possible analytic problems that promotion of a faculty member who is identified as a junior faculty member may pose for the assessment of salary compression, one constraint was placed on the formation of the junior faculty groups. The maximum length of employment for a junior faculty member prior to the 1999-2000 academic year was limited to a period less than the number of years a faculty member would need to serve in order to be promoted. Since Ashland University established three years of service as the

minimum time a faculty member must complete before requesting a promotion, the earliest academic year used to place a faculty member in a junior faculty group was the 1997-1998 academic year.

The Residual Salary Method was applied to each pair of junior and senior faculty groups. Such multiple analyses may provide evidence regarding how sensitive the results are to various groups of faculty being identified as the junior faculty. In addition, consistency of results may add a degree of confidence in the conclusions drawn from the analyses.

Step 3. Three regression models, one for each senior faculty group, were constructed and analyzed.

Step 4. Predicted salaries were generated for the each faculty member in each of the three junior faculty groups using the appropriate regression coefficients generated in Step 3. The predicted salaries of the junior faculty members were subtracted from their actual salaries to produce the residual values. The mean and standard deviation residual values were calculated for each of the three junior faculty groups. The number of junior faculty, the mean residual value, and the standard deviation of the residual values for each junior faculty groups are listed in Table 2.

Table 2
Residual Values of the Junior Faculty Groups

Junior Faculty Groups	Number of Faculty	Mean	Standard Deviation	t^a	p^b
Group 1	16	-.0313	.1170	-1.070	.301
Group 2	27	-.0058	.0978	-.304	.763
Group 3	36	.0085	.0931	.567	.575

^aThe t values were used to statistically test the differences between the mean values and zero.

^bThe alpha level for each test was set at .017.

Step 5. A one-sample t test was used to statistically test whether each of the mean residual values differed from zero. Since three separate t tests were conducted, the alpha level for each test was set at .017 (.05/3) in order to address the issue of inflated Type I error rates. The three one-sample t test values and their corresponding probability values are listed in Table 2. An examination of the probability values produced by the one-sample t tests reveals none of the mean residual salary values was significantly different from zero at the .017 alpha level.

The results of each of the three analyses indicates when junior faculty are financially compensated in the same way as senior faculty, as stipulated by the model, the difference between their predicted and actual mean salaries are not significant. Thus the results produced by the Residual Salary Method for the three junior faculty groups do not indicate the presents of salary compression.

Summary

The purpose of this study was to demonstrate how a university could use two methods to assess whether faculty

salary compression existed. The first method used, which is referred to as the Suppressor Effect Method, is designed to determine whether the faculty's years of experience serve as a negative suppressor in a multiple linear regression model. When the years-of-experience variable produces a negative suppressor effect, it suggests the salary structure reflects salary compression. The results produced by the analysis of Ashland University's 1999-2000 academic year faculty salaries with the Suppressor Effect Method did not reveal that years of experience served as a negative suppressor variable. Thus the results produced by this method do not support the view that the university's faculty salaries reflected compression.

The second method, which is referred to as the Residual Values Method, examined salary compression by statistically testing the mean difference between the predicted and actual salaries of junior faculty, where the predicted salaries were obtained from a regression model that assumed they were senior faculty. In this method the faculty are divided into two groups. One group, which is known as the junior faculty group, consists of the faculty who fit the operational definition of newly-hired faculty. The remaining faculty are classified as senior faculty members. Since differing positions are expressed in the literature regarding how the newly-hired faculty group should be operational defined, three different groups of newly-hired faculty and corresponding senior faculty were formed and analyzed in this study.

A multiple linear regression model was used to analyze the salaries of each of the three senior faculty groups. The regression coefficients produced by each of these analyses were used to predict the salaries of the corresponding junior faculty members. Each of the three mean residual values for the junior faculty members was tested to determine whether it differed from zero. Since none of the mean residual values for the junior groups established for the Ashland University faculty was significant, evidence of salary compression was not revealed by the results.

This study, which presented a step-by-step application of each analytic method, may serve as a guide or a reference for institutional researchers who undertake the task of analyzing faculty salaries. To further assist in the development of the literature that may assist these institutional researchers, a number of issues, which were not addressed or only tangentially discussed in this study, are suggested as topics for future studies. First, it may be important to determine the impact various criteria used to identify the junior faculty groups in the Residual Salary Method have on the assessment of salary compression. Developing a solid rationale for such criteria and determining whether various criteria produce substantially different results may be helpful to institutional researchers. Second, it would be informative to determine whether the Suppressor Effect Method and the Residual Salary Method always produce the type of results that lead to the same conclusions regarding the presences of salary compression. If the two methods produce different results, identifying the conditions under which that occurs

would be important. Third, once salary compression is judged to exist, university administrators may find it helpful to have future studies that develop and assess various methods used to address it.

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