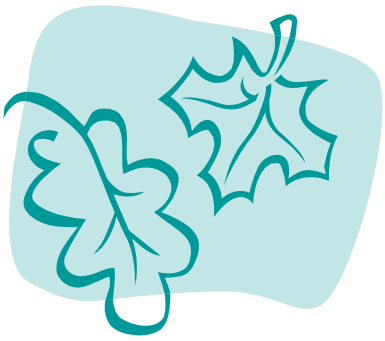
The OHIO Journal of Teacher Education



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Sarah Cecire, Ph.D.
Virginia McCormack, Ed.D.
George Metz, Ph.D.
Gayle Trollinger, Ph.D.

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Contents

A message from the Editors

The Spring 2009 issue of The Ohio Journal of Teacher Education has an open theme. The articles cover a range of topics of interest to teacher educators such as partnerships, Ohio Integrated Systems Model, advocacy for all students, professional development, continuous improvement framework, and Albert Shanker.

The first article by Blue describes a Math Science partnership that offered face-to-face summer courses and continued online courses during the school year to hundreds of teachers in southwest Ohio. Universities professors and teachers worked together to plan and deliver professional development for in-service teachers.

A collaborative effort by Devlin, Bleyaert, Cochrane and Welsch presents an overview of a statewide initiative, Ohio Integrated Systems Model (OISM), and a descriptive study exploring faculty awareness of the model in the educator preparation program at the University of Toledo. The goal of OISM is to provide a framework for systems change in Ohio through a comprehensive integrated model focused on student academic and behavior support. The six key components, along with tiers of academic and behavior support are to be implemented in a systematic manner to improve all student outcomes.

The third article by Freyn examines the role of public school boards, administrators, and teachers in fostering a safe school environment for lesbian, gay, bisexual, and transgender (LGBT) students. Statistics from the 2007 National School Climate Survey: Key Findings on the Experiences of Lesbian, Gay Bisexual and Transgender Youth in our Nation's Schools provided an account of school violence, harassment and discrimination Notable legal cases are explored and action steps for educational professionals are presented.

In the next article, Geer and Morrison investigate increasing Catholic elementary teacher self-efficacy perceptions and decreasing the student achievement gap in science through professional development. Extensive professional development for science teachers addressed teaching strategies and science content. The findings indicated that teacher efficacy perceptions and student achievement in science improved significantly.

The fifth article by Haughton, and Keil proposes a continuous improvement framework for university-based unit leaders in teacher preparation to be accountable while pursuing thoughtful and sustained continuous improvement. This framework provided unit leaders with a knowledge base, flexibility to addresses common accountability issues, and may be transferable to other university-based professional schools that are governed by performance-based accreditation standards.

Finally, Miller shares a book review about Albert Shanker, best known for his leadership of the American Federation of Teachers. Albert Shanker was vocal about his positions on critical educational issues that continue to be debated today, such as charter schools, standards-based education, creating rigorous national academic standards, teachers as creators and shapers of public policy, and the best means of accomplishing educational reform.

We hope you enjoy this issue of the journal, and we hope you find these articles to be informative and helpful in your various roles preparing teacher educators.

Sarah Cecire
Virginia McCormack
George Metz
Gayle Trollinger
Spring, 2009

Dynamic Complexity: The Interrelationship of Systems Thinking, Accreditation Standards, and Assessment Resources to Promote Continuous Improvement

Noela Haughton, Ph.D.
Virginia Keil, Ph.D.

Introduction

Demonstrating successful learning outcomes at the candidate and prekindergarten through twelfth grade (P-12) student levels have become critical for successful accreditation, which now places schools, colleges, and departments of education (SCDE) on a path of continuous improvement. Consequently, university-based educator education programs are being asked – and in some instances forced – to change in fundamental ways that many would describe as a paradigm shift. Changes include: a shift in the definition of quality away from inputs to outcome measures; the inclusion of the value-added outcomes metric to measure educator candidate performance impact on P-12 student learning gains; and use of electronic assessment systems to support program and unit improvement.

Therefore, it is fair to say that meeting the obligations that are required for continuous accreditation and program approval by today's evolving standards demands significant data collection, maintenance, and management efforts, as well as evidence that various feedback loop systems are in place and being monitored. The challenge becomes one of establishing and maintaining such a framework with manageable feedback loops that provides faculty and administrators the tools to monitor effectiveness at all levels. While much has been written about various issues related to the accreditation of university-based educational units, few resources exist to assist faculty and administrators to:

- understand the unit, along with its operating environment;
- understand the interrelationship of accreditation standards including their individual and collective impact throughout the unit and its external context;
- understand the learning and knowledge context of the unit, including the support of electronic assessment systems; and
- effectively manage the self-study process as part of the continuous improvement efforts.

The development of a framework that guides the efforts of faculty and administrators through this dynamic and complex process will support a deeper understanding of the self-study process as a tool to facilitate evidence-based continuous improvement while supporting unit knowledge and learning.

Accreditation Environment

Standards and quality measures help to ensure the application of high and rigorous external standards for the preparation of professionals in many disciplines. Success in the accreditation process is an indicator that preparation programs have met or exceeded established public standards or expectations of quality. Within the discipline of education, the demonstration of successful outcomes is progressively extending beyond the unit to its external environment and, also impacting the survival of units of education. "Public" stakeholders are increasingly requiring SCDE to demonstrate successful candidate learning outcomes, as well as program effectiveness in terms of the candidate's impact on P-12 student learning. The Na-

tional Council for the Accreditation of Teacher Education (NCATE) expects their accredited SCDE to provide evidence of effective practice based on six to eight assessments (NCATE, 2007). Candidates must know their academic content, understand the principles of learning and teaching, and increasingly, recognize their influence on P-12 student learning (NCATE, 2006; NCATE, 2002b). Some states, along with NCATE accreditation, have their own distinct approval and accountability requirements for individual programs. This brings additional pressures to units of education to monitor other aspects of candidate achievement such as performance on standardized tests and licensure examinations, the results of which are increasingly linked to continuous accreditation (Jacobson, 2004) and funding (Wolf, 2005).

Accreditation-related accountability exists on multiple levels: at the program level through SPAs; at the unit-level through NCATE; and at the institutional level through regional accreditors such as North Central Association of Colleges of Schools (NCA). Therefore, accredited colleges and universities must provide evidence of continuous monitoring to various bodies, including evidence-based changes and related outcomes (NCATE, 20002; NCATE, 2006, Ohio Department of Education, 2004a). Accordingly, these programs must dedicate resources to creating and maintaining processes and procedures that effectively monitor a system of feedback loops to provide administration and faculty with the ability to monitor effectiveness at multiple levels – college, program, curriculum, and course. Various accrediting bodies and governmental agencies demand significant data collection, maintenance, and management efforts, as well as evidence that various feedback loop systems are in place and being monitored to effectively bring about continuous improvement.

Applying Systems Thinking

A systems view enables the exploration and characterization of the system of interest, its environment, and its component parts (Banathy, 1996). Within this portrayal, the complexity of an environment is described in terms of a hierarchy of nested self-regulating systems in which those at the upper level are suprasystems, those that are a part of another system are sub-systems, and those that co-exist within the same suprasystem are peer systems (Hutchins, 1996). Systems thinking has a holistic focus (Hutchins, 1996), which makes it an appropriate methodology to characterize complex social systems such as education.

The educational unit, with its accreditation and continuous improvement requirements, has many systems-related properties. It is a complex living system that interacts with its environment (Miller, 1978) which includes a number of constituents such as accreditation agencies, P-12 schools, and community partners. It is purposeful, and is a part of a larger purposeful system (Ackoff, 1981) bounded by and accountable for learning outcomes within and beyond the unit. It has subsystems each of which is self-regulating (Hutchins, 1996) with multiple feedback loops (Forrester, 1971a) in the form of multiple data points. It has an intricate network of feedback processes, which are both self-reinforcing (*positive)* (such as maintaining high pass rates on licensure examinations) and self-correcting (*negative)* (such as addressing significant dropout rates within one or more program areas) (Sterman, 2006). There are interrelationships and interactions among its parts (Miller, 1978) (such as program requirements, candidate learning outcomes, P-12 student learning, academic experiences, technology integration, and public accountability). Finally, its parts (such as programs, accreditation requirements, and field-based opportunities) are dynamically interconnected resulting in an individual part or set of parts affecting the functioning of the entire system (Hutchins, 1996).

Existing Quality Models

The role of systems thinking in the concepts of continuous improvement and organizational learning has been evolving and has been applied in multiple contexts for decades. Forrester's works (1969, 1971b) applied system dynamics concepts to understanding of complex and dynamic social systems in which well-meaning and simplistic interventions failed, bringing with them untended consequences embodied in the exacerbation of the very conditions that were the target of the intervention. Argyris & Schon, (1974) discussed the concepts of single-loop learning in which error detection and correction are done to allow organizations proceed with existing policies and double-loop learning in which errors are detected and corrected proactively by examining underlying assumptions and policies and making appropriate changes. Senge (1990) introduced the concept of organizational learning and the five components (systems thinking, personal mastery, mental models, building a shared

vision, and team learning) necessary to build a learning organization. Sheffield Hallam University (2003) created the higher education version of the European Foundation for Quality Management (EFQM) model, which is a non-prescriptive framework based on nine criteria, five of which are enablers (leadership, people, policy and strategy, partnerships and resources, processes) and four of which are results (people results, customer results, society results, key performance results).

While these and other quality models have made and continue to make significant contributions to a number of contexts including the field of education, the current accountability context in which university-based educator preparation programs exists, carries with it a unique blend of issues and challenges. University-based schools, colleges, and departments of education are diverse in terms of a number of characteristics including size (enrollment), Carnegie classification, number of programs, and size of faculty, all of which influence continuous improvement requirements. Despite this diversity, the system and expectations of accountability is somewhat prescriptive, holding all units to the same set of standards and expectations. The system of accountability itself is multi-tired (university, professional college, program area, and, in many cases, state). The standards-driven environment continues to evolve and is becoming increasingly complex. NCATE-accredited units must demonstrate effectiveness and continuous improvement within the context of six accreditation standards and based on six to eight "key" (NCATE, 2007, p. 6) types of evidence, including performance-based assessments. NCATE-accredited units are also required to implement a technology-supported assessment system "that collects and analyzes data on applicant qualifications, candidate and graduate performance, and unit operations to evaluate and improve the unit and its programs" (NCATE, 2006, p. 21).

It is believed that a continuous improvement framework that draws on appropriate aspects of existing quality models but addresses this unique context is appropriate. Such a framework may be an essential tool to facilitate the efforts of faculty and administrators from diverse SCDE to pursue evidence-based continuous improvement in this dynamic and complex process while supporting unit knowledge and learning, both of which are critical for continuous improvement. The goal of this paper is to propose a framework of continuous improvement for university-based units of education in their respective contexts that uses systems thinking to: (a) illustrate the education unit in its larger context; (b) define the relationship between performance-based standards; (c) describe their individual and collective influence throughout the educational unit; (d) describe the unit's learning and knowledge context; and (e) propose a system of self-regulation through the monitoring of feedback loops.

Designing a Systems Framework for Continuous Improvement

Graphically representing a framework of supra, peer, and subsystems that defines the unit context was ultimately accomplished by the identification of systems within the unit and its larger context, including each NCATE standard. Our examination of this context further determined that relationships among these systems were primarily internal to the unit or external in the unit's environment. Finally, we examined the systems to identify the role of each within the accreditation context in terms of hierarchy, purpose, relationship, and connectedness. Applying systems thinking to this context enables the understanding of the: nature of the embeddedness"; relationships, interactions, and mutual interdependence of component systems; the purpose, goals, and boundaries of the whole system; and properties of wholeness and the characteristics that emerge at various systems levels (Banathy, 1996). Figure 1 illustrates the Systems View of an Education Unit (SVEU). Graphically, the SVEU is a set of five concentric circles, with each circle representing a nested, subsystem layer. The five layers of the SVEU are: Environment, Assessment System & Unit Evaluation, Unit Governance & Resources, Unit Programs, and Learning.

Environment is the outer-most circle that represents the larger context within which the education unit is bounded, and includes public accountability, P-12 schools, the current state of technology, funding sources, and governmental agencies. This larger context along with its stakeholders constantly provides challenges and opportunities that may impede or facilitate the progress of the unit as it achieves its purpose of learning. In response to these threats (such as funding shortfalls) and opportunities (such as accountability legislation), the unit must continuously self-assess and learn as a system as it pursues its mission.

Assessment System & Unit Evaluation falls immediately within *Environment* and bounds the internal

unit systems while connecting the unit to its external environment. It includes a system that collects and analyzes data on all sub-systems including candidate learning and unit operations to evaluate and improve the unit thus helping it to achieve its ultimate purpose – learning. In this framework, *Assessment System & Unit Evaluation* has the dual function of facilitating continuous improvement within the unit as well as responding to environmental issues, such as P-12 student learning and "public" accountability. Moreover, this circle bounds four of the remaining NCATE standards (Content Knowledge, Skills, and Dispositions; Field Experiences and Clinical Practice; Faculty Qualifications, Performance, and Development; Unit Governance and Resources) since it provides the evidence necessary for data based decision-making to occur throughout the system. In other words, this framework recognizes that *Assessment System & Unit Evaluation* is *sine qua non* to the mission of continuous quality and improvement.

Unit Governance & Resources falls immediately within *Assessment System & Unit Evaluation* and bounds *Unit Programs* and *Learning*. This system layer provides the infrastructure and governance system that supports the unit's activities necessary for program candidates, to attain learning outcomes that result in highly quality educators. This symbolizes the proposition that everything done programmatically within an education unit – courses, orientation and other special programs, technology integration, field-based experiences, faculty development, etc. – must contribute to the goal of high quality educator preparation. *Assessment System & Unit Evaluation* provides feedback (such as candidate achievement in terms of knowledge, skills, and disposition; faculty qualifications and resource needs; and candidate performance in field-based experiences) to continuously impact infrastructure in terms of program size, technology needs, and other aspects of unit operations such as physical plant.

Unit Programs falls within *Unit Governance & Resources* that include the peer systems of *Candidate Knowledge* (Standard 1), *Field Experiences* (Standard 3), and *Faculty Qualifications* (Standard 5), and bounds the *Learning* system layer.

In this framework we established these three standards as peer systems because of the nature of their interaction and influence on learning. Learning outcomes are achieved by a planned sequence of instructional and non-instructional opportunities offered within multiple programs areas and program levels, and includes offerings such as courses, service learning, and field experiences. Programs are designed and managed primarily by unit faculty, and provide the context in which highly qualified education professionals are prepared. *Standard 1* measures the degree to which candidates and graduates can demonstrate the knowledge, skills, and dispositions to effectively support P-12 student learning. It also provides critical feedback to programs regarding candidate performance quality, which is essential for continuous program improvement. *Standard 3* provides applied practice opportunities for candidates to demonstrate their ability to support student learning. Feedback from this standard enables the system to monitor candidate quality in an applied setting as they practice their theoretical knowledge. This feedback is critical for units, candidates, and faculty, for growth and continuous improvement. *Standard 5* provides role models (faculty, cooperating teachers, supervisors, and other school partners) who are able to demonstrate the convergence of theory (*Standard 1*) with practice (*Standard 3*) in all relevant settings. Faculty demonstrate exemplary practice in teaching, research, scholarship, service, professional engagement, collaboration, and reflective practice in terms of continuous learning and development.

Nested within *Unit Programs* is the *Learning* system layer that is the core purpose of this system as portrayed in this framework. Learning occurs throughout this framework at multiple levels, including candidates (internal stakeholders), P-12 students (external stakeholders), and at the unit and therefore, system level, as dictated by continuous improvement. Even though many would agree that the primary recipient of learning in the educational context are educator candidates and, by extension, P-12 students, for continuous improvement to occur, learning must occur throughout the system. Accordingly, the system layer of *Learning* extends to other stakeholders and systems including faculty who must model effective practice for candidates and mould them into highly qualified educators in all licensure and non-licensure areas. Accordingly, the unit of education must constantly adapt its "strategic lens" as it responds to internal and external pressures in pursuit of its purpose – learning.

Guiding Philosophy, Diversity, and Technology Integration

The strategic lenses are collective critical in-

fluences through which the unit's vision is articulated, implemented, and lived. NCATE accredited units may typically have as part of their strategic lens *Guiding Philosophy* (Conceptual Framework), *Diversity* (Standard 4), and *Technology Integration* as indicated by the textured portion of Figure 1. The composition of strategic lenses is strongly influenced by the distinctiveness of the institution and/or unit's identity. For example, religious affiliated institutions may adapt these lenses to include faith-based influences. Other institutions that emphasize service learning as critical to their mission may include community service related influences.

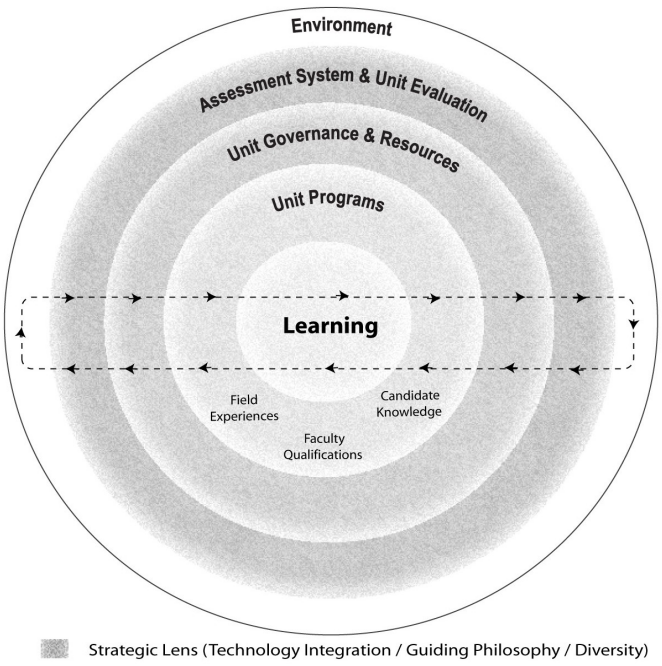

Figure 1. Framework for the Continuous Improvement of Units of Education

Guiding Philosophy

The unit's *Guiding Philosophy* is one of the three critical lenses through which the unit strategically articulates, implements, and lives its vision throughout all areas of the unit and beyond. It therefore helps to provide a common language between internal and external stakeholders. For NCATE-accredited units, this lens is manifested in the Conceptual Framework. Evidence of this manifestation must be apparent throughout all internal and external systems, thus setting the climate and cultural tone of the unit. In addition to facilitating the establishment of the unit's shared vision, the Conceptual Framework provides direction for the unit's programs, courses, teaching, candidate performance, scholarship, service, and accountability (NCATE, 2006; NCATE, 2002b).

As one of three strategic lenses, the *Guiding Philosophy* enables the unit to gain depth and meaning into itself (Senge, 1990) while remaining flexible in the face of inevitable internal and external change, such as new staff, new leadership, updated standards, increasingly diverse student populations, and technology. While not necessarily changing itself, the *Guiding Philosophy* must enable unit leadership to be mindful of the unit's inherent strengths and weaknesses, which in turn, will facilitate the unit's ability to respond to internal and external pressures that may result in opportunities and/or threats. This strategic lens must remain dynamic to constantly ensure coherence of purpose between unit systems – internal and external. This flexibility may result in adaptation of the unit's vision and/or its articulation, thus, enabling the unit to remain grounded in its purpose – learning, and therefore is a critical factor for continuous improvement. Senge (1990, p. 221) states "vision paints the picture of what we want to create. Systems thinking reveals how we have created what we currently have."

Diversity

In this framework, *Diversity* is one of the three components of a unit's strategic lens because "helping all students learn" (NCATE, 2006, p. 10) is critical to the unit's purpose. Federal and state law requires that each child have equal educational opportunities regardless of race, ethnicity, gender, religion, sexual orientation, and disability. The Educate America Act of 2000 mandates that the states guarantee that every American will possess the knowledge and skill necessary to compete in a global economy and to exercise the rights and responsibilities of citizenship. In order to meet this legal requirement and social imperative, university-based education needs to prepare professional education candidates by providing candidates with diverse experiences to support the learning of every child. "These experiences include working with diverse higher education and school faculty, diverse candidates, and diverse students in P-12 schools, (NCATE, 2006, p. 10). It is therefore safe to say that the *Diversity* lens is one for which all stakeholders – internal and eternal – hold units of education accountable and therefore, influences the very definition of continuous improvement.

Technology Integration

Technology Integration is the third component of the educational unit's strategic lens because of its critical role in the unit's pursuit of continuous improvement. This is evident throughout the system since technology is essential to supporting the knowledge base of the unit, candidates, faculty, P-12 students, and other external stakeholders, including accreditors and governmental agencies. Technology knowledge and skills are written in Standard 1 and Standard 3 as candidates are expected to be able to "integrate technology appropriately" (p. 15) and have clinical practice that affords them the opportunity to "use information technology to support teaching, learning, and other professional responsibilities" (p.28). Additionally, Standard 5 requires professional education faculty to "continue to develop their skills in using technology to facilitate their own professional work and help candidates learn" (p. 37). Finally, Standard 2 requires the use of technology to "play an increasingly important role in data gathering and analysis, as well as more broadly in unit planning and evaluation" (NCATE, 2006, p. 23).

The critical influence of *Technology Integration* is also manifested in the unit's *Guiding Philosophy* as reflected in the Conceptual Framework (NCATE, 2006) in which there is a commitment for programs to prepare "candidates who are able to use educational technology to help all student's learn" (p. 13). *Technology Integration* also provides a connection between the internal and external systems as it influences communication, development, direction, and decisions for both sets of systems. According to NCATE (2006) "technology will play an increasingly important role in data gathering and analysis, as well as more broadly in unit planning and evaluation" (p. 23.). Therefore, *Technology Integration* facilitates learning – unit, candidate, and student – through the monitoring of feedback loops that exist in the multiple data points that are the byproducts of unit operations at all levels throughout the system. Defining the knowledge context, including the supporting role of technology, is critical to effectively managing this multi-level learning process.

Defining the Unit Learning and the Knowledge Context

The Organization for Economic Cooperation and Development (2004) makes a critical distinction between information and knowledge. "Knowledge – in whatever field – empowers its possessors with the capacity for intellectual or physical action" (p. 19), while "Information, on the other hand, takes the shape of structured and formatted data that remains passive and inert until used by those with the knowledge needed to interpret and process than" (p. 19). This distinction forms the basis for our understanding of the knowledge context of units of education as depicted in Figures 2. An understanding of this context also further defines the role of NCATE Standard 2 especially as it relates to the use of an electronic assessment system and supporting human.

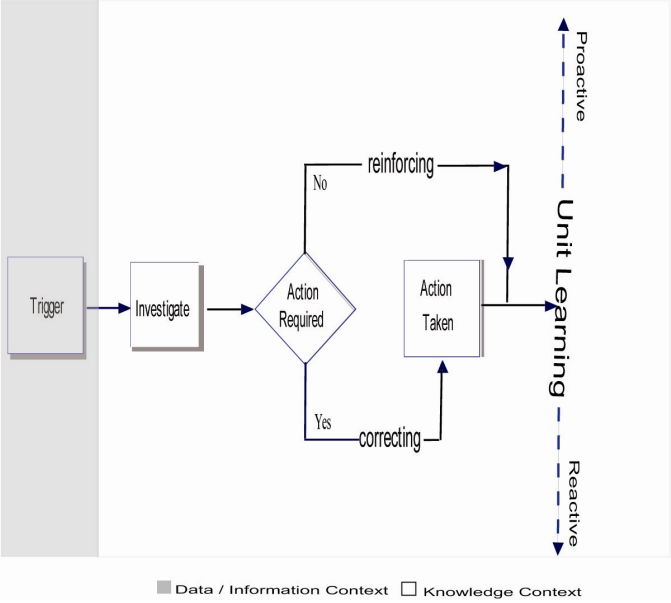

Figure 2. Learning and Knowledge Context with Continuous Improvement Feedback Loop Electronic Assessment System and Human Resources

The electronic assessment system (EAS) supports the unit by storing data and information, which facilitates unit learning and knowledge creation. The use of technology throughout the unit must occur on two levels: (1) the candidate level, and (2) the unit level. Therefore, the design and development of an electronic information system must allow candidates and the unit to demonstrate learning. On the candidate level, candidates must be able to demonstrate knowledge and skills based upon observation of behaviors, examination of artifacts as well as other sources of information (e.g., employer surveys). On the unit level, SCDE must demonstrate that organizational learning is occurring through the use of assessment data and information – from candidates and other

sources. This unit learning process involves the recognition of unit problems and the use of assessment data to support the analysis, implementation, and monitoring of unit improvement, thus creating and managing unit knowledge.

Critical to this process is the human resource, which in many cases, is a faculty member and/or administrator with assessment coordination responsibilities. This human element initiates the unit learning and knowledge creation process by using the information stored within the electronic assessment system to study many aspects of the unit context and candidate performance. It is also vital that the assessment coordinator, along with other appropriate stakeholders, continuously review the assessment policies, processes, procedures, and results. Feedback and experience should continuously influence further development and use of the electronic system. The coordinator, therefore, spearheads the implementation and monitoring of feedback loops within the EAS to achieve positive data-driven changes within the unit at all levels, and in accordance with demonstrating continuous improvement.

Feedback Loops

The arrows in Figure 1 reflect the dynamic interconnections of feedback loops within and throughout the internal system, extending into the external environment. The arrows and flow also illustrate the mutual impact of external elements on the educational unit. Learning within the unit is facilitated through the implementation and monitoring of these multiple feedback loops, which are embodied in data points that are generated by internal and external sub-systems. These data exist in multiple formats and are the byproducts of multiple processes and procedures. In clarifying the nature of the evidence with which units must demonstrate candidate learning outcomes, NCATE (2007) makes reference to candidate performance: (a) on state licensure testes; (b) on content assessments; (c) on instructional planning; (d) in clinical settings; (e) in terms of impact on and/or support of P-12 student learning; and (f) on other course-related assessments as determined by faculty. Understanding the impact of the "intricate network of feedback processes" (Sterman, 2006, p. 3), as embodied in these multiple data-points, is critical to managing unit learning and knowledge creation.

Figure 2 includes an illustration of the self-monitoring process of a single feedback loop within the unit's learning and knowledge context. A continuous improvement opportunity is triggered by an event such as summary scores from licensure tests, which are stored in the EAS. The assessment coordinator initiates an investigation (intellectual action), which is the first step in the self-study and knowledge generation process. Analysis of the data provides clarity. The results of the analysis determine the need for action – if at all. If no action is required – self-reinforcing – no action is taken. If action is required – self-correcting – the appropriate change is implemented, resulting in unit learning and knowledge creation.

In this illustration, the authors further propose that *unit learning* exists along a continuum; "reactive" (self-correcting) and "proactive" (self-reinforcing). *Reactive learning* results from the correction of an existing problem. *Proactive learning* occurs from actions that anticipate and avoid the occurrence of a problem. *Proactive learning* may also result from enhancing an existing successful process. Both types of learning may result from candidate and/or non-candidate information/data. Also, the continuous improvement monitoring process is the same. The triggering event determines a *self-correcting* versus *self-reinforcing* learning outcome. While units should strive towards *proactive learning*, it is inevitable in this complex and dynamic environment of constant change that corrections must be made to improve the unit. Consequently, the overriding considering must always be the act of self-monitoring as this is a fundamental factor in a culture of continuous improvement.

Using the Framework to Improve Assessment

A specific example is the review of the COE's student teaching portfolio requirement, in which inconsistencies had developed across programs within the accredited unit. Specifically, a sample of portfolios revealed missing required elements and the presence of unapproved programmatic modifications. It was further discovered that some programs had altered and/or supplemented the standard assessment rubrics and observation guides. Additional data was gathered by: reviewing the existing portfolio documentation requirements; reviewing the COE's existing student teaching handbook; conducting a focus group with field office personnel who manage the placement of student teachers; gathering existing field observation forms used by various programs; and examining peer institutions' documentation for their respective student teachers. Analyses of these data lead to the discovery

of gaps in the scope and sequence of field requirements. Many of these gaps resulted primarily from two sources: the very diversity of content across programs and a lack of communication of existing standards and expectations for new faculty and university supervisors.

A number of strategies were implemented to address the portfolio issue, which began with an extensive review of existing requirements for relevance and appropriateness for all programs. Next, a holistic solution that addressed breakdowns throughout the teacher preparation program and focused on the documentation and diffusion of performance standards was implemented. This solution centered on the development of an electronic teacher preparation manual for stakeholders – primarily pre-service teachers, faculty, university supervisors, and cooperating teachers – that detailed the requirements for teacher preparation from the freshman year through graduation. Specifically this manual is comprised of the following four sections:

- Section I – Information for Pre-Education Majors, which contains pertinent information and answers to questions often asked by students in the COE
- Section II – Information for Professional Education Majors, which contains performance-based assessments that must be successfully completed prior to student teaching
- Section III – Student Teacher Handbook, provides guidelines and expectations for the student teacher

Section IV – Student Teaching Portfolio, which provides guidelines, including performance-based assessments, for the successful completion of the student teaching portfolio.

The process of the development of this manual included: identification and validation of existing documentation; reviewing the alignment of the accredited unit's performance assessments with the PRAXIS III / Pathwise Framework; reviewing and revising the performance assessment rubrics to document and clarify performance levels; and continuous expert-paneling of additions and revisions by faculty members, field and student services support staff, graduate students, and teacher candidates. The completed document was presented to and accepted by the COE faculty at the first meeting of the current (2007 – 2008) academic year. This manual is currently available to teacher candidates at all levels, and existing and new stakeholders – faculty, university supervisors, cooperating teachers, and others – electronically via CD and the COE's website. Faculty and staff within the accredited unit are now actively using this document with candidates at all levels. It should also be noted that since its implementation updates have occurred when missing and or inconsistent information have been identified by end users. This living document will continue to be updated as additional requirements are identified, thus, continuous monitoring will occur.

The student teaching portfolio example included elements of reactive and proactive learning. The reactive elements centered upon discovering the inconsistencies, which quietly occurred. However, proactive elements centered upon the holistic solution of not only addressing the inconsistencies, but creating and publishing policies and procedures that should mitigate the reoccurrence of this inconsistencies as well as others. Examples of other potential issues are developing transparency and consistent expectations for new faculty, supervisors, candidates, and other stakeholders.

Both types of learning may result from candidate and/or non-candidate data points. Also, the continuous improvement monitoring process (Figure 2) is the same for both types of learning. The essential difference is one of self-correction versus self-regulation in terms of the nature of the improvement opportunity and thus, the point at which the self-study is initiated. While units should strive towards *proactive unit learning*, it is inevitable in this complex and dynamic environment of constant change, corrections must be made to improve the system. Therefore, the overriding considering must always be the act of self-monitoring as this is the fundamental factor in a culture of continuous improvement.

It is short-sighted for the reader to assume that this framework applies only to NCATE institutions. While NCATE accredits the bulk of the education units, accreditation standards and continuous improvement are universal. Therefore, the authors believe this framework has broad applicability in any education context in which continuous improvement and quality standards exist. The basic structure of a dynamic living system in which there is dynamic interplay between subsystems is frequently overlooked or ignored which leads to incomplete solutions and recurring problems.

This self study example illustrates how data driven changes impact the entire system. Through evidence from a data point, the unit was able to transform

information into knowledge that empowered the unit and its stakeholders. Learning outcomes are more clearly articulated to all stakeholders at various transition points. Candidates have advanced knowledge of performance assessment requirements and performance expectations. Faculty have reexamined course sequences and made appropriate modifications to the placement of performance assessments. Supervisors and cooperating teachers across all programs rely on the electronic documentation to improve supervision of teacher candidates in field experiences. The unit continues to monitor and revise this web-based handbook to ensure that all stakeholders have accurate and consistent information. The implementation of the electronic handbook has been expanded to include all licensure programs. Thus, this data-driven change has impacted unit effectiveness across all six NCATE standards and continues to positively impact the all stakeholders.

Conclusion

"The pathology of American schools is that they know how to change. They know how to change promiscuously and at the drop of a hat. What schools do not know how to do is to improve, to engage in sustained and continuous progress toward a performance goal over time." Richard Elmore (educator/ author). In addition to concurring with this perspective, the authors believe that this promiscuity is largely the result of a lack of understanding of elements that are critical to continuous improvement, including the structure of the unit within its larger context, the role of performance-based accreditation standards, and the unit learning process.

This framework provides unit leaders with a knowledge base to avoid promiscuous change and pursue thoughtful and sustained continuous improvement while being accountable. The flexibility of the framework enables diverse SCDE to adopt and adapt this model because it addresses common accountability issues. Additionally, the framework may be transferable to other university-based professional schools that are governed by performance-based accreditation standards. Future research will further define unit knowledge structures and their relationship to the database design of an electronic assessment system.

Noela A. Haughton, Ph. D. is an Assistant Professor and Assessment Coordinator in the Judith Herb College of Education at the University of Toledo. Virginia L. Keil, Ph.D. is the Associate Dean for Undergraduate Studies and Director of Teacher Education in the Judith Herb College of Education at the University of Toledo.

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Ohio Integrated Service Model (OISM): A Self-Study from a Key Stakeholder

Patricia Devlin, Ed.D. *Barbara Bleyaert, Ed.D.*
Wendy S. Cochrane, Ph.D. *Richard G. Welsch, Ph.D.*

With the passing of the No Child Left Behind Act of 2001 (Public Law 107-110) and the reauthorization of the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA), there is an emphasis on state and district accountability for all students. Federal and state laws and regulations require school districts to align curriculum and instruction with state content standards, and provide effective interventions to enable all students to achieve high standards. In alignment with the mission of the Ohio Department of Education (ODE), school district partnerships have been developed to plan and implement school improvement processes that raise expectations, and close achievement gaps for children with disabilities and other learners who are most at risk in standards-based reform efforts.

Through funding from the Office for Exceptional Children, the Ohio Integrated Systems Model (OISM) has evolved across the state to meet these challenges. OISM is a comprehensive school improvement model that provides support systems for addressing both the academic and behavior needs of all students, and it is consistent with the Response to Intervention model (RTI) (Graden, Stollar, & Poth 2008). This tiered model involves the formation of principal-led building leadership teams that support comprehensive academic and behavioral prevention and intervention. The model incorporates scientifically based research and data-based decision making, thus ensuring that all students have access to, and make progress toward achieving grade-level indicators aligned with academic content standards. In the past three years, Ohio's Special Education Regional Resource Center (SERRC) network has been utilized as an external provider system offering professional development and technical assistance to district implementation of the integrated model.

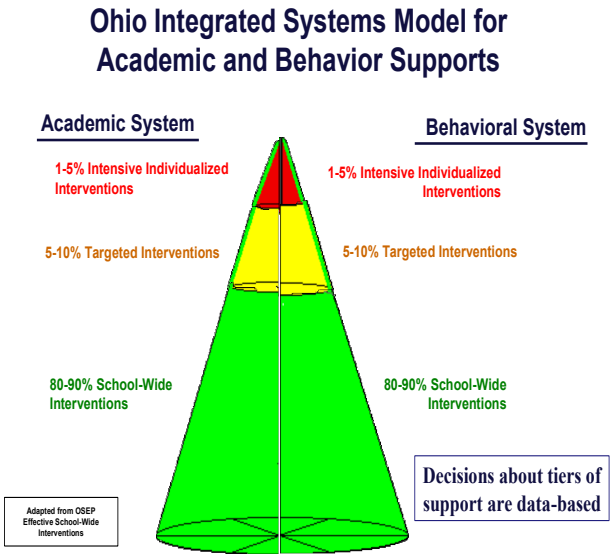

Figure 1. The Ohio Integrated System Model

OISM is designed to provide school-wide instruction and behavioral supports illustrated by a three-dimensional cone-shaped design (Figure 1). It is based on the application of a public health model for prevention and intervention to school problems (Walker & Shinn, 2002). Six key components form the base of the OISM cone: academic and behavior supports across 3-tiers, administrative leadership, collaborative strategic planning, scientifically based research, data-based decision making, and culturally responsive practices. The bot-

tom tier of the cone is universal and includes core academic and behavior curricula. A district that has effective school-wide academic and behavioral curricula and practices will address the needs of 80 to 90 percent of all students. The second tier, represented in the middle of the cone, is designed for the 5 to 10 percent of students at some risk for school failure who need more strategic and specific instruction in addition to the core curricula. The top tier represents intensive supports, most often individualized, that are needed to meet the needs of the remaining one to five percent of students at highest risk for failure. Students in this tier may include children with disabilities and other at-risk children requiring intensive supports to achieve success, even with effective school-wide and targeted supports in place.

The rationale for integrating tiers of academic and behavior support is based on research by Kellum (1998) who found significantly more positive effects for student outcomes when providing practices that addressed behavior and academics at the same time. The academic component emphasizes the provision of high quality, culturally responsive, research-validated reading instruction implemented early in every students educational experience. The behavior component of OISM focuses on providing positive behavioral supports (PBS) on schoolwide, targeted and intensive levels. Research has shown that punishing behavior without positive behavior support (e.g., teaching social skills and reinforcing/encouraging appropriate behaviors) results in increased aggression, truancy, and school dropout (Mayer, 1995). One specific benefit is that as the behavioral culture of a school improves, individual student behavior improves, academic gains are experienced and more time is directed toward academic instruction (Sugai & Horner, 2001). Likewise, the academic tiers of OISM mirror RTI that uses systematic and ongoing monitoring of progress in academic skills. Teachers, in turn, identify students who need additional help and focus on the elements of instruction (i.e., core program, supplemental, specialized) as needed (Haager & Klingner, 2005). To monitor the percent of students in tier one, most participating schools use building wide data services such as Schoolwide Information System (SWIS), and Dynamic Indicators of Basic Early Literacy Skills (DIBELS). These data are then used to make data-driven instructional decisions to improve achievement outcomes for all students.

One of the challenges associated with the implementation of OISM as well as RTI models in other states is educator training regarding the key concepts. In, Ohio, data from past efforts to implement prevention and intervention models resulted in two key lessons learned: the need for ownership of interventions within general education and special education and the need to provide information to faculty at Institutions of Higher Education (IHE) about the model so they could provide information for pre-service educators. Regarding the latter lesson, administrators across the state of Ohio consistently expressed concern about what was taught during pre-service training (or lack of training) and what was expected relative to knowledge and skills for educators working in OISM schools. The areas of need relative to pre-service training included using data-based decision-making and research-based instruction and interventions (Graden, Stollar, & Poth, 2008)

In 2005, Education Commission of the States, Educational Testing Services, Learning Point Associates, and Vanderbilt University entered into cooperative agreement with the U.S. Department of Education to operate the teacher quality content center. The result was the National Comprehensive Center for Teacher Quality (2009) and as stated on the center's website the purpose of it was as follows:

> National Comprehensive Center for Teacher Quality was created to serve as the premier national resource to which the regional comprehensive centers, states, and other education stakeholders turn for strengthening the quality of teaching—especially in high-poverty, low-performing, and hard-to-staff schools—and for finding guidance in addressing specific needs, thereby ensuring highly qualified teachers are serving students with special needs.

A search of center's website using the key words "teacher preparation" and "RTI" revealed numerous links to information posted by experts in the field of education discussing the lack of preparation of pre-service educators on the key concepts of RTI as an issue in most states. In Colorado, the Special Education Advisory Committee (2005) went so far as to issue a position statement relative to RTI stating:

> The CDE should highly encourage all Colorado teacher preparation programs (i.e., higher education) to include RTI training for prospective educators of all licensure areas. RTI train-

ing must be integrated into the contents and methods instructional curriculum and must not be restricted to courses dealing with special education (e.g., a class required of all prospective educators be developed within the department of education that addresses the RTI model and best practices).

Given past finding in Ohio about the need for pre-service educator preparation related to OISM key concepts, the Department of Education (ODE) reached out to Institutions of Higher Education (IHE) that offer educator preparation programs, hoping to increase awareness and familiarity of the OISM initiative among faculty responsible for training professionals who staff schools. In cooperation with ODE, the Special Education Personnel Development Advisory Committee (SEPDAC) developed an initial grant designed to create awareness of the OISM model and foster potential partnerships between IHE's and public school districts in the state. Numerous institutions that prepare preservice teachers and administrators responded by implementing demonstration and/or research projects, including the University of Toledo (UT).

The action research project at UT represented a collaborative effort within various school licensure programs (special education, general education, educational administration, school psychology), and also between universities (University of Cincinnati, University of Toledo). Two of the four goals in the UT project specifically related to creating an awareness of the OISM model among faculty in the College of Education and gauging current integration of OISM components in the curriculum of various program areas. Additionally, since research suggests that much education policy and many programs initiated by state agencies viewed as "top down" reform are "not implemented at all or are substantially modified during implementation" (Fowler, 2004, p. 17), the UT researchers were interested in faculty perception of the OISM initiative in particular, and their perceived role in advancing state education initiatives in general. The attempt by ODE to promote this initiative across educational agencies was viewed by the researchers as a highly positive strategy. However, Fowler (2004) suggests that successful implementation of education policy requires "developing and maintaining both the will and capacity" of those responsible for implementing it (p. 271). The UT researchers attempted to gain some understanding of the will of the faculty to advance initiatives generated at the state level, and issues related to capacity that might impede or facilitate their ability to do so.

Methods

This descriptive study examined faculty members at The University of Toledo who work in preparation programs designed for K – 12 educators including teachers, school psychologists, and administrators. The study explored awareness of the Ohio Department of Education's OISM model among faculty. Additionally, data was collected regarding faculty attitudes towards OISM and state education initiatives.

Data Collection Procedures

A written survey was developed to gather the information of interest (See Table 1). During a College of Education monthly faculty meeting a presentation describing the OISM model was conducted by a staff member from the local SERRC considered to be an expert on the model. The presentation included a 15-minute video prepared by the Department of Education designed to serve as a tool to increase awareness of the model, printed material about OISM, and responses to questions from the faculty. Immediately following the presentation faculty members were asked to complete the survey consisting of three sections: a) demographic information (e.g. rank, department, experience), b) faculty awareness of the OISM model and current faculty use of key components, c) opinion about state education initiatives in general. The data-gathering instrument was carefully developed utilizing closed-ended (i.e. yes/ no, Likert – rating scale) and open-ended (follow-up short answer) formats. Participation in the survey was voluntary. Members of the teaching faculty who work in preparation programs designed for K – 12 educators were encouraged to participate. In all, there were 41 participants in the survey, representing 67% of faculty involved in preparation programs for K – 12 educators.

Table 1

Ohio Integrated Systems Model (OISM) Faculty Survey

Awareness of OISM
1. Were you aware of the OISM model before today's meeting and presentation?
2. Do you teach the OISM model in at least one of your classes?
3. If you do not teach the OISM model per se, do you teach or promote any of the following components or concepts of the OISM model in at least one of your courses?

Please respond to each question		
a. A "core" reading and behavior curriculum that reflects high expectations for all students in a school	Yes	No
b. Prevention of learning and behavior problems versus intervention after failure	Yes	No
c. Integrated academic and behavior supports across 3 tiers: "core" + school-wide interventions (80-90% of students) "core" + targeted interventions (5-10% of students) "core" + intensive interventions (<5% of students)	Yes	No
d. Culturally responsive practices	Yes	No
e. The principles of Universal Design for Learning	Yes	No
f. Data-based decision-making	Yes	No
g. Research-validated instructional practices	Yes	No
h. Collaborative strategic planning	Yes	No
4. Based on what you know about the OISM model, do you think it is valuable and important to incorporate this model into our educator reparation programs? Please briefly explain your response:	Yes	No
5. What questions or additional interest, if any, do of you have in Ohio's OISM model?		

State Education Initiatives

Please use the following scale to indicate your level of agreement:

SD Strongly Disagree	**D Disagree**	**A Agree**	**SA Strongly Agree**

1. I feel compelled to keep abreast of state education initiatives being advanced by the Ohio Department of Education.
2. I find it easy to keep abreast of state education initiatives being promoted by the Ohio Department of Education.
3. I feel compelled to make the students in my classes aware of education initiatives advanced by the State of Ohio.
4. Because the U. of T. is a public university in Ohio, I feel more committed to the education initiatives being advanced in Ohio than I do to education initiatives being advanced in other states where our students live and work.

Data Analysis

As a descriptive study, the data collected represents the status quo assessing characteristics in regards to awareness of the current faculty. The responses were analyzed in relation to frequency and averages on closed-ended questions. A running record of responses was collected for open-ended questions. After which, the responses were grouped into categories (e.g., similar responses).

Participants

Most (92.68%) survey respondents were members of the College of Education Faculty. The only other college represented by respondents was Health Science and Human Service, which provides a program to train school counselors and psychologists. Full professors constituted 24.39% of respondents, Associate Professors 48.78% of respondents, and Assistant Professors 14.63% of respondents. The largest department within the College of Education represented in the survey was Curriculum and Instruction (41.46%), followed by Early Childhood, Physical & Special Education (24.39%), Foundations of Educa-

tion (21.95%), and Educational Leadership (4.88%). More than 70% of respondents indicated they had, at some point in their careers, been a teacher or staff member within a K – 12 education system. Additionally, the participants were faculty members who represented a wide range of licensure/preparation programs (See Table 2).

Table 2

Name of Program	Enroll.	Award Level
Adolescent/Young Adult (AYA) Language Arts	80	Baccalaureate & Graduate
Adolescent/Young Adult (AYA) Mathematics	128	Baccalaureate & Graduate
Adolescent/Young Adult (AYA) Social Studies	128	Baccalaureate & Graduate
Adolescent/Young Adult (AYA) Science	47	Baccalaureate & Graduate
Early Childhood Education	508	Baccalaureate & Graduate
Early Childhood Intervention Specialist	29	Graduate
Mild/Moderate Intervention Specialist	159	Baccalaureate & Graduate
Moderate/Intensive Intervention Specialist	43	Baccalaureate & Graduate
Visually Impaired Intervention Specialist	4	Baccalaureate & Graduate
Middle Childhood	70	Baccalaureate & Graduate
Foreign Language	29	Baccalaureate & Graduate
Health	43	Baccalaureate
Physical Education	20	Baccalaureate
Music Education	66	Baccalaureate & Graduate
Visual Art Education	86	Baccalaureate & Graduate
Vocational	40	Non-degree
Administrative Principal	128	Graduate
Administrative Superintendent	39	Graduate
Gifted Education Endorsement	12	Graduate
Reading Endorsement	5	Graduate
Career-based Intervention Endorsement	11	Post-Baccalaureate
Prekindergarten Endorsement	2	Post-Baccalaureate
Literacy Specialist Endorsement	7	Post-Baccalaureate
Transition to Work Endorsement	6	Post-Baccalaureate
School Counselor	99	Graduate
School Psychologist	23	Graduate
School Speech-Language Pathologist	57	Graduate

Results

Awareness about the OISM Model among Higher Education Faculty

Based on survey responses, most faculty members (63.41%) reported they were not aware of the OISM model before the presentation. In fact, only about one third (34.15%) of respondents indicated they had heard of the model. Given their lack of familiarity with the model, it is not surprising that a large majority of respondents (82.93%) indicated they currently do not teach the OISM model, as it had been described to them, in any of their classes.

However, when asked if they teach any of the individual components or concepts of the model, and given a list of components to choose from, many faculty members indicated they are teaching several key components of OISM in at least one class. Specifically, 73.17% indicated teaching prevention of learning and behavior problems versus intervention after failure, 90.24% reported teaching both culturally responsive practices and research validated instructional practices, 78.05% indicated they teach data-based decision making, and 65.85% indicated they teach collaborative strategic planning.

Survey results suggest that three concepts of the OISM model are less familiar to the faculty and/or not routinely included in their course content. Those concepts are: a) a core reading and behavior curriculum that reflects high expectations (48.78% not teaching this concept); b) integrated academic and behavior supports across three tiers of intervention (78.05% not teaching this concept); and c) the Principles of Universal Design (51.22% not teaching this concept.)

Faculty Attitudes toward OISM and State Education Initiatives

Since faculty in higher education enjoy great autonomy in developing course goals and content, questions within the survey were designed to gauge participants' attitudes toward this model, given their limited exposure to it, as well as their attitudes toward state education initiatives in general. Participants were asked, based on what they knew of the model, whether they think it would be valuable and important to incorporate OISM into the educator preparation programs at The University of Toledo. Just over half of the respondents (51.10%) indicated it would not; 41.46% indicated it would be valuable to incorporate. Participants were asked to explain their response to this question. While several participants noted value derived from the model's potential to improve student achievement ("represents an effective model to support learning for all"), several indicated they saw little difference between this model and what they were already teaching ("we do this at present"), or had concerns about implementation both within the higher education curriculum ("how would this be delivered instructionally to undergraduate and graduate students?") and in the field ("too top down."). Some participants noted concerns about the models' design, in particular too strong an emphasis on reading at the expense of other disciplines like science and math, and several indicated they had too little information to make a judgment. Several participants requested additional information on OISM and how other universities have integrated the model into their educator preparation programs.

Four items on the survey were designed to gauge faculty attitudes toward education initiatives promoted by state education agencies, specifically in Ohio (See Figure 2). When asked to indicate if they feel compelled to keep abreast of state education initiatives being advanced by the Ohio Department of Education, a large majority (82.93%) agreed or strongly agreed with this statement. A majority (75.59%) indicated they also feel compelled to make students in their classes aware of the education initiatives advanced by the State of Ohio. However, when asked if they feel more committed to the education initiatives being advanced in Ohio than initiatives advanced in other states where their students live or work, only 58.53% of respondents indicated they feel more committed to the Ohio initiatives than initiatives elsewhere. When asked to indicate if they find it easy to keep abreast of education initiatives being advanced

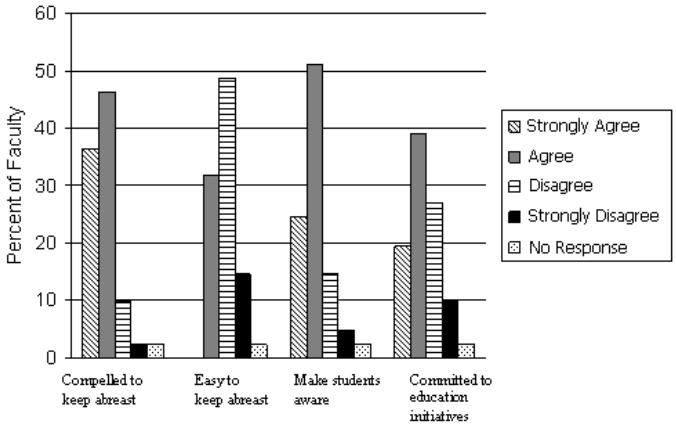

Figure 2. Faculty responses to state department of education initiatives

by the Ohio Department of Education, less than one third (31.71%) indicated they found it easy to keep abreast of state initiatives; 63.41% disagreed or strongly disagreed that it is easy to stay abreast of new initiatives.

Conclusion and Discussion

The goal of OISM is to provide a framework for systems change in Ohio through a comprehensive integrated model focused on student academic and behavior support. The six key components, along with tiers of academic and behavior support are to be implemented in a systematic manner to improve all student outcomes. A fundamental principle for systems change is the involvement of key stakeholders who are informed and understand every step of the change process (Curtis & Stollar, 2002). Clearly in the area of school system change, key stakeholders would include those writing public policy and procedures (i.e., Department of Education), those preparing future educators (i.e., university trainers), and those implementing policies and procedures (i.e., licensed educators). Data from the current faculty survey suggest that to date, teacher educators may be a key stakeholder who have been overlooked and uninvolved. Certain key components of the model are being taught in coursework, perhaps especially those concepts broadly supported in education research literature today. A future question to answer is whether this is sufficient. Are our students able to contribute to school system change in Ohio relative to OISM or is our preparation not comprehensive enough to make a difference?

Data results also indicate openness among faculty to be knowledgeable about the state's education initiatives and the "will" to advance them in their courses, though not to the exclusion of initiatives being advanced in states other than Ohio where their students may live and work. One challenge for state department officials advocating the OISM model may be helping higher education faculty distinguish between what they are already teaching and an emerging initiative like OISM.

If a goal of the State Department of Education is to insure that key stakeholders involved in systems change are aware of K-12 initiatives important to the state, an area of concern raised explicitly by results of this survey is communication between the Department of Education and university faculty who teach in educator-preparation programs. Given the lack of knowledge about this model among higher education faculty suggested by the results, as well as the levels of difficulty faculty acknowledge in keeping abreast of state initiatives, it appears that systems or processes designed to facilitate information-sharing between departments within the Ohio Department of Education and higher education faculty are either faulty or nonexistent. Increasing higher education faculty understanding of state initiatives such as the OISM model will require explicit and effective systems of communication between these autonomous groups that traditionally do not communicate regularly.

In essence, policy makers need a commitment to P-16 (or P-20) systems. Increasingly, more states are establishing councils to address the alignment of early learning, K-12, and postsecondary systems (Dounay, 2008). In Ohio, the Partnership for Continued Learning (PCL) was recently established with a mission of shared education reform that will impact teacher education. Certainly, system change requires new learning for faculty members in colleges of education. As such the PCL recommends that Ohio's "colleges and universities should be directed to extend faculty development programs for those who prepare educators and school leaders, including opportunities for school leaders with expertise in expanded learning approaches to provide technical support for faculty development." (Partnership for Continued Learning, 2008, p. 35)

Through this initial self-study grant funded by the Department of Education it is clear that efforts have begun to create an awareness of the OISM initiative at the teacher preparation level. This descriptive study established baseline data from which to launch important next steps towards systemic change. As efforts to advance OISM in our K-12 system across the state of Ohio continue, stakeholders may want to address several key questions, including: What systems or structures for communication between educational agencies already exist? How effectively are they being utilized to keep educators at all levels informed? How can they be used even more effectively? What new systems or communication structures may be required in order to insure a coherent and united effort to implement state reforms like the one under study? How can key stakeholders work together in coherent and purposeful coordination leading to improved educational outcomes for all students? The researchers view this attempt by the Ohio Department of Education to integrate IHE into the reform processes of K – 12 public schooling as commendable and promising,

perhaps a first step in responding to the important questions raised by this study.

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LGBT Students: What Can Public School Boards, Administrators, and Teachers Do?

Amy L. Freyn, Ed.D.

School can be a hostile and often dangerous environment for lesbian, gay, bisexual, and transgender (LGBT) students. One reason that LGBT students live silent and secretive lives is that to be visible (or to have come out as a gay or lesbian or transgendered teenager) means to place oneself at risk of verbal and/or physical abuse (McFarland and Dupuis, 2001). In February, 2008, 15-year-old Lawrence King, who was often ridiculed and harassed at school because of his perceived sexual orientation and gender expression, was shot and killed in a California middle school computer lab by his 14-year-old classmate. This tragic event captured the attention of many activists across the nation.

School violence against LGBT students is very real. The 2007 National School Climate Survey: Key Findings on the Experiences of Lesbian, Gay Bisexual and Transgender Youth in our Nation's Schools reported nine out of ten (90.2%) LGBT students heard the term "gay" used in a negative way and nearly nine-tenths of LGBT students (86.2%) reported being verbally harassed at school because of their sexual orientation. The study reported almost half (44.1%) of LGBT students reported being physically harassed (e.g., pushed or shoved) at school in the past year because of their sexual orientation. The harassment and/or discrimination of LGBT students is a serious issue and public school officials are being forced to be more proactive in order to create and maintain safe school environments for all students. The liability of school officials for not responding appropriately to claims of harassment can prove very costly. Lawsuit settlements have ranged from $25,000 to over $1 million (Freyn, 2006).

Lessons Learned: Legal Cases

Public schools can play a vital role for LGBT youth by "helping to counteract stubborn societal prejudices and also by reflecting the changes in public opinion about gays that have occurred in recent years" (Baker, 2002, p.14). However, many teachers and administrators fail to deal effectively with harassment of LGBT students and most school districts lack sufficient policies to protect the rights of LGBT students (Sadowski, 2001). Here is a review of some notable legal cases that dealt with these issues:

Nabozny v. Podlesny (1996).

Jamie Nabozny was a student in the Ashland Public School District in Ashland, Wisconsin throughout his middle school and high school years. During these years, Nabozny was continually harassed and physically abused by his classmates because he was homosexual. Nabozny's fellow students called him names, hit him, and spat on him. Nabozny reported the harassment to school administrators but the students' abusive behavior stopped only briefly. Another incident allegedly occurred during science class. Nabozny claimed two boys pushed him to the ground and performed a mock rape while 20 other students watched. When Nabozny escaped and reported the incident to the principal, Mary Podlesny, she said, "boys will be boys" and that he should expect such behavior if he was "going to be so openly gay." Nabozny then left school and ran home. The next day he was forced to speak with a counselor, not because of the mock rape, but because he left

school without permission. No action was taken against the alleged perpetrators involved with the mock rape.

The next year Nabozny was allegedly physically assaulted in a school bathroom. When the principal met with Nabozny's parents, she told them that he should expect such incidents because he is openly gay. The offending boys denied the incident and no actions were taken. The harassment continued and Nabozny attempted suicide. He finished his eighth grade year in a Catholic school but had to return to public school in ninth grade because the Catholic school did not offer classes beyond the eighth grade.

In Ashland High School, Nabozny's harassment and abuse allegedly continued. While using the restroom, he was pushed into a urinal and a student urinated on him. He was sent home to change his clothes. Nabozny's parents continued to meet with school administrators, but no action was taken. Nabozny again attempted suicide.

In the tenth grade Nabozny was allegedly beaten so badly by a group of students that weeks later he collapsed from internal bleeding. Finally, in the 11th grade, Nabozny withdrew from Ashland High School. School administrators told him and his parents they were unwilling to help him and that he should seek educational opportunities elsewhere. Nabozny left Ashland and moved to Minneapolis where he was diagnosed with Post Traumatic Stress Disorder.

On February 6, 1995 Nabozny filed a suit against Mary Podlesny, William Davis, Thomas Blauert, and the school district alleging that the defendants violated his Fourteenth Amendment rights to equal protection and due process. The court dismissed Nabozny's case without a trial, but a 1996 U.S. Court of Appeals held that the school district and the school employees were liable for discrimination against Nabozny. In November, 1996 a jury unanimously awarded Nabozny nearly $1 million in damages.

Nabozny v. Podlesny (1996) represents a groundbreaking case because it was the first time a U.S. court held a public school as well as individual employees monetarily liable under the federal equal protection law for failing to address anti-gay abuse of a student by other students. The school district argued that it was entitled and protected by qualified immunity because the federal and state laws concerning discrimination based on sexual orientation were not clear. However, the Seventh Circuit Court of Appeals found their argument unpersuasive. The court ruled that school officials violated Nabozny's constitutional right to equal protection by failing to protect him. The Nabozny case succeeded in bringing national attention to the harassment and discrimination against LGBT students in public schools.

Vance v. Spencer County (2000).

Alma McGowen enrolled in Spencer County Public School District as a sixth grader in November, 1992. She was taunted about her national origin and sexual orientation by other students. After she complained to a school counselor, the counselor spoke to the children and presentations were given about the acceptance of others. While riding the school bus, a high school student asked Alma to describe oral sex. Alma reported this and the student was expelled from the bus for a few days; however, when the student returned, he continued to curse at Alma and became increasingly more vulgar and verbally abusive.

During the 1993-1994 school year, Alma attended Spencer County High School. While there, she was repeatedly taunted about her perceived sexual orientation, was shoved into walls, and her homework was stolen and destroyed. When she reported these incidents to the assistant principal, he said that the boys considered her cute and that they were flirting, so she should just "be friendly." She was called a "whore" and was grabbed by a male student. The male student took her bag and when she tried to get her pen back from him, he stabbed her in the hand with the pen. She reported the incident to the gym teacher, who sent her to the principal's office. The male student was talked to but received no punishment or consequence.

During Alma's seventh grade year, two boys held her hands while other students started stripping off her shirt. When one boy stated he was going to have sex with her and began to take off his pants, another boy intervened and helped her. Alma did not report the incident but did tell her mother, who hand-delivered a letter about the incident the next day to the school. The teacher spoke to the boys, but it was not known if any disciplinary action was taken. The next year, Alma was touched inappropriately by a male student, who requested sexual favors. The boy, who was the son of a school board member, was spoken to but he said he would do whatever he wanted. The harassment increased to the point where Alma was propositioned or touched inappropriately in almost every class.

Alma's mother filed a complaint under the

school district's sexual harassment policy, but no action was taken. Instead the school took the position that it did not have enough information to investigate the specific allegations. The next school year students continued to ask for sexual favors and touched her and hit her with books. Alma withdrew from school and sued under Title IX and the Kentucky Civil Rights Act claiming that she was discriminated against on the basis of her national origin and her sex. The jury returned a verdict in favor of the plaintiff for $220,000. The court affirmed the verdict on appeal and found that the school district acted with deliberate indifference.

This case illustrates what a school district should not do. If a school district knows the remedial action being taken is inadequate and ineffective, it must take reasonable action in light of the circumstances to eliminate the behavior. If the school district knows that its efforts are ineffective but continues to employ the same methods, the school has failed to act reasonably. In this case, Alma and her mother had alerted the school on numerous occasions about the inappropriate conduct, including physical assaults. The school "spoke" to the offenders, and on at least three separate occasions involving physical assaults, the school's response, although ineffective, remained the same. The evidence confirmed the school's willingness to repeat ineffective measures time and time again.

Dahle v. Titusville Area School District (2002)

Timothy Dahle alleged he was pushed down a set of stairs and subjected to other physical assaults, such as hitting, name-calling, and obscene jokes based on his sexual orientation, while he was a student in the Titusville Area School District. Dahle said the harassment began in 1994, his sixth grade year and continued for five years. He alleged the harassment was so traumatizing that he attempted suicide in 1998. Dahle repeatedly reported the harassment to school officials but nothing was done to stop the other students from tormenting him. School officials said Dahle was belligerent to other students and brought the problems on himself. The plaintiff claimed a violation of his constitutional right to equal protection under the Fourteenth Amendment and Title IX. A settlement was reached in this case in which the Titusville Area School District agreed to pay Timothy Dahle a monetary award of $312,000.

This settlement provides clear lessons to be learned by school districts, administrators, and school staff. First and foremost, school districts, administrators, and teachers take a risk, a risk that can have large monetary implications on their districts, when this kind of harassment goes unchecked. School officials and teachers must be proactive in all situations of harassment and/or discrimination.

Henkle v. Gregory (2002)

Plaintiff Derek Henkle began his freshman year at Galena High School in Reno, Nevada in 1994. In the fall of 1995 Derek appeared on a local access cable channel where he participated in a discussion about gay high school students and their experiences. After the show aired, Derek Henkle alleged he experienced constant harassment, assaults, intimidation, and discrimination by other students. Derek reported the incidents to school officials, but school officials allegedly took no action. Derek claimed school officials told him not to discuss his sexual orientation with others.

In the fall of 1995 several students lassoed Derek around the neck and suggested dragging him behind a truck. Derek escaped from the students and reported the incident. No action was taken against the alleged harassers. Also, during Derek's English class students continuously wrote the word "fag" on the board and drew sexually explicit pictures. The teacher was aware of the harassment and the identity of the harassers, yet took no action to stop the students. At the end of the fall 1995 semester, the plaintiff was asked to transfer to Washoe High School, an alternative high school.

The principal at Washoe allegedly told Derek Henkle to keep quiet about his sexual orientation and told him to "stop acting like a fag." When Derek asked to transfer to a different school because of the lack of educational opportunities at Washoe, the principal allegedly told him that a transfer was not possible because he was openly gay and a traditional high school would not be appropriate. Plaintiff was eventually allowed to transfer to Wooster High School and was once again told to keep his sexuality to himself.

At Wooster the harassment continued. During one incident Derek was punched in the face and called names while the school police watched and did nothing to stop the perpetrators. Derek Henkle was then transferred to an adult education program at Truckee Community College. Derek dropped out of the adult education program at age sixteen because he could not

get a high school diploma there, since it was not a public high school and he was not old enough under Nevada law to take the G.E.D.

With the help of Lambda Legal, the nation's oldest and largest legal organization working for the civil rights of lesbians, gay men, and people with HIV/AIDS, Derek Henkle filed a lawsuit in federal district court against his former principals (Gregory, Floyd, and Robb), a former vice-principal (Hausauer), a former English teacher (Rende), a former district administrator (Ansastasio), the Washoe County School District, and the school police officers. The complaint included claims of violation of Derek's federal constitutional rights to equal protection, Title IX, freedom of speech, and state law claims for negligence, negligent supervision and training, and negligent and intentional infliction of emotional distress. A settlement was reached on August 28, 2002 that included a $451,000 monetary award to Derek Henkle and required eighteen policy changes for the Washoe County School District. Included in these policy changes was new harassment policies that protected persons on the basis of sexual orientation and required staff and student training in this area.

The Derek Henkle case provided many lessons to be learned by school districts, school administrators, and teachers. Harassment and discrimination against LGBT students must be taken seriously and acted upon immediately when reported. Another important lesson involved the freedom of speech. The judge in this case issued a precedent-setting opinion when he denied the Defendants' motion to dismiss Derek Henkle's violation of freedom of speech claim. The court's opinion held that school officials should have known that students have a constitutional right to speak about their sexual orientation and issues related to it in a school setting. If school officials or teachers censor or retaliate against that speech, it is a violation of the First Amendment. Also as a result of Henkle's lawsuit, eighteen important changes were made to policies affecting students, teachers, school officials, and school police in the Washoe County School District. These policy changes could be viewed as a model for schools across the nation.

Flores v. Morgan Hill Unified School District (2003)

Alana Flores endured harassment and death threats at Live Oak High School in Morgan Hill, California because other students believed she was a lesbian. For three years, threatening notes and sexually explicit pictures were taped to her locker. When Alana Flores told a teacher about the notes, the teacher asked her why it would bother her and asked her if she was a lesbian. When Alana went to the principal for help he did nothing to stop the harassment and told her not to bring that kind of trash to him anymore. The harassment continued and during her senior year, Alana tried to kill herself.

Alana Flores informed her parents about the harassment. Nine months after graduation, she decided to file a lawsuit against the Morgan Hill Unified School District for failing to protect her from pervasive and ongoing harassment. The ACLU and National Center for Lesbian Rights (NCLR) represented Alana Flores and five other plaintiffs who joined the case, including one student who had been hospitalized after a group of male students shouted homophobic slurs while hitting and kicking him in full view of the bus driver. All of the plaintiffs endured significant emotional distress related to harassment and violence that occurred on school property. The plaintiff's attorneys were able to document a long history of anti-gay harassment at Live Oak High School. The school district failed to respond appropriately in almost every incident. These failures were alleged to be violations of the Equal Protection Clause of the Fourteenth Amendment.

The Ninth Circuit Court issued a historic decision that held that school officials had failed in their constitutionally mandated duty to treat LGBT students equally and to protect them from harassment. The court ordered the school district to address and eliminate any harassment of LGBT students in the future. The Morgan Hill Unified School District agreed to settle the lawsuit by paying the six students $1,100,000. Additionally, the district agreed to provide training for all administrators, teachers, and students, as well as to revise the existing nondiscrimination policies and student handbooks. The district also agreed to keep written records of any complaints made concerning LGBT harassment or discrimination.

This case established that school officials are not entitled to qualified immunity when they act intentionally to discriminate against a group of students, or when they act with deliberate indifference to the students' valid complaints of harassment. In this case there was sufficient evidence to show that students' complaints of harassment were treated differently than other types of complaints. The school officials' deliberate indifference was clearly established by their un-

reasonable response to the students' continuous harassment.

The students in this case also presented evidence that the school district failed to train administrators, teachers, and students about its own policies prohibiting harassment on the basis of sexual orientation. As early as 1990, the Ninth Circuit Court had established that such conduct violated constitutional rights. The school district had fair warning that it could not give LGBT students less protection on account of their sexual orientation. The decision in this case affirmed that in public schools, all students deserve the same protection from school authorities.

Relevant Laws

As noted in the cited court cases, teachers, administrators, and school boards must be aware of the relevant laws in order to take appropriate steps to abide by their legal responsibilities when it comes to the issues surrounding LGBT students. Besides the Equal Protection Clause of the U.S. Constitution, other potential tools against the abuse of LGBT students are state and local civil rights protections, state tort law, and the federal statute called Title IX (Buckel, 2000). State and local civil rights laws, also known as human rights laws, prohibit anti-gay discrimination and will cover schools if the laws are within their jurisdiction. State tort law can be used in cases where a school principal harms a LGBT student by not adequately addressing harassment and/or violence (Buckel, 2000). Title IX is a federal statute that prohibits sex discrimination in schools. While the guidelines of Title IX do not forbid discrimination on the basis of sexual orientation, they prohibit actions that create a sexually hostile environment (McFarland & Dupuis, 2001).

Even though LGBT students most often face sexual orientation discrimination, they sometimes face sex discrimination. This can occur when school administrators neglect to protect a student because of their sex. For example, if schools subscribe to the notion that a male student is too feminine and should be a "real man" by handling the harassment himself, this is in violation of Title IX because it is sex stereotyping (Buckel, 2000). Understanding the relevant laws, such as the Equal Protection Clause, tort law, and Title IX, is critical in creating safe school climates for LGBT students.

Public School Boards and Administrators

Public schools must create cultures of inclusion to become welcoming places for LGBT students and their families. A good first step is to lay the legal groundwork (Macgillivray, 2004). Baker (2002) wrote, "Probably the single most important thing that school administrators and school boards can do is to review their antidiscrimination policies for both students and personnel to ensure that the policies are inclusive of sexual orientation" (p. 115).

Public schools should adapt and enforce anti-harassment policies. School boards and administrators should define sexual orientation harassment, and inappropriate use of language, with clear explanations of the channels for reporting such behavior, and its consequences (Woog, 1995). Anti-harassment rules must be written carefully, so that they do not forbid speech, opinions, or beliefs in and of themselves, but instead punish impermissible conduct that targets a person for threat, assault, or vandalism on the basis of the victim's actual or perceived race, religion, national origin, disability, gender, or sexual orientation (McFarland and Dupuis, 2001).

School boards and administrators set the overall tone in public schools, and they are extremely influential in determining how accepting a school will be toward its LGBT students. If harassment of LGBT students is tolerated or ignored by school officials, it will filter through all levels. If multicultural education or diversity workshops do not include any mention of sexual orientation, messages of disinterest or denial may be conveyed as well. A school administrator should take the lead in incorporating sensitivity training and education about homophobia for all school personnel. School staff should receive training that includes basic information about homosexuality and the needs of LGBT students, violence prevention strategies, and appropriate responses to expressions of homophobia. It takes practice to address name-calling. Teachers' comfort levels increase when they have the proper sensitivity training in order to create more inclusive environments. Several gay service organizations offer staff development materials and activities. The National Education Association (NEA) also provides workshops, materials, and speakers. A brochure from the American Psychological Association that provides succinct information appropriate for school boards and administrators to begin this process of education is *Just the Facts About Sexual Orientation and Youth* (2008). Another exceptional resource is *The Principal's Perspective: School Safety, Bullying and*

Harassment (2008). This study was conducted by GLSEN (Gay, Lesbian and Straight Education Network) in collaboration with the National Association of Secondary School Principals.

Public School Teachers

Public school teachers must address anti-gay harassment, jokes, graffiti, and vandalism the moment they occur. Teachers must send solid messages that derogatory behavior based on real or perceived sexual orientation is unfair, offensive, and harmful to everyone in a school community. Among other actions that public school teachers can take are the following:

1. *Learn about LGBT history, culture, and current concerns***.** Teachers must be aware of and well-informed about heterosexism and homophobia. Learning about LGBT history, culture, and current issues will give teachers the background knowledge necessary to deal with such issues, as well as be supportive to LGBT students and families.

2. *Change your assumption that everyone is heterosexual unless he or she tells you otherwise.* Teachers must eliminate the heterosexual assumption when talking with students and families. Teachers should use inclusive language, such as "parent" (instead of "mother" or "father") or "date" (instead of "boyfriend" or "girlfriend").

3. *Create an atmosphere where students can feel free to reject sex stereotyped roles***.** Children are given messages at an early age about which activities or professions are considered appropriate for males or females. Teachers must encourage all students to engage in all activities and to purse all academic and career possibilities. Teachers should model expanded sex roles and use gender neutral language. For example, as opposed to using the terms "policeman" or "fireman", teachers can instead say, "police officer" and "firefighter".

4. *Challenge homophobic language.* Teachers should treat insulting or offensive remarks about sexual orientation just as they would for remarks about race, gender, disability, religion, etc. In a straightforward way, tell any student making such comments that such remarks are unacceptable in your classroom and in the school. A common expression by children is "That's so gay." A 2008 campaign by the National Ad Council spotlighted three public service announcements against using the phrase, "That's so gay." These three commercials are appropriate for middle and high school and can be viewed at www.thinkb4youspeak.com.

5. *Be clear about your willingness to support LGBT students***.** Teachers can put up a "Safe-Zone for LGBT People" sticker, a pink triangle decal, or a rainbow flag. Teachers can celebrate Gay Pride Day or the National Day of Silence. These are all messages of acceptance.

6. *Be a role model of acceptance.* Show your students you are accepting of all minorities and that a person's character and behavior are what is important- not color, not gender, not religion, not sexual orientation.

7. *Have bulletin boards that depict the world's diversity, including sexual orientation***.** Teachers can include posters of famous LGBT people.

8. *Incorporate LGBT issues into curriculum***.** Age appropriate curriculum materials should be used. For example, appropriate topics for elementary school children could include treating everyone with kindness and respect and the reality that families come in different forms. In middle and high school teachers can use specific examples of accomplished LGBT writers, actors, athletes, artists, etc. and acknowledge their sexual orientation. Teaching Tolerance, a project of The Southern Poverty Law Center, has numerous resources, lesson plans, and activities centered on LGBT issues (www.tolerance.org).

9. *Include books on homosexuality, both fiction and non-fiction, in the school library***.** Libraries can often be a last resort for distressed or curious young people. Libraries should house comprehensive information on homosexuality.

10. *Support LGBT teachers so they can be visible role models and mentors.* It is usually a tough decision for a teacher to "come out". They often fear the loss of their job or the reactions of students, parents, and the community. When teachers do "come out" they deserve the support and respect from other teachers, staff, and administration. These teachers are taking a number of personal as well as professional risks to be a positive role model for LGBT students.

In addition to the recommendations above, all public school boards, administrators, and teachers must be knowledgeable of their legal responsibilities

to protect LGBT students from harassment and/or discrimination. Educators must strive to ensure that all students have a safe place to learn and believe in themselves. Woog (1995) stated, "it is not a question of whether, why, where, or how to implement these suggestions; it is only a question of when" (p.376). The longer educators wait, "the greater the chance that school will be a lonely, oppressive, hurtful place for one more youngster. That is a wait we simply cannot afford" (p.376).

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Southwest Ohio Science Institutes: A Partnership Model for Professional Development

Jennifer Blue, Ph.D.

Introduction

Most of the K-12 science instruction in the United States is less than exemplary (Weiss *et. al.*, 2003). Teacher preparation programs and educational service centers have been doing their part to improve it, and colleges and universities as well as museums and zoos also run professional development programs for practicing teachers (Astor-Jack *et. al.*, 2007).

As part of the No Child Left Behind Act (ed.gov/nclb), the federal government funds Mathematics and Science Partnerships (MSPs). These partnerships, funded through each state's department of education, are between high-needs K-12 school districts and science, technology, engineering, or mathematics (STEM) professors at colleges and universities (ed.gov/programs/mathsci). Their intent is to improve the content knowledge of K-12 science and mathematics teachers and to improve the performance of students on state science assessments. In what follows, one program will be described in which professors participated in every stage of the program.

SOSI

The Southwest Ohio Science Institutes (SOSI) program provided professional development for teachers of grades three to six in southwest Ohio (units.muohio.edu/sosi/index.html). This partnership ran from June 2006 through July 2009, reaching three cohorts of teachers. Each cohort had a two-week 80-hour course in the first summer (Course 1), continued web-based courses during the school year, and then a one-week 40-hour course in the second summer (Course 2). Each course was offered at three different sites around the region. There were separate courses for teachers in each of the four grades, so during the summers of 2007 and 2008, the two summers with two cohorts going at the same time, there were twenty-four courses offered. 160 teachers took courses during the summer of 2006, 209 took courses during the summer of 2007, and 370 during the summer of 2008 (Kahle & Bautista, 2008). The growing enrollment was a testimony to the excellent word-of-mouth the program got throughout the region.

The summer courses covered grade-specific content addressed by the Ohio Academic Content Standards (Ohio Department of Education, 2003). Course 1 was a full 80 hours long, as it has been shown that professional development must be at least that long to lead to lasting change (Supovitz & Turner, 2000). Of course, not every indicator for each grade could be addressed during this course; the partners from schools and from educational service centers chose the areas in which they had noted the most need. During Course 1, and also during the 40-hour Course 2 that teachers took in their second summer, content in physical, life, and earth and space sciences was presented. As one of the Ohio Academic Content Standards is scientific inquiry, the SOSI courses modeled inquiry-based instruction. Modeling inquiry for pre-service or in-service teachers can lead to lasting changes in the way they instruct their own students and, of course, it is also an excellent way for the teachers to learn the content themselves (McDermott, 1990; Supovitz *et. al.*, 2000). The courses were taught by

master teachers, with professors attending several times during each course to enhance the instruction.

During the school year following Course 1, SOSI participants continued their professional development through *iDiscovery*, which hosts online courses (idiscovery.org). These courses were designed by university employees and instructed by master teachers. During these courses, teachers discussed assigned readings, posted and received feedback on lesson plans, and reflected on their own teaching. They also had access to the "Ask a Scientist" feature, which allowed them to send their (or their students') scientific questions by electronic mail to area professors for rapid expert answers.

For the two summer courses and *iDiscovery*, participating teachers earned up to nine graduate credits from Miami University, which waived tuition and fees for teachers who participated in SOSI.

The Partnership

An extensive partnership planned and ran this professional development program. The partners were:

- Southwest Center for Excellence in Science and Mathematics, which helps to develop partnerships (excellentscimath.org)
- Discovery, which was established through NSF's Statewide Systemic Initiative program to provide professional development in science and mathematics in Ohio (units.muohio.edu/discovery)
- *iDiscovery*, which hosted the online courses
- Cincinnati Public Schools
- Norwood Public Schools
- Hamilton County Educational Services Center
- Clermont County Educational Services Center
- Xavier University, in Cincinnati
- University of Cincinnati – Clermont College, a two-year college
- Miami University College of Arts & Science Miami University Department of Teacher Education

The partnership worked together at all stages of the program, from the grant proposal to the evaluation. Members of the partnership had worked together on several professional development projects in the past. All partners had a chance to learn about each another's situations and to begin to use a common language. For example, the partners developed a common understanding about inquiry and its use in exemplary science teaching.

There were some difficulties of communication, however. The university professors tended to be more idealistic about what can be accomplished, while the representatives of the K-12 schools are more pessimistic (or realistic). For example, the partners often disagreed about the grade level at which the material in the institutes should be presented. The professors wanted to teach at a university level, while the K-12 teachers wanted to practice activities that could be immediately transferred to their own classroom at the third-through-sixth grade level. Each person involved was talking about teaching science in the way that came most naturally, but the different perspectives were sometimes hard to resolve.

Involvement of Professors

Professors from Miami University, Xavier University, and the University of Cincinnati – Clermont College, were involved in SOSI in three main ways. They reviewed the curriculum before it is printed, they assisted in the instruction of the summer institutes, and they participated in the "Ask a Scientist" program during the school year. Each of these three areas of involvement will be described briefly in what follows.

Curriculum Review

As was stated above, partners from schools and from educational service centers (ESCs) chose the content areas for the summer courses. Grade level teams of teachers and ESC employees wrote the curriculum and lesson plans. These lesson plans were then submitted to the project director and principal investigator and sent by them to physics, astronomy, biology, chemistry, and geology professors from three area universities. Recall that during the summers of 2007 and 2008 twenty-four different courses were given; eight different professors were involved in the review of the lessons those years. The professors were paid an hourly rate for their work reviewing the lesson plans.

The only difficulty with this review process is that the grade level teams did not always turn their lesson plans in early enough for a proper review. The teams were writing on their own time while working full-time jobs, and the writing took longer than they thought it would. If the lessons were to be reviewed, the review would have to have been before the notebooks for the participants went to the printer, which

needed to be before the facilitator training, which needed to be before the courses start. This did not always happen. Some lessons were turned in during the last week of the university's semester, when professors did not have time for any extra work, and some were never sent to professors at all.

However, when professors did get to review the lessons, they were very helpful. They tended to start their comments with a compliment about the lesson, but they also gave real criticism. For example, two different physics professors reviewed two lessons involving forces and weight, and both of them criticized the given definitions of weight, force, and gravity. They did make mitigating comments about how difficult these concepts are to understand, and they suggested replacement definitions. Each also suggested improvements to the lessons that were more nuanced than just corrections of errors: rearranging things to make them flow better, adding more examples, and adding some richness to a description of weightlessness.

Are the writing teams unable to get their work done in time to submit it for review, or are they purposely delaying their submissions in order to avoid criticism? The aforementioned philosophical agreement about the ideal difficulty of the summer institutes was probably a factor. This process did go more smoothly by the end of the project. One conjecture is that, as the local teachers and professors got to know one another better, the trust between them increased. Much of this happened during the instruction of the summer courses.

Instruction

Master teachers who have experience teaching grades three to six did the main instruction of the summer courses. As the curriculum was written and the schedule was set, the grade level teams identified times for "experts" to come in to the courses. Most of these experts were STEM professors, and one was a meteorologist from a local television station. Table 1 shows the schedule for the expert visits to Course 1 for the summer of 2008. Recall that each course was taught three times each summer, at different sites around the region. To cover these fourteen visits at three sites each it took twelve experts. Some visited just once, and some made several visits, visiting each course multiple times at each different site. The experts were paid for their time.

Table 1
Expert visits to Course 1, Summer 2008

	Grade 3	Grade 4	Grade 5	Grade 6
Day 1				
Day 2		Weather		Biology
Day 3				
Day 4	Physics	Biology	Physics	
Day 5		Geology	Physics	Biology
Day 6			Biology	Geology
Day 7	Geology	Geology		
Day 8	Geology			
Day 9		Chemistry		
Day 10				

Course 2 was five days long and contains more time for teacher reflection. In addition, a whole day of Course 2 was taken up by field trips, different ones for each grade level. Therefore, there were fewer expert visits to Course 2. In 2008 there were just three scheduled, one each for three of the four grade level courses.

What the experts did during their visits evolved during the first three years of the program. During the first year, most professors came with mini-lectures, some of which were found to be nearly inaccessible to the audience of elementary school teachers. Again, most professors wanted to teach at a university level, while many teachers wanted to be taught an elementary school level. The teachers were also sometimes annoyed by the professors' self-deprecating remarks that certain topics were out of their field. From a professor's point of view, a question about mouse habitats is out of her field if what she studies is the vascular systems of plants. But from an elementary teacher's point of view, both of those topics are life science, and a biology professor should be able to discuss either one.

In other instances, professors arrived in order to find that they were not really needed; the instructor of the course had worried that there would be difficult questions during an activity and wanted a professor in the back of the room just in case they were needed.

By the third year, professors arrived ready to teach their own inquiry-based lessons to the participating teachers. They often came at the end of two or three days' instruction on the same topic, and the teachers (and, in some cases, the facilitators) had saved up questions to ask the professor. While not perfect, most of the expert presentations were well re-

ceived.

Ask a Scientist

The teachers had further access to the experts during the academic year. As they participated in *iDiscovery*, they had the opportunity to send electronic mail to a coordinator who sent the questions to experts. Five experts were kept on alert: a meteorologist, a biology professor, a chemistry professor, a geology professor, and a physics and astronomy professor. The experts were paid a flat fee for the first twenty questions each semester, and would have been paid more if there had been more than twenty questions.

During one school year, there were forty-one questions asked and answered by the experts, as follows:

Ten biology questions
Eight chemistry questions
Six geology questions
Fourteen physics and astronomy questions
Three weather questions

The experts were almost surprisingly quick with their answers; all questions were answered within a week, and most took much less time. Occasionally the exchanges between teachers and professors turned into longer conversations, with clarifying questions from both sides. Teachers asked about the science, and professors asked about the prior knowledge and experiences of the teachers and students. In one case, a fifth-grade teacher started a blog where his students posted questions about space science for a professor to answer.

This program was such a success that it has expanded in two ways. "Ask a Scientist" was made available to K-12 teachers across Ohio who use *iDiscovery*, not only to the SOSI participants, and an "Ask a Mathematician" program was added to *iDiscovery*.

Conclusion

Mathematics and Science Partnerships are meant to be just that, partnerships. Universities and schools, professors and teachers, work together to plan and deliver professional development for in-service teachers. The SOSI partnership offered face-to-face summer courses and continued online courses during the school year to hundreds of teachers in southwest Ohio. Teams of teachers wrote the curriculum for the courses and taught them, but STEM professors helped in several ways. Professors leant their content expertise as they reviewed lesson plans, visited the summer courses, and answered the questions posed on "Ask a Scientist." The program was richer for their participation. Science instruction in the area will be, as well.

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Increasing teacher self-efficacy perceptions and decreasing the achievement gap: Professional development to improve science learning in Catholic elementary

Cynthia Geer, Ed.D. and Julie Morrison

Purpose of the Study

The purpose of the study was to examine the degree to which the Initiative for Catholic Schools (ICS), a professional development program designed to improve the quality of science and mathematics instruction in elementary schools, increases teachers' self-efficacy perceptions and improves students' science and mathematics achievement. The focus of this paper is on the science component of the program.

- What effect did participation the ICS program have on science teachers' self-efficacy perceptions in teaching science compared to their teaching self-efficacy prior to the program?
- What effect did the ICS program have on students' science achievement as measured by standards-based science tests?

Theoretical Framework

The theoretical foundation of self-efficacy beliefs is found in social cognitive theory (Bandura, 1977, 1997). Self-efficacy is defined as a belief in one's own abilities to perform an action or activity necessary to achieve a goal or task (Bandura, 1997). Beliefs about one's own abilities to accomplish specific tasks are powerful predictors of behavior (Usher & Pajares, 2008, 2009). Self-efficacy beliefs influence choices, effort, and persistence in the face of adversity (Pajares, 1997).

Studies indicate that professional development can increase teachers' self efficacy in the teaching and learning process. Teachers who participated in professional development have increased self-efficacy perceptions in teaching science (Carleton, Fitch, & Krockover, 2008; Duran & Duran, 2005) and in using technology (Overbaugh & Lu, 2008; Wu, Chang, & Guo, 2008). Furthermore, teacher self-efficacy beliefs have been linked to teachers' responsibility for student achievement (Guskey, 1982, 1988) and greater persistence in working with struggling students (Gibson & Dembo, 1984). It is also predictive to a willingness to implement innovative teaching strategies and improve methods of instruction (Allinder, 1994; Guskey, 1984, 1988; Odon, Stoddard, & LaNasa, 2007; Smylie, 1988; Stein & Wang, 1988). A teacher's self-efficacy perceptions have been found to play a critical role in their ability to impact student achievement (Ashton, 1985; Ashton & Webb, 1986) and were predictive of achievement on the Iowa Test of Basic Skills (Moore & Esselman, 1992 as cited in Henson, 2001).

Method

Seventy-seven Catholic elementary schools located in a Midwestern city were invited to submit a proposal for participation in the Initiative for Catholic Schools (ICS) Program. Of these potential participants, 21 Catholic elementary schools submitted a proposal and were then selected for participation. A team from each school consisted of at least one mathematics teacher, science teacher, and the school principal. The participating schools were diverse in socio-economic status, ethnic backgrounds, and location. All funding for ICS was granted by a private foundation, the Buenger Foundation, in collaboration with a Catholic university

in the area. The science educators are the focus of this study.

Participants and Program Description

Twenty-four science teachers began in the ICS Program. Among these teachers there were 23 females and 1 male. The prior teaching experience of the science teachers ranged from 0-39 years, with an average of 14 years of teaching experience (an average of 9 years teaching science). Due to attrition, there were 18 science teachers, 17 females and 1 male, participating in the ICS Program at end of the second year.

The science program included monthly workshops for two years and two two-week summer sessions. An assessment was conducted to tailor the focus of the activities to the teacher participants' needs. The monthly workshops examined topics which included constructivist learning theory, the learning cycle, science national, state, and district standards, pedagogical practices such as assessment, inquiry-based instructional techniques, and the use of technology to enhance science instruction. The focus of the summer sessions was content, although effective teaching strategies were modeled and discussed. In the summer of Year 1, life science topics were addressed and in the summer of Year 2, physical science concepts were taught. The summer courses were team taught by a science teacher educator and faculty from the College of Arts and Sciences.

Design and Procedures

The study used descriptive research methods to describe quantitative outcomes of the ICS Program. Pre-experimental within-subjects designs were used to examine changes in mean ratings of teacher self-efficacy and mean gains in student achievement over the course of the ICS Program. Changes in teacher self -efficacy ratings were measured across a 10-month period of time from the beginning of the ICS Program to mid-way through the program. To determine the gains in teachers' science content knowledge, a pre-test/posttest design was utilized. The content tests were administered at the beginning and end of each summer course.

A pre-test post-test comparison group quasi-experimental design was used to examine the gains in student science achievement relative to those of a comparison group. Student achievement tests in science were administered in October (pre-test) and again in April (post-test) of the same academic year to students in the ICS schools at the grade levels taught by ICS teacher participants. These same tests were administered in the same timeframe to students in five Catholic elementary schools from the same school system. The comparison schools were selected on the basis that they featured a range of socioeconomic diversity among the student population that was comparable to that of the ICS schools.

Measures and Analyses

Science Teaching Efficacy Beliefs Instrument (STEBI). The STEBI, developed by Enochs and Riggs (1990), was used to measure the teachers' judgment of their self-efficacy in teaching science. This instrument measures two aspects of science teacher efficacy, the personal science teaching efficacy (PSTE) and the science teaching outcome expectancy (STOE). The PSTE subscale consisted of 13 items and the STOE subscale was comprised of 10 items. The STEBI was structured using a 5-point Likert rating scale, where 5="Strongly Agree," 4= "Agree," 3= "Uncertain," 2= "Disagree," and 1= "Strongly Disagree." An analysis of the internal consistency of the STEBI provides support for the basic integrity of the two subscales and the overall reliability of the instrument (Bleicher, 2004).

Changes in teachers' self-efficacy perceptions were analyzed by comparing the teachers' self-ratings at the beginning of the ICS Program with the teachers' self-ratings mid-way through the ICS Program (10 months later). Paired-sample *t*-tests were conducted to determine the degree to which the changes in the mean self-ratings were statistically significant. Effect sizes were calculated to determine the strength of the mean change.

Teacher Content and Pedagogical Knowledge

Changes in teachers' science content knowledge were determined by comparing the pre-test scores on a life science and physical science exam to the post-test scores after completing the summer courses. The mean changes in performance, as given by the difference in the percentage correct from the pre-test to the posttest, were calculated. To evaluate gains in pedagogical knowledge, teachers planned and developed lesson plans and units throughout the two year professional development program. The lessons and units were evaluated based on a rubric that incorporated critical components of effective science teaching (see Table 1).

Table 1

Science Unit Rubric

ICS Unit Rubric

Topic	Unsatisfactory	Satisfactory	Excellent	Points
Instructional Goals	Instructional goals and objectives are vague and not well-developed. Goals and/or objectives fall short of meeting learner needs. (0pts)	Instructional goals and objectives are stated, but not thoroughly developed. Some goals/objectives may not address the needs of the intended learners. (1 pt)	Instructional goals and objects are clearly stated. Goals and objectives are age/grade, discipline appropriate. (2pts)	
Pacing/Flow	Sequencing is confusing or missing. Pacing is awkward. Does not address concerns for transition from simple to complex concepts or provide for transfer of learning. (0 pts)	Sequencing is logical, but sometimes mechanical. Pacing is fairly well-controlled. Transition through concepts and transfer of learning may not be clear. (1 pt)	Sequencing of the lessons is logical and effective. Pacing is controlled. The sequence allows for transition and transfer. (2 pts)	
Standards	Relationship to curricular focus is unclear. (0 pt)	Some connection to curricular standards is mentioned. (1 pt)	A strong connection to the curriculum is evident. (2 pts)	
Grade/Age Fit	Lessons do not address the developmental stage of the learner. (0 pts)	Some aspects may be inappropriate for the age or grade level. (1 pt)	The materials, activities, implementation is developmentally appropriate. (2 pts)	
Teaching Strategies I	Most lessons are traditional. Strategies are mundane, routine. (0 pts)	Some use of the learning cycle approach. (5 pts.)	Learning cycle is utilized and supports the objectives. Concrete activities utilized. (10 pts)	
Teaching Strategies II	No correlation between strategies/activities and learning outcomes/objectives. (0 pts.)	Instructional strategies/ activities support learning outcomes/objectives. (2 pts)	A variety of instructional strategies/ activities support learning outcomes/ objectives. (4 pts.)	
Use of Hands-on/ Concrete Activities	Little or no interactive activities are present. Activities do not engage the learner. (0 pts)	Some interactive activities are present. Some activities may place the learner in a passive role. (5 pts.)	Most of the activities are interactive. Activities engage the students. (10 pts.)	

Table 1 (Continued)

Science Unit Rubric

Topic	Unsatisfactory	Satisfactory	Excellent	Points
Student Thinking/ Real life Connections	Completion of lesson/unit requires students to regurgitate or copy information from one place to another; no higher order thinking skills required. Little or no real life connections. (0 pts)	Completion of lesson/unit requires students to think a little about what they are doing, but does not focus on higher-order thinking skills. Limited real life connections. (2 pts)	Completion of lesson/unit requires students to synthesize information from a variety of sources or think creatively about how to apply information to a local situation. (4 pts)	
Questions	No questions asked or most questions are closed ended. (0 pts)	Some questions asked are divergent questions. (5 pts)	Most questions asked are higher-level, divergent questions. Questions are used to facilitate student understanding. (10 pts)	
Science Content	Science content presented is not current or accurate. (0 pts)	Some science content presented is inaccurate. (2 pts)	The science content presented is accurate and current. (4 pts)	
Materials	Materials are missing. (0 pts)	Materials list incomplete or not clearly explained. (1 pt)	Materials list provided and use of materials is clearly explained. (2 pts)	
Assessment and Evaluation I	Activities do not engage the learner in the assessment process. Little or not authentic/alternative assessments utilized.(0 pts)	Some assessment activities may place the learner in a passive role. Some authentic/alternative assessments utilized. (2 pts)	Students are actively engaged in the assessment process. Authentic/ alternative assessments utilized. (4 pts)	
Assessment and Evaluation II	A plan for assessment does not respond to the stated goals and objectives. The plan for assessment is not communicated. (0 pts)	The plan for assessment addresses some of the goals and objectives. The plan for assessment is not completely communicated. (2 pts)	A plan for assessment is congruent with the goals and objectives. The plan for assessment is clearly communicated. (4 pts)	
Communication of Unit/Lesson	Method for facilitation is unclear. Description is unclear and difficult to follow. (0 pts)	Method for facilitation is stated. Description is fairly clear but not complete. (5 pts)	Methods for facilitation are clear and usable by others. Description is sufficiently clear to enable another teacher to teach the lesson. (10 pts)	
Citations/Creativity	Resources are missing or inadequate for the task. No citations given. Little originality. (0 pts)	Some resources are included. The content shows some evidence of originality. (2 pts)	Adequate and appropriate resources are identified. Citations provided where appropriate. Original and fresh ideas. (4 pts)	
Mechanics	Content has many misspellings and/or grammatical errors. (0 pts)	Content has few misspellings or grammatical errors. (2 pts)	Content has no misspellings or grammatical errors. (4 pts)	

ICS Standards-Based Tests of Student Achievement in Science. University faculty members with expertise in science education developed the Standards-Based Tests of Achievement in Science. Test items were sampled from items on the Ohio Proficiency Test at Grades 4 and 6 from the Ohio Achievement Test for Grade 8. All test content is available to the public online at the Ohio Department of Education website. Questions were chosen based on the content addressed in the ICS Program and on science content identified in the Archdiocese courses of study.

It should be noted that the teachers learned the same concepts albeit at the collegiate level during the summer sessions. In this way, there were links connecting teachers' content knowledge, the Archdiocese courses of study, and the students' experiences in the classroom. The teachers who participated in the ICS Program administered the Standards-Based Test of Achievement in Science (Grades 4-6) to their students in October and again in April of the same academic year.

Results

Teacher Outcomes Data.

According to the course evaluation data gathered from the teachers, all but one of the teacher participants responded that the ICS course met or exceeded their expectations. Their qualitative comments indicated that they valued being able to visualize science concepts in a conceptual manner. All of the science teachers judged the content and pedagogy emphasized in the ICS course as being beneficial. The qualitative comments centered around deepening the conceptual knowledge of concepts, connecting the concepts to appropriate hands-on materials, and acquiring many activities they could use in the classroom. Likewise, when asked which components of the ICS course were the most beneficial, teachers responded that they valued the materials, handouts, and activities they could use in the classroom.

In science, seventeen of the participants received an "A" and one participant received a "B" for both the ICS life and the physical science courses. Included in the course grades were the teachers' scores on the pre/post test on content knowledge, and the scores on the lesson plans and science units. The mean change in performance, as given by the difference in the percentage correct from the pre-to the post-test of the Teachers' Content Knowledge, was as follows: Life Sciences I (+39 percentage points, Life Sciences II (+14.2 percentage points), Physical Sciences I (+25 percentage points), and Physical Sciences II (+23.8 percentage points. The change in percentage correct from pre-test to posttest was statistically significant at the .05 level for all of the gain scores listed above.

Teachers' Self-Efficacy Outcomes.

The results of this investigation indicate that science teachers participating in the ICS Program demonstrated increases in their teaching self-efficacy perceptions during the course of their participation in the ICS Program. Science teachers' ratings increased overall from a mean of 88.53 (SD=9.52) to 98.53 (SD=7.21). This increase in science teachers' self-reported self-efficacy was statistically significant (t=-4.79, 14, p=0.00) and represented a strong effect (ES=1.05). See Table 2 below.

Table 2

Change in Science Teachers' Self-Efficacy (Prior to ICS vs. Mid-ICS)

		Pre-ICS Mean (SD)	Mid-ICS Mean (SD)	Effect Size	Statistical Significance
1.	When a student does better than usual in science, it is often because the teacher exerted a little extra effort.	3.67 (0.59)	3.94 (0.80)	0.45	
2.	I am continually finding better ways to teach science.	4.50 (0.51)	4.75 (0.44)	0.49	
3.	Even when I try very hard, I don't teach science as well as I do most subjects.	2.50 (1.10)	1.95 (0.89)	-0.50	*
4.	When the science grades of students improve, it is most often due to their teacher having found a more effective teaching approach.	3.65 (0.59)	4.05 (0.61)	0.68	*
5.	I know the steps necessary to teach science concepts effectively.	3.37 (0.96)	4.26 (0.56)	0.93	**

Table 2 (Continued)

Change in Science Teachers' Self-Efficacy (Prior to ICS vs. Mid-ICS)

6.	I am not very effective in monitoring science experiments.	2.60 (1.00)	2.45 (1.05)	-0.15	
7.	If students are underachieving in science, it is most likely due to ineffective science teaching.	2.90 (0.91)	2.95 (0.89)	0.05	
8.	I generally teach science ineffectively.	2.00 (0.92)	1.75 (0.79)	-0.27	
9.	The inadequacy of a student's science background can be overcome by good teaching.	3.70 (0.57)	3.90 (0.64)	0.35	
10.	The low science achievement of some students cannot generally be blamed on their teachers.	3.60 (0.75)	3.50 (0.83)	-0.13	
11.	When a low achieving child progresses in science, it is usually due to extra attention given by the teacher.	3.50 (0.69)	3.80 (0.62)	0.44	
12.	I understand science concepts well enough to be effective in teaching elementary science.	3.45 (1.23)	4.15 (0.81)	0.57	*
13.	Increased effort in science teaching produces little change in some students' science achievement.	2.85 (1.04)	2.20 (0.89)	-0.63	
14.	The teacher is generally responsible for the achievement of students in science.	3.37 (0.83)	3.58 (0.96)	0.25	
15.	Students' achievement in science is directly related to their teacher's effectiveness in science teaching.	3.22 (0.73)	3.61 (0.85)	0.53	
16.	If parents comment that their child is showing more interest in science at school, it is probably due to the performance of the child's teacher.	3.89 (0.57)	4.11 (0.74)	0.39	
17.	I find it difficult to explain to students why science experiments work.	2.44 (0.92)	2.00 (0.69)	-0.48	
18.	I am typically able to answer students' science questions.	3.50 (1.04)	4.17 (0.51)	0.64	**
19.	I wonder if I have the necessary skills to teach science.	2.37 (1.01)	1.95 (0.85)	-0.42	
20.	Effectiveness in science teaching has little influence on the achievement of students with low motivation.	2.32 (0.67)	2.16 (0.50)	-0.24	
21.	Given a choice, I would not invite the principal to evaluate my science teaching.	1.94 (1.06)	1.83 (0.99)	-0.10	
22.	When a student has difficulty understanding a science concept, I am usually at a loss as to how to help the student understand it better.	2.11 (0.81)	1.79 (0.63)	-0.40	
23.	When teaching science, I usually welcome student questions.	4.58 (0.51)	4.47 (0.51)	-0.22	
24.	I don't know what to do to turn students on to science.	2.11 (1.05)	1.68 (0.48)	-0.41	
25.	Even teachers with good science teaching abilities cannot help some kids learn science.	2.74 (1.15)	2.68 (1.11)	-0.05	

* Statistically significant at the 0.05 level

** Statistically significant at the 0.01 level

Student Science Achievement Outcomes

During the second year of program participation, students taught by an ICS teacher demonstrated gains in science achievement that were statistically significantly greater than those of the students in the comparison schools in life science at Grade 5 (t=5.570, 325, p=0.00) and Grade 6 (t=2.57, 306, p=0.01). Students in the Comparison School outperformed ICS students at Grade 4 (See Table 3).

Table 3

Results of the Standards-based Science Test in Life Science

	Number of Students	October 2005 Mean (SD)	May 2006 Mean (SD)	Statistical Significance
Grade 4				
ICS Students	64	56.9% (20.15)	66.3% (15.38)	+9.4
Comparison	107	46.5% (16.44)	64.7% (16.50)	+18.2*
Grade 5				
ICS Students	229	49.2% (16.46)	60.3% (16.82)	+11.1*
Comparison	98	63.3% (16.67)	61.8% (15.36)	-1.4
Grade 6				
ICS Students	197	48.6% (18.04)	61.5% (19.71)	+12.9*
Comparison	111	56.2% (22.36)	63.0% (22.51)	+6.8

Students in urban, low socioeconomic schools made greater gains overall than their peers in higher socioeconomic schools. (See Table 4).

Table 4

Percentage Correct on the Standards-Based Science Tests (Grades 4-6) by School Achievement Level, October to April

	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change in Performance
Grade 4			
Low Achieving (1 School, N=10)	37.0% (14.71)	61.0% (17.27)	+24.0%
Middle Achieving (2 Schools, N=39)	47.2% (18.83)	62.1% (15.20)	+14.9%
High Achieving (2 Schools, N=76)	59.2% (23.29)	69.1% (13.31)	+9.9%
Grade 5			
Low Achieving (3 Schools, N=64)	43.0% (14.11)	66.3% (18.81)	+23.3%
Middle Achieving (5 Schools, N=138)	49.1% (16.46)	64.2% (18.16)	+15.1%
High Achieving (3 Schools, N=137)	59.4% (16.06)	69.7% (16.84)	+10.3%
Grade 6			
Low Achieving (2 Schools, N=111)	34.6% (17.78)	57.2% (20.28)	+22.6%
Middle Achieving (2 Schools, N=96)	44.9% (18.06)	63.0% (18.01)	+18.1%
High Achieving (4 Schools, N=247)	44.8% (17.87)	62.0% (20.30)	+17.2%

Limitations

In this study, there are several limitations inherent that warrant attention in interpreting the results. First the participants in the program were self-selected and may not be representative of all teachers within the area (selection bias). The second limitation is the small sample size in terms of the number of participants and the impact any one participant could have on a given outcome. A third limitation is the reliance on outcome measures that are based on self-report to gather data on teachers' self efficacy. The final limitation is the absence of a randomized controlled trial to compare outcomes for the program participants with those of a control group. In the absence of a randomized controlled trail, causation cannot be established.

Discussion

As outlined by Bransford, Brown, and Cocking (2002) and Darling-Hammond and Baratz-Snowden (2007), teachers who know their subject matter, learning theory, and teaching strategies to meet the diverse learning needs of students are the most prepared to meet the demands of today's classrooms. In the National Commission on Teaching and America's Future (2003) and the Department of Education (2002) reports, teachers can acquire the critical knowledge of the teaching and learning process through several means: effective teacher education programs, induction, and professional development. The answers to the questions raised in this study are imperative to teacher educators and professional development leaders to confirm that their work with teachers has an impact on student achievement. After participating in the science professional development program outlined here, teachers were more knowledgeable in science, used constructivist-based approaches, and felt more effective in teaching these subjects. Odon, Stoddard, and LaNasa (2007) study lends further support that these types of teaching practices affect student achievement positively. The determination of effect size of the teachers' self-efficacy lends further support that the professional development program impacted the teachers' perceptions positively. The effect size provides more evidence that the ICS program greatly enhanced the self-efficacy beliefs of the teachers.

Furthermore, this study indicates that the students with the most needs, primarily urban, low socio-economic schools, are affected the most by their teachers who participate in professional development programs. The potential that the professional development has on the students from high needs schools can not be overlooked. These are the students who typically drop out or do not pursue science careers.

The findings indicate that professional development can have a positive impact on teacher efficacy beliefs and student achievement in science. Professional development and teacher education programs are continually striving to develop highly qualified teachers that will assure a valuable education for all students regardless of race, gender or socio-economic status. Studies have identified the teacher as the primary school-based determinant in student achievement, (Goldhaber & Brewer, 1996; Hanushek, 1996; Sanders & Rivers, 1996). Furthermore, research shows that teachers who have positive self-efficacy perceptions impact student achievement (Ashton & Webb, 1986; Anderson, Greene, & Loewen, 1988; Goddard, Hoy, Woolfolk, & Hoy, 2000; Guskey, 1982, 1988; Watson, 2006). This study provides additional support for the connection between teacher self-efficacy perceptions and student achievement. It is imperative for science leaders to confirm that their work with teachers has a positive impact on students. If monies and time are invested in professional development by federal, state, and local agencies, it is reassuring that the money is well spent and will improve student achievement in science.

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Book Review: Tough Liberal: Albert Shanker and the Battles over Schools, Unions, Race and Democracy by Richard Kahlenberg, Columbia University Press, New York, 2007.

Terry C. Miller, Ed.D., NCSP

There are two instances in which Richard Kahlenberg recounts a scene from the 1973 Woody Allen film *Sleeper* in his sprawling account of the life of Albert Shanker, the founder of the American Federation of Teachers and, according to many, the singular most important influence on American education in the latter half of the twentieth century. The scene has Allen's character in the movie waking up 200 years in the future to learn that civilization as we knew it was destroyed when "a man by the name of Albert Shanker got hold of a nuclear warhead" (p. 1). Such was Shanker's reputation at the time that he was reviled by many on the left end of the political spectrum who might normally have been expected to support his efforts to secure collective bargaining rights for teachers and other school workers. But, such was also the controversy that Shanker, a self-described "tough liberal," engendered among people from both ends of the political spectrum and at every point in between.

It is obvious that Kahlenberg has developed an enormous respect for the life and work of Shanker, carefully documenting his beginnings as a doctoral student in philosophy at Columbia University and his early experience as a public school teacher at P.S. 179 in New York City, to his rise as a union leader and educational reformer who advised presidents (most notably Bill Clinton) and other political leaders. He does a masterful job of both explaining and then marveling at the consistently democratic vision that Shanker had for both education and American society. While Shanker may be best known for his leadership of the American Federation of teachers, many may not be familiar with positions he took on critical educational issues that continue to be debated now – charter schools, standards-based education, and how best to accomplish educational reform. A strong believer in the labor movement and the need for collective bargaining rights, Shanker was also a fervent anti-communist who clearly understood that genuine workers' rights did not exist in so-called workers' paradises such as Cuba, the former Soviet Union, and China.

The heart of Shanker's tough liberalism, however, was his devotion to the color-blind ideals of full integration and equal access to educational opportunity. Refusing to be part of a trend he saw developing in the U.S. and more specifically within the Democratic Party, he never gave up on the dream of total integration of American society. His devotion to that ideal explains his refusal to support race-based affirmative action policies and identity politics in the guise of civil rights or community control. His stand in that regard prompted his activism in the late 60's on behalf of white teachers who were to be fired from their positions in the Ocean Hill-Brownsville schools, a largely African American district. When a newly appointed administrator sought to dismiss white, primarily Jewish teachers, without cause, Shanker led the teachers in a series of strikes that lasted two months. While incurring the wrath of the black activists and many white liberals, Shanker's stand on this issue drew the support of civil rights leaders and labor activists such as Bayard Rustin. They understood that allowing educational policy decisions to be made on the basis of race meant the end of the integrationist vision that Martin Luther King fought so hard for and the beginning of the bal-

kanization of American democracy. Shanker felt that the embrace of identity politics – whether it be feminist, black, Latino, or gay and lesbian – undercut a vision of American progressivism built on a foundation of issues related to class and workers' rights. The loss of presidential elections by the Democratic Party in 1980, '84, '88, 2000 and 2004 may have proved his point.

Albert Shanker professed to bridge the liberal-conservative divide in taking the positions he did on both domestic and foreign policy issues – strong advocacy for collective bargaining rights, strong on national defense, and vehemently anti-communist. While one could debate whether or not workers' rights or American democracy were served by the Vietnam war or by the support for the Contras in Nicaragua in the early 80's, Shanker's support for those interventions underscored his opposition to totalitarianism in any form and his support for workers' ability to form free and independent unions. His attempt to bridge the liberal-conservative divide extended to education as well. He took positions on standards and accountability that underscored his differences with the leadership of the historically dominant National Education Association (NEA). Shanker's support of peer mentoring and review was a serious response to the charge made against teachers' union that they made it impossible for schools to get rid of incompetent teachers and served only the interests of their own members. Similarly, Shanker consistently supported the move to create rigorous academic standards in the form of a national curriculum, often over the loud protests of union members, school administrators, and right wing critics of the public schools. He adopted positions on curriculum similar to those of E.D. Hirsch who argued that academic content should form the core of the educational enterprise and is the only way we can hope to achieve educational parity in a society as diverse as our own.

While Shanker supported many decisions that one would normally associate with more conservative critics of public education, his view of teachers as competent professionals who should be the center of education reform efforts is illustrated by his unexpected support for the concept of charter schools. These were not, however, to be the current version of charter schools in the form of underachieving, unaccountable "private" schools that divert funds away from cash strapped urban districts. Rather, Shanker envisioned educational experiments in the form of charter schools within public school districts, created and staffed by public school teachers themselves. His belief that teachers were in the best position to understand what reforms were needed in order to maximize achievement for all students never wavered. Similarly, while he professed a strong belief in rigorous standards and accountability measures, Shanker remained skeptical about the use of single measures of success in the form of high stakes standardized tests, and the belief that these alone could form the basis for comprehensive educational reform. Ultimately, Shanker was a strong proponent of the professional identity of public school teachers, as creators and shapers of public policy. This may appear to be contradictory, given his firm belief in the need for unionization of the profession; but Shanker was also well aware of the political dimensions of work and professional life, and sought a measure of power that other professionals, e.g., doctors and lawyers, bring to bear on the political debate in this country. As such, the moniker "tough liberal" is one that perfectly describes his unapologetic approach to his efforts to organize and promote the teaching profession.

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Innovations in Teacher Education
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Manuscripts, editorial correspondence, and questions can be directed to Gayle Trollinger, Ph.D., The Ohio Journal of Teacher Education, Bluffton University, 1 University Drive, Bluffton, OH 45817, (419) 358-3341, trollingerg@bluffton.edu.