A Look at the Condition of Rural Education Research: Setting a Direction for Future Research

Michael L. Arnold, John H. Newman, Barbara B. Gaddy, and Ceri B. Dean
Mid-continent Research for Education and Learning

The authors searched the ERIC and PsycINFO databases for K-12 rural education research studies conducted in the United States and published in journal articles between 1991 and summer 2003. This search was conducted in order to identify topics that appear in the rural education research literature and determine the quality of this research. Only 21% of studies in this database met the requirement of employing a "comparative" (broadly defined) research design to investigate a rural education problem. These articles were then reviewed using quality-of-research criteria developed by McREL. No truly experimental studies were found in this review. The strongest studies identified were quasi-experimental and causal-comparative research designs. Of the 106 articles that used some kind of comparative research design, only 10 were rated as higher-quality research, and only 48 were considered to be of medium quality. Forty-eight studies were rated as lower quality. The authors conclude with a proposed research agenda.

Introduction

Like all schools, rural schools face many pressures. Increasingly diverse student backgrounds, learning styles, and needs; new federal and state accountability requirements; and debates about the allocation and availability of education funding are challenges in every U.S. community. But rural schools face a unique set of challenges, largely due to their geographic isolation. Although some rural schools have successfully met these challenges, many still struggle. The need to attract and retain highly qualified teachers, for example, is especially pronounced in rural schools. Given the demonstrated link between teacher quality and student achievement, the need for evidence-based guidance concerning teacher recruitment, preparation, and professional development is even more paramount for superintendents and principals in rural communities. Rural school leaders also are eager for information about research-based interventions and strategies that enhance student success in rural communities.

Identifying such interventions is difficult, however, due to a lack of high-quality research conducted in rural settings. Relatively few scholars are studying rural education issues, and almost no funding is available to conduct education research in specifically rural contexts (Sherwood, 2000). Randomized field trials are rarely, if ever, completed in rural settings, and methodological limitations are common throughout the rural literature. Khattri, Riley, and Kane (1997) argue that rural education research often lacks adequate controls or comparison groups—a point that will become apparent in this report. Fan and Chen (1999) contend that this problem contributes to inconsistencies among findings from rural education studies.

A substantial proportion of rural education research is driven by a belief that there is a quality inherent in rural communities and schools that should be preserved (Khattri et al., 1997). This viewpoint is evident in all aspects of the research process, from the selection of the research questions, to the methods employed and the interpretations made. While this belief may be valid, it has not been substantiated by rigorous research. Such research would identify which of these characteristics can sustain meaningful reforms. Additionally, Arnold (2003) argues that this perspective can draw attention and resources away from issues of critical importance to rural schools. Without a research base to build upon, these beliefs do not represent an efficient approach to identifying proven strategies for addressing unique rural issues.

Further obscuring our understanding of rural school improvement are the multiple definitions of "rural" used in rural education research. The number of students who attend rural schools, depending on the definition one uses, can range from 1.1 million to 11.6 million.[1] The lack of a common, consistent, and explicit definition of "rural" makes it difficult, if not impossible, to compare results among the studies conducted on any particular rural issue.

The apparent lack of high-quality rural research, limited funding for rural education research, and inconsistent definitions of "rural" have led many to conclude that rural education research is limited and of poor quality, but to date no systematic investigation has been conducted to support such an assertion. The purpose of this report is to describe the results of a literature study conducted by Mid-continent Research for Education and Learning (McREL) on the condition of rural education research and to lay out a research agenda for future studies regarding rural education. McREL's study centered around the following questions:

1. What topics appear in the rural education research literature?

2. What is the quality of the rural education research?

The balance of this report is divided into three sections. In the first section, we identify the topics that appear in the rural education literature and discuss the relative frequency with which they appear. In the second section, we address the second question regarding the quality of the rural education research. The third section presents a summary of the condition of rural education. Finally, we present a research agenda that investigates ways to address apparent gaps in the rural education knowledge base and overcome key obstacles to improving rural schools.

Topics Appearing in the Rural Education Literature

Identifying the topics found in the rural education literature required a systematic approach to sorting through the relevant literature. A considerable amount of literature is published each year that purports to be rural education research, yet some of it is related only peripherally to rural education. Carefully sifting through these publications is necessary in order to provide a valid snapshot of the topics found in rural education studies. This section begins with a description of the abstract search and review process used by McREL, which is followed by a discussion of the topics that emerged from this process.

To identify the topics that have received attention in the rural education research literature, a comprehensive abstract search and review process was conducted by McREL staff members. The abstracts were identified through a search

of the Educational Resources Information Center (ERIC) and PsycINFO databases for K-12 rural education research studies conducted in the United States and published in journal articles between 1991 and summer 2003.[2] This search resulted in a preliminary database of 716 abstracts. Following a cursory review of the abstracts, 136 were deleted from the database because they were miscoded; that is, they were not about K-12 education or concerned studies not conducted in the United States. This process resulted in 580 abstracts—401 from ERIC and 179 from PsycINFO.

Two McREL staff members separately reviewed all of the abstracts and coded each one according to the primary topic of the abstract. This closer review resulted in the identification and subsequent elimination of an additional 66 abstracts that did not fall within the study's parameters (e.g., they were not published in journal articles or were not about K-12 education) and 16 abstracts that were duplicated between the ERIC and PsycINFO searches. The resulting 498 abstracts were coded according to the focus or primary topic of each abstract. This coding process initially resulted in 108 topics, 50% of which were associated with only one or two abstracts. A second review was conducted to merge similar topics and refine the topic labels. Table 1 presents data on the number of abstracts coded for each of the resulting 40 topics.

As a result of this review process, it became clear that there are at least two ways in which research is conducted in rural school settings. First, there is research that is conducted to specifically study rural education issues. For example, Howley, Howley, and Larson (1999) examined how rural principals differ from their suburban counterparts in their approaches to planning. This study was specifically aimed at understanding a rural education issue (i.e., how rurality influences principal behavior). We refer to studies such as this as "Rural Specific."

A second type of rural education research encompasses studies conducted in a rural context; in these studies, there was no apparent intent to investigate a rural education issue or explain how rurality influences some aspect of schooling; these types of studies occurred only incidentally in rural contexts. For example, a study of classroom discourse during science lessons on topics both familiar and unfamiliar to the teacher (Carlsen, 1997) could have been conducted

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[1]See Appendix A for a description of the three most common classification schemes for rural schools and districts and data on the number of rural school districts and students by classification definition.

[2]The year 1991 was chosen as the base year due to the publication that year of the U.S. Department of Education's *An Agenda for Research and Development on Rural Education* (Federal Interagency Committee on Education, Subcommittee on Rural Education, 1991), which identified six priority areas to guide rural education research.

Table 1
Rural Education Research Topics by Research Type, 1991-2003

Topic	Rural Specific	Rural Context Only	Total
Programs and strategies for students with special needs	49	29	78
Instruction	20	20	40
School safety and discipline	16	12	28
Student life and work planning	16	6	22
Factors influencing academic achievement	14	7	21
Students' attitudes and behaviors	12	9	21
Education leadership	18	2	20
Staff recruitment and retention	18	2	20
Teacher preparation and development	10	10	20
Teachers' beliefs and practices	13	5	18
Curriculum	13	3	16
Parent involvement	6	10	16
School community relationship	14	1	15
Health education	0	13	13
Teacher and staff characteristics	11	1	12
Teacher student relationships	6	6	12
Consolidation	11	0	11
Drug and alcohol use	8	3	11
Early childhood education	8	3	11
School finance	7	2	9
Cultural diversity and education	4	4	8
Literacy development	2	6	8
School reform	5	3	8
School choice	7	0	7
School counseling	3	4	7
Shared decision making	6	1	7
Grade configuration	6	0	6
Characteristics of rural schools	5	0	5
Dropouts	3	2	5
Educational collaboration	4	0	4
School health services	3	1	4
Assessment	2	1	3
Scheduling	2	1	3
School effectiveness	2	1	3
Multiage grouping	1	0	1
Rural education indicators	1	0	1
School law	1	0	1
School size	1	0	1
State school district relationship	1	0	1
Transportation	1	0	1
Total	330	168	498

in a classroom in any locale. These types of studies were coded as "Rural Context Only." We classified 66% ($n = 330$) of the studies as Rural Specific and 34% ($n = 168$) as Rural Context Only. The frequency of both types of research is recorded for all topics listed in Table 1.

Topics Most Frequently Addressed

Table 2 lists the top 10 topics found in the rural education research base. To provide a better understanding of the literature base, these topics were examined more closely for subtopics. For each topic, subtopics with four or more abstracts were identified. Each of the top 10 topics and related subtopics is described briefly below.

Programs and strategies for students with special needs. As Table 2 shows, Programs and Strategies for Students with Special Needs is by far the topic with the most rural education research journal articles ($n = 78$). This topic includes abstracts about education services provided to students with disabilities, students considered to be at risk of failure, or students identified as gifted and talented. Special Education—education services delivered to students with disabilities—is the subtopic with the largest number of articles ($n = 50$), followed by Gifted Education ($n = 19$) and Approaches for At-risk Students ($n = 9$). If Special Education was categorized as its own topic, it would be the largest topic in the literature base.

Instruction. Of the 40 abstracts coded as Instruction, a substantial number ($n = 16$) are about the use of technology to deliver instruction. This finding reflects the view that technology is one solution to the problem that rural schools face in offering comprehensive instructional programs. As Table 2 shows, a significant number of the Instruction abstracts focus on mathematics, science, or reading instruction ($n = 19$), mirroring the national attention being given to these content areas.

School safety and discipline. Given concerns and perceptions of increasing school violence, rural education researchers, not surprisingly, have focused substantial attention on school safety and discipline. Of the 28 abstracts that address this issue, 50% ($n = 14$) focus on violence in schools and the effectiveness of violence prevention programs. Discipline also has received attention ($n = 9$); this subtopic includes articles about suspension policies and the use of corporal punishment.

Student life and work planning. Twenty-two abstracts were coded under the topic Student Life and Work Planning. The largest subtopic in the group deals with student aspirations ($n = 14$). These abstracts primarily focus on students' plans for pursuing post-secondary education and the factors that influence those aspirations. The second subtopic is Student Career Education and Development ($n = 8$). Abstracts in this subtopic focus on the knowledge and skill students need to succeed in the workplace.

Factors influencing academic achievement. Twenty-one abstracts are about factors that influence the academic achievement of students. Among these abstracts, the only subtopic to emerge relates to the effects of school locale or size on achievement ($n = 8$). Several of these abstracts compare the academic achievement of rural versus nonrural students, while others in this subgroup consider how small school size influenced achievement. The rest of the abstracts in this topic concern the factors that influence student achievement, including socioeconomic status, family characteristics, students' self-esteem, and the institutional characteristics of schools.

Students' attitudes and behaviors. A dominant subtopic did not emerge among the 21 abstracts in the Students' Attitudes and Behaviors topic. The only subtopic that emerged was Students' Views of Curricula and Instruction ($n = 4$). Abstracts under this subtopic dealt with studies of rural students' perceptions of particular content areas (science, physical education, and mathematics), and the effectiveness of specific learning activities. In addition, a number of miscellaneous abstracts were identified that related to students' attitudes and behaviors; these covered a variety of issues including gender differences in students' behavior and attitudes, students' self-esteem, and students' perceptions of their communities.

Education leadership. Education Leadership refers to all aspects of school leadership, including issues related to superintendents, principals, teachers, and school board members. Among the 20 abstracts in this topic, two subtopics emerged. The first subtopic, Administrators' Behavior and Characteristics ($n = 7$), concerns the personal characteristics of administrators and the activities they engage in to fulfill their responsibilities, including how they plan and network with fellow administrators. The second subtopic, Leadership Roles ($n = 6$), is about the functions undertaken by school leaders; this subtopic is not limited to administrators. For example, one study examined changes in teacher leadership roles in rural schools that did not have formal leadership positions. Another analyzed the minutes of school board meetings to better understand the leadership roles of local boards of education.

Staff recruitment and retention. Staff Recruitment and Retention has been a long-standing problem for rural schools. This topic encompasses recruitment and retention issues related to teachers, administrators, and other professional staff. A number of the 20 abstracts coded in this area examine the factors that influence staff decisions to begin working in rural schools and their reasons for leaving ($n = 7$). In addition, several articles address teacher stress and burnout ($n = 4$), both of which contribute to teacher attrition.

Teacher preparation and professional development. The 20 abstracts identified as addressing Teacher Preparation and Professional Development encompass the career-long teacher professional development continuum from student

Table 2

Top 10 Topics and Related Subtopics by Rural Education Research Type, Number of Abstracts

| Topic	Rural Specific	Rural Context Only	Total
Programs and strategies for students with special needs	49	29	78
Special education	33	17	50
Gifted education	11	8	19
Approaches for at-risk students	5	4	9
Instruction	20	20	40
Technology in instruction	10	6	16
Science	6	5	11
Reading	1	3	4
Mathematics	0	4	4
Other	3	2	5
School safety and discipline	16	12	28
Violence and violence prevention	8	6	14
Student discipline	6	3	9
Other	2	3	5
Student life and work planning	16	6	22
Student aspirations	9	5	14
Student career education and development	7	1	8
Factors influencing academic achievement	14	7	21
School locale and/or size	7	1	8
Other	7	6	13
Students' attitudes and behaviors	12	9	21
Students' views of curricula and instruction	1	3	4
Other	11	6	17
Education leadership	18	2	20
Administrators' behavior and characteristics	6	1	7
Leadership roles	6	0	6
Other	6	1	7
Staff recruitment and retention	18	2	20
Influences on retention	6	1	7
Stress and burnout	3	1	4
Other	9	0	9
Teacher preparation and development	10	10	20
Effects of professional development on practice	2	6	8
Other	8	4	12
Teachers' beliefs and practices	13	5	18
Classroom techniques and practices	4	2	6
Reading programs and strategies	3	2	5
Other	6	1	7
Total	186	102	288
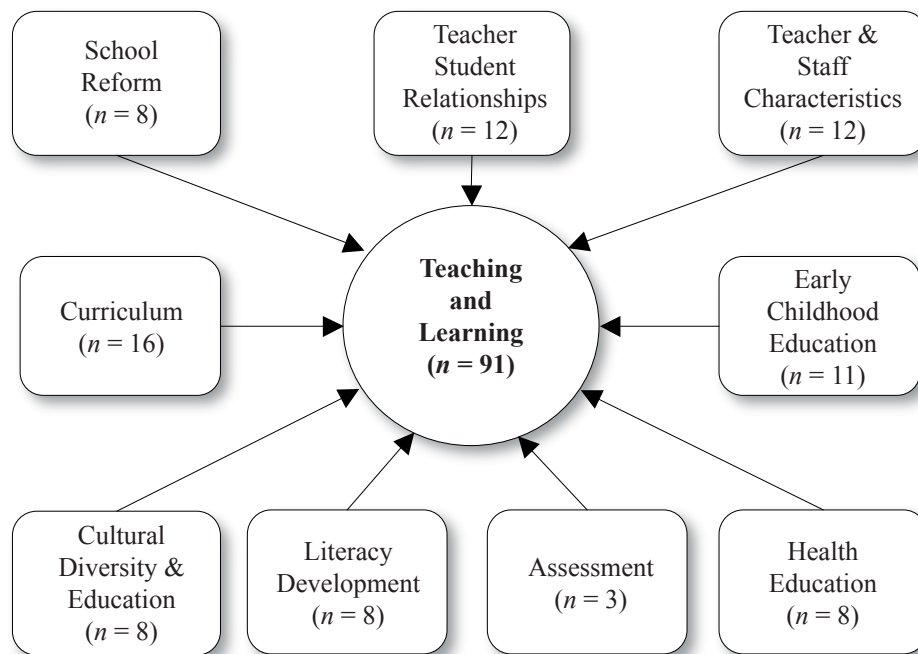
Figure 1. Teaching and learning cluster

teaching experiences to the in-service training teachers receive to improve their practice. In addition, a number of abstracts concerned professional development related to technology. Several others focused on the success of specific professional development strategies such as teacher study groups.

Teachers' beliefs and practices. As shown in Table 2, 18 abstracts were coded as Teachers' Beliefs and Practices. The first subtopic, Classroom Techniques and Practices ($n = 6$), included abstracts of studies investigating differences in beliefs and practices between rural and nonrural teachers about classroom management, as well as differences in terms of assessment and grading. The second subtopic, Reading Programs and Strategies ($n = 5$), encompasses abstracts related to teacher knowledge and beliefs about reading programs.

Clusters of Topics Less Frequently Addressed

The remaining 30 topics were grouped into clusters in order to provide additional insight into the issues studied by rural education researchers. Of the 498 abstracts, 210 (42%) were organized into the following clusters: Student Growth and Development Support, Teaching and Learning, Organization of Schooling, Schools and Communities, and Education Policy. Each cluster is discussed below.

Teaching and learning. The Teaching and Learning cluster (see Figure 1) has the largest number of topics ($n = 9$) and abstracts ($n = 91$), reflecting a healthy curiosity among

rural education researchers about what occurs in classrooms. This cluster complements the Instruction topic, which is the topic with the second highest number of abstracts.

Curriculum tops the list of topics in the Teaching and Learning cluster with 16 abstracts. A rather broad range of issues is examined among the abstracts in this topic including reading curricula, advanced placement programs in rural schools, and physical education. This topic also includes a number of rural-specific abstracts. Two abstracts, for instance, focus on agricultural education. Another abstract of particular note concerns a study regarding the perceived conflict between meeting state content standards and providing locally relevant curriculum.

Health Education and Literacy Development are two other topics in the Teaching and Learning cluster. Both topics are about the content and delivery of instruction. Cultural Diversity and Education concerns how racial and ethnic diversity is incorporated into curriculum and instructional materials and the effects these materials have on students. Abstracts dealing with the topic of Assessment are about issues related to measuring what students learn from the curriculum and instructional materials.

Two topics in this cluster relate to teachers and staff: Teacher and Staff Characteristics, and Teacher-Student Relationships. Abstracts coded with the topic of Teacher and Staff Characteristics primarily examine the practices and characteristics of teachers and support staff such as school counselors, occupational therapists, and school psychologists. These issues include how teachers manage
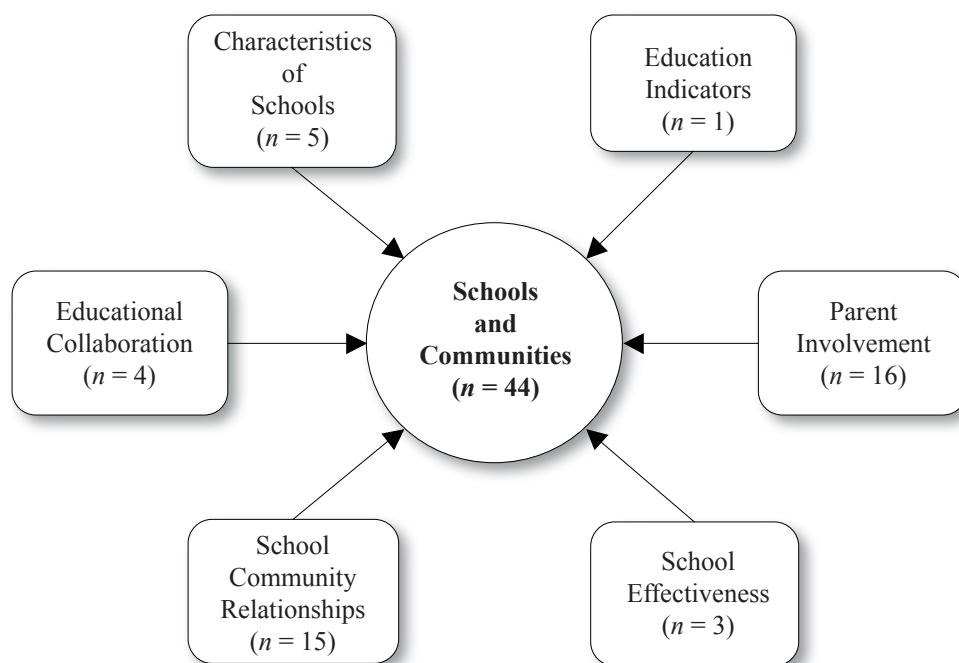
Figure 2. Schools and communities cluster

conflict, their teaching styles, and their personal traits. For example, one study compared the qualifications of rural and nonrural science teachers. Abstracts coded with the topic of Teacher-Student Relationships concern how teachers view and interact with students, and vice versa. Two studies in this topic examine the issue of gender equity for girls. Though not identified as a specific topic in this study, gender equity is an area in which there are specifically rural issues arising from traditional views of females held by some rural communities.

The two remaining topics in this cluster are Early Childhood Education and School Reform. The first topic speaks for itself. The second, School Reform, is about a wide range of issues including teachers' perceptions of school reform, characteristics of exemplary schools, and barriers to implementing school reform measures in schools.

Schools and communities. The Schools and Communities cluster (see Figure 2) is comprised of six topics encompassing 44 articles, making it the second largest cluster. The largest topic in the cluster is Parent Involvement ($n = 16$), which is often cited as an important component of school improvement. Among the issues examined are patterns of parent involvement in rural schools, effects of parent involvement on student achievement, parent attitudes toward public education, and teacher communication with parents. The relatively large number of articles ($n = 15$) grouped under the School-Community Relationship topic reflects

the close connection that exists between rural schools and their communities.

Characteristics of Schools, and Education Indicators are similar topics in that they both present information about rural schools. They differ in that the Education Indicators topic consists of a single study that presented data on rural schools in the context of each state's overall educational program. Articles in the Characteristics of Schools topic address the attributes of rural schools, but not in relationship to a specific state's education program.

Of the two remaining topics, Educational Collaboration involves the formal (e.g., intermediate school districts) and informal ways in which rural schools and districts work together. School Effectiveness is about the characteristics of effective rural schools and perceptions of effectiveness.

Education policy. The Education Policy cluster (see Figure 3) deals primarily with issues that are outside of the control of the school. Consolidation, the largest topic in the cluster, has long been a concern for rural educators. Indeed, we were surprised to find so few abstracts addressing this topic because of the considerable attention that rural educators and advocates have paid to avoiding school district reorganization.

School Finance is a topic that is closely tied to Consolidation because it is generally financial considerations that lead to district mergers. Studies in this topic are about the relationship between school size and outcomes, and
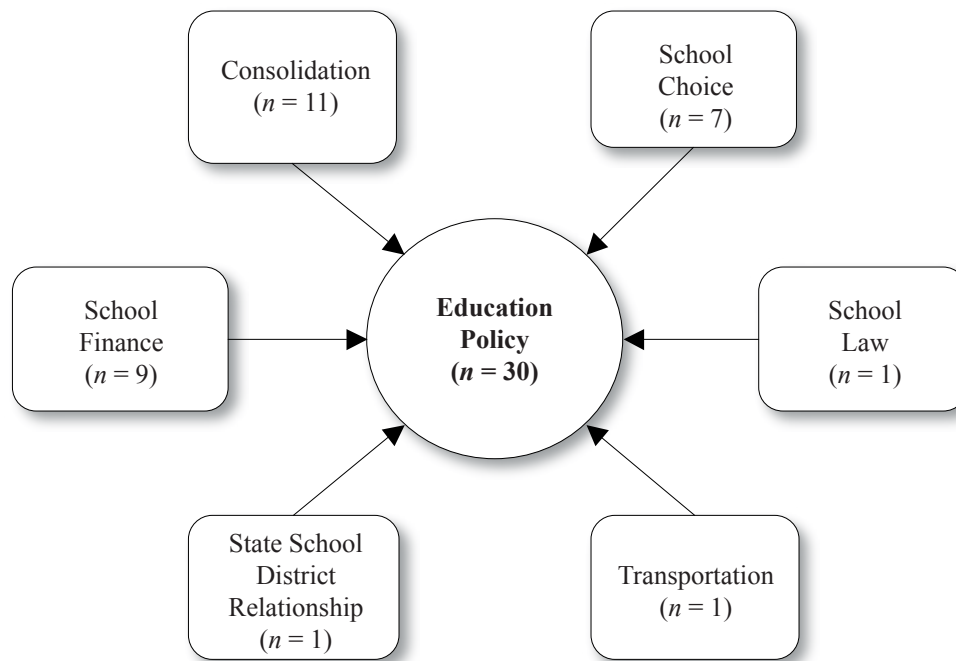
Figure 3. Education policy center

financial obstacles to maintaining small schools. There are also articles on issues related to passing tax increases to support rural schools.

Although school choice is generally not thought of as a rural issue, seven abstracts we reviewed explore the topic. Two abstracts each are about home schooling, and tuitioning students to other schools, that is, paying another district to provide services that a student's home district is unable to provide—a practice that was once common in rural areas. One study investigated the effects of rural charter schools on racial segregation in Arizona; this is noteworthy because it points to a potential issue for rural areas that are just now starting to experience influxes of minorities into their schools.

Student growth and development support. As shown in Figure 4, four topics are grouped around the Student Growth and Development Support cluster (*n* = 27). These topics are about nonacademic issues that influence the development of children and youths. School Counseling is a topic that relates closely to the other topics in this cluster in that counseling can be used in dropout prevention programs, in drug and alcohol prevention programs, and in the provision of school-based health services. Abstracts under the School Counseling topic include studies investigating what it is like to be a counselor in a rural school and the effectiveness of counseling programs. Abstracts in the Drug and Alcohol Use topic are predominately about the extent of drug and alcohol use among students, and about the effectiveness of drug and alcohol prevention programs. Abstracts in the Dropouts topic

are about factors that influence students' persistence and motivation to stay in school. Of the four abstracts related to School Health Services, two deal with health screening, one with mental health programs, and another focuses on school nurses' attitudes toward HIV and AIDS.

Organization of schooling. The Organization of Schooling cluster (see Figure 5) includes abstracts from studies that examine how students are grouped for learning and the administrative processes in the school. It is the smallest of the five clusters, with only 18 abstracts grouped into five topics.

Abstracts in the Grade Configuration and Multiage Grouping topics examine the effects of specific ways of grouping students on student achievement. The Scheduling topic includes two abstracts about attitudes and perceptions of block scheduling and one study evaluating a year-round school calendar.

The one abstract in the School Size topic examines the effect of the number of students in a school on the school's curriculum and social relations. Five other abstracts examine school size, but were grouped into other topics: two in Factors Influencing Academic Achievement, two in Consolidation, and one in School Finance.

The final topic in the Organization of Schooling cluster, Shared Decision Making, encompasses a different aspect of the cluster in that it deals with a process rather than structure. Abstracts coded with this topic examine issues related to teacher and parent involvement in the management of the school, including principals' perspectives on the practice.
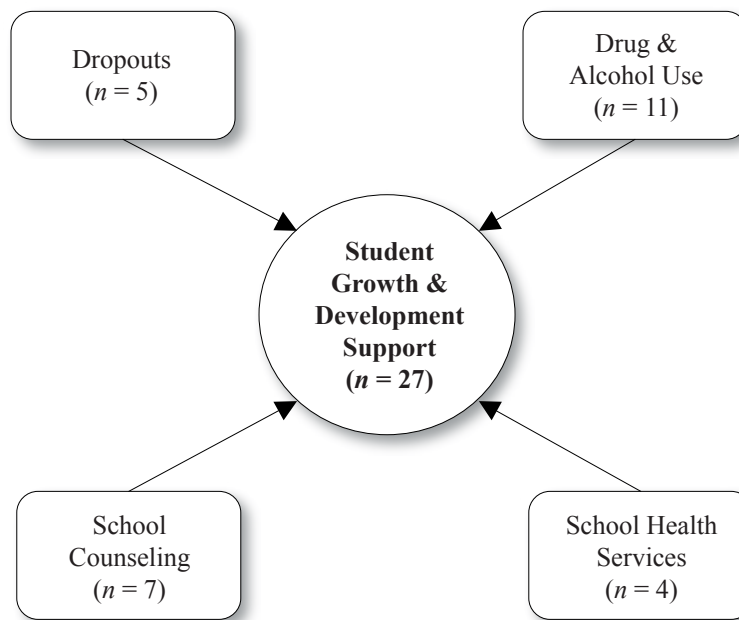
Figure 4. Topics in student growth and development cluster

Quality of the Rural Education Research

Through experimental research, sound judgments can be made about the causes of different student outcomes and the efficacy of interventions. However, the information available through abstracting services often does not support accurate distinctions among research designs. In order to assess the quality of the rural education research literature, using the abstracts obtained through our search of the ERIC and PsycINFO databases we identified the comparative research conducted in rural settings and evaluated the quality of that research. Here the term "comparative" is used in its broadest sense of contrasting two circumstances or groups on some measure. This includes studies using single-group pretest-posttest, causal-comparative, quasi-experimental, and experimental designs. This section describes the process used at McREL to assess the quality of the studies identified as a result of the ERIC and PsycInfo searches described in the previous section, as well as the results of this qualitative review process.

In order to capture studies from which causal attributions can be drawn, our first step was to review each of the abstracts obtained from the ERIC and PsycINFO searches. Each abstract was reviewed by two teams of two in order to identify studies in which comparisons were being made. This process resulted in the identification of 222 abstracts that appeared to use comparative research methods or make causal claims. As explained later, not all studies that reported to be comparative in their abstracts truly used comparative methods.

Unfortunately, no truly experimental studies, that is, those using randomized designs, were found in our review of the abstracts. The strongest studies identified were quasi-experimental and causal-comparative research designs. By noting this, we do not intend to undervalue the importance of nonexperimental research, or observational studies, which can make important contributions to our vision of rural education. Rather, our disappointment recognizes the importance of identifying causal relationships between interventions and outcomes with higher degrees of certainty.

Articles for each of the 222 abstracts identified as being potentially comparative were obtained from area libraries for further examination. Each article was reviewed using the Quality of Research criteria developed by McREL for use in conducting research syntheses. Articles received a score of 0 to 4 points on eight dimensions of quality research.[3] The quality points were used to assign studies using comparative designs to one of three categories: lower quality ranged from 0 to 14 points, medium quality ranged from 15 to 21 points, and higher quality ranged from 22 to 26 points.

Seven reviewers evaluated the articles. After quality judgments were made, each reviewer wrote a summary of the

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[3](a) construct validity of the intervention, (b) fidelity of implementing the intervention, (c) construct validity of the outcome measures, (d) internal validity of the participant assignment, (e) contamination threats to internal validity, (f) sampling threats to external validity, (g) external validity-testing within subgroups, and (h) statistical validity as evidenced by effect size estimation and completeness of reporting.
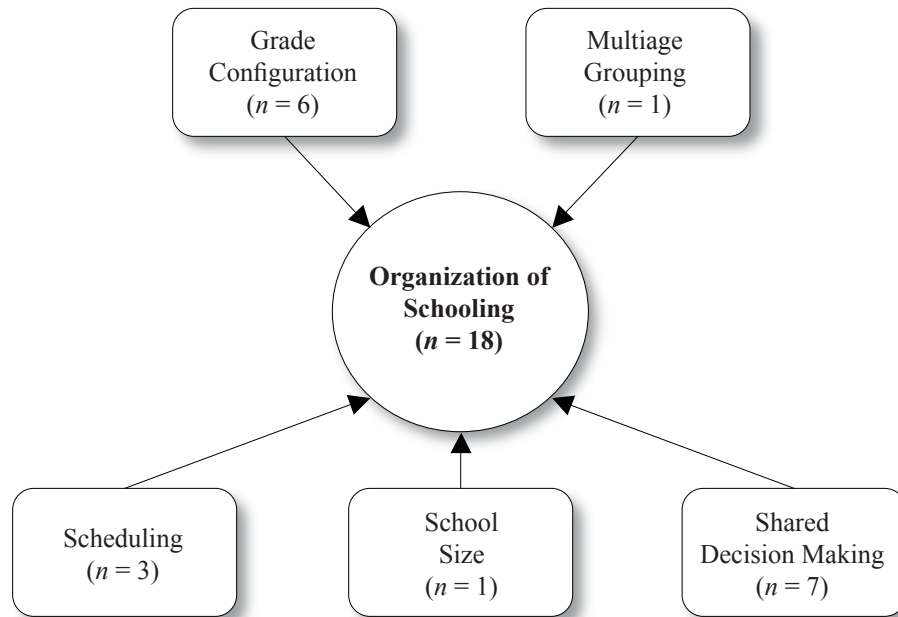
Figure 5. Organization and schooling cluster

higher- and medium-quality research findings and suggested themes addressed in the work. The completed worksheets were reviewed for consistency of use, and the completed summaries were "fact checked" against the articles. A random sample of 54 articles stratified by the quality index categories was judged by a second reviewer. The inter-rater judgment of the total quality index score for these 54 articles was modestly correlated ($r = .55$, $p < .001$). For the higher-, medium-, and lower-quality categories, 22 category assignments were exact matches, 25 diverged by one level, 6 by two, and 1 by three levels. The small value for this correlation suggests the need for additional training for reviewers in the interpretation of research quality in articles.

In focusing on empirical and comparative studies, we wanted to identify rigorous research. However, our purpose was to identify the constellation of rural education research-based publications that claim to make comparisons between conditions and appear to imply causal interpretations. Part of that comparative research literature uses causal-comparative designs to analyze the impact of uncontrollable dimensions such as age, cohort, and time (Donaldson & Horn, 1992) on aspects of education. We make a distinction between the appropriate uses of causal comparison as opposed to instances where it would be more appropriate to expressly present correlational statistics that imply no directionality of effects. The quality scoring system also permits the judgment of how adequately these designs contribute to the corpus of comparative research.

The purpose of this component of the project is to go beyond identifying evidence of effective treatments. We also

wish to indicate where in the literature researchers have made comparative and causal claims—claims that purport to be based on comparative research that suggests causal relationships—that may not be supported by their work and thus may be misleading. By presenting a view of "the better" of the published literature, we hope to reinvigorate a research agenda that addresses the needs of rural students and schools and encourage experimental research that provides strong evidence of what works to meet those needs.

Of the 222 articles reviewed, less than half ($n = 106$) met the requirement of using a comparative research design to investigate a rural education problem (see Table 3). The high percentage of noncomparative research found in these articles, in spite of an extensive process to weed them out with the search engines and an abstract review, suggests that database records are not an accurate description of the research they summarize. Noncomparative research often is described as though comparisons between groups are being made, when, in fact, observations are simply being described.

Of the 106 studies identified as comparative research, no studies used randomized assignment of participants to treatment and control conditions. Only 10 nonexperimental studies were rated as higher quality. The remaining studies were split almost evenly between medium and lower quality ratings. It was our determination that the lower quality studies did not warrant further discussion in this report. It also is worth keeping in mind that many of the medium-quality studies were causal-comparative designs and did not investigate a specific intervention. Although over half

Table 3
Number and Percentage of Examined Rural Education Research Articles by Quality

	Experimental Research	Nonexperimental Comparative (*n* = 106)				Total
		Higher Quality	Medium Quality	Lower Quality	Non-comparative	
Number of Articles	0	10	48	48	116	222
Percentage of Articles	0	4.5	21.6	21.6	52.2	100

of the comparative studies report results that are to a degree interpretable, we are disappointed that there has been very little higher-quality rural education research and no systematic experimentation.

We now consider the content of the 10 higher-quality and 48 medium-quality rural education articles identified by the selection process. Although the kind of research designs used in these studies can, at best, provide us with possible evidence for causal relationships, the articles do illuminate the limited rural education knowledge base, and the topics chosen for study and reporting provide evidence for directing future research. In preparation for the following sections, the reader might hold in mind the following question: Is there some aspect of education peculiar to rural settings that a specific intervention might either take advantage of, or ameliorate, in order to improve student achievement and/or school operations? The topics and common threads addressed, and the reported comparisons of individual articles, indicate the areas that have piqued the interest of rural researchers. This examination can provide the foundation for asking more mature experimental questions in the form suggested above. It is also informative if such questions cannot be formulated.

The higher- and medium-quality studies are discussed in the sections that follow. They are organized by the topics and clusters identified in the first part of the study. The topics are presented in order from the highest to lowest number of abstracts (see Table 1).

Top 10 Topics

Programs and strategies for students with special needs. All of the articles that address special education were rated as being of medium quality. Russell and Wiley's (1993) study, comparing occupational stress levels of rural K-8 and 9-12 special education teachers, reported no significant differences related to supervisor support, room type, or job satisfaction.

The next three studies in the topic focus on instructional effectiveness. Marchand-Martella, Martella, Orlob, and Ebey (2000) suggest that a peer-delivered corrective reading program using Big Books had positive effects on the vocabulary and reading comprehension of rural special education students. Shoho, Katims, and Wilks (1997) indicate that special education students who were pulled out of class felt more alienated than did the learning disabled students who were fully included in the mainstream classroom. A 1997 study by Butera et al. suggests that rural special education students included in regular classrooms were less likely to be on task than their normative peers, and were less attentive when more than one adult was in the room.

Two medium-quality articles in the Programs and Strategies for Students with Special Needs topic are about gifted and talented education. In an intervention study, Lamb and Daniels (1993) suggest that math attitudes and aspirations of rural gifted girls were improved by an 18-week program aimed at this purpose. Johnsen, Haensly, Ryser, and Ford (2002) report that teachers trained in the learning differences and characteristics of gifted students exhibited more change in the content and rate of their teaching, but no student performance measures were reported as being investigated. Although clearly intended to be rural research, it is apparent that this last study does not have very special implications for the rural locale in which it was conducted. A true random assignment experiment along these lines could be of general education interest, but we ask if there are circumstances that would recast the subject as a specifically rural research question.

Instruction. In the single higher-quality study in the Instruction topic, Gallini and Helman (1995) provide possible evidence that the writing performance of rural Hispanic students was better when they knew that their writing was going to be read by out-of-state peers as opposed to their teacher or their school peers. Among the medium-quality studies, Fayden (1997) reports that the Big Books reading program was effective in developing reading skills in a classroom of primarily Native American and Hispanic kindergarten children—children whose early experiences with books were limited. Faubert, Locke, Sprinthall, and Howland (1996) report positive outcomes of a role-taking action-learning intervention on the abstract thinking and ego development of African American students in rural schools, though boys

appeared to profit cognitively more than girls. Siskind (1994) reports that calculator use may have improved performance among a predominantly rural African American, Title I, Algebra II class. The advantage provided by calculator use was interpreted as being of special importance for informing practice at rural schools because of prevalent negative attitudes toward calculator use held by rural parents and the limitations of technological resources in rural communities. A study conducted by Reaux, Ehrich, McCreary, Rowland, and Hood (1998) found no significant performance differences between students whose parents received information technology training and networked computing equipment in their homes versus those who did not.

School safety and discipline. The two articles in the School Safety and Discipline topic were of medium quality. Farrell, Valois, and Meyer (2002) report that sixth-grade students who participated in a school-based violence prevention program have lower approval ratings for violent behavior, and admit less peer pressure to use drugs or to engage in provocation than students in a comparison group. Over the 1-year period, discipline problems actually increased in both groups, but those of the treatment group rose at a significantly slower rate. Taub (2002) evaluated the efficacy of the Second Step Violence Prevention Program in a rural elementary school. After a year of program implementation, comparisons of teacher ratings for student behavior indicated possible differences in students' social competence and antisocial behaviors between treatment and comparison groups. Independent observation did not verify the differences in antisocial behaviors but did support the improvement of prosocial behavior.

Student life and work planning. There are six studies in the Student Life and Work Planning topic. In the single higher-quality study, differences in education aspirations of rural and nonrural youth were found to be explained almost entirely by family socioeconomic status and future occupational goals (Haller & Virkler, 1993). Gandara, Gutierrez, and O'Hara's (2001) medium-quality study reported that rural students were at greater risk of limiting their occupational goals, and that ninth-grade Latina students had no plans for life beyond high school. Hektner (1995) suggests that rural youth experience greater conflict between their future goals and a desire to remain in their community than do nonrural youth, which may lower their expectations. Ley, Nelson, and Beltyukova (1996) found congruence between students' own aspirations and their teachers and parents' aspirations for them. Students also indicated that they valued living in their current locale more so than did teachers.

In a medium-quality study, Mullis, Mullis, and Brailsford (1997) report that rural students' preferences for applied and realistic occupations were related to lower academic comfort and aspirations. Mullis et al. also indicate that girls had more academic comfort than boys and that parents' employment had an influence on students' aspirations and

comfort. In another medium-quality study, Baker, Linhart, and Dunham (1999) found that, compared to graduates of general education and academic programs, rural vocational program graduates perceived their programs to be more effective in developing thinking, personal quality, resource management, and technology skills, and in preparing them for their occupation of choice.

Factors influencing academic achievement. One study in the Factors Influencing Academic Achievement topic was rated as being of higher quality. Using data from the National Educational Longitudinal Study (NELS), Fan and Chen (1999) detected no differences in rural and nonrural grades 8, 10, or 12, on four academic achievement tests in math, reading, science, and social studies, when controlling for socioeconomic status. Of the remaining four medium-quality studies, Russell and Elder (1997) found that isolated rural students were positively influenced by mothers who tried to promote success in school, and that parents of academically successful students had higher satisfaction with parenting. Roscigno and Crowley (2001) also used the NELS database to investigate a group of students from grades 8 through 12 and concluded that low achievement scores were due to disadvantages based on parent education and social status. Lee and McIntire (2000) partly replicated these negative findings, looking at math achievement in 8th and 12th grades using data from the National Assessment of Educational Progress. They detected no differences between rural and nonrural students in math achievement during 8th grade but did report differences in favor of rural students during 12th grade. However, these differences varied by state, and their analysis did not control for socioeconomic status. Haller, Monk, and Tien (1993) hypothesized that the less extensive curricula typically found in rural schools would negatively influence the development of higher order thinking skills in science and mathematics but found no differences between rural and nonrural students in the content areas.

Students' attitudes and behaviors. There is one higher-quality study in the Students' Attitudes and Behaviors topic. That study found that girls in rural communities have somewhat more stereotypical ideas about gender-appropriate careers than do rural boys and nonrural children (Jessell & Beymer, 1992). In a medium-quality study, Howley, Harmon, and Leopold (1996) found that rural students were less satisfied with their local communities than were students from nonrural places, but there was no difference in their eagerness to leave. In another medium-quality study, Trost et al. (1996) detected possible gender differences in physical activity among predominately African American rural fifth graders. Girls demonstrated lower levels of physical fitness, lower self-efficacy in overcoming barriers to physical activity, and lower participation levels in community sports activities.

Education leadership. The single article in the Education Leadership topic was of medium quality. Howley et al.

(1999) report that rural and suburban principals use different planning techniques. This difference is accounted for in part by district size and principals' administrative experience. Differences in state-level direction to schools, for example instructions to implement specific curricula or practices, also shaped principals' planning techniques.

Staff recruitment and retention. Two studies in the Staff Recruitment and Retention topic address issues related to teacher stress and burnout. Bornfield, Hall, Hall, and Hoover's (1997) higher-quality study of attrition and retention rates of rural special education teachers suggests that teachers leave their positions to seek more opportunities rather than because of low satisfaction or burnout. Rural special education teachers who stayed at a school reportedly did so because of responsibilities to a spouse or elderly parents and not because they were more satisfied with working conditions. Abel and Sewell's (1999) medium-quality study indicates that compared to urban teachers, rural teachers experience less stress caused by working conditions and staff relations. In addition, stress from students and from time pressures appeared to be greater than stress from working conditions and staff relations. A regression analysis indicated that poor working conditions and time pressures were most predictive of burnout for rural teachers.

Teacher preparation and development. Four studies were classified under the Teacher Preparation and Development topic. Allinder and Beckbest's article (1995), a higher-quality article, suggests that rural special education teachers were able to self-monitor their implementation of a mathematics program for special education students with the same effectiveness as a comparison group monitored through classroom observation. In a medium-quality study, Devlin-Scherer, Devlin-Scherer, Wright, Roger, and Meyers (1997), report that rural teachers who participated in teacher study groups changed their daily instructional practices to a greater degree than did teachers who only received feedback from their principals. These two studies may have implications for schools with limited access to professional development staff or resources. Another medium-quality study, Cook and Van Cleaf's study (2000), found that specific preservice training in diversity issues may have positively affected 1st-year elementary school teachers' ability to interact with parents from a variety of backgrounds. This preparation was reported to have a differential impact, with urban teachers showing greater understanding for the sociocultural needs of parents and students than their rural and suburban counterparts. Greenberg, Woodside, and Brasil (1994) report differences in the learning-oriented behavior, and math and reading performance, of rural Appalachian children whose teachers were trained in mediated learning techniques versus those students in matched control classrooms.

Teachers' beliefs and practices. No higher- or medium-quality studies are found in the sample about this topic.

Remaining Topic Clusters

As one might expect, some studies could be coded in more than one way, particularly when they are gathered into broad topic clusters as they are in this section. In such cases, we placed the study in the cluster that most closely captured the content of the article.

Student growth and development support. No higher- and medium-quality studies were grouped in the Student Growth and Development Support cluster in this sample of articles.

Teaching and learning. Nine articles in the sample of higher- and medium-quality studies were grouped under Teaching and Learning. In a medium-quality study in the Curriculum topic, Wright, Stewart, and Birkenholz (1994) report that students studying agriculture in a school with an agriculture program showed more knowledge and more positive perceptions of agriculture than did students studying agriculture in schools with no agriculture program or students not studying agriculture.

In the lone medium-quality study in the Early Childhood Education topic, Bickel and Spatig (1999) evaluated the effects of a Head Start transition program in rural West Virginia that was designed to maintain the gains of early childhood achievement into the school years. They found no significant effects of the program, but this was complicated by an absence of any initial Head Start benefits to maintain.

In the Health Education topic, two of the three articles were of higher quality. Kumpfer, Alvarado, Tait, and Turner (2002) evaluated the effectiveness of a multidimensional substance abuse prevention program in 12 rural schools. Their results suggest that substance abuse prevention programs including both school- and family-based interventions may be the most effective. Davis, Lambert, Gomez, and Skipper (1995) report that a culturally appropriate cardiovascular health curriculum project resulted in more self-reported healthy behavior (e.g., less salt and fat consumption and tobacco use, increases in physical exercise) among rural Native American boys, but not among girls.

In a medium-quality study, Esters, Cooker, and Ittenbach (1998) investigated the effects of a mental health unit on students' perceptions of mental illness and their attitudes about seeking professional help. Data from 40 high school students who attended school in rural Mississippi and a comparison group suggest that students participating in the program had more favorable attitudes toward seeking professional help for mental illness and that their conceptions about mental illness were more in line with those of mental health professionals.

In another medium-quality study, Kushman and Yap (1999) studied 33 schools in rural, high poverty areas of Mississippi that had implemented the Onward to Excellence (OTE) school improvement process over a 5-year period. Results of the implementation study indicate that OTE

was very difficult to conduct and/or sustain past 2 years. Longitudinal analysis showed no significant improvement in overall achievement over the 6 years. Comparisons with non-OTE schools in the state were nonsignificant for overall school achievement, mathematics achievement, and reading achievement. The lack of differences was interpreted as supporting the existence of a fidelity problem in implementing and sustaining OTE.

Three articles report studies about Teacher and Staff Characteristics. In the higher-quality study of this topic, Carlsen and Monk (1992) report that rural science teachers were more likely to have majored in education in college than in science, that they took fewer science and science methods courses at the undergraduate and graduate levels, and that they were less likely to have a graduate degree. They also indicated that rural science teachers typically have less teaching experience, and spend more time teaching other subjects. Results from Cornille, Pestle, and Vanwy's (1999) medium-quality study indicate that teachers as a group appear to have less confrontational management styles than do other professionals; however, no differences were indicated between rural and nonrural teachers. In another medium-quality study, Graham, Updegraff, Tomascik, and McHale (1997) found no effect of a school advisor program implemented with eighth graders in a rural school who met in small groups with a teacher compared to students who did not. They did find, however, that students who participated in the program had higher grade point averages (GPAs). In contrast, urban students who met with teachers in small groups during a regularly scheduled period of the school day had greater enjoyment in participating in extracurricular activities, GPA, and less depression.

Organization of schooling. Six articles in the sample fell into the Organization of Schooling cluster. Brown, Carr, Perry, and McIntire's (1996) medium-quality study found no differences in decision making based on gender of principals or school level. They reported that the rural Maine principals perceived staff as being involved in decision making and the community as informed but not involved. In addition, the principals indicated a desire for greater involvement from both staff and community groups.

All three articles in the Grade Configuration topic are of medium quality. Wihry, Coladarci, and Meadow (1992) looked at the effects of a school's grade span on the performance of eighth-grade students on academic achievement tests. In their sample, the elementary setting was the most favorable location for eighth-grade student performance, and the junior/senior high school setting was the least favorable.

Franklin and Glascock (1998) examined the relationship of different grade configurations to both academic achievement and student behavior. After studying data gathered from grades 6, 7, 10, and 11 in four different settings (K-7, 6-9, 7-12, and K-12), they found that students in grades 6 and 7

showed more positive scores and behavior in either the K-7 or K-12 grade configuration. On the other hand, Alspaugh and Harting (1995) found no significant differences in overall achievement among five grade configurations: K-4, K-5, K-6, K-7, and K-8. However, they did find achievement losses when students transitioned from the elementary setting into departmentalized classes, but those losses were recovered within 1 year.

In the Scheduling topic, Pittman and Herzog's (1998) medium-quality study assessed whether a year-round school schedule impacted the academic achievement, behavior, and attitude of rural students, staff, and parents. They evaluated standardized test scores, course grades, attendance, and results from personal surveys. No differences were found in achievement or behavior between the year-round schedule and the traditional schedule in rural schools.

The lone article in the School Size topic was judged to be of medium quality. Lee, Smerdon, Alfeld-Liro, and Brown (2000) investigated how enrollment size influenced curriculum and social relations. From interviews with teachers, principals, guidance counselors, and students in high schools of various sizes, they concluded that the curriculum in small schools often was more limited and directed toward the average student rather than toward the full range of students.

School and communities. Two of the higher- and medium-quality studies in the sample were in the School and Communities cluster. The Parent Involvement topic had one medium-quality study. Prater, Bermudez, and Owens (1997) report that rural parents were generally less engaged with the school, but did attend school-sponsored events more frequently than did suburban and urban parents. In a medium-quality study in the Educational Collaboration topic, Galvin (1995) appraised the variations in structure for intermediate educational agencies (called Boards of Cooperative Educational Services, or BOCES, in this case) and their influence on opportunities for rural school districts. Prater's study indicates that as both district and BOCES size increased, per-pupil spending decreased. Thus, larger school districts gain little in efficiency from membership in BOCES, and smaller districts gain little from joining small BOCES.

Education policy. The Education Policy cluster had the second highest number of higher- and medium-quality studies. One of the three articles in the Consolidation topic was of higher quality. Streifel, Foldesy, and Holman (1991) examined the financial impact of school district consolidation. They surveyed consolidations in 19 states for 3 years and presented financial information for each district in comparison to state averages for all districts. Streifel et al. concluded that the financial impact of consolidation on individual districts is highly variable and that districts contemplating consolidation should consider the financial implications experienced by other institutions of similar kind on an individual basis.

The remaining two articles in this cluster are of medium quality. Hough and Sills-Briegel (1997) compared student achievement in middle schools located in consolidated and nonconsolidated school districts. Their results indicate no significant difference in the academic achievement between students who attend consolidated and nonconsolidated schools. Academic achievement differences were more closely tied to SES. They also indicate that consolidated school districts implemented more middle-school-level components (e.g., team teaching, flexible teaching, and cooperative learning) than did community-based schools. Haller (1992) investigated the effects of school consolidation on discipline. He indicated that truancy and more serious forms of misconduct became slightly worse when small rural schools were consolidated. Since the effects were so small, Haller recommended that consolidation decisions be based on other factors.

The lone article in the School Choice topic is of medium quality. Cobb and Glass (1999) addressed policy issues in a study of charter schools in Arizona. They compared the ethnic makeup of charter schools with that of adjacent public schools. Their results suggest that policymakers should be concerned that charter schools are resulting in ethnic stratification.

The two articles in the School Finance topic are of medium quality. Alspaugh (2001) compared the effects of enrollment size on a number of financial measures for both rural K-8 and K-12 school districts. However, Alspaugh's results do not support his conclusion that small K-12 districts might be able to improve their financial status by converting to K-8 districts and joining with nearby districts for the 9-12 grade levels. In another investigation of financial foundations for schools, Deller and Walzer (1993) evaluated the effects of an aging population on support for education in rural Illinois. Their results suggest that higher percentages of aged persons do not adversely affect the economic base or the passage of referenda supporting local schools.

In a medium-quality study in the Transportation topic, Howley, Howley, and Shamblen (2001) surveyed elementary school principals about the experience of elementary students who ride the bus in rural locations versus suburban locations. They report that elementary schools in rural locales are more likely than suburban schools to have the longest ride for students, large attendance areas, and rougher rides for students, and to include secondary-school-age students on the bus. These findings illuminate some of the difficulties related to consolidation.

Summary of the Conditions of Rural Education Research

Table 4 presents data on the number of abstracts and higher- and medium-quality studies for each of the top 10 topics and the five clusters. These data indicate that more higher- and medium-quality studies were found in this sample around the topics of Programs and Strategies for Students with Special Needs, and Student Life and Work Planning. Close behind with five articles each were Instruction, and Factors Influencing Academic Achievement. Among the clusters, Teaching and Learning had the most articles with nine.

Of importance is the paucity of higher- and medium-quality studies in this sample around particular topics. There were no quality studies in the sample about Teachers' Beliefs and Practices and only one about Education Leadership. This result suggests that a significant gap may exist in the knowledge base about the professional growth of rural teachers and the work of rural school administrators. Parent Involvement is another topic for which we would have expected to see more higher- and medium-quality studies. Among the clusters, Student Growth and Development Support stands out because there are no higher- and medium-quality studies in the sample.

Two points are important to note. First, a handful of studies on any particular topic does not constitute a knowledge base. There is not the level of research quality or a sufficient mass of evidence to make claims of certainty in any of the identified topics. Much more research needs to be conducted in these areas. Second, in many cases, the researchers expected to observe change or rural/nonrural differences, but when higher-quality research methods were evident, changes and differences were not detected. These observations lead us to question what is generally accepted as being known about rural education and suggests that the research areas identified in this section need conceptual refinement around rural research questions and more rigorous study.

It is also important to note that a third of the research conducted in rural settings is not intended to identify rural phenomena. We classified this research as Rural Context Only. Although not intended to provide specific insight into rural school issues, it can inform our understanding of the obstacles to rural school improvement and ways of overcoming them. In the absence of an extensive knowledge base, this research is important in that it can provide clues to rural phenomena if it is used in conjunction with research conducted in urban and suburban settings in order to clarify rural issues.

The results of this review indicate that there has been very little research that can be used reliably to inform policy and practice about rural education issues. The articles evaluated in this review suggest that rural education issues have not been investigated using true experimental research designs. Rather, the experimental rural education studies that have been conducted have primarily employed quasi-experimental and causal comparative methods. These results also indicate that rural education is dominated by descriptive research. These types of research techniques play an impor-

Table 4
Number of Abstracts, and Higher- and Medium-Quality Studies by Topic and Cluster

	Abstracts	Higher- & Medium-Quality Studies
Top 10 Topics		
Programs and strategies for students with special needs	78	6
Instruction	40	5
School safety and discipline	28	2
Student life and work planning	22	6
Factors influencing academic achievement	21	5
Student attitudes and behaviors	21	3
Educational leadership	20	1
Staff recruitment and retention	20	2
Teacher preparation and development	20	4
Teachers' beliefs and practices	18	0
Totals	288	34
Clusters		
Student growth & development support	27	0
Teaching and learning	91	9
Organization of schooling	18	6
Schools and communities	44	2
Education policy	30	7
Total	210	24

tant role in building knowledge. This review did not examine the quality of the descriptive rural education literature, so there is little that can be said conclusively about the quality of that literature. It can be said that qualitative research has its own set of rigorous research designs. Because there are more rural education researchers using descriptive methods, we would hope higher-quality, noncomparative studies exist than we found in the comparative literature.

A Research Agenda for Rural School Improvement

The results of the literature review described in this report confirm that the condition of rural education research is poor. Since there is no topic with a sufficient body of research, policymakers and practitioners cannot make decisions regarding the likelihood of success for any given intervention with a high degree of confidence. To address this problem, McREL published *Guiding Rural Schools and Districts: A Research Agenda* (Arnold, 2004), which was developed based on a previous review of the rural education research (Arnold, Newman, & Bailey, 2003) and in consultation with the policymakers, practitioners, and researchers on

McREL's Rural Advisory Committee. The following agenda draws heavily upon this earlier document.

The paucity of rigorous rural education research points to an almost limitless number of possibilities for a rural education research agenda. In order to prioritize, and therefore narrow, the number of issues to be addressed, McREL has identified a research agenda that connects the results of the literature review, the challenges schools face in implementing the provisions of NCLB, and long-standing concerns of rural schools. The rural education research agenda crafted by McREL includes nine priority topics:

- Opportunity to learn
- School size and student achievement
- Teacher quality
- Administrator quality
- School and district capacity
- School finance
- Local control and alternative organizational structures
- School choice
- Community and parent aspirations and expectations

Some of these topics appear on the top 10 topics list in the literature review, indicating at first that perhaps they do not need to be considered a priority research topic. However, when reviewing the quality of the studies identified in the literature review, it became clear that there is little quality research even on those top 10 topics. There are no quality studies on Teachers' Beliefs and Practices, for example, and only one on Education Leadership. There is also a lack of quality research for the topic clusters. For example, in the Education Policy cluster, which includes studies on consolidation and school choice, there are only seven studies of medium or higher quality. In such cases, we have included topics from the literature review's top 10 topics list or the topic clusters as research priorities when the topic is one that is key to the implementation of NCLB, e.g., teacher quality, or a long-standing concern of rural schools, e.g., local control and alternative organizational structures.

Priority Topics

A discussion of each of the nine priority topics, including potential research questions, follows.

Opportunity to learn. If NCLB holds schools and districts accountable for ensuring that all students reach the proficient performance level for identified standards, students must have the opportunity to learn the knowledge and skills embedded in those standards. Opportunity to learn is the notion that students have access to a viable curriculum and to effective instruction. Of the school-level factors examined in a recent meta-analysis of student achievement (Marzano, 2000), opportunity to learn was found to have the strongest relationship to student achievement. Therefore, one of the most effective strategies for increasing student achievement is to ensure that students have the opportunity to learn content identified in district and state content standards.

Standardized test scores suggest that rural schools have done a good job of teaching the basics. Time after time, rural students have been shown to hold their own against their urban counterparts on standardized tests (Gibbs, 2001; Economic Research Service, 2003). But rural schools typically offer fewer advanced and college preparatory courses, and lower proportions of rural students take advanced classes such as physics and calculus (Greenberg & Teixeira, 1998). The primary reason for this difference is that rural schools traditionally have not been organized around the goal of ensuring that students are prepared for admission to college (McGranahan & Ghelfi, 1998). Priority should be given to developing and testing strategies that rural districts can use to provide students with opportunities to take courses in advanced topics. Potential research questions related to how rural districts can provide students with the opportunity to learn advanced topics include the following:

- How cost effective are different methods of providing advanced courses to rural students, including the use of technology?

- How does the introduction of advanced courses affect the overall achievement of rural students?

- Does a focus on providing opportunities to learn in advanced subjects improve all curricula and instruction, or does it divert attention elsewhere?

School size and student achievement. Although smaller class size has been shown to increase student achievement, a related issue is the relationship between school size and student achievement. This issue is of particular interest to rural educators because of a growing trend toward consolidation of schools and districts. If student achievement is positively influenced by smaller school size, there is a good rationale for maintaining small schools.

Lee et al. (2000) distinguish between strands of school size research. One strand examines how smallness affects the organizational systems of schools. The second strand focuses on the economic aspects of smallness, including cost-benefits analyses. Lee et al. note that results from the two strands lead to different conclusions: "Although the studies with an organizational focus generally favor small schools, the research with an economic focus tends to suggest benefits from increased size" (p. 148). These contradictory views make decision making difficult for educators and policymakers.

Priority should be given to how schools can better use small student enrollment to increase achievement. Small size does not automatically result in increased learning if educators engage in practices that are better suited to schools with larger class sizes. Potential research questions about school size and student achievement include the following:

- What is the nature of the relationship between school size and student achievement?

- How can rural schools take advantage of small size to improve student achievement?

- What organizational structures of rural schools facilitate improved student achievement?

Teacher quality. Finding and retaining good teachers is a challenge for all schools, yet rural schools are at a considerable disadvantage in an increasingly competitive market for teachers. Given that NCLB requires that all teachers of core subject areas must be highly qualified by the 2005-2006 school year, there is a heightened concern

among rural administrators that they will be unable to fill teaching positions. In commenting on the highly qualified teacher provision of NCLB, Gene Carter (2003), executive director of the Association for Supervision and Curriculum Development, notes that "as teacher quality provisions of NCLB increase the demand for licensed teachers, rural communities will face greater difficulty recruiting and retaining qualified teachers" (p. 1).

Three broad areas related to the quality of rural teachers need to be explored: (a) recruiting highly qualified teachers and inducting them effectively into rural schools; (b) providing effective teacher professional development that is aligned with research-based strategies and school improvement goals; and (c) retaining teachers in geographically isolated schools. Additional knowledge is needed about the effects of state policies on rural teacher quality, and on how higher education institutions can assist in improving the quality of rural teachers. Potential research questions related to the quality of rural teachers include the following:

- How can rural schools attract and induct new teachers?

- How can rural schools retain teachers?

- How can rural schools build teachers' content knowledge and pedagogical skills in ways that have the greatest impact on student achievement?

- How do state policies facilitate or hinder the recruitment, retention, and improvement of rural teachers?

Administrator quality. Similar to the issue of teacher quality is the problem of recruiting and retaining administrators who are adequately prepared to create and sustain high-performing learning systems that ensure that all students meet high standards. This problem begins in university administrator preparation programs that are geared primarily for training urban and suburban school leaders. McREL's review of the rural education literature points to a shortage of information about the professional development of rural administrators. Technology has emerged as a potential solution for providing professional development to administrators in geographically isolated schools, but questions remain about the effectiveness of this type of training. There are also questions about whether the knowledge and skills that rural administrators need to be successful differ depending upon the community in which they work.

Rural school districts face a different set of challenges in recruiting administrators than do their urban and suburban counterparts. Rural administrators have to assume more responsibilities in small districts (e.g., instructional

leader, athletic director, bus driver) because there are fewer administrators in the district. They also receive less compensation and have greater visibility in their communities. In short, being a rural administrator is a difficult job that fewer and fewer people are willing to take. Distributed leadership, which occurs when there is shared responsibility and mutual accountability toward a common goal or goals for the good of an organization, is a potential solution for easing the burden on rural school administrators. Questions remain, however, about how distributed leadership differs in practice in rural schools versus nonrural schools. Potential research questions about administrator quality include the following:

- What are the elements of effective professional development for rural administrators?

- How effective is technology in delivering professional development to rural administrators?

- How can rural districts attract and retain administrators?

- Does distributed leadership look different in rural schools than in nonrural schools?

- Do rural principals need more instructional knowledge than nonrural principals do?

- Have alternate routes to administrative certification been successful?

School and district capacity. Rural schools and districts need the internal capacity to successfully reach the goals of NCLB. First, one must examine whether rural schools and districts have adequate resources and the infrastructure to implement programmatic innovation. Professional isolation can lead to weak professional communities, which perpetuate ineffective practices. Such organizations may lack leaders who know how to build internal capacity, such as systems that facilitate ongoing improvement of practices. Second, rural schools face significant resource limitations, particularly in terms of economic and human resources. In addition, there are social, cultural, and political forces that can influence the capacity of rural schools to improve. Therefore, priority should be given to developing and testing strategies that build school and district capacity to improve student achievement. Potential research questions related to school and district capacity include the following:

- How are rural schools developing the local capacity to respond to the curricular and instructional alignment required by standards-based education?

- How are rural schools developing the local capacity to conduct formative and summative assessments that are part of a standards-based system?

- Do rural administrators have to consider different issues in school improvement than their nonrural counterparts?

- How do traditional notions of schooling, and the roles individuals play in schools, influence the development of rural school capacity?

- How do rural administrators increase their knowledge and ability to build school and district capacity?

- How do rural schools develop and use their human, cultural, social, economic, and political resources to improve?

School finance. There is considerable debate about the financial implications of NCLB. Regardless of one's view of the issue, of main concern is whether rural schools have adequate financial resources to successfully comply with the Act's requirements. Like all schools, rural schools receive a considerable amount of their funding through state funding formulas. In recent years, states have taken on greater responsibility for funding schools. With tightening state budgets, lawmakers are seeking ways to reduce public education costs. Rural schools become easy targets because of higher per-pupil costs in the smallest schools and districts. As a result, lawmakers seeking to reduce state budgets turn to school district consolidation. However, as Odden and Picus (2000) note, "In most cases, there is not a strong research base [about the benefits of consolidation] for continuing to encourage school and district consolidation" (p. 231).

In addition, there are issues about how much it costs to bring all students to proficient levels of performance. Some rural school advocates maintain that rural schools are more instructionally efficient because the cost of educating a child all the way through graduation is lower in rural districts than in urban districts, which typically have lower graduation rates. The issue of costs is also of special concern for schools and districts with growing numbers of students for whom English is a second language. Potential research questions about school finance issues include the following:

- What are the different ways in which states are funding rural schools given higher per-pupil costs in small districts?

- How can rural school districts increase efficiency (i.e., lower costs while increasing student achievement)?

- Are rural schools instructionally more effective and efficient than nonrural schools?

- With the increase in English language learners, how are district and school resources distributed and redistributed?

Local control and alternative organizational structures. Local control of schools is a deeply held value in many rural communities, yet many educators and policymakers think that local control is an outdated notion that hinders rather than facilitates successful school improvement. Advocates of local control counter that schools are community institutions and that local governance is an important part of community culture (Jimerson, 2004). Related to local control are governance issues. Consolidation has long been a contentious issue in rural America as local communities have struggled to maintain control over their schools in the wake of state budget cuts.

In recent years, school districts have experimented with alternative organizational structures that reduce central administration costs while ensuring that policy decisions are made at the local level. These arrangements, sometimes called regional cooperation of governance agreements, may be an effective compromise that meets the goals and objectives of both sides of the consolidation debate. No research is available, however, on the relationship between alternative organizational structures and student achievement. Potential research questions related to local control and alternative organizational structures include the following:

- How can local community control be used to improve student achievement?

- What are the effects of alternative organizational structures on costs, local control, and student achievement?

- What are the contextual factors that could make alternative organizational structures cost effective?

School choice. School choice in rural areas is a subject that has been largely overlooked by researchers. This gap in the rural education knowledge base may be due to the perception that geographic isolation precludes choice. However, there are signs to the contrary. Rural charter schools are providing an option to school consolidation by giving parents and educators the opportunity to keep their local school open. State inter-district choice laws are giv-

ing parents the opportunity to send their children to schools outside of their home district. NCLB provides parents with the opportunity to send their children to another school at district expense if their neighborhood school is found to be in need of improvement.

The lack of educational alternatives in the most isolated communities weakens parental choice. Because even outstanding rural schools cannot meet the needs of all students, it is important to develop and test alternatives that could result in parents having more viable educational choices. Potential research issues related to school choice in rural schools include the following:

- How can school choice be effectively provided in rural contexts?

- In what ways can school choice options improve the educational outcomes of rural students?

- Can school choice improve the responsiveness of rural schools to community and parent educational expectations for students, and how?

- How effective are alternative choice models at improving student achievement?

Community and parent aspirations and expectations. Rural community aspirations and expectations can influence the success of school improvement efforts, perhaps even negatively, if communities continue to adhere to the economic development model of bringing in low-skill, low-wage jobs. For many years, the conventional wisdom has been that rural economic development should be based on attracting businesses that offer these lower wage/lower skill jobs (Hobbs, 1998). Thus, academically talented rural youth often have been encouraged by their parents and teachers to stay in school, go to college, and move to the city to find higher paying jobs. As a result, there has been a steady migration of the most successful graduates away from rural areas (Jischke, 2000).

A related issue is parent expectations, which are an important factor in improving student achievement. In fact, as Marzano (2003) notes, "high expectations communicated to students are associated with enhanced achievement" (p. 129). Thus, schools can boost student achievement by encouraging parents and other community members to recognize the potential of higher aspirations and expectations. Potential research questions related to community and parent aspirations and expectations include the following:

- How can rural schools educate parents and community members about the importance of student achievement?

- Are there effective models for how rural schools can support community development efforts?

- How can schools encourage parents to have high expectations for their children?

Moving the Agenda Ahead

McREL has developed this research agenda in order to encourage a strong body of rural education research. Building this body of research will require a concerted effort to commit the critical mass of resources needed to sufficiently investigate these issues. Adding to the difficulty is the diversity of rural America, which requires studies to be conducted in a variety of settings in order to capture the nuances of rural education. At the same time, there is a need to recognize that the values found in rural America differ in important ways from those in urban and suburban areas. In particular, the relationship between the school and the local community is different. Schools are much more important to the day-to-day functioning of the community in rural areas. Failure to understand those differences creates tension between school reform initiatives and local school improvement efforts. These tensions create obstacles that will continue to hinder rural school improvement regardless of how much high-quality rural education research exists.

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Appendix
School and District Classification Schemes
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The Rural Policy Research Institute (RUPRI) (2003) notes that most classification schemes of communities commonly use three criteria: (a) population size and density, (b) level of urbanization, and (c) adjacency and relationship to an urbanized area. Some classification schemes also consider the principal economic activity of the area. Of those, the most commonly used systems by federal agencies are Metropolitan Status Codes, Rural-Urban Continuum Codes, and Locale Codes.

Metro Status Codes

Metro Status Codes are derived from the Office of Management and Budget's Metropolitan Status Codes, which identifies metropolitan statistical areas (MSA). Under this system, each district is classified based on the location of the superintendent's office. There are three categories:

- Central City of a Consolidated Metropolitan Statistical Area (CMSA) or Metropolitan Statistical Area (MSA).
- Located in a CMSA or MSA, but not in the Central City.
- Not located in a CMSA or MSA (National Center for Education Statistics, 2003).

Rural-Urban Continuum Codes

The Rural-Urban Continuum Codes, sometimes known as Beale Codes, uses the metropolitan-nonmetropolitan status codes as announced by the OMB to group counties into four metro and six nonmetro groupings. Breaking down the metropolitan and nonmetropolitan counties into smaller subgroups lets researchers create finer residential groupings beyond simply metro or nonmetropolitan. The 10 categories in the 2003 Rural-Urban Continuum Codes are:

Metropolitan counties

0. Central counties of metro areas of 1 million population or more.

1. Fringe counties of metro areas of 1 million population or more.

2. Counties in metro areas of 250,00 to 1,000,000 population.

3. Counties in metro areas of fewer than 250,000 population.

Nonmetropolitan counties

4. Urban population of 20,000 or more, adjacent to a metro area.

5. Urban population of 20,000 or more, not adjacent to a metro area.

6. Urban population of 2,500-19,999, adjacent to a metro area.

7. Urban population of 2,500-19,990, not adjacent to a metro are

8. Completely rural or less than 2,500 urban population, adjacent to a metro area.

9. Completely rural or less than 2,500 urban population, not adjacent to a metro area. (Economic Research Service, 2003)

Of important note, is that the 2003 Rural-Urban Continuum Codes are not fully compatible with previous coding systems. The OMB made substantial changes in the metropolitan-nonmetropolitan delineation as well as the Census Bureau altered its method for measuring rural and urban. Users familiar with previous codes will notice that there are only 10

categories compared to 11 categories in previous versions. Users also may note that there are a number of different ways in which to define rural areas using this system. One way is to use the dichotomy of metro versus nonmetro. Another method of defining rural areas is to classify Codes 0 through 7 as nonrural and Codes 8 and 9 as being rural since they are defined as being "completely rural."

Locale Codes

Locale codes were developed by the U.S. Census Bureau to address the need for a classification system that was more discreet than the county level. As such, the system classifies individual schools into one of eight categories that reflect the proximity to metropolitan areas, population size and density. School districts are classified by the locale of the plurality of students, meaning that a rural school can be part of a nonrural district. The eight locale codes are:

1. Central City of a Consolidated Metropolitan Statistical Area (CMSA) or Metropolitan Statistical Area (MSA) with population of 250,000 or more or a population.

2. Central City of a CMSA or MSA but not designated as a large central city.

3. Place within the CMSA or MSA of a large central city.

4. Place within the CMSA or MSA of a mid-size central city.

5. Place not within a CMSA or MSA but with population of 25,000 or more and defined as urban.

6. Place not within a CMSA or MSA with a population of at least 2,500 but less than 25,000.

7. Place not within a CMSA or MSA and designated as rural.

8. Place within a CMSA or MSA designated as rural (National Center for Education Statistics, 2003).

Locale Codes 7 and 8 are always identified as being rural. Many researchers also include Locale Code 6, sometimes known as the "Small Town" category, as being rural. A few researchers will try and include Locale Code 5 as a rural category, but that practice is generally frowned upon because it includes communities of substantial size.

Number of Rural School Students and Districts by Classification System (2001)

	Metro Code 3	Rural-Urban Codes 4-9	Rural-Urban Codes 8-9	Locale Codes 6-8	Locale Codes 7-8	Mean	Range
Students	9,108,695	9,557,451	1,143,883	11,636,098	7,153,799	7,719,985	10,492,215
School Districts	7,740	7,986	1,857	9,451	6,398	6,686	7,594

Source: National Center for Education Statistics (2003).