# Professional Staffing Levels and Fourth-Grade Student Research in Rural Schools with High-Poverty Levels

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## Abstract

*Rural schools in high-poverty areas are often understaffed. This descriptive phenomenological study examined fourth-grade state research projects in high-poverty rural Iowa schools to reveal the influence of school librarians' staffing levels on student learning of research skills. To determine evidence of students' critical literacy, ethical use of information, content learning, and understanding of the inquiry process, researchers analyzed twenty-four student work samples from eight schools, along with students' responses to questionnaires and school librarians' responses to surveys.*

*Six (66 percent) student work samples in higher-staffed schools showed higher critical-literacy scores than those in the five lower-staffed schools. Six (of nine) students in higher-staffed schools garnered higher scores in ethical use of information. Content learning in all but one school was mainly factual. At the end of the project fourteen students (58 percent) posed new inquiry questions that were either conceptual or provocative.*

## Introduction

School administrators and boards must make data-driven decisions regarding budget priorities. This reality raises a severe concern in small rural districts where scale places the school library at a high per-pupil cost. However, students in high-poverty rural schools have an urgent need for developing information-literacy skills in school because students in high-poverty rural schools are more likely to lack high-speed Internet access at home and public library resources are more limited in rural areas. According to Iowa Department of Education 2008–2009 data (Iowa Dept. of Ed. 2008, 2009a, 2009b), while 45 percent of Iowa school districts reported enrollment of fewer than six hundred, school librarians in those districts represent only 15 percent of the school librarians in Iowa. This single statistic raises concern about learners' opportunities to develop important information-literacy skills in minimally staffed school library programs.

# Purpose

This descriptive phenomenological study examined fourth-grade United States research assignments in eight high-poverty rural Iowa schools to determine whether rural students are better served by more investment in school library professional staffing. Five of the participating schools indicated lower levels of professional library personnel (ten hours or fewer per week), and three had higher levels (more than twenty hours per week). Student work samples, students' responses to questionnaires, and school librarians' responses to surveys were analyzed to determine evidence of students' information-literacy skills, ethical use of information, content learning, and understanding of the inquiry process. Student work samples were selected by the local school librarians to represent best performances as assessed in their respective schools.

# Background

The scholarly literature in the domains of school librarianship, instructional technology, and literacy education is rich with references to a multitude of literacies. These literacies include information literacy, critical literacy, digital literacy, media literacy, technological literacy, visual literacy, textual literacy, and information and communication technology (ICT) literacy. The common goal of these literacies is to prepare students for the comprehensive demands of a global society and workplace.

The nationally recognized "Framework for 21st Century Learning" (Partnership for 21st Century Skills 2011) not only recommended multiple literacies of information, media, and technology, but also integrated them with creativity, collaboration, and critical thinking to prepare students for "work and life in the 21st century." Additionally, the American Association of School Librarians endorsed multiple literacies in the common beliefs expressed in *Standards for the 21st-Century Learner* by affirming, "Multiple literacies, including digital, visual, textual, and technological, have now joined information literacy as crucial skills for this century" (AASL 2007, 3). Marilyn P. Arnone and Rebecca Reynolds (2009) provided empirical support for multiple literacies to be included in the AASL standards. Also, the AASL standards have been aligned with the Common Core State Standards through the "AASL Learning Standards and Common Core State Standards Crosswalk" (AASL 2012).

# Literature Review

This review of relevant literature is informed by three perspectives that underpin seemingly independent research domains of school librarianship, instructional technology, and literacy education. These perspectives include information literacy and the inquiry process, digital literacy, and online critical literacy.

## Information Literacy/Inquiry Process

The collective research of Carol C. Kuhlthau (2004) provides a theoretical model of information seeking that describes information literacy as a staged process. Her model of the information-seeking process delineates both the cognitive and affective aspects of information seeking. This information process model for guided inquiry instruction has been empirically tested for more than two decades (Kuhlthau 1988a, 1988b, 1988c, 1989, 1993, 2010; Kuhlthau et al. 1990; Kuhlthau et al. 2007). Kuhlthau also described the role of mediator in information seeking. She

proposed that the mediator "assists information seeking and learning from information access and use" (2004, 107). Such a role invites the school librarian to participate in and support students' research experiences. The importance of the school librarian's role in collaborative information-literacy instruction is further delineated in descriptions of inquiry where school librarians collaborate with classroom teachers to "help students to seek and use diverse, often conflicting, sources of information" (Todd 2006). Earlier Ross J. Todd (1995) found significant differences between treatment and control groups in science content learning and information skills, when information-skills instruction was integrated throughout a science course. The theoretical perception of information literacy as a cognitive process that engages students in constructing meaning is a central concept in the scholarship of information literacy.

Library Research Service (2013) provides reports on national impact studies as well as twenty state studies that provide evidence of the impact strong school library programs with high levels of staffing and information resources have on student achievement. Among the most recent state studies is the Pennsylvania study (Kachel and Lance 2013). In this study results indicated that reading and writing test scores were consistently better in schools employing full-time certified school librarians. Of particular relevance in this study was the finding that students who are economically disadvantaged benefit from full-time professional library staffing more than students generally. For all students in this study, those with full-time school librarians were almost three times more likely to have "Advanced" writing scores than did students without full-time librarians.

## Digital Literacy

AASL has defined digital literacy as the "…ability to find, use, analyze, and produce information using digital technology" (2009, 24). The emphasis on technology in this conceptual frame yields an emphasis on the media for access and communication rather than the cognitive process. A definition of technological literacy from the State Educational Technology Directors Association affirms the limitation to digital contexts: "the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century" (SETDA 2003).

The following studies revealed challenges students have and insights into electronic information searching. Dania Bilal (2004) found seventh-grade students used mostly keyword searches and viewed the list of results quickly, seeking specific answers to the task, rather than trying to develop an understanding of the information. Delia Neuman (2004) observed that high school freshmen and sophomores lacked understanding of information organization and mistakenly sought papers about inorganic chemistry in a database that covered only organic chemistry and included papers about organic chemistry in their bibliographies. Additionally, Nancy Seamans (2002) noted students' preferences for simple search, and Ross J. Todd (2008) observed rapid scans and stockpiling of information without evaluating relevance, accuracy, or authority.

Barbara Blummer summarized students' lack of understanding of critical evaluation of information in the context of digital media: 1) Teens placed importance on technologies; 2) youth were savvy in using digital literacies; 3) school programs should use more online instructional technologies in the contexts of student interest areas: however, the focus should be on the cognitive skills of teaching analytical reading and writing, rather than on the technologies (2008). Bettina Fabos learned that despite the conscious efforts of school librarians and collaborating teachers, their diligent instruction in Boolean and advanced searching did not deter

students from using only the first page or two of the search results list that "contained redundant and heavily commercialized" sources (2002, 60).

Consistent with research about student difficulties, 99 percent of teachers agreed that digital literacy was an important skill for all students; 88 percent agreed that Web research is important for school work, and 75 percent agreed Web research was important in the "…formation and validation of their pupils' beliefs"; however, most teachers rated students' digital-literacy abilities as average to poor (Miller and Bartlett 2012, 50). The only domain in which most teachers rated students' digital-literacy abilities average to good was in understanding how search engines operate. However, Teresa D. Williams, Bonnie J. Grimble, and Marilyn Irwin found that most teachers themselves were apprehensive about use of electronic databases available through school libraries. Although most teachers said they knew databases had more-reliable and focused information for students, teachers surveyed were more likely to direct their students to use the Web because it fit the instructors' own comfort levels. Teachers found the Web to be "faster, more current, easier to use, and greater in scope of information than electronic databases" (2004).

## Online Critical Literacy

Just as school library researchers have studied information-literacy practices, so literacy researchers have recognized the importance of critical literacy as students work online. Donald J. Leu and his colleagues defined a "New Literacies Perspective" and a set of ten principles to inform research in this area. Driven by a wide variety of information and communication technologies (ICTs), such as gaming, video, search engines, webpages, and technologies to establish communities on the Internet, Leu et al. asserted that students should be prepared to use these new online literacies for the "use of information and the acquisition of knowledge" (2004, 1571).

An important dimension in the scholarship of online critical literacy is the comparison of online reading comprehension and offline comprehension. Julie L. Coiro and Elizabeth Dobler found that skilled sixth-graders reading online simultaneously used skills in the following three areas: "(1) prior knowledge sources, (2) inferential reasoning strategies, and (3) self-regulated reading processes" (2007, 229). In a later study, Coiro found that among seventh-graders' online reading, offline reading, and prior knowledge assessment, all three independent variables correlated with one another but did not have significant interactions. Coiro concluded: "Higher levels of online reading comprehension skills may help compensate for lower levels of prior knowledge when adolescents read on the Internet" (2011, 370). Julie Coiro, Jill Castek, and Lizabeth Guzniczak (2011) identified traditional and new reading comprehension tasks used in seventh-graders' paired online reading: planning, searching, overviewing, determining important ideas, integrating, questioning, evaluating, monitoring, repairing, reflective processing, and confirming/clarifying. Additionally, students took on new roles when working together, and they showed more complex levels of thinking for tasks such as integrating and confirming/clarifying, activities that the researchers interpreted as evidence of deeper thinking.

Julie Coiro and Clint Kennedy initiated the Online Reading Comprehension Assessment (ORCA) to measure middle school students with an "authentic, problem-based, and interdisciplinary task" (2011, 6) such as: "Are energy drinks dangerous to teen heart health?" Students had forty-five minutes to research online and to present a relevant answer appropriate for the defined audience. These researchers found that students were not skilled in new literacies but could benefit from "…scaffolded and regular practice" (2011, 13). More recently, Coiro has

asserted there is a "dire" need for innovative assessments of reading comprehension in online contexts. Specifically, she emphasized the need to measure "(1) the ability to critically evaluate, synthesize and communicate new understandings related to a self-generated task that looks completely different from one student to the next, and (2) the ability to perceive, sort out, and respond to multiple agendas and perspectives represented (or missing) across a collection of online texts" (2012, 413).

Additional studies showed that instruction targeting website evaluation at the fourth- and fifth-grade level, if integrated into curricular unit areas, was successful in raising students' ability (Baildon and Baildon 2008) and awareness (Zhang, Duke, and Jimenez 2011).

In summary, research findings from three perspectives—librarianship, technology, and literacy—affirm the need for effective instruction in information literacy, digital literacy, and online critical literacy.

# Research Questions

In the context of rural schools situated in high-poverty districts, the following research questions guided this study:

> *Critical literacy*: How well do students' cited sources demonstrate attention to authority and potential bias? How well do students find and interpret information?

> *Ethical use*: How well do students attribute credit to sources? How well do students employ ethical use of information, e.g., direct quotations and cited paraphrasing?

> *Content learning:* To what extent do students apply factual findings to arrive at insights or discoveries?

> *Inquiry process:* To what extent do students wonder about new questions once they have completed a research project? And what steps would they expect to take to investigate those questions?

# Method

Descriptive phenomenological research is a technique that "…consists of answering the major research questions and forming an in-depth understanding of the central phenomenon through description" (Creswell 2008, 254). Phenomenological research aims to form a "deeper understanding of [an] experience" (Pickard 2013, 268). According to Barbara M. Wildemuth such research seeks to understand a phenomenon "…for the particular purpose of using that understanding to improve a system's or program's design" (2009, 28). This research aims to understand students' research processes and learning in a conventional United States research project through the lenses of critical literacy, ethical use of information, content learning, and inquiry. The purpose of this study is to describe characteristics of students' state "research" projects from eight rural schools with high-poverty levels, noting differences in school library professional staffing levels and how these differences may influence student learning.

Based on 2008 census poverty data provided by the Iowa Department of Education, researchers identified Iowa elementary schools (see table 1) with a high-poverty level in the district. Researchers invited thirty schools to participate, and eight agreed to participate in the study. Poverty rates for participating schools fell between 15 and 21 percent. Five schools showed

lower professional staffing (zero to ten hours), while three buildings had higher staffing at twenty or more hours per week. None of the professional school librarians worked full-time in one building. One participating school had indicated a school librarian staffing level of 40 hours per week on the annual statewide survey of school libraries; however, the individual serving in the position held no school librarian certification. Thus, researchers identified this school as zero hours of professional school librarian staffing in this study.

**Table 1. Participating schools' demographics and library resources indicators.**

| Building | Endorsed School Librarian (SL) Hours per Building | Grade Levels This Building | Building Enrollment | Poverty Level | Total Buildings & (Enrollment) per This SL |
|---|---|---|---|---|---|
| 1 | 0* | K–5 | 535 | 17.99% | 1 (535) |
| 2 | 7.5 | 3–6 | 375 | 15.81% | 5 (1224) |
| 3 | 8 | PK–5 | 134 | 15.91% | 5 (983) |
| 4 | 9 | PK–4 | 191 | 15.49% | 2 (499) |
| 5 | 10 | 3–5 | 287 | 16.38% | 2 (588) 0.5 FTE |
| 6 | 20 | PK–8 | 458 | 16.90% | 1 (458) 0.5 FTE |
| 7 | 25 | PK–5 | 392 | 16.16% | 2 (645) |
| 8 | 35 | PK–8 | 448 | 21.35% | 2 (818) |

*Licensed teacher serving in capacity of school librarian without library endorsement
Note: Shading indicates higher-staffed schools.

# Limitations of the Study

This study is limited by the small sample of schools. One reason for the small sample was the requirement that the school librarian had completed the annual state school library survey. Further, some school librarians cited a lack of time and scheduling difficulties, particularly for those who served multiple buildings or districts. Another limitation of the study was the state research assignment itself. While fourth-grade curriculum often includes a study of the states, it is not universally taught as a research project. One school substituted a cultures research project for fourth-graders because the curriculum did not include the U.S. research.

# Findings

For triangulation of data sources, researchers analyzed three types of data for the eight participating schools. The first data source was fourth-grade students' end products of their research; these products included student papers, PowerPoint Glogster presentations, and a "My State Book" prescriptive format. Each school librarian submitted three end products as exemplars of best performance based on local assessments. The second data source was the survey responses from the same three selected students from each school. The third source was the response to the school librarian survey.

One school substituted a cultures visual-literacy project for fourth grade in place of a United States research project. Researchers reviewed these projects and incorporated the students' survey responses in the data analysis; however, analysis of the projects was not comparable to the states projects due to substantive differences in the assignment.

Researchers assessed the students' end products through three lenses. In the first reading, researchers noted the variety of formats and assignment parameters. In the second reading, factual and comprehension levels were assessed. Lastly, the projects were reviewed for noteworthy excerpts or characteristics.

Researchers developed a rubric (see table 2) to assess students' survey responses (see Appendix A) for indicators of critical literacy skills, ethical use of information, content-area learning, and inquiry learning, including the ability to pose new questions having completed an initial research project.

**Table 2. Student survey response rubric.**

| Criteria to Evaluate Survey Responses | Expert = 3 points | Apprentice = 2 points | Novice = 1 point [Incomplete or no response = 0 points] |
|---|---|---|---|
| Content Learning (Survey Questions 1, 2, 3, 9) | Student identifies new learning at either the synthesis, evaluation, or analysis level. | Student identifies new learning at the comprehension level. | New learning is described as isolated facts. |
| Critical Literacy-Finding Sources (Survey Question 4) | Student lists 3 or more sources were used. | Student lists 2 sources were used. | Student lists 1 source was used. |
| Critical Literacy-Evaluating Information (Survey Question 5) | Student states 2 or more criteria for evaluating information including purpose, scope, timeliness, and authority. | Student differentiates between information from the open Web and paid resources—print or electronic, shows awareness of Web domains, compares information from two or more sources, or other indicators of quality. | Student states a general criterion for evaluation, i.e., reliable, teacher or parent approved it, etc. |
| Critical Literacy-Rejecting Sources (Survey Question 6) | Student indicates information sources that he/she rejected and can identify at least two criteria for a decision to reject. | Student can identify one qualitative reason to reject a source of information (i.e., couldn't understand it, didn't fit needs of project, etc.). | Student states a source was rejected, but gives no reason or basis is strictly quantitative (i.e., had too much information). |
| Ethical Use of Information-Citing Information (Survey Question 7) | Student is able to state 2 purposes, i.e., to show credibility of own work and to give credit to others. | Student is able to state 1 purpose, i.e., to show credibility of own work or to give credit to others. | Student states only purpose is as a finding aid (i.e., a means to find the passage again). |

| | | | |
|---|---|---|---|
| Inquiry-New Questions (Survey Question 10) | Student is able to pose one or more new research questions that are either conceptual or provocative questions. | Student is able to pose 2 or more new questions that are factual questions. | Student is able to pose 1 new question that is a factual question. |
| Critical Literacy-Finding Information (Survey Question 10b) | Student describes a process for locating information beginning with general sources and progressing to more focused sources. | Student locates information in 2 or more sources and identifies different types of sources (e.g., websites, books, databases), or student identifies 1 source and 1 location strategy. | Student describes tools or a strategy for finding information, but is not able to differentiate among types of sources. |

Finally, to understand the instructional context of the project and the involvement level of the school librarians, researchers analyzed responses to the survey of participating school librarians (see Appendix B). These surveys were completed at the conclusion of the participants' involvement in the research; thus, the survey also provided for the school librarians' reflections on what they might do differently in future projects. The study's four research questions relating to online critical literacy, ethical use of information, content learning, and inquiry provided a frame for analysis of data.

## Critical Literacy

### Overview

Critical literacy is the ability to find information and evaluate sources for authority, bias, purpose, and timeliness. Critical literacy questions on the student survey asked students to list their information sources, evaluate sources, and list steps to investigate future questions. Figure 1 shows all twenty-four students' scores for the eight participating schools, arranged in order of weekly school librarian hours. Student scores were assigned using the Student Survey Response Rubric (see table 2) to assess all four questions relating to critical literacy (questions 4, 5, 6, and 10b). Thus, twelve points was the highest score a student could earn for critical literacy; in this category, two students scored ten points with one student in a higher-staffed school and one in a lower-staffed nine-hour school. Notably, six students in higher-staffed schools had consistently higher critical-literacy scores than students in the schools with ten or fewer hours per week.

**Figure 1. Student survey scores: critical literacy.**
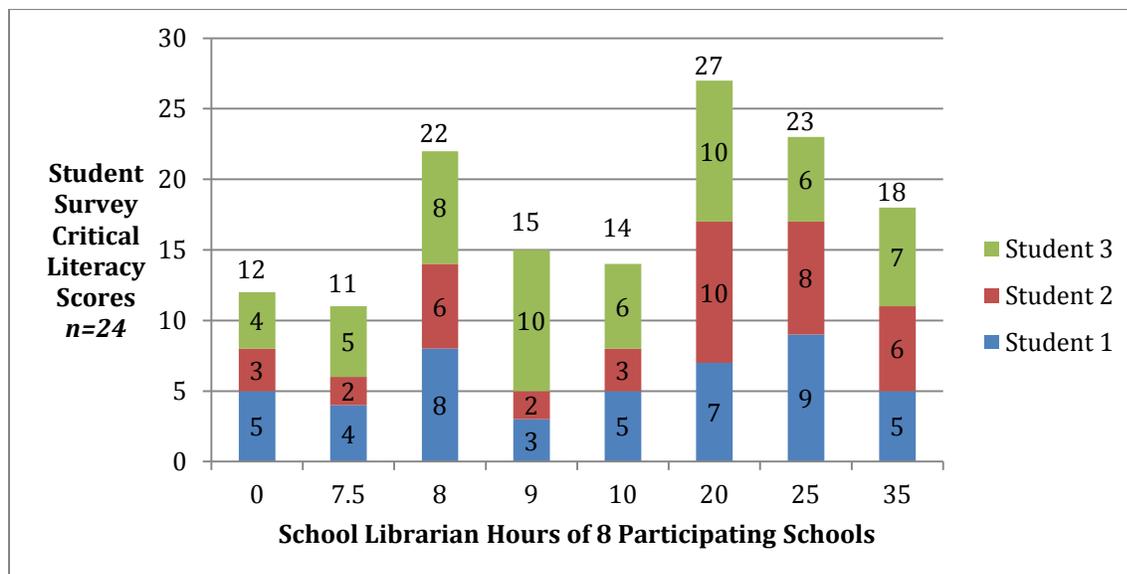


## Identifying Resources

Students reported where they found their information and listed sources used (for example, Google, Iowa AEA Online databases, the school library, a book, etc.). Responses were scored using the rubric, with researchers giving three points if the student listed three or more sources, two points for two sources, and one point for one source. Students also reported whose idea it was to use this source (my idea, parents, teacher, school librarian). Three (33 percent) students from the higher-staffed schools mentioned the school librarian, and four (26 percent) in the lower-staffed schools credited the school librarian.

*CultureGrams State Edition* is a database provided to all schools in Iowa. This would have been an ideal resource for the United States research projects. Only six of the twenty-one students doing states projects reported that they used the *CultureGrams States Edition* database. Three students (from the ten-hour school) listed this database by name on the survey, but their projects did not include citations. All three students from the twenty-hour school specifically cited *CultureGrams States Edition* in their citation slides in their PowerPoint presentations. Alternatively, sixteen students (66 percent) said they used Google, and eleven (45 percent) used books.

Of the seven school librarians facilitating state studies, four specifically mentioned *CultureGrams States Edition* in their survey responses. Consistent with her students who cited *States Edition*, the school librarian from the twenty-hour school included a lesson objective for "helping students become more aware of using the AEA databases." Also in line with her students' responses that they used this source, the school librarian from the ten-hour school stated that she used an activity to introduce students to *States Edition*. However, two school librarians stated that they had encouraged use of *States Edition*, but without success. The school librarian in the 7.5-hour school said that, during one of her monthly classes with all fourth-grade students, she showed students how to access the Iowa AEA Online databases including *CultureGrams* and allowed students to explore: "I told them that whenever they started this [project], *CultureGrams States Edition* would be a great resource to use." She also sent e-mails to the fourth-grade teachers suggesting these resources as well as the school library's states books. The school librarian in the eight-hour school stated that, although she did not have a

major role in this unit, she "informed the classroom teacher about the AEA resource *CultureGrams States Edition* that could have been used in student research."

In response to 10b, Students listed the steps to investigate future research questions. The highest-scoring students listed two or more steps to information gathering including process-oriented steps about sorting information or identifying keywords in addition to proposing types of sources; table 3 shows samples of these students' responses. Only five students (all from higher-staffed schools) scored three points for this question.

**Table 3. Scoring samples of student survey responses to information process question 10b. (Language errors in student responses are native to the students' actual responses.)**

| Score | Question 10b. List the steps you would take to investigate those questions. |
|---|---|
| 1 | I would go on google and find the information. |
| 1 | I would look in a book or on the internet and get the answers. |
| 1 | I would use my previous sources, and I would try to find the answers to the question. |
| 1 | I would look in the sources I used and also some new sources. |
| 1 | I would use state grams. |
| 2 | I would go to google.com, first type in Fort Pultuski battle injurys, get the answer, go back, type in Georgia population and get the answer. |
| 2 | I will start with Louisiana's song, animal, tree, then jazz then why they don't have counties I would use google and books to get more detail. |
| 2 | 1. Get answers from the people and how they feel. 2. Find what they need or want culters and why. 3. How can culters relate with other things like religions. |
| 2 | First look in a book of your state then if you don't fine anything then you can ask someone who has been to that state, or you can get online. |
| 2 | You could use a book the computer other people. |
| 3 | Think of what I know - Background knowledge.<br>Brainstorm Questions<br>Search out answers online or in books<br>Sort reliable (good) or bad (unreliable).<br>Sort what I understand the don't.<br>I would organize info that makes sense together.<br>I could then make decisions about that culture and add it to my knowledge. |
| 3 | 1. use a computer to explor the databases. 2. Use key words to search for topics. 3. If I can't find a source, look in a book. |
| 3 | 1. Use a computer to explore databases. 2. Use key words for the topics, 3. If I can't find it look in a different source. |
| 3 | Use a computer and explore website. Use key words to find inforemation. If I can't find my ryserch I'll find it in a book. |
| 3 | I could look in books at my library or I could use the internet. I think a book might work better though because sometimes books have more valid information. |

## Evaluating Information

Students appeared to struggle with evaluation of information. Table 4 shows a sampling of student responses organized by scores.

**Table 4. Scoring samples of student survey responses to information evaluation questions. (Language errors in student responses are native to the students' actual responses.)**

| Score | Question 5. How did you know you had good information? | Question 6. Did you find sources of information and decide not to use them? / If so, why did you decide not to use them? |
|---|---|---|
| 0 | I just guest | No / I used something from all of my sources |
| 1 | I double checked my resources and my writing to see if it sounded right | Yes / I thought they didn't sound interesting |
| 1 | For the birds, it showed the pictures of them with their name and their family right beside the picture. | Yes. / For the battles there were tons of different ones and I did't need that much information. |
| 1 | The state grams were from Mrs. D. | Yes / Because I figured if I had too much information, my glog would get crowded. |
| 2 | I rechecked my answers on different sources. | yes / because I wanted to get people to learn about more than one thing in Colorado and there was a lot of information so I decided to use some of it from many different sources. |
| 2 | Because the sources I used had information that was the same. | |
| 2 | I looked in several resources. I compared and used the best information possible. | |
| 2 | I knew I found good info when I saw it twice or it seemed real like it would really happen. | yes / Some of them I did not use because it only had a little bit of info that I was looking for and if they were really long and did not have anything I did not use that site. |
| 2 | My topic matched. I found it on more than one source. | Yes. / The weren't good or hard to understand. They also may have been common knowledge. |
| 3 | | Yes, I decided not to use them because it was not the information I needed or the information wasn't right. |

Students reported how they determined whether they had good information. No students listed more than one criterion for evaluating information. A popular answer (ten of the twenty-four students) was that they were satisfied if two sources said the same thing. Nine students stated one simple criterion such as they thought the source was reliable or seemed trustworthy, but they did not give any evidence for this judgment. Five students either didn't answer the question or said they guessed.

As another indicator of evaluation of information sources, students reported on whether they had decided not to use a found source. Only one student provided more than one criterion for rejecting the source, "Yes, I decided not to use them because it was not the information I needed or the information wasn't right." Eight students scored a two for a response that identified one reason to reject a source; for example, some students stated a source was too difficult to understand. Nine students gave a reason for rejecting a source, but it was simply that they already had enough information.

## Ethical Use of Information

### Overview

Students responded to a survey question that asked why it is important to list your sources of information. Figure 2 shows students' scores by schools, sorted by number of school librarian hours. No student answers stated the purpose for citations was to provide authority or credibility

for the students' own work. Nine students said the purpose was to give credit to the author of that source, and fifteen stated only that listing the sources facilitates future location of the information for themselves or their teacher. Notably, six of the nine students in schools with higher professional school librarian staffing had higher scores for ethical use of information than did the students in the lower-staffed schools.

**Figure 2. Student survey scores: ethical use of information.**
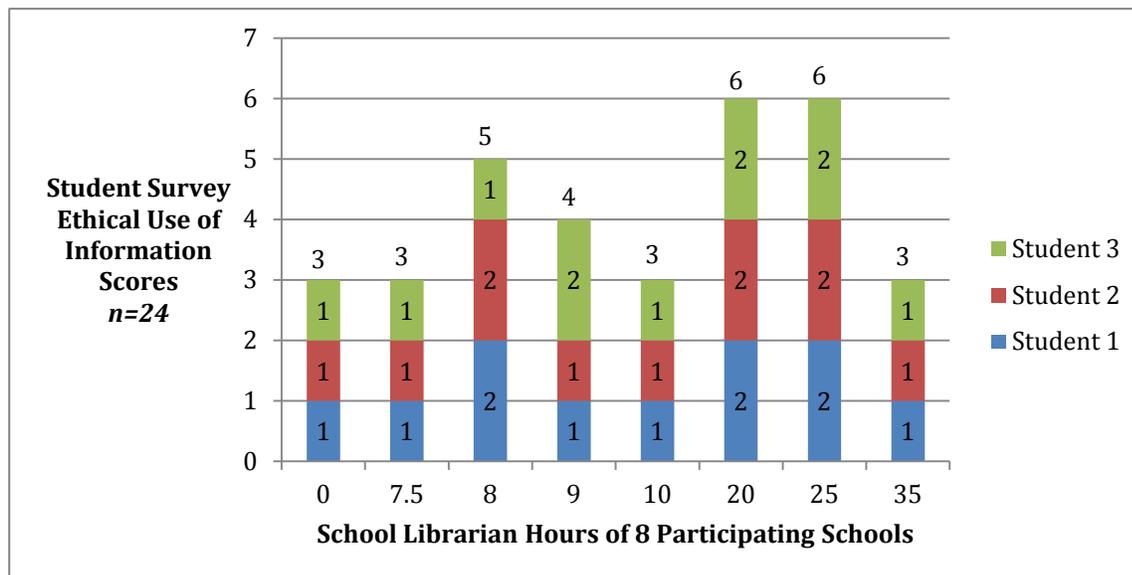


## Noting Information and Its Sources

In explaining how they wrote down their information, twenty two students chose "I wrote down parts of sentences in my own words." Two students chose "I wrote down important words." No students chose "I copied the exact words or sentences."

In spite of students' knowing the purpose for citations, only nine students—three (20 percent) from the lower-staffed school group and six (66 percent) from the higher-staffed school group—included citations in their end products. In the twenty-hour school, citations appear to have been given instructional attention because each of these students had multiple citations.

Consistent with the student survey responses, two school librarians reported that they taught students how to cite sources. The school librarian in the twenty-hour school said she taught MLA citation format. (Her students used complete, accurate citations for multiple sources.) The school librarian in the twenty-five-hour school also said she taught citations prior to the United States research: "Prior to this project I presented lessons on the importance of giving credit to the resources/persons who provided the information for this research project and any other research." Unfortunately, citations were not required in the projects at that school.

# Content Learning

## Overview

Content-area learning includes information about states, such as history or economy, with rubric scoring levels for factual, comprehension, and synthesis. Results showed that, in all but one school, students' learning of content was mainly factual. Most student responses listed facts such as: they play a lot of jazz in Louisiana; the wild rose is the state flower; Houston (TX) is named after Sam Houston; or there are many tourist attractions in Florida. Table 5 shows samples of the predominantly factual learning statements.

## Higher-Level Thinking

Only five student statements or questions scored were at the comprehension level with a connection to another concept or idea.

The only responses that demonstrated the synthesis level were from the school that did an alternate research project "What Does a Picture Tell You about Culture?" in which students studied *National Geographic* images to understand geography and human characteristics. One student stated, "I learned that people are less fortunate than most people and some people can't afford as much things as others." Additionally, a student noted, "I am most proud of learning about how people and their religion live as one big economy because some are rich and poor but we are all just humans."

**Table 5. Scoring samples of student survey responses to content questions.**
**(Language errors in student responses are native to the students' actual responses.)**

| Score | 1. List what you learned about your topic from this project. | 2. How did your research change your opinion about your topic? | 3. What are you most proud of learning about your topic? |
|---|---|---|---|
| 1 | I learned that Iowa is famous for corn and rich soil. | I thought that Alaska's economy was just fish, but now I know crabs is too. | I am proud of learning that Herbert Hoover is a famous person in Iowa. |
| 1 | What I learned about Louisiana is Louisiana is the only state that does not have counties. They play jazz and a lot of hunting and fishing. | I thought that Hawaii was always warm but from my research it can be 53 degrees! | My states nickname is Hawkeye state |
| 1 | I learned that Gutzon Borglum came up with the idea of Mt. Rushmore. I learnd that South Dakota has many landforms | I thought Lake Tahoe was not in California but in a different state. | I am proud that there is a Olympic gold medalist swimmer in my state. |
| 1 | That North Dakota is called the Glickertail state. And Theodore Roosevelt was a rancher there. | I thought Colorado was going to be a boring place but it's not. | I was really really interested when it said Colorado had the highest elevation. |
| 1 | Houston was named after Sam Houston. | It changed my opinion because I didn't know anything about him I learned he was more exciting and fun to learn about. | That Michigan had president Gerald Ford. |
| 1 | That the Lake of the Ozarks is one of the man - made lakes in the world. | The research changed my opinion made my opinion about it not having many state parks I found it has over 90. | They raise a lot of horses and I love horses so much. |

| 1 | There is many tourist attractions in the state of Florida. | I thought that South Dakota didn't have many landforms now I know that it has a lot of them. | That Alaska is the biggest state in the world. |
|---|---|---|---|
| 2 | I learned that Michigan has more shoreline than any other state except Alaska, It was the 26th state. | I found out more things then I though I would. Francis made this song during war. He was way more exciting then I thought. | I am proud that I learned about someone who had written our national anthem. |
| 3 | I learned that people are less fortunate then most people are some people can't afford as much things as others. | The research changed the way I thought about this topic about why they are living this way. | I am most proud of learning about how people and there religion live as one big economy because some are rich and poor but we are all just humans. |

# Inquiry Process

## Overview

Inquiry learning includes posing new questions about a topic and developing a plan for investigation of those questions. Students were asked, "What new questions do you wonder about now that you have completed your project? List as many things as you can." Fourteen students (58 percent) posed new inquiries that were either conceptual or provocative. Notably, nine of those fourteen students were from schools with professional school librarian staffing of twenty-five-hours, twenty hours, and nine hours. Four students posed multiple factual questions. Two students posed one factual question, and three students, all from lower-staffed schools, stated they had no additional questions.

**Figure 3. Student survey scores: inquiry.**
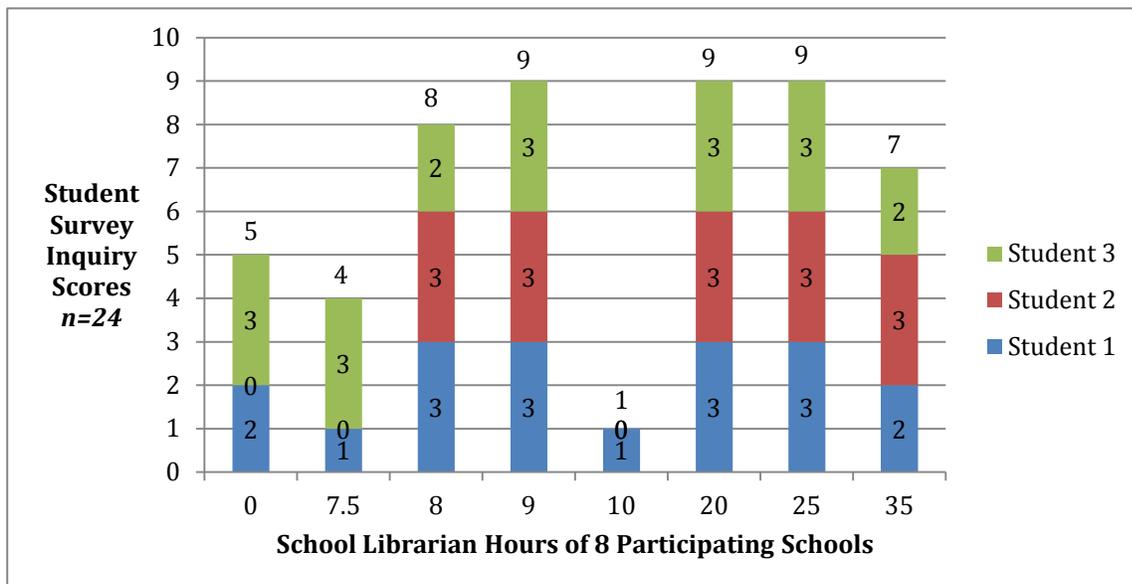
## Sample Questions

Table 6 shows samples from students who posed new inquiry questions at the conclusion of their current states research project. Many students posed questions that could be used for further research with a connection to a state. Examples of lines of inquiry included: why jazz is part of Louisiana culture, cultures in Colorado, presidential comparisons, poverty and foreign aid, or musical inspirations. For students' description of the process they would follow to investigate their new questions, see the discussion of survey question 10b in the "Critical Literacy" section above and samples of students' responses in table 3.

**Table 6. Scoring samples of student survey responses to inquiry questions. (Language errors in student responses are native to the students' actual responses.)**

| Score | 10. What new questions do you wonder about now that you have completed your project? List as many things as you can. |
|---|---|
| 0 | I do not have any more questions about Iowa. |
| 0 | I don't have any, they were all answered in my project. |
| 1 | How many people were hurt in the battle of Fort Pultuski? What's the population of Georgia now or in the closest time past recorded. |
| 2 | How big is Hawaii? How many people live in Hawaii? What is its beverage? |
| 3 | Louisiana's tree, song, animals, why did they play jazz and why they do not have counties. |
| 3 | Where does the name "Colorado" come from? What kinds of people live in Colorado? Where are the Rocky Mountain located in Colorado? |
| 3 | Why are there only four presidents on Mt. Rushmore? Are there other states that have two nicknames? |
| 3 | How do they keep there culture special and different, How do people accept there cultures, Do people choose cultures, How do you come up with cultures? Do people make them, Why are there so many and not just one, Are people happy with there culture, yes or no? |
| 3 | I would ask how long have people been living this way and why our country will not help them and if they are why can't we do more about it and help the people that are poor and are living on streets. |
| 3 | I wonder were the stars live, has it ever snowed there, how do you produce movies, What is the biggest beach there called |
| 3 | How did the Missouri river get its name? How did they make the Lake of the Ozarks? How did Missouri get its name? |
| 3 | I was wondering why he made this song while there was a war going on. I also wanted to know if he died during the war. |

# Discussion and Recommendations

## Overview

Four findings emerged from analysis of student projects and survey responses, and school librarians' survey responses.

1. School librarian collaborative instruction facilitated student work.
2. Collaborative instruction was helpful to address student struggles with evaluation of information.
3. The quality of students' products exhibited potential for deeper inquiry.
4. New-inquiry motivation was high.

## School Librarian's Collaborative Instruction at the Highest-Scoring School

Student surveys and projects from the higher-staffed schools had the highest scores in nearly all areas except content. The school librarian in the twenty-hour school reported in her survey that three objectives included use of online databases, a variety of resources to complete a project, and a citation format. Although she worked only two days a week at the K–12 district school, she appeared to be the only school librarian who engaged in collaborative instruction with the fourth-grade teacher: "Class time was made available for me to instruct students and when they had free time they were allowed to come to the library/computer lab to work on their project and get help." She taught how to locate information in databases and, following this instruction, provided time for students to practice. She also taught how to locate information in print encyclopedias and online library books. Models were provided for students to practice determining relevance of information. State projects were shared at parent-teacher conferences. The value of collaboration between teacher and school librarian and of research instruction integrated into the project development was evident in these students' end products and their survey responses that exceeded all other schools in critical literacy and ranked in the top schools in all other areas.

In contrast, during fixed-schedule library lessons "prior to their research," the school librarian in the twenty-five-hour school presented lessons on the importance of giving credit to the resources for their research. Her students learned to use Citation Maker, and she taught skills related to finding and evaluating websites. In the future, she would "not limit research to just the Internet." Her survey response indicated that the teacher decided to use only Web sources. With twenty-five-hours per week of staffing by a professional school librarian, this school was one of the best-staffed among participants. However, responses indicated a lack of collaborative planning and teaching in favor of more isolated fixed-schedule classes in the library.

Regarding the use of *CultureGrams States Edition* as a credible and authoritative source: students in schools where librarians provided intentional, contextualized direct instruction about it made use of this resource. However, mere out of context mention of the resource—to either students or teachers—did not cause it to be used. The failure to apply to the research project lessons taught in library classes echoes the findings of previous studies in which the power of collaborative planning and teaching have been emphasized (Todd 1995; Todd 2006). Further, James E. Herring (2011) showed that students have difficulty transferring their learning to a new situation, so skills must not be taught in isolation.

In the nine-hour school, content learning was high among students who were learning about cultures, rather than states. This learning may have been related to the appeal of their unique assignment. Students in the eight-hour school also demonstrated content learning. Their Glogster projects had great potential for provoking deeper inquiry. However, information evaluation and citations were lacking.

## Instruction Needed to Address Student Struggles with Evaluation of Information

Generally, students were better at answering questions about finding information sources than about evaluating information. Paralleling this finding, a number of studies reviewed showed that more instruction and understanding about evaluation of the highly commercialized information on the Web is needed at all grade levels (Blummer 2008; Fabos 2002, 2005; Miller and Bartlett 2012).

Although school librarians were not asked specifically whether they taught information evaluation, two volunteered this information. The school librarian in the twenty-hour school said she taught students to look for "important data, copyright date, author, and Web details such as .edu, .gov." The school librarian in the twenty-five-hour school said that during a library lesson, in preparation for the states project, she gave students a worksheet to use as she taught students about finding sources online and evaluating source reliability. The school librarian in the 7.5-hour school said she included information about what makes information trustworthy, but that she wanted to do more:

> Obviously, I want to be more involved in the process, from start to finish. That includes sitting down with the teacher to plan before she ever starts the project with the kids. That way I could ensure that the students are learning to do research accurately according to a research process model…I'd teach some lessons on how to evaluate the quality of information sources. I typically delve into this topic beginning in fifth grade, but it is important for even younger students to learn.

## Quality of Students' Products Show Potential for Deeper Inquiry

Submitted samples of student work were selected at the schools to represent the best work. In the 7.5-hour school this classroom teacher seems to have taught students to write interesting, well-organized reports. Student papers were each two single-spaced handwritten pages. One student wrote about Georgia; her first section was about birds, followed by a transition ("Get ready for a long road trip") to a section about the distance to travel to Georgia. Unfortunately, this section digresses into irrelevant information that may have come from Web travel ads about eating delicious barbeque at The Pink Pig and a "romantic" Four Seasons Hotel that is also "luxurious." Her report included a brief section about Civil War battles in Georgia, and her survey response about new questions asks more about battles in Georgia.

Perhaps lacking here was a focused purpose and identified audience for the project. This situation may signal the need for more instruction on the development of a focal point or central question to be pursued when one engages in research. The solution may be not only collaborative teaching about the inquiry process, but also school librarian/teacher collaborative planning to set expectations for the assignment to incorporate a research focus and audience. Correspondingly, AASL standards (2007) concur that it is essential for school librarians to involve students in purpose setting for their research so that students are engaged in inquiry and critical thinking. Likewise, Todd (2012) showed that greater instruction in forming a focus for one's research would improve student learning.

Most of the PowerPoint presentations and Glogs were fact-oriented. Some, such as one about South Dakota with facts about Crazy Horse and Gladys Pyle, the first woman elected to the legislature, showed potential for deeper research. Regarding the student projects she saw, the school librarian in the eight-hour school said, "they were effectively using the information that they found through research and presented it effectively through their Glog." This assessment of satisfaction underscores the possible need to set expectations for deeper learning.

The least rigorous project was the "My State Book," which was fill-in-the-blank style. The classroom teacher supervising the school library in the zero-hour school said the activity was designed for students to fill in information from their research in their state booklet.

## New Inquiry Motivation Is High

Notably, fourteen (58 percent) of students wrote new inquiry questions that were conceptual or provocative (see table 6). New inquiry is evidence of learning and also of motivation to learn. School librarians may want to consider using the completed states project as a starting point for inquiry. With the time-intensive fact-gathering portion of the research already completed, students are primed for beginning true inquiry and may be able to more quickly complete inquiry with the guidance of the school librarian within scheduled library classes. To avoid students' boredom in extensive inquiry research, students need to generate their own questions. These students demonstrated that fourth-graders are able to generate their own insightful questions that extend beyond fact-seeking (see table 6). Students in four schools scored high in posing new inquiry questions.

# Conclusion

While this study is limited by its size and narrowly selected population, it yields findings worthy of further consideration for determining minimum threshold levels of professional staffing in school libraries, especially in small schools where scale challenges staffing allocations.

These findings may also inform future design of research assignments that focus on generating a research question beyond fact-finding, as well as collaborative planning and teaching for application of information and digital-literacy skills.

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# Appendix A

**To the Teacher or Teacher Librarian who gives the student this survey:**

**Please say this to the student:**

Your [States (or substitute the name of project title)] project was outstanding and was selected to be sent to the University of Northern Iowa where some librarians will look at your good work. It will be returned when they are finished with it. All the questions on this paper that ask about your "Project" are about your [States] project you've just completed. Your answers will help them understand the work you did.

**Student Survey**

1. List what you learned about your topic from this project.

_____
_____
_____

2. How did your research change your opinion about your topic?

_____
_____
_____

3. What are you most proud of learning about your topic?

_____
_____
_____

4. Where did you find your information? List as many as you used (Google, Iowa AEA Online, the school library, a book, or others).

_____

Whose idea was it to use this source? (my idea, parents, teacher, teacher librarian)

_____

5. How did you know you had good information?

_____
_____
_____

6. Did you find sources of information and decide not to use them? _____

If so, why did you decide not to use them? _____

_____

_____

7. You used information from a book or website in your project. Why is it important to list your sources of information?

_____

_____

_____

8. When you wrote down information, how did you do it? (Circle one answer.)
    a.  I wrote down important words.
    b.  I wrote down parts of sentences in my own words.
    c.  I copied the exact words or sentences.

9. What questions about your topic did you look for information about?

_____

_____

Who helped you? (myself, parents, teacher librarian, teacher)

_____

10. What new questions do you wonder about now that you have completed your project?

List as many things as you can.

_____

_____

_____

_____

List the steps you would take to investigate those questions.

_____

_____

_____

_____

# Appendix B

**Teacher Librarian Survey**

**Completed through a Google Form**

1. List your student objectives/outcomes for the states [or other topic - please list] research project.

2. What instruction or instructional materials did you design to support student learning about information access and evaluation, and how was instruction delivered?

3. What activities and resources were used for students participating in the [states] research to learn to find information?

4. What activities and resources were used for students participating in the [states] research to learn to evaluate information quality?

5. In what ways do you feel students met the above stated objectives/outcomes for this project?

6. What would you do differently if you were to implement the [states] research project again?

7. What else would you like the researchers to know about the [states] research project?

What is your name? [Your name will not be used in research reporting, and your information will remain anonymous. We are using the information you provide here about the research objectives and activities to help us better understand the students' work, and your name will help us to match your responses with your students' projects. Thanks!]

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