

## APPENDIX A. TECHNOLOGY LEADERSHIP STANDARDS COMPARISON

TL	COSN	NETS-A
<p>Leadership and Vision</p> <p>Educational technology leaders will facilitate development of a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of the vision.</p> <p>Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Identify and apply educational and technology-related research, the psychology of learning, and instructional design principles in guiding the use of computers and technology in education.</li> <li>B. Apply strategies for and knowledge of issues related to managing the change process in schools.</li> <li>C. Apply effective group process skills.</li> <li>D. Lead in the development and evaluation of district technology planning and implementation.</li> <li>E. Engage in supervised field-based experiences with accomplished technology facilitators and/or directors.</li> </ul>	<p>Leadership and Vision</p> <p>Works closely with the executive cabinet and stakeholders to create a vision for how technology will support the district's strategic goals.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Ability to establish and lead governance committees and facilitate the process of priority-setting and decision-making.</li> <li>B. Interpersonal skills and a willingness to work closely with all constituents.</li> <li>C. Ability to adapt known technologies to new uses and envision natural relationships between emerging technology resources and the education process.</li> <li>D. Big-picture understanding of school organization, of curriculum and of the issues of greatest importance to teaching and learning.</li> <li>E. Understanding of the change process and effective approaches to facilitating change.</li> </ul>	<p>Leadership and Vision</p> <p>Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision.</p> <p>Educational leaders:</p> <ul style="list-style-type: none"> <li>A. Facilitate the shared development by all stakeholders of a vision for technology use and widely communicate that vision.</li> <li>B. Maintain an inclusive and cohesive process to develop, implement, and monitor a dynamic, long-range, and systemic technology plan to achieve the vision.</li> <li>C. Foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology.</li> <li>D. Use data in making leadership decisions.</li> <li>E. Advocate for research-based effective practices in use of technology.</li> <li>F. Advocate on the state and national levels for policies, programs, and funding opportunities that support implementation of the district technology plan.</li> </ul>

TL	COSN	NETS-A
<p>Planning and Designing Learning Environments and Experiences</p> <p>Educational technology leaders plan, design, and model effective learning environments and multiple experiences supported by technology.</p> <p>Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.</li> <li>B. Apply current research on teaching and learning with technology when planning learning environments and experiences.</li> <li>C. Identify and locate technology resources and evaluate them for accuracy and suitability.</li> <li>D. Plan for the management of technology resources within the context of learning activities.</li> <li>E. Plan strategies to manage student learning in a technology-enhanced environment.</li> <li>F. Identify and apply instructional design principles associated with the development of technology resources.</li> </ul>	<p>Planning and Budgeting</p> <p>Works with the instructional and technical teams to identify the steps needed to meet strategic goals and a budget that takes into account the total cost of implementing technology solutions.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Ability to think strategically, manage projects, and lead the district from vision to effective delivery of services.</li> <li>B. Ability to set practical and realistic timelines for technology implementation.</li> <li>C. Understanding of the steps and financial tools involved in the budgeting process.</li> <li>D. Strong working knowledge of the concept of total cost of ownership and the ability to translate that into realistic budgets.</li> <li>E. Understanding of the impact and need for technology throughout the enterprise - and the relationship between curriculum, instruction and technology in providing a teaching and learning environment.</li> </ul>	<p>Learning and Teaching</p> <p>Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching.</p> <p>Educational leaders:</p> <ul style="list-style-type: none"> <li>A. Identify, use, evaluate, and promote appropriate technologies to enhance and support instruction and standards-based curriculum leading to high levels of student achievement.</li> <li>B. Facilitate and support collaborative technology-enriched learning environments conducive to innovation for improved learning.</li> <li>C. Provide for learner-centered environments that use technology to meet the individual and diverse needs of learners.</li> <li>D. Facilitate the use of technologies to support and enhance instructional methods that develop higher-level thinking, decision-making, and problem-solving skills.</li> <li>E. Provide for and ensure that faculty and staff take advantage of quality professional learning opportunities for improved learning and teaching with technology.</li> </ul>

<b>TL</b>	<b>COSN</b>	<b>NETS-A</b>
<p>Teaching, Learning, and Curriculum</p> <p>Educational technology leaders apply and implement curriculum plans that include methods and strategies for applying technology to maximize student learning.</p> <p>Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Facilitate technology-enhanced experiences that address content standards and student technology standards.</li> <li>B. Use technology to support learner-centered strategies that address the diverse needs of students.</li> <li>C. Apply technology to demonstrate students' higher-order skills and creativity.</li> <li>D. Manage student learning activities in a technology-enhanced environment.</li> <li>E. Use current research and district/region/state/national content and technology standards to build lessons and units of instruction.</li> </ul>	<p>Team Building and Staffing</p> <p>Creates and supports cross-functional teams for decision-making, technology support, professional development, and other aspects of the district's technology program.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Strong leadership skills and the ability to empower others to assume leadership roles.</li> <li>B. Skills at facilitating team building activities, modeling examples of trust between department members, and utilizing quality improvement tools for decision-making.</li> <li>C. Ability to identify strengths and weaknesses and make effective hiring decisions.</li> <li>D. Strong communication skills and a commitment to keeping all parties informed about technology progress and choices.</li> </ul>	<p>Productivity and Professional Practice</p> <p>Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others.</p> <p>Educational leaders:</p> <ul style="list-style-type: none"> <li>A. Model the routine, intentional, and effective use of technology.</li> <li>B. Employ technology for communication and collaboration among colleagues, staff, parents, students, and the larger community.</li> <li>C. Create and participate in learning communities that stimulate, nurture, and support faculty and staff in using technology for improved productivity.</li> <li>D. Engage in sustained, job-related professional learning using technology resources.</li> <li>E. Maintain awareness of emerging technologies and their potential uses in education.</li> <li>F. Use technology to advance organizational improvement.</li> </ul>

<b>TL</b>	<b>COSN</b>	<b>NETS-A</b>
<p>Assessment and Evaluation</p> <p>Educational technology leaders communicate research on the use of technology to implement effective assessment and evaluation strategies.</p> <p>Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques.</li> <li>B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.</li> <li>C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.</li> </ul>	<p>Information Management</p> <p>Oversees the establishment and maintenance of systems and tools for gathering, mining, integrating and reporting data in usable and meaningful ways.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Understanding of data-driven decision making and the role information needs to play in shaping and supporting a district's educational programs.</li> <li>B. Understanding of techniques and tools for data gathering, warehousing, and analysis - including knowledge of available applications and the options for customizing them or building new tools in-house.</li> <li>C. Knowledge of data-related industry standards (e.g., SIF and SCORM) and of governmental mandates (e.g. NCLB or IDEA) with information reporting requirements.</li> <li>D. Ability to assess and respond to the needs and concerns of a variety of knowledge workers.</li> </ul>	<p>Assessment and evaluation</p> <p>Educational leaders use technology to plan and implement comprehensive systems of effective assessment and evaluation.</p> <p>Educational leaders:</p> <ul style="list-style-type: none"> <li>A. Use multiple methods to assess and evaluate appropriate uses of technology resources for learning, communication, and productivity.</li> <li>B. Use technology to collect and analyze data, interpret results, and communicate findings to improve instructional practice and student learning.</li> <li>C. Assess staff knowledge, skills, and performance in using technology and use results to facilitate quality professional development and to inform personnel decisions.</li> <li>D. Use technology to assess, evaluate, and manage administrative and operational systems.</li> </ul>

TL	COSN	NETS-A
<p>Technology Operations and Concepts</p> <p>Educational technology leaders demonstrate an in-depth understanding of technology operations and concepts.</p> <p>Educational technology leaders:</p> <p>A. Demonstrate knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Teachers).</p> <p>B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.</p>	<p>Systems Management</p> <p>Directs, coordinates, and ensures the implementation of all tasks related to: the development of technical specifications and infrastructure decisions; the selection, purchasing, installation and maintenance of IT; and the integration of technology into every facet of operations.</p> <p>Knowledge or Skills Required:</p> <p>A. Knowledge and expertise about infrastructure and performance standards for all aspects of the IT system.</p> <p>B. Strong technical background accompanied by a personal commitment to ongoing research and learning.</p> <p>C. Ability and willingness to hire skilled experts to support and oversee different aspects of the IT program.</p> <p>D. Ability to make purchasing and implementation decisions based on needs of the total school system - and on an understanding of the full life cycle of technology purchases.</p>	<p>Support, management, and operations</p> <p>Educational leaders ensure the integration of technology to support productive systems for learning and administration.</p> <p>Educational leaders:</p> <p>A. Develop, implement, and monitor policies and guidelines to ensure compatibility of technologies.</p> <p>B. Implement and use integrated technology-based management and operations systems.</p> <p>C. Allocate financial and human resources to ensure complete and sustained implementation of the technology plan.</p> <p>D. Integrate strategic plans, technology plans, and other improvement plans and policies to align efforts and leverage resources.</p> <p>E. Implement procedures to drive continuous improvement of technology systems and to support technology replacement cycles.</p>

TL	COSN	NETS-A
<p>Social, Ethical, Legal, and Human Issues</p> <p>Educational technology leaders understand the social, ethical, legal, and human issues surrounding the use of technology in P-12 schools and develop programs facilitating application of that understanding in practice throughout their district/region/state.</p> <p>Educational technology leaders:</p> <p>A. Model and teach legal and ethical practice related to technology use.</p> <p>B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.</p>	<p>Ethics and Policies</p> <p>Oversees the creation, implementation and enforcement of policies and educational programs related to the social, legal and ethical issues involved in technology use throughout the district.</p> <p>Knowledge or Skills Required:</p> <p>A. Knowledge about laws and legal issues related to copyright, privacy, filtering and other aspects of school technology use.</p> <p>B. Awareness of other relevant issues including safety, technology-related health concerns and guidelines for fair and ethical implementation of technology.</p> <p>C. Experience with AUP development and enforcement.</p> <p>D. Commitment to modeling responsible technology use and working closely with all constituents.</p>	<p>Social, legal and ethical issues</p> <p>Educational leaders understand the social, legal, and ethical issues related to technology and model responsible decision-making related to these issues.</p> <p>Educational leaders:</p> <p>A. Ensure equity of access to technology resources that enable and empower all learners and educators.</p> <p>B. Identify, communicate, model, and enforce social, legal, and ethical practices to promote responsible use of technology.</p> <p>C. Promote and enforce privacy, security, and online safety related to the use of technology.</p> <p>D. Promote and enforce environmentally safe and healthy practices in the use of technology.</p> <p>E. Participate in the development of policies that clearly enforce copyright law and assign ownership of intellectual property developed with district resources.</p>

<b>TL</b>	<b>COSN</b>	<b>NETS-A</b>
<p>Procedures, Policies, Planning, and Budgeting for Technology Environments</p> <p>Educational technology leaders coordinate development and direct implementation of technology infrastructure procedures, policies, plans, and budget for P-12 schools. Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Use the school technology facilities and resources to implement classroom instruction.</li> <li>B. Follow procedures and guidelines used in planning and purchasing technology resources.</li> <li>C. Participate in professional development opportunities related to management of school facilities, technology resources, and purchases.</li> </ul>	<p>Business Leadership</p> <p>Serves as a strong business leader who guides purchasing decisions, assists in determining the "return on investment" for all technology implementations, and fosters good relationships with vendors, potential funders, and other key groups.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Comfort managing a budget, making purchasing decisions, and handling the financial aspects of running an IT business.</li> <li>B. Knowledge about market rates for technology equipment and services and the issues that determine ROI.</li> <li>C. Ability to direct, manage, and negotiate with vendors and business partners.</li> <li>D. Strong communication skills, the ability to build partnerships and articulate a vision for the district's technology program.</li> </ul>	

<b>TL</b>	<b>COSN</b>	<b>NETS-A</b>
<p>Productivity and Professional Practice</p> <p>Educational technology leaders design, develop, evaluate and model products created using technology resources to improve and enhance their productivity and professional practice.</p> <p>Educational technology leaders:</p> <ul style="list-style-type: none"> <li>A. Use technology resources to engage in ongoing professional and lifelong learning.</li> <li>B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.</li> <li>C. Apply technology to increase productivity.</li> <li>D. Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning</li> </ul>	<p>Education and Training</p> <p>Budgets, plans for and coordinates ongoing, purposeful professional development for all staff using new technologies.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Current understanding of both technical and educational best practices and the appropriate uses of technology to support high-caliber, rigorous student work.</li> <li>B. Understanding of the key elements contributing to successful professional development.</li> <li>C. Awareness of technology-related professional growth needs of all staff members - including administrators and support staff - and the ability to respond to these needs, including providing "just in time" opportunities to remain current on technical content.</li> <li>D. Ability to plan professional development activities that help teachers meet a wide range of instructional goals for the district with help from interactive technologies.</li> </ul>	

<b>TL</b>	<b>COSN</b>	<b>NETS-A</b>
	<p>Communication Systems</p> <p>Directs and coordinates the use of e-mail, district web sites, voicemail systems and other forms of communication technology to facilitate decision-making, dialog and effective communication with the community and other key stakeholders.</p> <p>Knowledge or Skills Required:</p> <ul style="list-style-type: none"> <li>A. Working knowledge of various communication tools - including purchasing options and technical issues related to implementation.</li> <li>B. Understanding of web design and support issues and the staffing needed to keep district and school sites updated and operational.</li> <li>C. Knowledge about converging technologies and new options for enhancing communication through technology.</li> <li>D. Strong communication skills and the ability to provide leadership to stakeholders in the utilization of communication resources.</li> </ul>	

## APPENDIX B. EXPERT PANEL FEEDBACK FORMS

**STANDARD 1****Standard: Leadership and Vision.**

Educational technology leaders will facilitate development of a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of the vision. Educational technology leaders:

- A. Identify and apply educational and technology-related research, the psychology of learning, and instructional design principles in guiding the use of computers and technology in education.
- B. Apply strategies for and knowledge of issues related to managing the change process in schools.
- C. Apply effective group process skills.
- D. Lead in the development and evaluation of district technology planning and implementation.
- E. Engage in supervised field-based experiences with accomplished technology facilitators and/or directors.

**Question – D.I.1**

To what extent did you participate in your district's or school's most recent technology planning process?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 1 (cont.)****Question – D.I.2**

To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.I.3**

To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 1 (cont.)****Question – D.I.4**

<p>To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?</p> <p><input type="checkbox"/> Not applicable</p> <p><input type="checkbox"/> Not at all</p> <p><input type="checkbox"/> Minimally</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Significantly</p> <p><input type="checkbox"/> Fully</p>	<p>How well do you believe this question measures this standard area?</p> <p><input type="checkbox"/> Not at all</p> <p><input type="checkbox"/> Weak</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Strong</p> <p><input type="checkbox"/> Very Strong</p>
--	---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.I.5**

<p>To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?</p> <p><input type="checkbox"/> Not applicable</p> <p><input type="checkbox"/> Not at all</p> <p><input type="checkbox"/> Minimally</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Significantly</p> <p><input type="checkbox"/> Fully</p>	<p>How well do you believe this question measures this standard area?</p> <p><input type="checkbox"/> Not at all</p> <p><input type="checkbox"/> Weak</p> <p><input type="checkbox"/> Somewhat</p> <p><input type="checkbox"/> Strong</p> <p><input type="checkbox"/> Very Strong</p>
---	---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 1 (cont.)****Question – D.I.6**

<p>To what extent did you engage in activities to identify best practices in the use of technology (e.g. reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Not applicable</li><li><input type="checkbox"/> Not at all</li><li><input type="checkbox"/> Minimally</li><li><input type="checkbox"/> Somewhat</li><li><input type="checkbox"/> Significantly</li><li><input type="checkbox"/> Fully</li></ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Not at all</li><li><input type="checkbox"/> Weak</li><li><input type="checkbox"/> Somewhat</li><li><input type="checkbox"/> Strong</li><li><input type="checkbox"/> Very Strong</li></ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

## STANDARD 2

### **Planning and Designing Learning Environments and Experiences.**

Educational technology leaders plan, design, and model effective learning environments and multiple experiences supported by technology.

- A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.
- B. Apply current research on teaching and learning with technology when planning learning environments and experiences.
- C. Identify and locate technology resources and evaluate them for accuracy and suitability.
- D. Plan for the management of technology resources within the context of learning activities.
- E. Plan strategies to manage student learning in a technology-enhanced environment.
- F. Identify and apply instructional design principles associated with the development of technology resources.

### Question – D.II.1

1. To what extent did you design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners?
- Not applicable
  - Not at all
  - Minimally
  - Somewhat
  - Significantly
  - Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 2 (cont.)****Question – D.II.2**

<p>To what extent did you apply current research on teaching and learning with technology when planning learning environments and experiences?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.II.3**

<p>To what extent did you identify and locate technology resources and evaluate them for accuracy and suitability?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 2 (cont.)****Question – D.II.4**

<p>To what extent did you plan for the management of technology resources within the context of learning activities?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.II.5**

<p>To what extent did you plan strategies to manage student learning in a technology-enhanced environment?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 2 (cont.)****Question – D.II.6**

---

To what extent did you identify and apply instructional design principles associated with the development of technology resources?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### STANDARD 3

#### **Standard: Teaching, Learning, and Curriculum.**

Educational technology leaders apply and implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Educational technology leaders:

- A. Facilitate technology-enhanced experiences that address content standards and student technology standards.
- B. Use technology to support learner-centered strategies that address the diverse needs of students.
- C. Apply technology to demonstrate students' higher-order skills and creativity.
- D. Manage student learning activities in a technology-enhanced environment.
- E. Use current research and district/region/state/national content and technology standards to build lessons and units of instruction.

#### **Question – D.III.1**

To what extent did you provide or make available assistance to colleagues to use technology for interpreting and analyzing student assessment data?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

#### **Question – D.III.2**

To what extent did you provide or make available assistance to colleagues for using student assessment data to modify instruction?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 3 (cont.)****Question – D.III.3**

<p>To what extent did you disseminate or model best practices in learning and teaching with technology to colleagues?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
---	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.III.4**

<p>To what extent did you provide support (e.g., release time, budget allowance) to colleagues who were attempting to share information about technology practices, issues, and concerns?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
---	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 3 (cont.)****Question – D.III.5**

To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.III.6**

To what extent did you facilitate or ensure the delivery of professional development on the use of technology to faculty and staff?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

## STANDARD 4

### **Standard: Assessment and Evaluation.**

Educational technology leaders communicate research on the use of technology to implement effective assessment and evaluation strategies. Educational technology leaders:

- A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques.
- B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.
- C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

### Question – D.IV.1

To what extent did you promote or model technology based systems to collect student assessment data?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### Question – D.IV.2

To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 4 (cont.)****Question – D.IV.3**

To what extent did you assess and evaluate existing technology-based administrative and operations systems for modification or upgrade?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.IV.4**

To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 4 (cont.)****Question – D.IV.5**

---

To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

## STANDARD 5

### **Standard: Technology Operations and Concepts.**

Educational technology leaders demonstrate an in-depth understanding of technology operations and concepts. Educational technology leaders:

- A. Demonstrate knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Teachers).
- B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

### Question – D.V.1

To what extent did you support colleagues in connecting to and using district- and building-level technology systems for management and operations (e.g., student information system, electronic grade book, and curriculum management system)?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### Question – D.V.2

To what extent did you allocate campus discretionary funds to help meet the school's technology needs?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 5 (cont.)****Question – D.V.3**

<p>To what extent did you pursue supplemental funding to help meet the technology needs of your school?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
---	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**Question – D.V.4**

<p>To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not applicable</li> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Minimally</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Significantly</li> <li><input type="checkbox"/> Fully</li> </ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Not at all</li> <li><input type="checkbox"/> Weak</li> <li><input type="checkbox"/> Somewhat</li> <li><input type="checkbox"/> Strong</li> <li><input type="checkbox"/> Very Strong</li> </ul>
--	--

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 5 (cont.)****Question – D.V.5**

---

To what extent did you advocate for adequate, timely, and high-quality technology support services?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

## STANDARD 6

### **Social, Ethical, Legal, and Human Issues.**

Educational technology leaders understand the social, ethical, legal, and human issues surrounding the use of technology in P-12 schools and develop programs facilitating application of that understanding in practice throughout their district/region/state. Educational technology leaders:

- A. Model and teach legal and ethical practice related to technology use.
- B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

### Question – D.VI.1

To what extent did you work to ensure equity of technology access and use in your school?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### Question – D.VI.2

To what extent did you implement policies and programs meant to raise awareness of technology-related social, ethical, and legal issues for staff and students?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 6 (cont.)****Question – D.VI.3**

To what extent were you involved in enforcing policies related to copyright and intellectual property?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.VI.4**

To what extent were you involved in addressing issues related to privacy and online safety?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 6 (cont.)****Question – D.VI.5**

To what extent did you support the use of technology to help meet the needs of special education students?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.VI.6**

To what extent did you support the use of technology to assist in the delivery of individualized education programs for all students?

- Nor applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 6 (cont)****Question – D.VI.7**

---

To what extent did you disseminate information about health concerns related to technology and computer usage in classrooms and offices?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

## STANDARD 7

### **Standards: Procedures, Policies, Planning, and Budgeting for Technology Environments.**

Educational technology leaders coordinate development and direct implementation of technology infrastructure procedures, policies, plans, and budget for P-12 schools. Educational technology leaders:

- A. Use the school technology facilities and resources to implement classroom instruction.
- B. Follow procedures and guidelines used in planning and purchasing technology resources.
- C. Participate in professional development opportunities related to management of school facilities, technology resources, and purchases.

### Question – D.VII.1

To what extent did you use the school technology facilities and resources to implement classroom instruction?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### Question – D.VII.2

To what extent did you follow procedures and guidelines used in planning and purchasing technology resources?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 7 (cont.)****Question – D.VII.3**

To what extent did you differentiate among specifications for purchasing technology systems in school settings?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.VII.4**

To what extent were you participate in professional development opportunities related to management of school facilities, technology resources, and purchases?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

## STANDARD 8

### **Standard: Productivity and Professional Practice.**

Educational technology leaders design, develop, evaluate and model products created using technology resources to improve and enhance their productivity and professional practice.

Educational technology leaders:

- A. Use technology resources to engage in ongoing professional and lifelong learning.
- B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.
- C. Apply technology to increase productivity.
- D. Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning

### Question – D.VIII.1

To what extent did you participate in professional development activities meant to improve or expand your use of technology?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

### Question – D.VIII.2

To what extent did you use technology to help complete your day-to-day tasks (e.g., personal calendar, developing budgets, communicating with others, gathering information)?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

---

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

---

**STANDARD 8 (cont.)****Question – D.VIII.3**

To what extent did you use technology-based management systems to access staff/faculty personnel records?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**Question – D.VIII.4**

To what extent did you use technology-based management systems to access information?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

How well do you believe this question measures this standard area?

- Not at all
- Weak
- Somewhat
- Strong
- Very Strong

Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.

**STANDARD 8 (cont.)****Question – D.VIII.5**

<p>To what extent did you encourage and use technology (e.g., e-mail, blogs, and videoconferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Not applicable</li><li><input type="checkbox"/> Not at all</li><li><input type="checkbox"/> Minimally</li><li><input type="checkbox"/> Somewhat</li><li><input type="checkbox"/> Significantly</li><li><input type="checkbox"/> Fully</li></ul>	<p>How well do you believe this question measures this standard area?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Not at all</li><li><input type="checkbox"/> Weak</li><li><input type="checkbox"/> Somewhat</li><li><input type="checkbox"/> Strong</li><li><input type="checkbox"/> Very Strong</li></ul>
<p>Please provide any suggestions or comments regarding the questions above in the space below. If you have suggestions for additional questions please write the questions in the space below.</p>	

## APPENDIX C. SELF-ASSESSMENT INSTRUCTIONS FOR ETLA SURVEY

For the ETLA field test, the following instructions were provided to participants:

You have been selected to take the Educator Technology Leadership Assessment. This assessment consists of 38 multiple choice style questions related to different aspects of education technology leadership. The results of the survey will be used to inform technology planning efforts in the Des Moines Public Schools. Thank you in advance for your survey participation. Please click the link below to begin the survey.

You are being given this technology leadership assessment at the request of the technology department, which will use the results to guide its leadership training and professional development programming. Assessment items are based on the International Society for Technology in Education (ISTE) National Educational Technology Leadership Standards. The purpose of the assessment is to provide detailed and comparative feedback about education technology leadership.

The individual items in the assessment ask you about the extent to which you have engaged in certain behaviors that relate to K-12 school technology leadership. Please answer all questions. If you feel a specific question is not applicable, you may mark as Not Applicable. Note that marking multiple items Not Applicable may limit the usefulness of the assessment results.

There are 38 questions in the survey. It should take 15-20 minutes to complete this survey.

As you answer the questions, think of your actual behavior over the course of the last school year. Do not take into account planned or intended behavior. As you select the appropriate response to each question, it may be helpful to keep in mind the performance of other educators that you know. Please note that the accuracy and usefulness of this assessment is largely dependent upon your candor. If done with care, the results can provide valuable information.

Your responses to the survey will be kept confidential by the technology department researcher.

#### APPENDIX D. EVALUATION INSTRUCTIONS FOR ETLA SURVEY

For the ETLA field test, the following instructions were provided to Principals using the survey as a validity check:

In order to help validate the survey, we are asking you to use the survey to assess the technology leadership of one of your staff members that is taking the survey. Specifically, we'd like you to use the survey to assess <<teacher\_name>>, who was chosen at random.

Again, we are asking for this to help validate the survey tool. Both your responses and <<teacher\_name>> responses will be kept confidential by the researcher. This project is not in any way being used as a teacher evaluation tool.

Please click the link below to begin the survey. You are being given this technology leadership assessment at the request of the Technology Department, which will use the results to guide its leadership training and professional development programming. Assessment items are based on the International Society for Technology in Education's (ISTE) National Educational Technology Leadership Standards. The purpose of the assessment is to provide detailed and comparative feedback about education technology leadership.

You are being asked to use this survey to assess the technology leadership of one of your staff members. This information will be used to help validate the survey tool.

The individual items in the assessment ask you about the extent to which the selected staff member has engaged in certain behaviors that relate to K-12 school technology leadership. Please answer all questions. If you feel a specific question is Not Applicable, you may mark as not applicable. Note that marking multiple items Not Applicable may limit the usefulness of the assessment results.

There are 38 questions in the survey. It should take 15-20 minutes to complete this survey.

As you answer the questions, think of the staff member's actual behavior over the course of the last school year. As you select the appropriate response to each question, it may be helpful to keep in mind the performance of other staff members. Please note that the accuracy and usefulness of this assessment is largely dependent upon your candor. If done with care, the results can provide valuable information.

Your responses to the survey will be kept confidential by the technology department researcher.

## APPENDIX E. HUMAN SUBJECTS APPROVAL

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office of Research Assurances  
Vice Provost for Research  
1138 Pearson Hall  
Ames Iowa 50011-2207  
515 294-4366  
FAX 515 294-4267

**DATE:** April 30, 2007

**TO:** Greg Davis  
1801 W 21<sup>st</sup> St N, Newton, IA 50208

**CC:** Frank Hernandez  
N229B Lagomarcino

**FROM:** Jan Canny, IRB Administrator  
Office of Research Assurances

**IRB ID:** 07-224                      **Study Review Date:** 27 April 2007

---

The Institutional Review Board (IRB) Chair has reviewed the project, "Mining for Gold: Finding Education Technology Leadership in the Field" (IRB ID 07-224) and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b), Exempt Category (2). A description of this exemption category can be found in the list on the next page. Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

The IRB determination of exemption means that this project does not need to meet the requirements from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects, unless required by the IRB. We do, however, urge you to protect the rights of your participants in the same ways that you would if the project was required to follow the regulations. This includes providing relevant information about the research to the participants.

Because your project is exempt, you do not need to submit an application for continuing review. However, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent if you have stated in your application that you will do so or if required by the IRB.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form, prior to making any changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

## APPENDIX F. DES MOINES PUBLIC SCHOOLS RESEARCH APPROVAL

*Assessment Services*

1915 Prospect Road, Room 210  
Des Moines, Iowa 50310

May 3, 2007

Greg Davis  
1801 W. 21<sup>st</sup> St. N.  
Newton IA 50208

Dear Greg:

Your proposal to conduct research in the district has been reviewed. Your request is approved.

You may contact me at the address above, by phone at 242-7664, or by district E-mail if you have questions. When you have completed your study, we would appreciate receiving an abstract of your findings. We wish you success in this endeavor.

Sincerely,

  
John F. Tompkins, Ph.D  
Assessment Specialist

## APPENDIX G. RANKING DATA SET DESCRIPTIVE STATISTICS

Item	N	Range	Minimum	Maximum	Mean	Std. Deviation
<b>Leadership and Vision</b>						
D.I.1	10	2	3	5	4.00	0.667
D.I.2	10	2	3	5	4.10	0.568
D.I.3	10	2	3	5	4.00	0.667
D.I.4	10	2	3	5	4.00	0.471
D.I.5	10	2	2	4	3.70	0.675
D.I.6	10	2	3	5	3.60	0.699
<b>Planning &amp; Designing Learning Environments</b>						
D.II.1	10	2	3	5	3.90	0.738
D.II.2	10	2	3	5	3.90	0.568
D.II.3	10	2	3	5	3.90	0.568
D.II.4	10	2	3	5	3.90	0.568
D.II.5	10	2	3	5	4.30	0.675
D.II.6	10	2	3	5	3.60	0.843
<b>Teaching, Learning &amp; Curriculum</b>						
D.III.1	10	1	3	4	3.80	0.422
D.III.2	10	1	3	4	3.80	0.422
D.III.3	10	2	3	5	4.00	0.471
D.III.4	10	1	4	5	4.20	0.422
D.III.5	10	3	2	5	3.80	0.789
D.III.6	10	1	4	5	4.20	0.422
<b>Assessment and Evaluation</b>						
D.IV.1	10	1	3	4	3.90	0.316
D.IV.2	10	1	3	4	3.90	0.316
D.IV.3	10	1	3	4	3.90	0.316
D.IV.4	10	1	3	4	3.90	0.316
<b>Technology Operations and Concepts</b>						
D.V.1	10	0	4	4	4.00	0.000
D.V.2	10	2	2	4	3.10	0.876
D.V.3	10	1	3	4	3.40	0.516
D.V.4	10	0	4	4	4.00	0.000
D.V.5	10	1	4	5	4.20	0.422
<b>Social, Ethical, Legal, and Human Issues</b>						
D.VI.1	10	2	3	5	4.10	0.738
D.VI.2	10	1	4	5	4.70	0.483
D.VI.3	10	1	4	5	4.50	0.527
D.VI.4	10	1	4	5	4.30	0.483
D.VI.5	10	1	3	4	3.90	0.316
D.VI.6	10	1	3	4	3.90	0.316
D.VI.7	10	1	3	4	3.70	0.483

Item	N	Range	Minimum	Maximum	Mean	Std. Deviation
<b>Procedures, Policies, Planning &amp; Budget</b>						
D.VII.1	10	3	2	5	4.00	1.155
D.VII.2	10	2	2	4	3.20	0.789
D.VII.3	10	1	2	3	2.40	0.516
D.VII.4	10	2	3	5	4.20	0.789
D.VII.5	10	1	4	5	4.40	0.516
<b>Productivity and Professional Practice</b>						
D.VIII.1	10	1	4	5	4.40	0.516
D.VIII.2	10	1	4	5	4.40	0.516
D.VIII.3	10	2	3	5	4.00	0.943
D.VIII.4	10	1	4	5	4.80	0.422
D.VIII.5	10	1	4	5	4.40	0.516

## APPENDIX H. ASSESSMENT DATA SET DESCRIPTIVE STATISTICS

Item	N	Range	Minimum	Maximum	Mean	Std. Deviation
<b>Leadership and Vision</b>						
D.I.1	10	1	4	5	4.60	0.516
D.I.2	10	2	3	5	4.00	0.667
D.I.3	10	1	4	5	4.70	0.483
D.I.4	10	1	4	5	4.60	0.516
D.I.5	10	1	4	5	4.90	0.316
D.I.6	10	2	3	5	4.10	0.568
<b>Planning &amp; Designing Learning Environments</b>						
D.II.1	10	1	4	5	4.60	0.516
D.II.2	10	1	4	5	4.80	0.422
D.II.3	10	1	4	5	4.70	0.483
D.II.4	10	1	4	5	4.50	0.527
D.II.5	10	1	4	5	4.60	0.516
D.II.6	10	2	3	5	3.90	0.738
<b>Teaching, Learning &amp; Curriculum</b>						
D.III.1	10	2	3	5	4.10	0.568
D.III.2	10	1	4	5	4.80	0.422
D.III.3	10	1	4	5	4.70	0.483
D.III.4	10	1	4	5	4.90	0.316
D.III.5	10	2	3	5	4.00	0.471
D.III.6	10	1	4	5	4.50	0.527
<b>Assessment and Evaluation</b>						
D.IV.1	10	1	4	5	4.30	0.483
D.IV.2	10	1	4	5	4.50	0.527
D.IV.3	10	1	4	5	4.40	0.516
D.IV.4	10	1	4	5	4.60	0.516
<b>Technology Operations and Concepts</b>						
D.V.1	10	1	4	5	4.60	0.516
D.V.2	10	1	4	5	4.80	0.422
D.V.3	10	1	4	5	4.60	0.516
D.V.4	10	1	4	5	4.89	0.333
D.V.5	10	1	4	5	4.60	0.516
<b>Social, Ethical, Legal, and Human Issues</b>						
D.VI.1	10	1	4	5	4.90	0.316
D.VI.2	10	1	4	5	4.70	0.483
D.VI.3	10	1	4	5	4.90	0.316
D.VI.4	10	1	4	5	4.70	0.483
D.VI.5	10	1	4	5	4.60	0.516
D.VI.6	10	2	3	5	3.90	0.738
D.VI.7	10	2	3	5	4.10	0.568

Item	N	Range	Minimum	Maximum	Mean	Std. Deviation
<b>Procedures, Policies, Planning &amp; Budget</b>						
D.VII.1	10	1	4	5	4.40	0.516
D.VII.2	10	1	4	5	4.50	0.527
D.VII.3	10	1	4	5	4.70	0.483
D.VII.4	10	1	4	5	4.90	0.316
D.VII.5	10	0	5	5	5.00	0.000
<b>Productivity and Professional Practice</b>						
D.VIII.1	10	1	4	5	4.60	0.516
D.VIII.2	10	1	4	5	4.70	0.483
D.VIII.3	10	1	4	5	4.60	0.516
D.VIII.4	10	1	4	5	4.80	0.422
D.VIII.5	10	0	5	5	5.00	0.000

## APPENDIX I. COMPARISON OF DRAFT AND FINAL ETLA ITEMS

TL Standard	Final Survey Questions	Draft Survey Questions
Leadership and Vision	F.I.1. To what extent did you participate in your district's or school's most recent technology planning process?	D.I.1. To what extent did you participate in your district's or school's most recent technology planning process?
Leadership and Vision	F.I.2. To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?	D.I.2. To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?
Leadership and Vision	F.I.3. To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?	D.I.3. To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?
Leadership and Vision	F.I.4. To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?	D.I.4. To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?
Leadership and Vision	<i>Deleted</i>	D.I.5. To what extent did you advocate for inclusion of technology practices in your school?
Leadership and Vision	F.I.5. To what extent did you engage in activities to identify best practices in the use of technology (e.g., reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?	D.I.6. To what extent did you engage in activities to identify best practices in the use of technology?
Planning and Designing Learning Environments	F.II.1. To what extent did you design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners?	D.II.1. To what extent did you design developmentally appropriate learning opportunities?
Planning and Designing Learning Environments	F.II.2. To what extent did you apply current research on teaching and learning with technology when planning learning environments and experiences?	D.II.2. To what extent did you apply current research on teaching and learning with technology when planning learning environments?
Planning and Designing Learning Environments	F.II.3. To what extent did you identify and locate technology resources and evaluate them for accuracy and suitability?	D.II.3. To what extent did you identify and locate technology resources and evaluate them for accuracy?
Planning and Designing Learning Environments	F.II.4. To what extent did you plan for the management of technology resources within the context of learning activities?	D.II.4. To what extent did you plan for the management of technology resources?
Planning and Designing Learning Environments	F.II.5. To what extent did you plan strategies to manage student learning in a technology-enhanced environment?	D.II.5. To what extent did you plan strategies to manage student learning in a technology-enhanced environment?

TL Standard	Final Survey Questions	Draft Survey Questions
Planning and Designing Learning Environments	<i>Deleted</i>	D.II.6. To what extent did you identify and apply instructional design principles associated with the development of technology resources?
Teaching, Learning and Curriculum	F.III.1. To what extent did you use systems like a data warehouse to access student information?	D.III.1. To what extent did you provide or make available assistance to use technology for interpreting and analyzing student assessment data?
Teaching, Learning and Curriculum	F.III.2. To what extent did you provide or make available assistance to colleagues for using student assessment data to modify instruction?	D.III.2. To what extent did you provide or make available assistance for using student assessment data to modify instruction?
Teaching, Learning and Curriculum	F.III.3. To what extent did you disseminate or model best practices in learning and teaching with technology to colleagues?	D.III.3. To what extent did you disseminate or model best practices in learning and teaching with technology to colleagues?
Teaching, Learning and Curriculum	F.III.4. To what extent did you collaborate with colleagues who were attempting to share information about technology practices, issues, and concerns?	D.III.4. To what extent did you collaborate with colleagues who were attempting to share information about technology practices, issues, and concerns?
Teaching, Learning and Curriculum	<i>Deleted</i>	D.III.5. To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?
Teaching, Learning and Curriculum	F.III.5. To what extent did you facilitate or support the delivery of professional development on the use of technology to colleagues?	D.III.6. To what extent did you facilitate or support the delivery of professional development on the use of technology to colleagues?
Assessment and Evaluation	F.IV.1. To what extent did you promote or model technology-based systems to collect student assessment data?	D.IV.1. To what extent did you promote technology-based systems to collect student assessment data?
Assessment and Evaluation	F.IV.2. To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?	D.IV.2. To what extent did you promote the evaluation of instructional practices to assess their effectiveness?
Assessment and Evaluation	F.IV.3. To what extent did you assess and evaluate existing technology-based systems in your school for modification or upgrade?	D.IV.3. To what extent did you assess existing technology-based systems in your school for modification or upgrade?
Assessment and Evaluation	F.IV.4. To what extent did you evaluate the effectiveness of technology related professional development offerings in your school?	D.IV.4. To what extent did you evaluate the effectiveness of professional development offerings in your school to meet the needs of teachers and their use of technology?
Assessment and Evaluation	F.IV.5. To what extent did you use multiple measures of evaluation to determine the appropriate use of technology-based resources?	

TL Standard	Final Survey Questions	Draft Survey Questions
Technology Operations and Concepts	F.V.1. To what extent did you support colleagues in connecting to and using district- and building-level technology?	D.V.1. To what extent did you support colleagues in connecting to and using district- and building-level technology?
Technology Operations and Concepts	<i>Deleted</i>	D.V.2. To what extent did you support colleagues in connecting to and using district- and building-level technology systems for management and operations (e.g., student information system, electronic grade book, and curriculum management system)?
Technology Operations and Concepts	F.V.2. To what extent did you pursue supplemental funding to help meet the technology needs of your school?	D.V.3. To what extent did you pursue supplemental funding to help meet the needs of your school?
Technology Operations and Concepts	F.V.3. To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?	D.V.4. To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?
Technology Operations and Concepts	F.V.4. To what extent did you advocate for adequate, timely, and high-quality technology support services?	D.V.5. To what extent did you advocate for adequate, timely, and high-quality technology support services?
Social, Ethical, Legal, and Human Issues	F.VI.1. To what extent did you work to ensure equity of technology access and use in your school?	D.VI.1. To what extent did you work to ensure equity of technology access and use in your school?
Social, Ethical, Legal, and Human Issues	F.VI.2. To what extent did you consider policies and programs meant to raise awareness of technology-related social, ethical, and legal issues?	D.VI.2. To what extent did you consider policies and programs meant to raise awareness of technology-related social, ethical, and legal issues?
Social, Ethical, Legal, and Human Issues	F.VI.3. To what extent were you involved in enforcing policies related to copyright and intellectual property?	D.VI.3. To what extent were you involved in enforcing policies related to copyright and intellectual property?
Social, Ethical, Legal, and Human Issues	F.VI.4. To what extent were you involved in addressing issues related to privacy and online safety?	D.VI.4. To what extent were you involved in addressing issues related to privacy and online safety?
Social, Ethical, Legal, and Human Issues	F.VI.5. To what extent did you support the use of technology to help meet the needs of all students, including special education students?	D.VI.5. To what extent did you support the use of technology to help meet the needs of special education students?
Social, Ethical, Legal, and Human Issues	<i>Deleted</i>	D.VI.6. To what extent did you support the use of technology to assist in the delivery of instructional education programs for all students?
Social, Ethical, Legal, and Human Issues	<i>Deleted</i>	D.VI.7. To what extent did you disseminate information about health concerns related to technology and computer usage in classrooms and offices?

TL Standard	Final Survey Questions	Draft Survey Questions
Procedures, Policies, Planning	F.VII.1. To what extent did you use technology resources to implement classroom instruction?	D.VII.1. To what extent did you use technology resources to implement classroom instruction?
Procedures, Policies, Planning	F.VII.2. To what extent did you contribute with planning on how to spend building discretionary technology funds.	D.VII.2. To what extent did you differentiate among specifications for purchasing technology systems in school settings?
Procedures, Policies, Planning	<i>Deleted</i>	D.VII.3. To what extent did you participate in professional development opportunities related to management of school facilities, technology resources, and purchases?
Procedures, Policies, Planning	F.VII.3. To what extent did you follow procedures and guidelines used in planning and purchasing technology resources?	D.VII.4. To what extent did you follow procedures and guidelines used in purchasing technology resources?
Procedures, Policies, Planning	F.VII.4. To what extent did you participate in technology planning for your building?	D.VII.5. To what extent did you participate in technology planning for your building?
Productivity and Professional Practice	F.VIII.1. To what extent did you participate in professional development activities meant to improve or expand your use of technology?	D.VIII.1. To what extent did you participate in professional development activities meant to improve or expand your use of technology?
Productivity and Professional Practice	F.VIII.2. To what extent did you use technology to help complete your day to day tasks? (E.g. personal calendar, developing budgets, communicating with others, gathering information)?	D.VIII.2. To what extent did you use technology to help complete your day to day tasks? (E.g. personal calendar, developing budgets, communicating with others, gathering information)?
Productivity and Professional Practice	F.VIII.3. To what extent did you encourage and use technology (e.g. e-mail, blogs, videoconferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?	D.VIII.3. To what extent did you encourage and use technology (e.g. e-mail, blogs, videoconferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?
Productivity and Professional Practice	F.VIII.4. To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?	D.VIII.4. To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?
Productivity and Professional Practice	F.VIII.5. To what extent did you evaluate and compare options for the technology you used in your job?	D.VIII.5. To what extent did you evaluate and compare options for the technology you used in your job?

## APPENDIX J. FIELD TEST DESCRIPTIVE STATISTICS

Item	N	Mean	Std. Deviation	Variance	Item-Rest Correlation	Alpha if item removed
F.I.1	205	2.55	1.34	1.80	0.58	0.97
F.I.2	189	2.52	1.30	1.70	0.63	0.97
F.I.3	182	2.09	1.16	1.34	0.74	0.97
F.I.4	196	2.29	1.16	1.35	0.72	0.97
F.I.5	206	2.33	1.11	1.24	0.73	0.97
F.II.1	206	2.92	1.07	1.14	0.66	0.97
F.II.2	205	2.87	1.01	1.02	0.73	0.97
F.II.3	208	2.45	1.12	1.26	0.71	0.97
F.II.4	205	2.52	1.09	1.18	0.77	0.97
F.II.5	210	2.75	1.11	1.24	0.77	0.97
F.III.1	208	3.09	1.19	1.41	0.32	0.97
F.III.2	208	3.01	1.14	1.29	0.48	0.97
F.III.3	206	2.93	1.09	1.19	0.79	0.97
F.III.4	212	3.04	1.02	1.04	0.76	0.97
F.III.5	207	2.96	1.29	1.67	0.80	0.97
F.IV.1	207	2.76	1.07	1.14	0.55	0.97
F.IV.2	198	2.51	1.11	1.23	0.70	0.97
F.IV.3	206	2.28	1.20	1.44	0.78	0.97
F.IV.4	203	2.61	1.14	1.30	0.76	0.97
F.IV.5	201	2.15	1.04	1.09	0.73	0.97
F.V.1	206	3.40	1.14	1.30	0.47	0.97
F.V.2	201	2.06	1.26	1.59	0.65	0.97
F.V.3	181	2.13	1.24	1.53	0.76	0.97
F.V.4	202	2.76	1.28	1.63	0.73	0.97
F.VI.1	195	2.58	1.28	1.65	0.82	0.97
F.VI.2	201	2.19	1.15	1.32	0.72	0.97
F.VI.3	191	2.19	1.30	1.69	0.64	0.97
F.VI.4	203	2.37	1.27	1.61	0.74	0.97
F.VI.5	203	3.36	1.17	1.37	0.65	0.97
F.VII.1	198	3.29	1.06	1.12	0.61	0.97
F.VII.2	196	2.22	1.36	1.85	0.71	0.97
F.VII.3	176	2.80	1.52	2.32	0.70	0.97
F.VII.4	210	2.73	1.42	2.03	0.74	0.97
F.VIII.1	213	3.14	1.24	1.54	0.69	0.97
F.VIII.2	214	4.29	0.83	0.70	0.45	0.97
F.VIII.3	214	3.93	0.92	0.85	0.27	0.97
F.VIII.4	194	2.29	1.17	1.36	0.71	0.97
F.VIII.5	206	2.61	1.19	1.42	0.74	0.97

## APPENDIX K. MATCHED PAIRED ITEM CORRELATIONS

Paired Item	N	Correlation	Sig.
ETLA Item 1	17	0.086	0.743
ETLA Item 2	13	0.199	0.514
ETLA Item 3	14	0.392	0.166
ETLA Item 4	15	-0.106	0.707
ETLA Item 5	15	-0.523	0.045
ETLA Item 6	19	0.172	0.481
ETLA Item 7	19	-0.011	0.963
ETLA Item 8	17	-0.278	0.280
ETLA Item 9	17	0.239	0.356
ETLA Item 10	18	-0.238	0.341
ETLA Item 11	18	0.192	0.444
ETLA Item 12	18	0.387	0.112
ETLA Item 13	18	0.005	0.984
ETLA Item 14	19	0.546	0.016
ETLA Item 15	16	0.443	0.086
ETLA Item 16	17	-0.258	0.318
ETLA Item 17	18	-0.548	0.018
ETLA Item 18	15	-0.376	0.167
ETLA Item 19	16	-0.257	0.336
ETLA Item 20	15	-0.333	0.226
ETLA Item 21	18	0.369	0.132
ETLA Item 22	14	0.224	0.441
ETLA Item 23	13	-0.071	0.818
ETLA Item 24	16	-0.303	0.255
ETLA Item 25	16	-0.263	0.324
ETLA Item 26	15	-0.170	0.545
ETLA Item 27	14	-0.477	0.084
ETLA Item 28	15	0.168	0.549
ETLA Item 29	17	0.073	0.781
ETLA Item 30	18	-0.121	0.632
ETLA Item 31	14	0.312	0.278
ETLA Item 32	10	0.320	0.367
ETLA Item 33	16	0.213	0.429
ETLA Item 34	19	0.251	0.299
ETLA Item 35	19	-0.118	0.630
ETLA Item 36	19	-0.125	0.610
ETLA Item 37	15	-0.151	0.591
ETLA Item 38	13	-0.298	0.323

## APPENDIX L. EFA ROTATED FACTOR MATRIX

Item	Factor					
	1	2	3	4	5	6
F.I.1	0.424					
F.I.2				0.434	0.515	
F.I.3	0.599					
F.I.4		0.424	0.506			
F.I.5		0.560	0.410			
F.II.1					0.618	
F.II.2		0.663				
F.II.3	0.443	0.531				
F.II.4		0.609				
F.II.5	0.429	0.560				
F.III.1						
F.III.2				0.688		
F.III.3		0.636				
F.III.4	0.485	0.553				0.403
F.III.5	0.486					
F.IV.1				0.609		
F.IV.2		0.553		0.445		
F.IV.3	0.602	0.470				
F.IV.4		0.433	0.468			
F.IV.5		0.468	0.553			
F.V.1				0.520		
F.V.2	0.413		0.460			
F.V.3	0.681					
F.V.4	0.583					
F.VI.1	0.623		0.451			
F.VI.2			0.550			
F.VI.3			0.441			
F.VI.4			0.689			
F.VI.5		0.403			0.406	
F.VII.1		0.465			0.483	
F.VII.2	0.748					
F.VII.3	0.484		0.426			
F.VII.4	0.710					
F.VIII.1			0.500			
F.VIII.2					0.577	
F.VIII.3						0.517
F.VIII.4		0.533				
F.VIII.5	0.457					0.411

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

## APPENDIX M. ETLA SURVEY (PRINTED VERSION)

**Instructions:** You are being given this technology leadership assessment at the request of the technology department, which will use the results to guide its leadership training and professional development programming. Assessment items are based on the International Society for Technology in Education's (ISTE) National Educational Technology Leadership Standards. The purpose of the assessment is to provide detailed and comparative feedback about education technology leadership. The individual items in the assessment ask you about the extent to which you have engaged in certain behaviors that relate to K-12 school technology leadership. Please answer all questions. If you feel a specific question is not applicable, you may mark as not applicable.

There are 38 questions in the survey. It should take 15-20 minutes to complete this survey. As you answer the questions, think of your actual behavior over the course of the last school year. Do not take into account planned or intended behavior. As you select the appropriate response to each question, it may be helpful to keep in mind the performance of other educators that you know. Please note that the accuracy and usefulness of this assessment is largely dependent upon your candor. If done with care, the results can provide valuable information. Your responses to the survey will be kept confidential by the technology department researcher.

To what extent did you participate in your district's or school's most recent technology planning process?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you communicate information about your district's or school's technology planning and implementation efforts to your school's stakeholders?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you promote participation of your school's stakeholders in the technology planning process of your school or district?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you compare and align your district or school technology plan with other plans, including district strategic plans, your school improvement plan, or other instructional plans?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you engage in activities to identify best practices in the use of technology (e.g., reviews of literature, attendance at relevant conferences, or meetings of professional organizations)?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you apply current research on teaching and learning with technology when planning learning environments and experiences?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you identify and locate technology resources and evaluate them for accuracy and suitability?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you plan for the management of technology resources within the context of learning activities?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you plan strategies to manage student learning in a technology-enhanced environment?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you use systems like a data warehouse to access student information?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you provide or make available assistance to colleagues for using student assessment data to modify instruction?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you disseminate or model best practices in learning and teaching with technology to colleagues?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you collaborate with colleagues who were attempting to share information about technology practices, issues, and concerns?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you facilitate or support the delivery of professional development on the use of technology to colleagues?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you promote or model technology-based systems to collect student assessment data?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you promote the evaluation of instructional practices, including technology-based practices, to assess their effectiveness?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you assess and evaluate existing technology-based systems in your school for modification or upgrade?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you evaluate the effectiveness of technology related professional development offerings in your school?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you use multiple measures of evaluation to determine the appropriate use of technology-based resources?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you support colleagues in connecting to and using district- and building-level technology?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you pursue supplemental funding to help meet the technology needs of your school?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you ensure that hardware and software replacement/upgrades were incorporated into school technology plans?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you advocate for adequate, timely, and high-quality technology support services?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you work to ensure equity of technology access and use in your school?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you consider policies and programs meant to raise awareness of technology-related social, ethical, and legal issues?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent were you involved in enforcing policies related to copyright and intellectual property?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent were you involved in addressing issues related to privacy and online safety?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you support the use of technology to help meet the needs of all students, including special education students?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you use technology resources to implement classroom instruction?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you contribute with planning on how to spend building discretionary technology funds?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you follow procedures and guidelines used in planning and purchasing technology resources?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you participate in technology planning for your building?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you participate in professional development activities meant to improve or expand your use of technology?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you use technology to help complete your day to day tasks? (E.g. personal calendar, developing budgets, communicating with others, gathering information)?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you encourage and use technology (e.g. e-mail, blogs, and video-conferences) as a means of communicating with education stakeholders, including peers, experts, students, parents/guardians, and the community?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you advocate for inclusion of research-based technology practices in your school improvement plan?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

To what extent did you evaluate and compare options for the technology you used in your job?

- Not applicable
- Not at all
- Minimally
- Somewhat
- Significantly
- Fully

## APPENDIX N. DEFINITIONS

*Assessment.* A method of measurement used to evaluate progress. Student assessment typically refers to a method of evaluating student performance and attainment to determine whether or not a student is achieving the expected outcome(s).

*Halo error.* This occurs when an individual assesses themselves based on a general impression of their performance or behavior, and the general impression is allowed to unduly influence all the assessments given. An example of halo error would be an individual who rates highly on every single assessment item. It is rare that individuals perform at exactly the same level on every dimension of leadership. It is more likely that an individual performs better in some areas than on others.

*Leniency error.* This occurs when an individual gives themselves an assessment higher than they deserves. This could occur for several reasons: the individual has relatively low performance standards; the individual assumes that other individuals also inflate their ratings; or, for social or political reasons, the individual judges that it would be better not to give a poor assessment.

*Recency error.* This occurs when an individual bases an assessment on their most recent behavior, as opposed to their entire behavior over some fixed period of time (e.g., the last year).

*Research-based.* A practice that employs systematic, empirical methods that draws on observation or experiment to provide reliable data. Research-based work uses research designs and methods appropriate to the research question posed and are presented in sufficient detail for replication. The strongest research-based practices typically obtain acceptance through peer-reviewed journals or expert panels.

*Technology.* Generally refers to personal computers, networking devices and other computing devices (e.g., electronic whiteboards and personal digital assistants (PDAs)); also includes software, digital media, and communications tools such as the Internet, e-mail, CD-ROMs, and video conferencing.

*Technology planning.* Any process by which multiple stakeholder groups (e.g., district administration, school administration, faculty, and parents) convene to develop a strategy for the use or expanded use of technology in instruction and operations. Technology planning need not be separate from other planning efforts, but should be a recurring theme if integrated within a more comprehensive planning process.

## REFERENCES

- ACOT. (1995). A report on 10 years of ACOT research. Retrieved September 1, 2006, from <http://images.apple.com/education/k12/leadership/acot/pdf/10yr.pdf>
- Anderson, R. E., & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly*, 41(1), 49-82.
- Avolio, B. J., & Bass, B. M. (2002). *Developing potential across a full range of leadership: cases on transactional and transformational leadership*. Mahwah, N.J.: Lawrence Erlbaum Associates.
- Barnett, H. (2001). *Successful K-12 technology planning: Ten essential elements* (No. EDO-IR-2001-06). Syracuse, N.Y.: ERIC Clearinghouse on Information and Technology.
- Barth, R. S. (1999). *The teacher leader*. Providence, R.I.: Rhode Island Foundation.
- Bass, B. M., & Avolio, B. J. (1997). *Full range leadership development: Manual for the multifactor leadership questionnaire*. Redwood City, CA: Mind Garden, Inc.
- Battle, M. C. (2004). *Superintendents' perceptions of educational technology leadership*. Unpublished Ph.D., The University of Southern Mississippi, United States -- Mississippi.
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education*, 39(4), 395-414.
- Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge, Mass.,: Belknap Press of Harvard University Press.
- Byrne, B. M. (1989). *A primer of LISREL: Basic applications and programming for confirmatory factor analytic models*. New York: Springer-Verlag.
- Byrom, E., & Bingham, M. (2001). *Factors influencing the effective use of technology for teaching and learning: Lessons learned from the SEIR-TEC Intensive Site Schools. 2nd Edition*. Greensboro, NC: SouthEastern Regional Vision for Education.
- Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Beverly Hills, CA: Sage Publications.

- Center for the Advanced Study of Leadership in Education. (2005). Principals Technology Leadership Assessment. Retrieved September 1, 2006, from [http://www.schooltechleadership.org/uploaded/PTLA\\_Info\\_Packet.pdf](http://www.schooltechleadership.org/uploaded/PTLA_Info_Packet.pdf)
- CEO Forum. (1997). School technology and readiness report: From pillars to progress. Retrieved September 1, 2006, from <http://www.ccoforum.org/downloads/>
- CEO Forum. (1999). School technology and readiness report: Professional development - A link to better learning. Retrieved September 1, 2006, from <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED428747&site=ehost-live>
- CEO Forum. (2000). School technology and readiness report: The powers of digital learning. Retrieved September 1, 2006, from <http://ccoforum.org/downloads/report3.pdf>
- CoSN. (2006). CoSN's school district Chief Technology Officers' (CTO) Council. Retrieved September 1, 2006, from [http://www.cosn.org/resources/cto\\_council/index.cfm](http://www.cosn.org/resources/cto_council/index.cfm)
- CoSN K-12 CTO Council. (2006). What it takes: Essential skills of the K-12 CTO. Retrieved September 1, 2006, from [http://www.cosn.org/resources/cto\\_council/skills.cfm](http://www.cosn.org/resources/cto_council/skills.cfm)
- Cotton, K. (2003). *Principals and student achievement: What the research says*. Alexandria, Virginia: Association for Supervision and Curriculum Development.
- Creighton, T. B. (2003). *The principal as technology leader*. Thousand Oaks, CA: Corwin Press.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publications.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*, 38(4), 813-834.
- Culp, K. M., Honey, M., & Mandinach, E. (2005). A retrospective on twenty years of education technology policy. *Journal of Educational Computing Research*, 32(3), 279-307.
- Deal, T. E., & Peterson, K. D. (1999). *Shaping school culture: The heart of leadership*. San Francisco: Jossey Bass Inc.

- Dede, C. (2000). Emerging influences of information technology on school curriculum. *Journal of Curriculum Studies*, 32(2), 281-303.
- Demetriadis, S., Barbas, A., Molohides, A., Palaigeorgiou, G., Psillos, D., Vlahavas, I., et al. (2003). Cultures in negotiation: Teachers' acceptance/resistance attitudes considering the infusion of technology into schools. *Computers & Education*, 41(1), 19-37.
- Dikkers, A. G., Hughes, J. E., & McLeod, S. (2005). A bridge to success: STLI - In that no man's land between school technology and effective leadership, the University of Minnesota's School Technology Leadership Initiative is a welcoming bridge. *T.H.E. Journal*, 32(11), 20.
- Dillman, D. A. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, N.J.: Wiley.
- Earl, J., & Lampe, M. D. (2004). *Toward a new golden age in American education - How the Internet, the law and today's students are revolutionizing expectations*. Retrieved September 3, 2006, from <http://www.ed.gov/about/offices/list/os/technology/plan/2004/index.html>.
- Earle, R. S. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational Technology*, 42(1), 5-13.
- Eichinger, R. W., & Lombardo, M. M. (2006). Education competency wheel. Retrieved September 3, 2006, 2006, from <https://www.microsoft.com/education/competencies/default.msp>
- Elmore, R. F. (2000). *Building a new structure for school leadership*. Washington, DC: The Albert Shanker Institute.
- Ertmer, P. A., Bai, H., Dong, C., Khalil, M., Park, S. H., & Wang, L. (2002). Online professional development: Building administrators' capacity for technology leadership. *Journal of Computing in Teacher Education*, 19(1), 5-11.
- Fenn, J., Linden, A., & Fairchok, S. (2003). *Strategic technology planning: Picking the winners* (No. R-20-3354): Gartner, Inc.
- Fishbaugh, M. S. (1997). *Models of collaboration*. Boston: Allyn and Bacon.
- Fitzpatrick, K. A., & Pershing, J. A. (1996). *Technology: Indicators of quality information technology systems in K-12 schools*. Schaumburg, IL: National Study of School Evaluation.
- Fraenkel, J. R., & Wallen, N. E. (1993). *How to design and evaluate research in education* (2nd ed.). New York: McGraw-Hill.

- Fullan, M. (2001a). *Leading in a culture of change*. San Francisco: Jossey Bass.
- Fullan, M. (2001b). *The new meaning of educational change* (3rd ed.). New York: Teachers College Press.
- Fullan, M. (2003). *Change forces with a vengeance*. New York: RoutledgeFalmer.
- Garnder, J. W. (1990). *On leadership*. New York: Free Press.
- GLEF. (2001). GLEF Blast Newsletter. Retrieved September, 2006, from <http://www.edutopia.org/EdutopiaPDF/Fall01.pdf>
- Granger, C. A., Morbey, M. L., Lotherington, H., Owston, R. D., & Wideman, H. H. (2002). Factors contributing to teachers' successful implementation of IT. *Journal of Computer Assisted Learning*, 18(4), 480-488.
- Grote, R. C. (1996). *The complete guide to performance appraisal*. New York: AMACOM.
- Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2004). *Survey methodology*. Hoboken, NJ: J. Wiley.
- Hair, J. F. (1979). *Multivariate data analysis: With readings*. Tulsa, Ok.: PPC Books.
- Hall, G., & Hord, S. (2001). *Implementing change: Patterns, principles, and potholes*. Boston: Allyn & Bacon.
- Healy, J. M. (1998). *Failure to connect: How computers affect our children's minds - for better and worse*. New York: Simon and Schuster.
- Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences* (5th ed.). Boston: Houghton Mifflin.
- Holland, L., & Moore-Steward, T. (2000). A different divide: Preparing tech-savvy leaders. *Leadership*, 30(1), 8-10,37-38.
- Holland, P. E. (2001). Professional development in technology: Catalyst for school reform. *Journal of Technology and Teacher Education*, 9(2), 245-267.
- Hord, S. M. (1997). Professional learning communities: What are they and why are they important? Retrieved November 1, 2007, from <http://www.sedl.org/change/issues/issues61.html>
- Hudanich, N. V. (2002). *Identifying educational technology leadership competencies for New Jersey's school superintendents*. Unpublished Ed.D., Seton Hall University.

- Hughes, M., & Zachariah, S. (2001). An investigation into the relationship between effective administrative leadership styles and the use of technology. *International Electronic Journal For Leadership in Learning*, 5(5).
- Hurley, D. (2002). *The yin and yang of technology leadership in education* (No. COM-16-1192): Gartner, Inc.
- ISTE. (2000). *National educational technology standards for students*. Eugene, OR: International Society for Technology in Education.
- ISTE. (2002). *National educational technology standards for teachers*. Eugene, OR: International Society for Technology in Education.
- ISTE. (2004). *National educational technology standards for administrators*. Eugene, OR: International Society for Technology in Education.
- ISTE. (2006). National educational technology standards. Retrieved September 1, 2006, from <http://osx.latech.edu/>
- Jukes, I. (1996). The essential steps of technology planning. *School Administrator*, 53(4), 8-14.
- Keller, B., & Rust, B. (2001). *K-12 E-education: Governance* (No. SPA-14-4362): Gartner, Inc.
- Kim, J., & Mueller, C. W. (1978a). *Factor analysis: Statistical methods and practical issues*. Beverly Hills, CA: Sage Publications.
- Kim, J., & Mueller, C. W. (1978b). *Introduction to factor analysis: What it is and how to do it*. Beverly Hills, CA: Sage Publications.
- Kline, P. (1994). *An easy guide to factor analysis*. New York: Routledge.
- Kotter, J. P. (1996). Transforming organizations: Why firms fail. In *Leading Change*. Boston: Harvard Business School Press.
- Kozma, R. B. (2005). National policies that connect ICT-based education reform to economic and social development. *Human Technology*, 1, 117-156.
- Lambert, L. (1998). *Building leadership capacity in schools*: Association for Supervision & Curriculum Development.
- Lambert, L. (2003). *Leadership capacity for lasting school improvement*. Alexandria, Va.: Association for Supervision and Curriculum Development.
- Lambert, L. (2005). What does leadership capacity really mean? *Journal of Staff Development*, 26(2), 38-40.

- Lauer, J. M., & Asher, J. W. (1988). *Composition research: Empirical designs*. New York: Oxford University Press.
- Leithwood, K., Louis, K. S., Anderson, S., & Wahlstrom, K. (2004). *How leadership influences student learning*. New York, NY: The Wallace Foundation.
- Marzano, R. J. (2003). *What works in schools: Translating research into action*. Alexandria, Virginia: Association for Supervision and Curriculum Development.
- Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd ed.). Thousand Oaks, CA: Sage.
- Mayer, R. E. (2003). *Learning and instruction*. New Jersey: Pearson Education, Inc.
- McKenzie, C., & Padayachee, G. (2001). *Technology II: Implementation planning guide*. Sacramento, CA: California Community Colleges.
- McKenzie, J. (1998). Technology's webs. *School Administrator*, 55(4), 6-10.
- Means, B., & et al. (1993). *Using technology to support education reform* (No. 0160420482). District of Columbia: U.S. Government Printing Office.
- Mirra, D. R. (2004). *The role of the school superintendent as a technology leader: A Delphi study*. Unpublished Ed.D., Virginia Polytechnic Institute and State University.
- National Center for Education Statistics. (2006). *Digest of education statistics, 2005* (No. NCES 2006-030): U.S. Department of Education.
- National Center for Education Statistics. (2007). *Digest of education statistics, 2006* (No. NCES 2007-017): U.S. Department of Education.
- Newman, I., & McNeil, K. A. (1998). *Conducting survey research in the social sciences*. Lanham, Md.: University Press of America.
- Norris, C., Smolka, J., & Soloway, E. (1999). *Convergent analysis: A method for extracting the value from research studies on technology in education*. Paper presented at the The Secretary's Conference on Educational Technology, Washington, DC.
- Office of Postsecondary Education. (2003). *Application for grants under the preparing tomorrow's teachers to use technology (PT3)*. Washington, DC: U.S. Dept. of Education, Office of Postsecondary Education, Higher Education Programs,.
- Office of Research Assurances. (2006). Human subjects. Retrieved September 1, 2006, from <http://www.compliance.iastate.edu/ComplianceWeb/irbForms.aspx>

- Office of Technology and Assessment. (1989). *Linking for learning: A new course for education*. Washington, DC: U.S. Government Printing Office.
- Office of Technology and Assessment. (1995). *Teachers & technology: Making the connection*. Washington, DC: U.S. Government Printing Office.
- Peterson, R. A. (2000). *Constructing effective questionnaires*. Thousand Oaks, CA: Sage Publications.
- Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and educational research*. Lanham, Md.: Rowman & Littlefield Publishers.
- Pitler, H. (2005). *McREL technology initiative: The development of technology intervention program. Final report*. Aurora, CO: Mid-Continent Research for Education and Learning (McREL).
- Pounder, D. G. (1998). *Restructuring schools for collaboration promises and pitfalls*. Albany, NY: State University of New York Press.
- Rea, L. M., & Parker, R. A. (2005). *Designing and conducting survey research: A comprehensive guide* (3rd ed.). San Francisco: Jossey-Bass.
- Retallick, J., & Fink, D. (2002). Framing leadership: Contributions and impediments to educational change. *International Journal of Leadership in Education*, 5(2), 91-104.
- Riedl, R., Smith, T., Ware, A., Wark, A., & Yount, P. (1998). *Leadership for a technology-rich educational environment*. Paper presented at the SITE 98: Society for Information Technology & Teacher Education International Conference, Washington, DC.
- Ringstaff, C., & Kelley, L. (2002). *The learning return on our educational technology investment: A review of findings from research*. San Francisco, CA: WestEd.
- Ross, J. D., McGraw, T. M., & Burdette, K. J. (2001). *Toward an effective use of technology in education: A summary of research*. Charleston, WV: AEL, Inc.
- Rowand, C. (2000). Teacher use of computers and the internet in public schools. *Education Statistics Quarterly*, 2(2), 72-75.
- Rust, B. (2006). *CIOs in K-12 education must demonstrate political and interpersonal skills* (No. G00139095): Gartner, Inc.
- Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology: Creating student-centered classrooms*. New York: Teachers College Press.

- Sansone, C., Morf, C. C., & Panter, A. T. (2003). *The Sage handbook of methods in social psychology*. Thousand Oaks, CA: Sage Publications.
- Schiller, J. (2002). Interventions by school leaders in effective implementation of information and communications technology: Perceptions of Australian principals. *Technology, Pedagogy and Education* 11(3), 289-301.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8(4), 350.
- Skinner, R. A. (2002). Tracking tech trends. *Education Week*, 21(35), 53.
- Spillane, J. P., Halverson, R., & Diamond, J. B. (2001). Investigating school leadership practice: A distributed perspective [Electronic Version]. *Educational Researcher*. Retrieved September 2006 from [www.soemadison.wisc.edu/elpa/people/faculty/halverson/JamesSpillaneDistributedLeadership.pdf](http://www.soemadison.wisc.edu/elpa/people/faculty/halverson/JamesSpillaneDistributedLeadership.pdf).
- Starkweather, K. N. (2002). ITEA/Gallup Poll: Interpreting what others think of technology teaching. *Technology Teacher*, 61(8), 31-33.
- Stegall, P. (1998). *The Principal: Key to technology implementation*. Paper presented at the Annual Meeting of the National Catholic Education Association.
- Stogdill, R. M. (1974). *Handbook of leadership: A survey of theory and research*. New York: Free Press.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn and Bacon.
- Tiene, D., & Luft, P. (2001). Teaching in a technology-rich classroom. *Educational Technology*, 41(4), 23-31.
- Twomey, C. R., Shamburg, C., & Zieger, L. B. (2006). *Teachers as technology leaders*. Eugene, OR: ISTE Publications.
- U.S. Department of Commerce. (2002). A nation online. How Americans are expanding their use of the Internet. Retrieved September 1, 2006, from <http://www.ntia.doc.gov/ntiahome.dn>
- Valdez, G. (2000). *Computer-based technology and learning evolving uses and expectations*. Oak Brook, IL: North Central Regional Educational Laboratory.
- Waters, T., Marzano, R. J., & McNulty, B. (2003). *Balanced Leadership: What 30 years of research tells us about the effect of leadership on student achievement*. Denver, CO: McRel.

- Weiner, L. (2000). Research in the 90s: Implications for urban teacher preparation. *Review of Educational Research, 70*(3), 369-406.
- Welkowitz, J., Cohen, B. H., & Ewen, R. B. (2006). *Introductory statistics for the behavioral sciences* (6th ed.). Hoboken, N.J.: Wiley.
- Wheatley, M. J. (1999). *Leadership and the new science: Discovering order in a chaotic world* (2nd ed.). San Francisco: Berrett-Koehler Publishers.
- Wilsmore, D., & Betz, M. (2000). Information technology and schools: The Principal's role [Electronic Version]. *Educational Technology & Society*. Retrieved September 1, 2006 from [http://ifets.ieee.org/periodical/vol\\_4\\_2000/discuss\\_october2000.pdf](http://ifets.ieee.org/periodical/vol_4_2000/discuss_october2000.pdf).
- Wonacott, M. E. (2001). Technological literacy. ERIC Digest. Washington, DC: Office of Educational Research and Improvement.
- Yee, D. L. (1998). Chalk, chips, and children. *Educational Leadership, 55*(7), 57-59.

## ACKNOWLEDGMENTS

I'd like to acknowledge the support of my major professors during my PhD program of study at Iowa State University. Dr. Tom Alsbury, who helped me develop my program of study and get me started. Dr. Frank Hernandez, who helped me through the middle stages of my program, including my Capstone work. Dr. Scott Mcleod, who served as a mentor and a guide for my work related to education technology leadership.

In addition to the leadership of my major professors, I had great support from a number of Iowa State University faculty and staff, including Dr. Gary Phye, Dr. Ann Thompson, Dr. Denise Schmidt, Dr. Troyce Fisher, and Dr. Joanne Marshall. I offer a special thank you to Judy Weiland in the Department of Education Leadership and Policy Studies for helping me to navigate through the University procedures and various requirements.

Thank you to my colleagues in the Des Moines Schools who encouraged me in the pursuit of my degree. Dr. Linda Lane especially served to inspire and motivate me in my PhD efforts. And thank you to the members of my PhD cohort, especially Dr. Elizabeth Cox, for making the effort to stay in touch and make sure we all supported each other even after the coursework was finished.

My wife Amy, my son Calvin, and my daughter Haley provided great love and support throughout my pursuit of the PhD degree. As a family we share in each other's accomplishments, and I know they were a big part of this one.