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ABSTRACT

This paper documents the authors' efforts at constructing, deploying, and analyzing Snapshot Surveys in a range of educational settings. The Snapshot Survey Service is an Internet-based technology that enables educators at the local, state, and even national level to survey, quickly and at low-cost, other educators on issues that are particularly important to their local area. The first section summarizes the Snapshot Surveys hosted and experiences with follow-through. The second section presents data from the surveys and discusses findings. The third section addresses the impact of the Snapshot Survey process. The fourth section describes the Snapshot Survey and World Wide Web site design rationale, including choice of questions, interface design, the human side of collecting data, the technology side of collecting data, analysis and display of findings, automation issues, and presentations. The report, "A Snapshot of the Implementation of Education-Related Technology in Nebraska's K-12 Schools: Executive Summary of Preliminary Findings" (Neal W. Topp, Neal Grandgenett, Robert Mortenson, Cathleen Norris, and Elliot Soloway), is appended. (MES)

The Snapshot Survey Service: A Web Site for Teachers' and Administrators' Technology Activities, Beliefs, and Needs

By: Cathleen Norris and Elliot Soloway

The Snapshot Survey Service: *A Web Site for Assessing Teachers' and Administrators' Technology Activities, Beliefs, and Needs*

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The Need for the Snapshot Survey Service: Enabling Informed Decision Making

Schools and school districts are making all manner of decisions with regard to technology (e.g., buying computers, providing teachers with professional development, installing Internet connections, and constructing curricular materials with embedded technology). All these decisions will involve teachers at some point. Thus, a rational decision-making process would include an assessment of where teachers stand on various key issues, including the following:

- What are the beliefs of teachers with respect to technology?
- What are teachers' *real* needs with respect to technology?
- How do teachers currently use technology?

Further, inasmuch as technology brings about rapid changes even in schools, an assessment of these issues needs to be carried out on a regular basis, at least every semester. A baseline needs to be established and then follow-up assessments need to be routinely conducted in order to better understand the patterns of growth and change in teachers' and administrators' activities, beliefs, and needs.

In contrast to the more traditional academic survey studies that operate on a three-year cycle, we have developed an Internet-based technology—The Snapshot Survey Service. This service enables educators at the local, state, and even national level to survey, quickly and at low-cost, other educators on issues that are particularly important to their local area.

In what follows, we document our efforts at constructing, deploying, and analyzing Snapshot Surveys in a range of educational settings—from surveying 3,100 teachers and administrators across Nebraska to surveying all 70 educators from Glendale, Pennsylvania, a small rural school district. The section headings follow the list of deliverables as set out in the initial contract.

Experiences in Carrying out the Snapshot Survey Process

During the contracting period of this effort, we hosted the following Snapshot Surveys:

- **State of Nebraska, February 11-22, 2000:** Essentially all 23,000 educators in the state of Nebraska received letters inviting them to participate in the Snapshot Survey (http://snapshotsurvey.org/nebraska). Approximately 3,100 Nebraska teachers and administrators took the survey during that period.
- **Educational Leadership Magazine, April 13-25, 2000:** We placed an announcement in the April issue of *Educational Leadership,* inviting readers to participate in a Snapshot Survey (http://snapshotsurveyorg/EL). The magazine's readership is greater than 100,000—approximately 70 individuals took the survey.
- **The school district in Glendale, Pennsylvania, June 1-15, 2000:** All 70 educators in this small school district completed the survey at http://snapshotsurvey.org/glendale.
- **Electronic Communication Across the Curriculum in K-12, July 1-14, 2000:** All 14 K-12 teachers from the central Upper Peninsula of Michigan attending a workshop at Michigan Technological University took the survey at http://snapshotsurvery.org/ecac. (This is also part of one of the Challenge Grants.)

In addition, Dr. Gerald Knezèk, Professor, University of North Texas, used parts of our Snapshot Survey in his work with educators in Allen, TX. Dr. Knezek is responsible for evaluating a U.S. Department of Education Challenge Grant. As well, Dr. Eric Kiopfer, Assistant Professor, MIT, used the Snapshot Survey (http://education.mit.edu/summer/survey.htm) as part of an evaluation instrument for a workshop he ran at MIT for K-12 teachers on the use of StarLogo for learning.

We have had numerous inquiries about running a Snapshot Survey in other locations. School board members, principals, and teachers have contacted us about what it would take to run a Snapshot Survey in their school district or school. We have had more than a dozen follow-up conversations, via e-mail, with different individuals after their initial inquiries. A decision to commit the time and resources (minimal as they are) to running a Snapshot Survey requires the buy-in from a broad range of individuals. Given how arduous decision making is in public schools, getting a clear go-ahead is a challenge. Getting significant follow-through is even a greater challenge. Some of our experiences have included the following:

- Mr. Bruno, director of technology in a small district in Glendale, was able to bring about a quick and favorable decision and followed through to get all his colleagues to take the survey.

- In contrast, we worked with a large district in a southern state where the superintendent made the decision relatively quickly to do the survey, but the follow-through took a backseat to other activities in the district. In the end, they did not conduct a survey because people were too busy and it seemed too low a priority.
- We have been in discussions for over a year with educators from New York about running a Snapshot Survey for all the educators in that state. While there is clear interest, actually coming to a decision has turned out to be quite complex. For example, in response to concerns from some in New York, we have prepared a Frequently Asked Questions Web page: http://snapshotsurvey.org/papers/faq.htm

The lesson is clear: from our experiences in successfully conducting the four surveys identified above, it takes someone to assume the commitment to marshal the resources, persuade the teachers and administrators, and follow through for a period of time.

Results of Snapshot Survey Process

Physics identifies universal laws (e.g., force = mass * acceleration) that apply in Idaho, Michigan, and even California. However, in the social sciences, that which is local is key. For example, the differences in location, culture, weather, commerce, and so on between Utah and Florida converge to generate differences in educational systems. In particular, "teachers" is not a homogeneous population. There are elementary school teachers and secondary school teachers; there are science teachers and language arts teachers; there are teachers new to the profession and teachers who have taught for 30 years. And, there are wide differences in teachers with respect to their comfort and expertise using technology for teaching and learning.

The Snapshot Survey, then, is a means by which a school, district, state, or even country can access teachers and administrators and discover their needs, beliefs, and uses of technology in the classroom. Moreover, it is a means to determine subgroups, the differences in the teacher population. For example, we observed that math teachers in Nebraska are markedly different from science teachers in Nebraska in their comfort and expertise in the use of technology in the classroom. And, as the number of individuals in the survey increases, we can break subgroups down even further. Based on analysis of teachers at such a fine-grained level, decisions can be made that are specifically tailored to particular subgroups.

This notion that "teachers are not a homogenous group" displays itself in our analysis in two ways. First, we argue that there are two broad audiences for findings from the Snapshot Surveys. Second, we provide an example of a fine-grained analysis by looking specifically at a few significant differences between science and math teachers in Nebraska.

Two Audiences: The Details Matter

Broadly speaking, there are two audiences for the results from a Snapshot Survey:

1. *Local Audience:* The organization that sponsors a Snapshot Survey is the primary consumer of the information gathered in the Survey. In particular, each organization individualizes a Snapshot Survey by including questions that are specific to that

organization. For example, in Table 1 we provide several questions each that Nebraska and Glendale included.

2. *National Audience:* There are a number of questions that we have used in every Snapshot Survey we have conducted; several of those questions are included for illustration in Table 1. While one needs to exercise care in comparing findings across different locales,[1] the differential findings to these sorts of questions are provocative. Of course, the local sponsoring organization will also find the data from the "standardized" questions informative.

Table 1: Locally Interesting Questions: Glendale, Pennsylvania

Please indicate you level of agreement with the following statements:	Mean	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Telephone service in my classroom has been educationally useful.	3.88	5	2	11	29	22
		7.2%	2.9%	15.9%	42.0%	31.9%
Cable television in my classroom has been educationally useful.	3.09	7	7	35	15	6
		10.0%	10.0%	50.0%	21.4%	8.6%
The transition to incorporating technology into the district has been handled in a professional and effective manner.	3.39	7	3	21	35	5
		9.9%	4.2%	29.6%	49.3%	7.0%
I believe that in the coming school year I will be able to use the new technologies to benefit my students.	3.72	2	4	12	44	7
		2.9%	5.8%	17.4%	63.8%	10.1%
I would like to see locally developed educational materials (e.g., school events) distributed over the school cable network.	3.87	1	2	18	33	16
		1.4%	2.9%	25.7%	47.1%	22.9%
My students have benefited from the Compass Learning computer-based instructional system.	3.47	4	3	32	18	13
		5.7%	4.3%	45.7%	25.7%	18.6%

Table 1 is quite interesting. Ignoring the "no opinions" for a moment, one can see that the educators in Glendale were pleased with the use of different technologies (from the telephone to a computer-assisted instruction system). Indeed, there is an upbeat attitude as the Glendale educators head into the coming school year. Now, why are there so many "no opinions"? More analysis is needed. Perhaps the "no opinions" on the last question (use of the Compass Learning System) was due to the fact that those respondents didn't use the Compass Learning System and thus a "no opinion" is just that!

[1] The Snapshot Survey typically violates the assumption of a "randomized" sample. (In Glendale, the Snapshot Survey was more of a "canvas" since all educators participated in the survey. However, in Nebraska, the 3,100 educators who provided information on the Snapshot Survey were not drawn from a random population.) Unlike the survey work of researchers such as Henry Becker, those taking the Snapshot Survey are not chosen at random. However, by aligning demographic data on the various populations, one can make comparisons. More generally, the Snapshot Survey technique, where the Internet is used to tap into a population, is serving as yet another challenge to traditional assessment methods. Statistical methods need to be invented that take advantage of the opportunities afforded by the Internet in sampling nonrandomized populations. Simply discounting these sorts of data because they violate traditional experimental guidelines is not a viable strategy; our analysis methods need to keep pace with the emerging technologies available for sampling.

However, the need to analyze the data at a deeper level—and perhaps carry out follow-up interviews with selected respondents—illuminates another problem that must be addressed: While academics might feel comfortable exploring the data, it is not clear that local school staff will be so inclined. How much gratis work can we do? Will districts pay for this sort of analysis? In the bigger districts, there might well be a statistician on staff who would have the expertise to deal with these data. However, orchestrating communication so that this person participates along with the others now becomes key.

Table 2 shows the Nebraska teachers feeling quite solid about integrating technology into the classroom. Designing Web pages is another story; but do most teachers need to design Web pages? It would be interesting to look at what these same positive teachers said about their needs, beliefs, and uses of technology. Yes, they can design lessons that use technology—but do they? Again, answering these sorts of questions requires considerable skill in analyzing data. Frankly, it is not likely that in the near term we will be automating these sorts of deeper analyses.

Table 2: Locally Interesting Questions: Nebraska

Rate your agreement with the following statements:	Mean*
I feel comfortable with designing lessons that integrate the Internet.	2.73
I feel comfortable with authoring Web pages.	1.90
I feel comfortable with designing lessons that reflect Nebraska or district or national curriculum standards.	2.72
I feel comfortable with designing lessons that integrate more than one discipline.	2.98
I feel comfortable with designing lessons that integrate technology.	2.82

*4-point scale: Strongly Disagree, Disagree, Agree, Strongly Agree

In Table 3, we list the findings from the Glendale Snapshot Survey, where there were only 70 respondents, and the findings from the Nebraska Snapshot Survey, where were there over 3,100 respondents. As we pointed out earlier, given that these two "samples" are not randomly selected, there is some concern that drawing an inference from comparing these two sets of numbers is not statistically valid. To be statistically valid, one needs to align the samples along common demographic lines. Indeed, going to those lengths is warranted if one can conclude that there really is not much difference between the two groups with regard to these questions.

Table 3: Standardized Questions (Questions That Appear on All Snapshot Surveys)

Please indicate your level of agreement with the following statements:	Glendale Mean	Nebraska Mean
I believe that electronic media will replace textbooks within five years.	2.38	2.40
I believe that it is a waste of time for students to search the Internet, and thus, teachers should provide them with specific sites to visit for class assignments.	2.64	2.55
I believe that the role of schools will be dramatically changed because of the Internet within five years.	3.35	3.45
I believe that the role of the teacher will be dramatically changed because of the Internet within five years.	3.23	3.22
I believe that I am a better teacher with technology.	3.41	3.78
I believe that having my students search the Internet for information for a classroom assignment is time well spent.	3.40	3.67

Teachers, Science Teachers, and Math Teachers in Nebraska: Details Matter Again

The charts in this paper expand on the data analysis of the recent Nebraska Snapshot Survey presented in the accompanying report. Here are some notable findings:

- While the secondary science teachers report that they do believe that technology can lead to increased learning, and while they report having the lion's share of the classroom Internet-connected computers, they do not report using those computers any more than other teachers (except math teachers; see below).
- While the secondary math teachers use computers and the Internet for their own purposes at home and at school with the same frequency as do the non-math teachers, nonetheless, the math teachers need more compelling reasons why they should use technology in their classrooms. Acting on this belief, they use computers and the Internet significantly less frequently than teachers from other disciplines.

The legend for the following three tables is as follows: √√ means the group chose the decision significantly more often than the other group; √ means the group chose the decision significantly less often than the other group.

Table 4: Math Teachers Versus All Other Disciplines

Secondary Teachers in Nebraska	Math Teachers	All Other Disciplines
Beliefs		
I'm a better teacher with technology. (21.5)	√	√√
Electronic media will replace textbooks within the next five years. (21.1)	√	√√
Attitude		
Comfortable designing lessons that integrate the Internet (19.1)	√	√√
Comfortable designing lessons that integrate more than one discipline (19.4)	√	√√
Needs		
Need more training to use technology (12.3)	√	√√
Need more technical support to keep the computers working (12.8)	√	√√
Need more compelling reasons why I should incorporate technology into my classroom (12.10)	√√	√
Need faster access to the Internet for my students (12.11)	√	√√
Need access to faster, more powerful computers for my students (12.12)	√	√√
Computer Use		
A typical student would use a computer (but not the Internet) for curricular purposes. (16.3)	√	√√
A typical student would use the Internet for curricular purposes. (16.4)	√	√√

Table 5: Math Teachers Versus Science Teachers

Secondary Teachers in Nebraska	Math Teachers	Science Disciplines
Beliefs		
Electronic media will replace textbooks within the next five years. (21.1)	√	√√
Attitude		
I am comfortable designing lessons that integrate the Internet. (19.1)	√	√√
Needs		
Need more training to use technology (12.3)	√	√√
Need access to more computers for my students (12.5)	√	√√
Need more access to the Internet for my students (12.6)	√	√√
Need more technical support to keep the computers working (12.8)	√	√√
Need more compelling reasons why I should incorporate technology into my classroom (12.10)	√√	√
Need faster access to the Internet for my students (12.11)	√	√√
Need access to faster, more powerful computers for my students (12.12)	√	√√

Table 6: Science Teachers Versus All Other Disciplines

Secondary Teachers in Nebraska	Science Teachers	All Other Disciplines
Attitude		
I feel comfortable with designing lessons that integrate technology. (19.5)	√√	√
Needs		
Need more time to change the curriculum to better incorporate the technology (12.2)	√√	√
Need access to more computers for my students (12.5)	√√	√
Need more access to the Internet for my students (12.6)	√√	√
Computer Use		
A typical student would use a computer (but not the Internet) for curricular purposes. (16.3)	√	√√
YOU use a distance-learning classroom for a class. (16.5)	√√	√
YOU use a distance-learning classroom for meetings. (16.6)	√√	√

Impact of Snapshot Survey Process

While we had hoped to already see some impact from the findings of the Snapshot Surveys in Nebraska and Glendale, we are seeing that the results are still being digested by each of these communities:

- *Nebraska*: The report that was presented to the Nebraska State Board of Education is reprinted as Appendix A. Dr. Topp has been asked to present the findings from the survey at various state meetings; he has been asked to continue such presentations through fall 2000.
- *Glendale*: Mr. Dennis Bruno, director of technology for the Glendale school district and sponsor of the Snapshot Survey, said "The survey...has provided important information to

guide our activities in the fall." However, little will happen until at least August when the school administrators and teachers come back from vacation.

Thus, at this point we must remain mute about how the findings from the Snapshot Survey actually impacted the sponsoring organization. Needless to say, however, we will follow up with Dr. Topp (Nebraska) and Mr. Bruno (Glendale) this fall.

Snapshot Survey and Web Site Design Rationale

In this section, we describe a range of issues that bear on the construction, administration, and analysis of the Snapshot Survey.

Choice of Questions

We have been evolving the specific questions and their wording for approximately two years. Quite frankly, we are still revising both! Our intent is to discover the beliefs and needs of teachers when the teachers are broken down into different groupings. As well, we want to correlate those beliefs and needs with the actual uses of the technology by the teachers themselves at home and at school and by their students. Beliefs impact actions; if teachers are not convinced of the value of the Internet, it is not surprising that they do not use the Internet with their students.

We are settling on approximately 10 demographic questions and 20 beliefs, needs, and use questions. There are different questions for administrators. Using a version of "adaptive testing," we can dynamically alter the survey based on the answers provided by the respondents.

Interface Design

We have now had upwards of 3,000 educators fill out the Snapshot Survey. Overall, the Survey has proven itself to be quite usable. We had a few reports from respondents who said they had to scroll horizontally to see the whole survey. We were not able to track down this problem, though we surmised it was a browser-specific issue. Thus, we feel we have developed a format that is accessible and useable.

Collecting Data: Human Side

In Nebraska and Glendale, we sent out letters to educator who then distributed them to teachers and administrators at their schools. We also involved local school personnel to encourage their colleagues to fill out the Snapshot Survey. In both Nebraska and Glendale, some time during inservice events was devoted to teachers and administrators going online to fill out the survey. Thus, we feel we gave the vast majority of potential respondents ample opportunity to know about the Snapshot Survey.

It is a reasonable conjecture, however, that only those educators in Nebraska who felt comfortable with the technology and had access to it responded. This group of respondents was likely more technology-savvy than those who did not respond. We are trying to gather demographic data on these issues now.

In contrast, in Glendale, all the educators responded to the Snapshot Survey. Clearly pressure was brought to bear on them; otherwise the turnout would not have been so complete.

Interestingly, the Glendale Snapshot Survey required respondents to enter their names. However, in the Nebraska Snapshot Survey, it asked for e-mail addresses and stated quite clearly that this was voluntary information and would be kept private. We still intend to send those that gave us their e-mail addresses information on how their answers related to those of the group.

Collecting Data: Technology Side

We employed three Windows NT servers to support the Nebraska Snapshot Survey. An Oracle database underlies the Snapshot Survey. Only two servers were used for the Glendale Snapshot Survey, however. While we kept a constant eye on the data coming in, we feel we need to increase the automatic checks of data integrity. Moreover, we are planning on moving to a Sun Solaris environment; given the limited resources we have, it is difficult to keep the NT servers up and running.

Analysis and Display of Findings

In this early stage of our efforts, we are still evaluating the analyses by hand using SPSS. For example, a baseline analysis of the Glendale Snapshot Survey data is displayed at: http://snapshotsurvey.org/glendale/results.html. As we note below, however, we need to incorporate more automation if we are ever to make this service a rapid, Internet-time service.

We have made little progress on our goal of providing individual respondents with individualized feedback. We did not, as we had outlined in our original proposal, provide users with a Web page with information about their responses in comparison to responses of others in the sample. Rather, we focused our attention on supporting more Snapshot Surveys and on rebuilding the "plumbing." However, we have a moral obligation to provide respondents with this information and we will still do so.

Automation Issues

In order to truly make the Snapshot Survey an Internet-type service where school organizations can come and create a survey with almost no intervention on our part, we need to increase the amount of automation available. There are, in fact, Web sites that users can access, create surveys, and have them administered for a fee, of course. We feel that we have a solid framework upon which to build those automated services: The survey is totally database generated (Oracle). From the database, we can create a survey and a baseline display of the findings, e.g., http://snapshotsurvey.org/glendale/results.html.

Presentations

In addition to the Web site at http://snapshotsurvey.org, we have produced the following:

- Press Conference, February 25, 2000, Indian Falls, Nebraska, hosted by the Secretary of Education of Nebraska
- Demonstration (Invited), March 7, 2000, Washington, DC, The John Glenn Commission on K-12 Math and Science Education

- Keynote (Invited), May 1, 2000, New York City, New York, SchoolTech Conference
- Keynote (Invited), May 12, 2000, Kansas City, KS, eSchool News Workshop on Grants and Funding in Education
- Spotlight Session (Invited), June 24, 2000, National Educational Computing Conference (NECC), Atlanta, Georgia

Concluding Remarks

The NCREL seed funding has enabled us to build an initial Web site to support the Snapshot Survey Service. We have carried out several Snapshot Surveys and had a shakedown of our basic procedure. We have achieved all the goals initially set out in our proposal save one—we have not yet provided feedback to individual respondents.

However, in the next incarnation, we plan to take an even bolder step: In addition to providing a Web page that contains information about a respondent's answers and their relation to the sample's answers, we plan on providing information tailored to the specific needs of the respondent. For example, if the respondent notes on the Snapshot Survey that he/she needs more training with technology, we will create a Web page that contains information about workshops and mini-courses in that person's local area. As well, we will recommend Web sites, books, and magazines depending on the respondent's subject area and grade-level assignment. The information on the local courses is available, typically, from the regional education/technology organization. We are planning on rolling this service out in the fall in our Snapshot Survey in New York. We are also planning on carrying out surveys in Texas.

The Snapshot Survey Service is an example of the emerging new generation of technologies that can provide new and novel support for learning and teaching. We greatly appreciate the funding from NCREL; it has gotten us off to a great start!

Appendix A:

A Snapshot of the Implementation of Education-Related Technology in Nebraska's K-12 Schools

Executive Summary of Preliminary Findings

Dr. Neal W. Topp, Dr. Neal Grandgenett, and Dr. Robert Mortenson, University of Nebraska at Omaha

Dr. Cathleen Norris, University of North Texas

Dr. Elliot Soloway, University of Michigan

Introduction[2]

Nebraska educators are moving to integrate computer and Internet technology into the curriculum in schools and classrooms around the state. In order to get a picture of how this implementation is progressing, we invited the approximately 23,000 educators to log onto the Internet and take the Nebraska Educational Technology Snapshot Survey. In the 10 days of this Internet-based event, 14 percent of Nebraska teachers and administrators volunteered responses to the survey.

The snapshot provided by these data is clear; Nebraska is making definite progress toward having K-12 schoolchildren use computers and the Internet.

- Thirty-nine percent of the educators reported that their students use computers for curricular activities for at least one hour per week, and an additional 40 percent reported that their students use computers about 30 minutes per week.
- In 1996, a statewide survey found that 40 percent of the teachers used the Internet with their students, while the current survey found that 90 percent of the teachers are using the Internet.

But, it is also clear that educators feel that lack of access to technology is still a major stumbling block. While Internet links are available in the classrooms, more computers are needed. And,

[2] The Nebraska Educational Technology Snapshot Survey was a collaborative effort conducted by the Office of Internet Studies at the University of Nebraska at Omaha, the Texas Center for Educational Technology at the University of North Texas, and the Center for Highly Interactive Computing in Education at the University of Michigan. It was sponsored in part by the Nebraska Department of Education, the Nebraska Educational Service Units, and the North Central Regional Educational Laboratory.

while teachers are comfortable with operating the technology, they now indicate they need time to focus on integrating the technology into the curricula.

In what follows, we first describe how the Snapshot Survey was conducted, and then we present additional findings from the survey.

The Snapshot Survey Process

This Snapshot Survey of Nebraska was a cooperative venture, including the Office of Internet Studies at the University of Nebraska at Omaha, the Texas Center for Educational Technology at the University of North Texas, and the Center for Highly Interactive Computing in Education at the University of Michigan. It was sponsored in part by the Nebraska Department of Education and the Nebraska Educational Service Units. This project was designed to survey educators during a 10-day period (February 11-20, 2000) and report on the data within a few days. This short timeframe is important because of the rapid changes in technology.

In order to encourage the educators of the state to complete the survey, the educational service unit sent e-mails, posted Web page notices, and made announcements in newsletters. In addition, paper flyers were distributed to all schools to be placed in each teacher's school mailbox.

Over 3,100 Nebraska educators completed the survey, including approximately 2,350 teachers, 250 administrators, and 500 school support staff. Responding educators were from all parts of the state, all school sizes, and all grade levels.

Educators Beliefs about Technology in Education

Nebraska educators clearly see that technology is playing a key role in teaching and learning. Fully two-thirds of the teachers who responded to the Snapshot Survey indicated they believe that (1) using technology in the classroom will make them better teachers and (2) they have the skills, as defined by the Nebraska Educator Competencies in Technology, to integrate technology into their classroom lessons.

Furthermore, 96 percent of teachers feel that their students benefit from using technology. High percentages of teachers also believe that technology enables their students to produce artifacts that reflect higher-order thinking, increases their motivation, supports student collaboration, and helps students become more responsible for their learning. Moreover, teachers feel that having their students search the Internet is a useful learning activity. As one fifth-grade teacher stated, "We have researched polyhedron, mathematicians, binomial theorem, Pascal's triangle, Rational Zeros Theorem, and much more. I especially like to use it for topics that are not adequately covered in the text." Interestingly, teachers do *not* seem concerned with students coming upon inappropriate material on the Internet, but they are very concerned about the ease with which the Internet can enable plagiarism.

Most importantly, teachers spoke with a unanimous voice on one issue; they believe that parents support their efforts in working to integrate technology into the classroom. Essentially all teachers reported that they believe their school principals also support them in that effort.

Use of Technology in the Classroom

Acting on their beliefs about the value of technology for education, 39 percent of the teachers reported that their students use computers (but not the Internet) one hour or more a week, while an additional 40 percent reported their students use computers about 30 minutes per week. Internet usage is distinctly lower; 17 percent of the teachers reported having their students use the Internet for one hour or more a week, while 40 percent reported having their students use the Internet about 30 minutes a week. Teachers were willing to share their educational tactics and strategies as they provided 1,187 Internet-infused lesson ideas.

Access to Technology for Curricular Uses

Almost all teacher-respondents (89%) indicated that they have convenient access to an Internet-connected computer for their use at school. Over one-third of the teachers report that Internet Web sites are their most frequently used resource for information about teaching with technology.

The current trend in the U.S. is to put Internet-connected computers into classrooms as opposed to creating computer labs. This more flexible arrangement enables teachers to better orchestrate students' use of the technology.

- In Nebraska, 89 percent of the teachers reported that they have at least one Internet-connected computer in their classroom; of that group, only 15 percent have five or more. In fact, 11 percent reported having no Internet-connected computer in their classroom.
- Over 70 percent of the teachers indicated that they have access to an Internet-connected computer lab for their classes at least once a week.

What Needs Remain

Given the above, it is not surprising that teachers indicated that their most urgent need is more access to more computers for their students. Access to the Internet is not specifically an issue since their rooms are wired; what they need, then, are more computers to hook into the Internet. Teachers' training needs are no longer focused on just operating the technology, but rather, they need more time to fully integrate technology into their curricula and more opportunities to interact with their colleagues around the use of educational technology.

Concluding Remarks

Nebraska educators have indeed made progress toward integrating technology into the classroom. Their needs, as reported on the Snapshot Survey, indicate they are among the more technologically sophisticated users of educational technology. That is, we have found from previous Snapshot Surveys administered around the country, that as teachers become more technologically sophisticated with respect to using educational technology, their needs change. While they initially request more training in the operation of the technology, they progress to requesting more time to work the technology into the curriculum. Based on these findings, then, we might venture a prediction: As the state moves aggressively toward resolving the lack of sufficient access to technology, Nebraska's educators are poised to help their school children reap the benefits to learning that technology can provide.