

# Legislative Study



*A Study of the Student Information Systems  
Operating in Iowa School Districts*

## Background

In June 2008, the Iowa Department of Education (DE) posted a Request for Proposal to fulfill House File 468. House File 468 required:

*a study regarding the student information systems currently in use in the state, the types of data collected, and the future needs for additional types of data at the kindergarten through grade twelve and postsecondary levels and for use by the state, including but not limited to the use of electronic student transcripts to share with other kindergarten through grade twelve and postsecondary institutions. This study shall examine the systems in use in other states as well as current systems approved for use within the departments of education project easier and the emerging student information data systems under development. The study shall take under consideration a recommendation on limits on the numbers of software systems approved to connect to project easier. The study shall focus on systems that will improve efficiency, accuracy, and security of, and access to, the data by various users.*

In September, the DE commissioned a study with Parex Consulting Group, LLC. Parex is a Michigan-based company that focuses on building large-scale data warehouses and decision support systems for state departments of education. Two individuals, Dr. Lucian Parshall, director of Parex; and Mr. Bruce Bull, consultant, conducted the investigation. Dr. Parshall has had prior contracts with the U.S. Department of Education to conduct statewide evaluations of No Child Left Behind (NCLB) data elements in seven states: Wisconsin, North Dakota, Wyoming, Tennessee, Kentucky, Missouri, and Oregon. He has consulted on data warehousing in 13 states. Mr. Bruce Bull of Special Education Data Services and Information Systems (SPEDSIS) is also the project manager on Iowa's contract to build the I-STAR system. Mr. Bull has experience working on educational data with American Samoa, Connecticut, Vermont, Nevada, Oregon, and Tennessee. Dr. Parshall and Mr. Bull more recently collaborated on the design of a data warehouse model for the Montana Office of Public Instruction.

## Research Questions

Using the requirements set out by the Iowa Legislature in House File 468, the following five research questions were developed in concert with the DE and were used to guide the study.

- What are the student information systems (SISs)<sup>1</sup> currently in use in Iowa school districts?
- What efficiency is there to the number of SISs used to provide data to the Iowa DE?
- What are the accuracy, cost, and security issues of the SISs currently in use by Iowa districts?
- What are the types of data being collected and the future data needs for K-12 and postsecondary levels?
- What are the systems in other states?

## Methodology

An online survey, focus groups with Iowa educators, as well as phone interviews, were conducted to examine the five research questions. Working with the DE, six different target groups were selected. Four of these target groups were involved in the online survey and two were involved in the phone interviews. A series of questions were designed for each group to meet the five research questions. The online survey questions were then reviewed by DE staff and were pilot tested by a number of education professionals in Iowa. Once finalized, the DE sent emails to alert the four-targeted group of the investigation, the purpose, timelines, and invited them to take the online survey.

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<sup>1</sup> The following analogy is provided to help the reader understand the terminology used in this report. A Student Information System (SIS) is a **database**, which in this case is a collection of related student records. It is the equivalent of all the contact cards in a Rolodex. In the case of an SIS, each contact card would be a single student **record**. A record is a group of related fields (like name, address, age, ethnicity, etc.) or the equivalent to one card in the Rolodex. A **field** is a unit of information (like gender or zip code). It is the equivalent of a single line on a Rolodex card. In a typical SIS, fields have multiple variables. For example, there are two variables: male or female to populate the gender field.

This quantitative portion (online survey) consisted of roughly 45 questions targeted to each of the four groups of professionals involved with SIS applications and/or Project EASIER in their districts. These four groups were:

1. Central Office Administrator (superintendent or their designee) - Survey items included SIS costs, current and future expectations of the system, and staffing related to the system in general and to Project EASIER in particular.
2. Project EASIER Staff - Survey items included technical issues and processes relative to Project EASIER efficiency, reporting, data cleaning and data availability as it pertains to the SIS and availability of other data that may be needed in the future.
3. Information Technology (IT) Staff - Survey items included technical issues relative to SIS security, reporting capabilities, current and future expectations, data cleaning and the availability of other data that may be needed in the future.
4. Data Entry Staff - Survey items included data entry processes, training and support availability and usefulness and internal district procedures.

The online survey was open for data collection over a three-week period from November 2 through November 21, 2007. School districts were invited to have all respondents from the above four groups that met the criteria complete the online survey. Due to the large numbers of respondents who held more than one role, clear differentiation between the four groups was not possible. Forty-three percent (43%) of all respondents held more than one role. The survey was designed so all groups answered some questions, while other questions were targeted to a specific respondent group. In cases where a respondent indicated they served more than one role, all questions associated with each role were administered to that respondent. There were 15 different possible role combinations—each affecting the questions a respondent would be asked. These variations affected the total number (N) of respondents for each specific question.

The qualitative portion of the investigation consisted of six special focus groups of district staff as well as phone surveys for vendors and area education agency (AEA) staff. The six special focus groups were conducted on November 6 and 7 in three different cities across the state. A total of 79 participants attended these focus groups. Members consisted of superintendents, principals, information technology directors, secretaries, Project EASIER coordinators, business managers, counselors and curriculum directors.

The phone interview portion of the investigation included all SIS vendors in Iowa. Vendor phone interviews were conducted between November 12 and 20. All 10 AEAs were invited to participate in two AEA conference calls conducted on November 20 and 28. Three AEAs participated in these calls.

### **Limitations of Study**

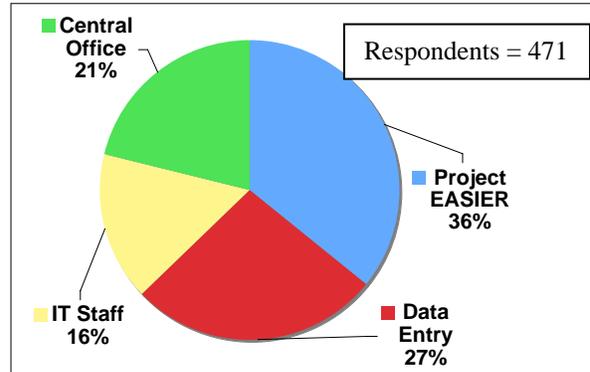
The quantitative portion of the investigation was seeking responses from the four groups indicated above; however, it is not known how many of this group is represented in each district. For example, several staff may be involved in data entry in a larger district and there also may be several information technology staff employed. In smaller districts, one staff might perform many of these roles. Thus, sampling size could not be determined.

Without knowing the entire population, the interpretation of the results of the investigation is limited to respondents that completed the survey and should not be generalized. However, 283 of the 365 districts (78%) were represented in the investigation. Also, out of the 15 vendors who sell SIS applications to Iowa school districts, all were represented by one or more districts that responded to the online survey. This is an excellent return rate for this type of investigation.

## Background of Respondents

Overall, the respondents appeared to have sufficient knowledge and understanding of their SIS applications to complete their portion of the online survey accurately.

- Two hundred eighty-three (283) districts completed the online survey. This represented 391,536 of the 482,584 students in Iowa or 81 percent of the student population. In addition, 258,320 student records are archived in the SIS applications used by the responding districts. Student files are frequently archived for follow-up studies, move backs, confirmation of prior services, etc.
- Student information system applications have been used for decades by many Iowa districts. When asked the date when the district began using their SIS application, several respondents indicated as early as the mid '80s.
- Four hundred seventy-one (471) individual responses were used in analysis of the quantitative data. Each target group was well represented (see pie chart).



Districts in Iowa are fortunate to have a very skilled group of information technology and data entry staff that manage SIS issues that arise. Eighty-nine percent (89%) of the information technology staff and 88 percent of the data entry staff indicated that they were either experienced or very experienced SIS users (see table below). When asked what percent of the workweek they spend on data entry, staff averaged 33 percent of their workweek on their SIS application.

	IT	Data entry
Novice User	2%	2%
Moderately Experienced	9%	9%
Experienced	46%	49%
Very Experienced	43%	39%

Totals may not equal 100 percent due to rounding

## Results of Study

The study was successful in surveying users of SIS applications in Iowa. Overall, the 15 SIS applications were represented and accurately reflect the use and distribution of applications across the state by school districts.

### *Research question 1: What are the SISs currently in use in Iowa school districts?*

The investigation took the opportunity to identify what platforms districts were currently using to manage their SIS applications. The applications operated on a variety of hardware, operating systems, and Internet browsers. Due to respondents using multiple computer systems and browsers, percentages do not sum to 100 percent.

Hardware	Percent	Operating system	Percent	Internet browser	Percent
Windows based PC	68%	Win 2000	21%	Internet Explorer	68%
Mac	49%	Win XP	58%	Firefox	46%
Other	1%	Win Vista	8%	Safari	33%
		Mac OS9	7%	Netscape	11%
		Mac OSX	50%	Mozilla	11%
		Other	3%	Other	5%

To answer research question #1, three different perspectives were taken. The first question asked what SIS applications were currently being used by the district; second, were they satisfied with their SIS; and third, was their SIS capable of producing key reports commonly requested by policymakers. The following SIS applications were being used by Iowa districts at the time of this investigation (N=283):

SIS	Percent	SIS	Percent
Administrators Plus	<1%	MacSchool	4%
AEA 10 System	<1%	Pentamation	2%
CenterPoint	7%	PowerSchool	15%
CIMS	<1%	SASIXp	3%
eSIS	<1%	Schoolmaster	3%
IMSeries	<1%	STI	<1%
Infinite Campus	11%	WinSchool	<1%
JMC	51%	Other	<1%

Totals may not equal 100 percent due to rounding

However, four of the above SISs were recently purchased by one vendor (Pearson, Inc.) and will be consolidated into one SIS application over the next two years. This new SIS will then represent 30 percent of those applications currently being used.

Student information system applications usually have annual upgrades with new features, reports and bug fixes. When asked if their SIS application had the most current release of the applications, respondents indicated (N=226):

Not current	1%
Not very current	1%
Fairly current	26%
Very current	68%
Do not know	4%

New SIS upgrades sometime require new hardware to improve its performance. Respondents were then asked if they planned to upgrade their hardware that runs the SIS application:

No plans to upgrade	41%
Do not know	34%
Plan to upgrade	25%

When respondents were asked to describe their satisfaction with the current SIS application they were using, 21 percent of the respondents indicated their SIS was below adequate (N=471).

Inadequate - doesn't do much of what we need	2%
Not quite adequate - does most of what we need	19%
Adequate - does what we need	52%
Great - can do more than we need	27%

Respondents were also asked if they were considering a SIS change in the SIS application in the next 12 months, 21 percent of the respondents indicated that they were. When asked why the district was considering the change, respondents indicated (N=101):

Less expensive	5%	Existing SIS being phased out	43%
More intuitive to use	22%	Do Not Know	9%
Greater functionality	47%	Other	17%
Fewer staff needed to operate	2%		

(Totals do not equal 100 percent - respondents could choose more than one response.)

When the same group was asked what SIS was being considered to replace the existing SIS, the 21 percent considering change indicated three primary applications:

Infinite Campus	41%	PowerSchool	75%
JMC	24%	Other	11%

Finally, respondents were asked how satisfied they were with the reporting functionality of their applications, which is important to produce school report cards, NCLB reports as well as adequate yearly progress.

SIS reporting functionality (N=448)	Strongly Disagree	Disagree	Agree	Strongly Agree	Do not Know
With your SIS you can easily produce files requested by the DE.	3%	10%	46%	35%	6%
With your SIS you can easily produce district level reports.	3%	11%	46%	34%	5%
With your SIS you can easily produce building level reports.	3%	9%	47%	38%	3%
With your SIS you can easily produce student level reports.	2%	10%	45%	41%	3%
With your SIS you can easily produce reports to parents.	3%	10%	43%	38%	5%
With your SIS you can easily produce reports to the general public.	4%	19%	38%	24%	15%

Totals may not equal 100 percent due to rounding

*Summary:* Iowa has at least 15 SIS applications, which will likely be reduced over the next two years due to both vendor consolidation and district conversion. *It is likely that in two years there will be four SIS applications in Iowa that represent approximately 92 percent of all the SIS applications used by Iowa districts.* The SIS applications are kept up-to-date without substantial hardware upgrades. Districts are generally satisfied with the applications they are using, and are meeting minimal reporting needs for the districts. Those districts that are exploring the possibility of switching to a new SIS are selecting from the existing major vendors in Iowa and are changing primarily because of a desire for greater functionality in the SIS.

**Research question 2: What efficiency is there to the number of SISs used to provide data to the IA DE?**

In order to secure an in-depth answer regarding the issue of efficiency to the great diversity of SIS applications across the state both quantitative and qualitative questions were designed. Three questions on the online survey as well as separate questions for the focus groups and phone interviews were used. Respondents had a wide variety of opinions relating to the value and challenges of having so many SIS applications in Iowa.

Of course, one measure of efficiency is the time it takes to manage data under the existing data collection methodology. Respondents were asked the degree to which managing student data was time consuming. Responses of “Strongly Disagree” mean that it takes an excessive amount of time.

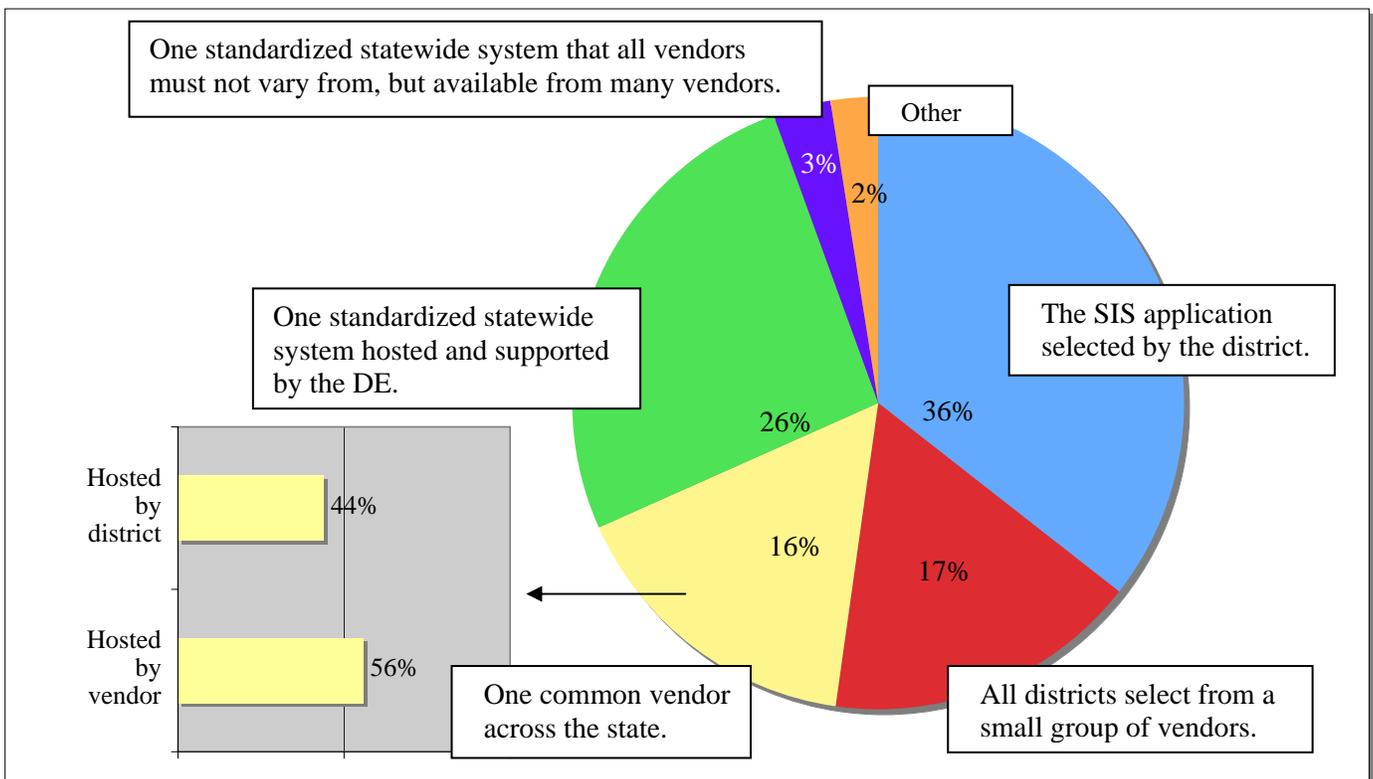
<b>Managing student data is often time consuming (N=419)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Don't Know</b>
Your internal systems are arranged so that it takes the appropriate amount of time to gather data on a single student, prior to submission.	2%	12%	64%	18%	5%
It takes the appropriate amount of time for you to clean data prior to sending data to DE.	3%	19%	59%	12%	8%
It takes the appropriate time to enter data into your SIS (e.g., screen layout, saving, keyboard functionality).	4%	13%	59%	19%	5%
It takes the appropriate amount of time for you to load data into Project EASIER.	3%	11%	56%	20%	10%
It takes the appropriate amount of time for you to fix the data after loading it into Project EASIER.	3%	15%	57%	16%	8%
It takes the appropriate amount of time to validate data after submission to Project EASIER.	3%	11%	59%	18%	9%

Totals may not equal 100 percent due to rounding

Respondents were also asked to select the one type of data management system that they would most prefer to have in Iowa from the six options below:

1. The SIS application selected by the district. (The current structure: typically managed and hosted by the district with maximum flexibility and full control at district level.)
2. All districts select from a small group of vendors. (Fewer vendors than current system. It is still a district decision and district hosted?)
3. One common vendor across the state.
4. One standardized statewide system hosted and supported by the DE. (Minimized local costs.) If chosen:
  - a. Data remains under district control but the application is hosted by the vendor, or
  - b. One system hosted and supported locally by the district.
5. One standardized statewide system that all vendors must not vary from, but available from many vendors (as many as the market will bear).
6. Other

The results are shown in the chart below:



Respondents in focus groups provided a broader perspective relating to the number of SIS applications which can best be reflected in the following statements:

"We (districts) collect data for day-to-day improvement purposes. The DE collects it for statewide reporting. Our SIS gives us the info we need for both objectives. We don't want to abandon what we know and use for our day-to-day work just for the purpose of making the reporting to DE more efficient and streamlined."

"As time has gone on, these SISs have become more sophisticated. We've had to become more sophisticated in using them. There is a learning curve for any new system. Unless we know we are going to get something really good out of an SIS change, we are going to be reluctant to have our staff (not just IT, but also teachers, counselors, data entry, etc.) learn a new SIS."

"Project EASIER has gotten easier but it is not easy and is still a small piece of the SIS pie."

"Ten years ago folks interacting with the SIS were secretaries and principals. Now, it is the teachers and entire staff. Every change affects transportation staff, teachers, nurses, etc. Today SIS changes touch everyone."

Comments on this issue from focus group participants spread across a continuum but those most frequently heard are grouped into three categories:

Only one SIS in the state	Limited number of preferred SISs in the state (3 to 5)	Let districts choose from any vendor (currently 15)
		
Need one systemic approach, currently too disjointed - somewhat tired of "local control" on this issue – willing to take the pain if there is some gain.	May not be any advantage in having 3-5 SIS vendors, Iowa is still too small, and either leave as is or go to one SIS.	Schools already have too heavy an investment in customization, leave as is.
Too many disparate systems, information management system (IMS) showing and not connected with individualized educational plans (IEPs), needs more integration.	Too little too late, districts have long-term contracts with vendors so the DE must give a lot of lead time for changes.	Most districts like their existing SIS and are in second and third generation of the software they know.
Might try an open source application, with the DE doing basic data needs and districts customizing the rest.	The DE would need to indicate who can sell and what the terms are for certification.	It's a matter of scalability, the needs of small districts are different than large, different SIS provide for the different needs.
If one SIS, small districts would need money or form consortiums. They can't pay more for features they wouldn't use.		
The DE would have to focus on what the SIS is used for locally.		

A final feature of efficiency might be the degree of human resources that it takes districts in Iowa to prepare student data files on their SIS, as well as the cleaning, loading, error checking, secure transmission and correction of returned files that are collected by the DE.

<b>Indicate the importance of these general SIS concepts and features (N=457)</b>	<b>Not Important</b>	<b>Less Important</b>	<b>Fairly Important</b>	<b>Most Important</b>	<b>Don't Know</b>
Ease of preparing data and transmitting it to the DE.	0%	0%	20%	78%	2%
Cleaning the data prior to sending to DE.	0%	2%	28%	66%	4%
Knowing your district's data is secure and confidentiality is maintained.	0%	1%	9%	90%	1%

Totals may not equal 100 percent due to rounding

*Summary:* There is uncertainty that a fewer number of SIS vendors would provide the school districts in Iowa with any greater “clout” when it comes to certification, training or technical support. Iowa may not have the critical mass to secure the attention needed from fewer or a single vendor. Certainly the efficiency of the current structure with its diversity of SIS applications does not appear to be an excessive burden on districts in terms of the amount of time it takes. The greater percentage of respondents indicated that the time spent on student data files seems appropriate. In addition, there does not appear to be an issue with preparing, cleaning or transmitting the data files to the DE.

Feedback from participants in the focus groups did not favor any specific approach to reducing the number of SIS vendors in Iowa. Overall, less than half of the respondents to the survey were in favor of one common vendor. As few as 16 percent of the respondents indicated that they preferred one common vendor. Furthermore, only 26 percent supported the idea of one standardized statewide system hosted and supported by the DE. It might be more beneficial to local districts if the DE were to focus its resources on the pieces needed for a statewide data warehouse, such as: building relationships between data sets (e.g., linking teacher data with student data with assessment data), or making educational data more accessible to districts through a data mart.

***Research question 3: What are the accuracy, cost, and security issues of the SISs currently in use by Iowa districts?***

Three groups of questions in the online survey were designed to answer the accuracy, cost, and security issues relating to SIS applications in school districts. One possible indicator of data accuracy in the SIS might be: Is the district willing to use its data?

Respondents were asked a series of questions relating to how they use their SIS data. Items about decisions, support operations, rapid response to requests, longitudinal tracking and data quality provide insight on the accuracy of the data and the value they represent to the educational community.

<b>Use of SIS (N=257)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Don't Know</b>
You rely on the data from your SIS application to make decisions.	3%	8%	56%	30%	2%
Your SIS application is important to supporting the district's daily operations.	1%	2%	30%	67%	0%
Your SIS allows you to rapidly respond to requests and justification for different funding.	3%	17%	32%	12%	37%
You actively track longitudinal benchmarks in your educational programs with your SIS.	8%	32%	24%	6%	30%
The information from your SIS is reliable because of the high quality of data in it.	2%	8%	62%	21%	6%

Totals may not equal 100 percent due to rounding

Respondents were asked what the annual costs are for the maintenance and annual fees of their SIS applications, excluding the cost of staff (in FTE) needed to maintain and manage their application. The responding districts to this investigation spend millions of dollars annually on their SIS applications—not counting personnel costs.

Responding districts reported spending \$2,666,657 with an average cost per year of \$13,882 per district. Responding districts also averaged 2.09 FTE staff to operate the components of their SIS.

In addition to real costs, the survey also investigated “hidden costs.” A district’s SIS budget is no different from its transportation budget. When a district adds a new bus to their fleet, the expense does not stop with the cost of the vehicle. There is gasoline to keep it running, maintenance to keep it well tuned, repair bills when it breaks down, increases in insurance premiums, and the salary of an additional driver—all expenses that must be covered year after year.

How much does the SIS really cost? The answer, of course, will vary from district to district, based on enrollment; geography; age of servers; patterns of support, and management; and naturally, what kind of technology (e.g., network) is deployed and how extensively. Respondents were asked a series of questions relating to these “soft cost” items associated with their SIS. They were asked their level of agreement with their current budget relative to these cost areas.

The far right column provides the mean percent respondents indicated that this portion of their budget should ideally represent.

<b>Hidden costs: your district has budgeted adequately for (N=154)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Don’t Know</b>	<b>Ideally, what percentage of your district budget should each area represent?</b>
Professional Development	4%	21%	60%	13%	3%	18%
Software	2%	7%	70%	17%	4%	27%
Support	2%	15%	63%	18%	1%	17%
Replacement costs	2%	19%	58%	19%	3%	17%
Connectivity	3%	11%	63%	21%	3%	11%
Long-term investment	1%	10%	65%	21%	3%	11%

Totals may not equal 100 percent due to rounding

Security issues in school districts generally fall into three categories: (1) record protection, (2) system security, and (3) access to files.

1. Student records are protected by district personnel under the Family Educational Rights and Privacy Act (FERPA). Respondents were asked the following five questions relating to district policies that protect confidentiality of student records located in their SIS.

<b>Record protection (N=409)</b>	<b>Yes</b>	<b>In Process</b>	<b>No</b>	<b>Don’t Know</b>
Does your district have a written FERPA policy relating to data in your SIS?	46%	10%	9%	35%
Does your district have a policy regarding minimum cell size when presenting aggregate data on your web page?	3%	2%	39%	56%
Does your district have a purge and destruction practice of student data that is annually applied to student data?	20%		46%	34%
Does your district track who has accessed a student record in your SIS?	30%		49%	21%
Does your district monitor who has been given user permissions to the student data in your SIS?	85%		5%	10%

Totals may not equal 100 percent due to rounding

2. Respondents were also asked the five questions below relating to the ability of unauthorized individuals to gain access to the SIS.

<b>System security (N=282)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Don't Know</b>
You are confident you know who accesses this SIS.	2%	6%	47%	38%	8%
You are confident that the person accessing is the person recorded as accessing.	1%	6%	51%	31%	11%
You have the ability to grant and control access rights.	2%	3%	34%	54%	7%
You have user profiling or differential user levels within the SIS.	1%	2%	36%	48%	13%
Do you feel the data in your SIS is secure?	1%	3%	52%	39%	5%

Totals may not equal 100 percent due to rounding

3. Finally, once an individual has been authorized to use the SIS there is often control over what fields they may read or write to in a student record. A series of six questions below were asked regarding the district's control of the record.

<b>Access to files (N=121)</b>	<b>No</b>	<b>To Some Degree</b>	<b>Yes</b>	<b>Don't Know</b>
Allow authorized district staff to read and write to all the records and all fields in the SIS?	27%	40%	32%	1%
Place limits on access to individual records but not fields in the SIS?	25%	30%	42%	3%
Place limits on specific fields in the SIS?	8%	16%	71%	4%
Place limits on district staff at a read-only level to specified fields in the SIS?	7%	11%	80%	1%
Do you feel your district has good student information security measures in place to protect the identity of its students?	4%	25%	70%	1%
Place read-only limits to the general public (if permitted via firewall) on specified fields?*	11%	6%	52%	2%

\*Thirty percent did not permit general public access

Totals may not equal 100 percent due to rounding

*Summary:* Respondents are fairly confident of the accuracy of their data based on their willingness to use it to make decisions and support district operations. The average annual cost to a district was \$13,882 per district in addition to staff costs for 2.09 FTE needed to operate the SIS.

Of the three security issues: record protection, system security, and access to files, respondents expressed confidence that the data was secure and that there is limited access to the files. However, record protection appears to be an issue of concern. Only half the respondents indicated that their district had a written FERPA policy. A very large group of respondents (95%) indicated they did not have or did not know if the district had a policy regarding minimum cell size when presenting aggregate data on their web page. Minimum cell size is very important to disclosure. (Statistical disclosure is the risk that arises when a population is so narrowly defined that tabulations are apt to produce a cell small enough to permit the identification of a single individual. For instance, in a search of the Iowa Testing Program scores of Native American students or a student with a disability, a particular district might reveal information about the specific ethnicity or disability of a student.)

**Research question 4: What are the types of data being collected and the future data needs for K-12 and postsecondary levels, including transcripts?**

The ability of the DE to collect data in the future that will lead to better policies has three aspects. First, do the areas (also called modules if they are purchased separately) that the DE might plan to collect specific data about in the future exist in the SIS applications today? That is, do districts have a location to enter data? Second, is a consistent set of data definitions available so that district staff is clear what information is/might be requested? And third, are the fields in the modules actually being used (i.e., are they being populated) by the district?

To answer the first and third aspect to research question #4, the online survey asked a series of questions relating to the additional features commonly found in an SIS application (i.e., those that go beyond standard demographic data). These might include features for transportation routing, tracking free and reduced lunch or administering special education programs and services. Respondents were first asked if the district had the module; if so, did they populate that feature with data.

Module (N=194)	Do not have this module	Have module but do not populate it	Populate some fields but not all	Populate all or almost all fields in module	Don't Know
Lunch	14%	2%	15%	55%	13%
Transportation	31%	27%	14%	6%	22%
Special education	5%	4%	22%	60%	9%
Medical	13%	20%	27%	26%	13%
Attendance	0%	2%	6%	88%	5%
Grading	4%	2%	8%	79%	7%
Scheduling	5%	3%	9%	75%	8%
Library	71%	3%	2%	1%	24%
Discipline	4%	6%	21%	58%	12%
Human resources	44%	6%	14%	7%	29%
Budget/billing	60%	3%	6%	2%	29%
Postsecondary intentions	12%	3%	16%	43%	26%
Parent accessibility	16%	5%	12%	58%	8%

Totals may not equal 100 percent due to rounding

To make sense of data, in any module, a meta data dictionary is an absolute necessity. Meta data provide a description of and meaning to the fields and values of each record so that the stakeholder can understand what data to manipulate and where it is located. Student data is commonly aligned along data “subjects” rather than by functions. For example, information about a category of students (i.e., special education, Title I, career and technical education, etc.) may be grouped together, even though these data could and should be used across multiple reports (i.e., annual progress report (APR), financial distribution, NCLB state report card, etc.). Respondents were asked the three following questions about the importance of a data dictionary.

Indicate the importance of these general SIS concepts and features (N=457)	Not Important	Less Important	Fairly Important	Most Important	Don't Know
Having agreed upon business rules for the editing and error checking of data.	1%	3%	39%	45%	11%
Having a statewide data exchange policy that allows data to be transferred between SISs.	2%	13%	36%	44%	5%
Having a common dictionary of agreed upon definitions of student data.	0%	3%	26%	69%	2%

Totals may not equal 100 percent due to rounding

Finally, there were no quantitative questions that addressed the production and use of e-transcripts by districts. However, feedback from participants in the focus groups generally found that transcripts are primarily a high school issue. Participants noted that transcripts require significant counselor time to interpret. For example, a transferring high school student's previous courses must be reviewed individually for not only course content but for converting credits mathematically because of: block vs. non-block, dual enrollment, weighted grades, and quarter/tri/full semester. Similarly, it was pointed out that higher education must also manually interpret transcripts as there is no established course cross walk among districts in Iowa. Des Moines is one exception having an established protocol with Iowa State University (ISU) due, presumably, to the relatively high volume of students from Des Moines that apply to ISU.

*Summary:* Prior to any data being collected in the future by the DE, school districts must: first, have the module on their management system; second, have a standard set of definitions; and third, be populating the fields with data. From the 13 modules listed on the previous page, two, in particular, might be a problem for future collection needs. Respondents indicated that 44 percent do not have features relating to human resources and 60 percent do not have a budget/billing module.

Normally, state level data warehouses contain five data sets. The five data sets are usually those that the DE can secure immediate control of through educational policy or legislation. They include:

- Single student record data (e.g., date of exit and reason, grade, program, unique ID number).
- Student assessment information data (e.g., annual statewide assessment/Iowa Testing Programs, General Educational Development [GED], advanced placement scores, American College Testing [ACT], and Scholastic Assessment Test [SAT] results).
- School infrastructure data (e.g., condition of building, number of classrooms, age of computers, connectivity, crime/safety, accreditation).
- School personnel data (e.g., degree held, certification, assignment by grade level, salary, full-time equivalent [FTE], professional development).
- District financial data (e.g., comprehensive financial data which includes balance sheet, revenue, district expenditure, and building expenditure).

Based on survey responses, local districts will have particular problems in the immediate future combining student data with school personnel and finance data - both essential to the management, improvement, and development of educational policy at local levels. Without these modules being integrated into their SIS, local districts will be unable to perform more complex analysis that often drive school improvement such as determining the cost per student by program or linking student performance with teacher experience.

Also, a more comprehensive online data dictionary is necessary so that elements can be collected among districts and provided to other agencies for richer analysis of 21<sup>st</sup> century educational issues.

Generally there was minimal interest in having district-to-district e-transcripts. The focus groups indicated that it takes only 15 minutes or so to enter new student data from an enrollment form. Interpretation is time consuming and cannot be expedited by an e-transcript system. However, focus group respondents felt that they must get data from higher education, which was more important than e-transcripts. Existing post-school surveys don't work. Some respondents felt that school-to-school transcripts could be on a common form and sent as a pdf file (for upload only) but they must contain performance indicators and statewide course standards. The concept of e-transcripts might best be tabled until standardized course content (using NCES codes) and classification schema is developed and adopted across the state.

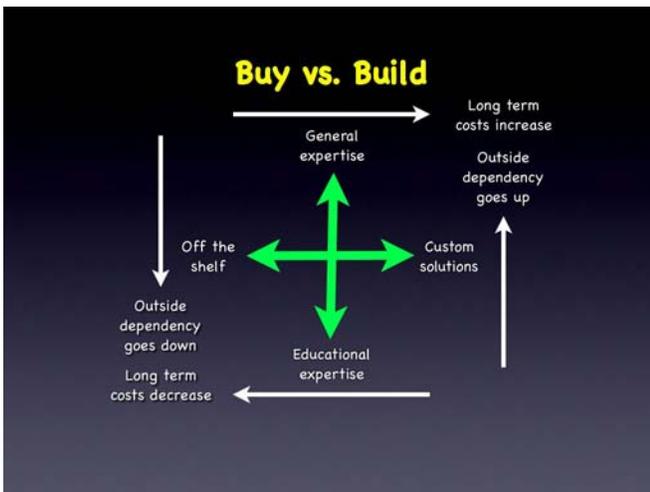
**Research question 5: What are the systems in other states?**

The answer to “what are the systems in other states” is more complex than it appears. The following information provides a background to better understand this complexity while explaining what stages systems might be in other states.

There can be as many as twelve steps to building a state level management system that will store data used by a department of education. This usually consists of management data such as: student, finance, teacher, performance and building infrastructure. So response to research question #5 will have to reference which of the twelve steps needs to be addressed. In all states, the foundation of the state level data management system is a comprehensive policy with adequate funding that commits the organization to a strategic path, that ends with the ability of a user to do extensive “data mining,” and that supports good educational policy.

*The Decision to Buy or Build.* Many of the twelve steps can be implemented concurrently but all steps depend on decisions of which part(s) to build and which part(s) to buy. The decision to build or buy parts of a state level data management system depends on time and the agency’s level of staffing. Generally, when an agency is short on time, or when they have limited human resources they end up purchasing more of the twelve parts to the system. Likewise, the inverse is true, more time and staff allow for more “in-house” development. Both approaches have their strengths and weaknesses.

Another issue to building or buying is that many contractors do not fully understand district or state level policy. A general contractor usually provides “off the shelf” solutions. A “non-education” contractor’s general expertise in producing business systems is in great contrast to expertise in learning systems used by schools. Conversely,



state agencies do not usually have dedicated staff time, technical expertise, and/or the understanding of data management technologies for large-scale databases to build “in-house” systems without external consultation and contractors. Expenditures for state-level systems will vary based on the degree of customization, integration with local district SISs, sensitivity to implementation, complexity of the data sets being sought, as well as the ability to keep internal educational expertise to manage the system as it matures over time.

When building a state level system “in-house” with existing staff, the system usually reflects all the subtleties and peculiarities found in education. Often these systems are highly customized to address state-level policy as well as the needs of various program

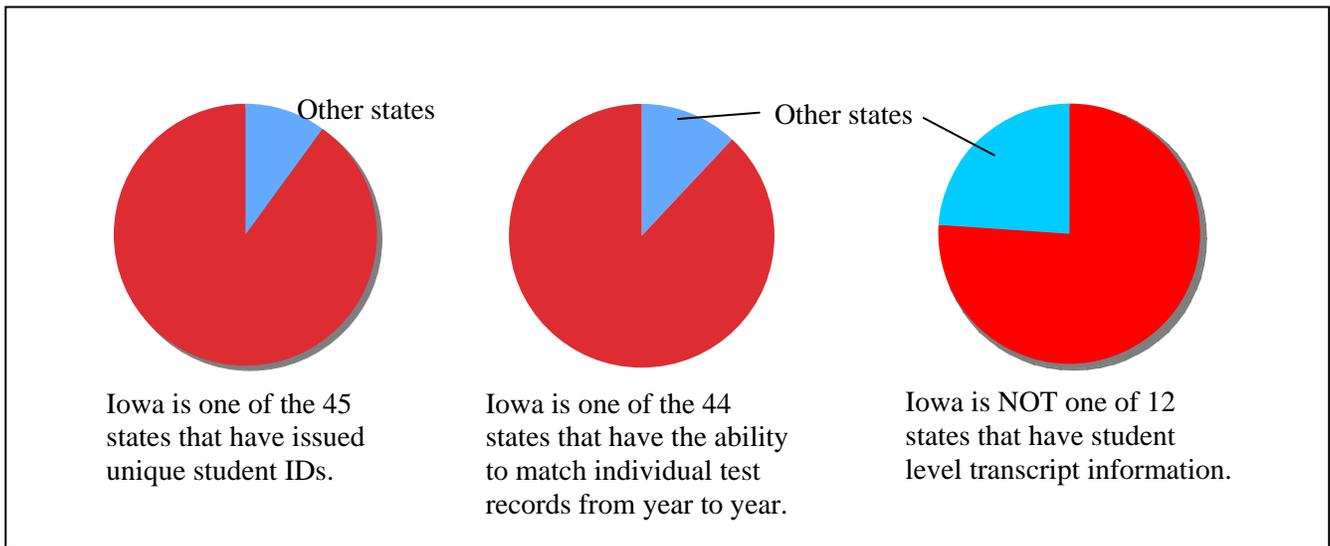
areas, such as special education, ELL, etc. When buying software from a vendor, the speed of hardware implementation might be faster, but staff use is slower. Staff usually needs extensive training to “fit” their needs into the contractor’s software application. In the majority of cases, states find that a combination of building and buying usually provides an optimal solution.

For example, in most states, the “business intelligence” tool (one of the twelve steps) is purchased. These tools are used to make sense of the massive amount of data commonly found in a state-level data warehouse and have sophisticated tools for posting state reports on a web page, such as Annual Progress Report (APR), annual yearly progress (AYP) or other state report cards. On the other hand, issues such as security, confidentiality and website design (also part of the 12 steps) are built and maintained by internal department staff. Out of the 20 states that Parex has consulted with, only two states had purchased a single SIS application for the entire state and only one state has built its own SIS application for all its districts. The remaining states used a combination of building and buying. Seventy-six percent of states had already, or were in the process of hiring contractors or purchasing software to help build their student information systems for their state (NCES Forum Survey, 2002).

For this investigation, and with the above background as a perspective, Parex reviewed the national data collected annually through the Data Quality Campaign, which conducts a survey about state data systems. This survey is used by the U.S. Office of Education to determine the number of states that have built the infrastructure to respond to data requirements under NCLB. Surveys were conducted beginning in 2003. For the 2006-07 school year, the survey addressed ten elements of a student data system from all 50 states. A review of this data found three key areas that relate to this study.

1. The states ability to issue student IDs, pass them back to districts and duplicate student names when they occur.
2. The ability to match students with annual assessment data over time, so that academic growth can be measured, and
3. The ability to match K-12 student records with higher education.

As the pie charts show, in comparison with other states, Iowa appears to be in with the majority on these three items. Most states have student IDs and they match these IDs with assessment tests and most states do not have student transcript information.



The primary reason for improving the quality of our educational data is to improve student performance and overall public satisfaction with our educational system by increasing the efficiency and effectiveness of our educational policy. We can no longer judge the educational system by looking only at output measures. We must begin to evaluate its outcomes as well. This means that we must use student data to go beyond input, process and output issues, and address effectiveness issues.

*Summary:* The purpose of data management systems in other states that Parex has consulted with is that their data warehouse becomes the **single source** of consistent data that will describe the state’s educational environment to its stakeholders. Its design is to create a common core of educational information; so non-technical users can participate and understand policymaking.

- The product of the warehouse will be information.
- The power of the data warehouse is in its users who make increasingly important decisions faster than before.
- The outcome becomes collaboration between stakeholders that will enable better policymaking that leads to school improvement.

A data warehouse includes not only data but also the policy, procedures, personnel, training, and query tools that make access to the data easier and more relevant to decision makers. The purpose of the data warehouse is to increase the value of the organization's data asset. More specifically, states are seeking:

- A flexible system that can respond to constantly changing legislative mandates, and has the capacity to accept and safely process files received from the variety of local district student-management packages used throughout the state.
- A manageable, centralized warehouse repository of information to provide accurate student, staff and school infrastructure information necessary for determining school quality and allocating state funds.
- A repository of student data with current, agreed upon definitions, that includes technical requirements and business rules for data transformation to make it accessible, clean and timely to the end user.
- The capability for school districts to have online access for inquiry into their respective student information to help resolve duplicates and respond to reports prior to them being made public,
- Specified uniform management and reporting, as well as access to warehouse information through query and ad hoc tools.
- A cost effective system that will accommodate the existing investments that local districts have made in their own student information systems.
- An open information system, with full protection of confidential data.

### **Results of study**

Change is a process, not an event. We can't just will it to happen but need to provide leadership, coordination, and support that will ensure that local efforts can thrive and all educators can participate in the information revolution. The DE successfully accomplished the legislative directive under House File 468 that should produce further change in Iowa school districts. The study found that:

- There is uncertainty that a fewer number of SIS vendors would provide the school districts in Iowa with any greater "clout" when it comes to certification, training or technical support. Iowa may not have the critical mass to secure the attention needed from fewer or a single vendor.
- Only half the respondents indicated that their district had a written FERPA policy and 95 percent said they "did not" or "did not know," if the district had a policy regarding minimum cell size when presenting aggregate data on their web page.
- Prior to any data being collected in the future by the DE, school districts must: first, have the module on their management system; second, have standardized definitions; and third, be populating the fields with the requested data.
- There can be as many as 12 steps to building a state-level management system (data warehouse) that will store data used by a department of education. These steps are critical for the success at both the Department of Education and district levels.
- In all states, the foundation of the state-level data management system is a comprehensive policy with adequate funding that commits the organization to a strategic path that ends with the ability of a user to do extensive "data mining" that supports good educational policy.
- Conversely, state agencies do not usually have dedicated staff time, technical expertise, and/or the understanding of data management technologies for large-scale databases to build "in-house" systems without external consultation and contractors. Expenditures for state-level systems do vary based on the degree of customization, integration with local district SISs, sensitivity to implementation, complexity of the data sets being sought, as well as the ability to keep internal expertise to manage the system as it matures over time.

- These tools are used to make sense of the massive amount of data commonly found in a state-level data warehouse and have sophisticated tools for posting state reports on a web page, such as APR, AYP or other state report cards.
- Out of the 20 states that Parex has consulted with, only two states had purchased a single SIS application for the entire state and only one state has built its own SIS application for all its districts.

These findings stress the importance of data management in Iowa. Data are a strategic asset for any agency, but their value becomes truly tangible when it is turned into viable information for everyone to use. A comprehensive data management system, with its decision-support tools, can create an opportunity to change the way the educational community in Iowa views student achievement, school improvement and program change.

While the results of this investigation may be useful to the DE regarding SIS applications, further study could be conducted in the areas of e-transcripts, collaboration with districts about data warehousing, and an improved meta data manual.

The long-term goal for the DE must be the timely presentation of educational data to policymakers. A statewide system can assist a policymaker in moving from guesswork to confidence in supporting a decision because of the high quality of data, the capability for rapid access, and the sophisticated data manipulation tools.