



**SPEEDE**EXPRESS

***A Business Case  
for the  
Electronic Exchange  
of  
Student Records***

Under Contract with  
U.S. Department of Education  
National Center for Education Statistics

Sierra Systems Consultants, Inc.

April 17, 1997

# **SPEEDE/ExPRESS**

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## **What is SPEEDE/ExPRESS?**

SPEEDE/ExPRESS is an acronym which stands for the Standardization of Postsecondary Electronic Data Exchange (SPEEDE) and the Exchange of Permanent Records Electronically for Students and Schools (ExPRESS). It represents the collaborative efforts of the National Center for Education Statistics (NCES), Council of Chief State School Officers (CCSSO), the American Association of Collegiate Registrars and Admissions Officers (AACRAO) and representatives from State Education Agencies, Higher Education, and school districts from across the country to develop a standardized data format for exchanging student records electronically. The goal is to improve educational services for students.

Historically, two committees worked on this project: the SPEEDE committee made up of members of AACRAO representing postsecondary institutions and ExPRESS made up of representatives from the elementary/secondary community as established by the Council of Chief State School Officers. The technology used to standardize this format is called Electronic Data Interchange or EDI. The joint efforts of these two groups, commonly referred to as SPEEDE/ExPRESS, acknowledge the fact that all of the education community has worked together to agree upon using common standards for data exchange.

### ***SPEEDE/ExPRESS***

- ***Standardization of Postsecondary Education Electronic Data Exchange***
- ***Exchange of Permanent Records Electronically for Students and Schools***



## **History of SPEEDE/ExPRESS**

An important factor in deciding to adopt SPEEDE/ExPRESS is to gain an understanding of the history of the project and reasons for its existence. Gathering and reporting information about education at all levels of the community has been fraught with problems. This became painfully evident upon publication of the “Nation at Risk” report in the early eighties. Many conclusions about education were drawn based on “soft” data. Another publication which further exacerbated the situation, was the US Department of

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Education's "Wall Chart". This document, which was produced on an annual basis, attempted to compare states using data which was not consistent both in definition and collection strategies.

In 1988, the US Congress took action on the problem as part of their proposal to improve education in America, the Hawkins-Stafford Act of 1988 (PL 100-297). Recognizing the need for the States to develop a solution they could all buy into, the act called for the development of a "National Cooperative Education Statistics System" that would "produce and maintain with the cooperation of the States, comparable and uniform educational information and data that are useful for policy-making at the Federal, State, and local level."

## **National Cooperative Education Statistics System Project**

**"The purpose of the System is to produce and maintain with the cooperation of the States, comparable and uniform educational information and data that are useful for policy-making at the Federal, State, and local level."**

**Public Law 100-297**

In the fall of 1988 representatives from state education agencies (SEA's) and other interested groups, convened to review the mandates and work together to come up with a solution they could all live with. This was the birth of the "National Forum for Education Statistics" which now serves as an advisory body to the National Center for Education Statistics. It was at this meeting that the vision of developing a national data standard that would define critical educational information was also conceived. It was also recognized that information that is useful must be delivered in a timely, efficient manner which predicated the use of technology as an integral part of the solution.

Representatives from states that had successfully launched such efforts described their successes. As a result of this discussion, it was decided that experts from each system would be invited to present at the next NCES/Florida Management Information System Conference in Orlando in February 1989. As a result of that successful event, the National Center for Education Statistics decided to fund a feasibility study to determine the viability of developing a national standard format for student records.

A feasibility task force was convened in April of 1989 to assess the viability of such a project. Three of the five states already had implemented systems that demonstrated successful implementation of the technology. The other two were gearing up to develop similar systems. Given the likelihood that further diverse data structures would be

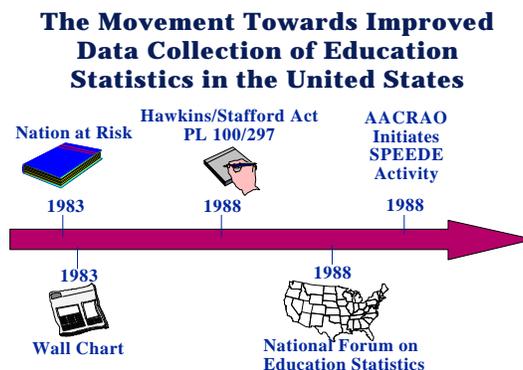
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developed, it appeared that it was not only feasible but critical that this work begin as soon as possible.

This launched the project which was referred to as the Interstate Student Records Transfer System. Funding from the National Center for Education Statistics covered the costs of travel for the task force to meet. They brought together individuals from organizations who had implemented proprietary EDI systems within their states or were extremely interested in launching efforts. This included student information system experts from Washington, California, Texas, Florida, and New York State as well as staff from the National Center for Education Statistics and Council of Chief State School Officers. Each participating organization contributed their staff's time to accomplish the task.

At the same time the elementary/secondary effort was going on, the American Association of Collegiate and Admissions Officers (AACRAO) was sponsoring similar activities involving their members which has since become known as SPEEDE. Both groups recognized the advantages of consistency because of a natural trading relationship for student transcripts. This relationship was further enforced when both groups decided to submit a student record transaction set to ANSI ASC X12 approval and subsequent adoption as a certified national standard.



The ExPRESS task force defined their charter with an objective “to design, test, and implement a national system for the electronic transfer of student records between school districts and to postsecondary institutions.” The scope of the record would include “the essential information necessary to make an appropriate educational evaluation of the student.”

It should be noted that the focus was directed toward sharing student information between schools and the information contained in the record would be limited to the type of information schools need to quickly assume the duties of educating the child.

Identification of the benefits was also considered a critical piece of the project. These included:

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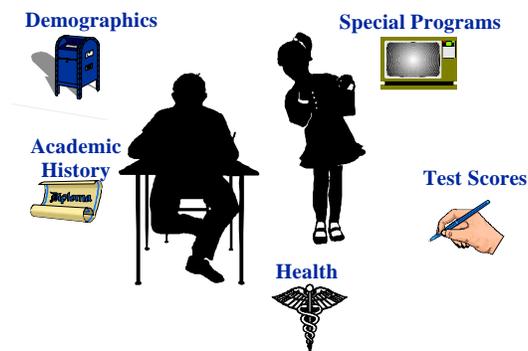
- Faster transfer of student records.
- Timely and appropriate placement into educational programs.
- Increased reliability & consistency interpreting records.
- Increased security over other exchange methods.
- Reduced direct and indirect costs.
- Promotion of greater national compatibility.

## **NCES Interstate Student Record Project Charter**



The group then proceeded to identify what common types of information are necessary to matriculate a student. Five general categories of information were identified with a task force member assigned to each. The assignment was to research the most appropriate elements that should be included within each area. These included demographics, academic history, health, special programs, and test scores.

## **Student Educational Record Components**



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Within each general category, data elements were identified along with a proposal for definition, type, size, and supporting code set, if appropriate. Whenever possible, an existing code set was adopted-the more universal, the better. These proposals were then presented to the committee who rigorously reviewed and critiqued each item. The AACRAO SPEEDE committee participated in the reviews as well which further strengthened the content.

Having agreed upon the contents, the record was mapped into the format expected by the American National Standards Institute's, Accredited Standards Committee X12 for Electronic Data Interchange for their approval as a standard.

**American National Standards  
Institute's  
Accredited Standards Committee X12  
Electronic Data Interchange  
(Est. 1979)**

**CHARTER**

**To develop uniform  
standards for the electronic  
interchange of business  
transactions**

In order to demonstrate competency to ASC X12, a pilot exchange between three of the participants was initiated in December of 1991.

In February 1992, the record was accepted as a draft standard. Shortly thereafter, the companion transaction sets for sending, receiving, and acknowledgment were also accepted. The records now had credibility among the industry as well as a democratic forum for all interested parties to participate.

Under the auspices of the Council of Chief State School Officers performing under a contract with the National Center for Education Statistics, the ExPRESS Technical Advisory Committee and AACRAO SPEEDE Committee continued to perform maintenance and spread the word about SPEEDE/ExPRESS.

The contract with CCSSO concluded in November of 1995 at which time the National Center for Education Statistics developed and published a Request for Proposal for a new project called *The Statistical Networking Applications Project (SNAP)*. The following describes the over-all purpose of the project:

In order to enhance the efficiency in the creation, maintenance, and delivery of education statistics data and improve data quality, the Statistical Networking Applications Project will develop, maintain, promote and support the national adoption of appropriate American National Standards Institute's Accredited Standards Committee X12 Electronic Data Interchange standards throughout the educational community of the United States.

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Within the SNAP proposal, NCES requested the development, promotion, maintenance, and support of the following EDI applications:

- Transaction Set 130 - Student Educational Record
- Transaction Set 131 - Student Educational Record Acknowledgment
- Transaction Set 132 - Personnel Information
- Transaction Set 133 - Educational Institutional Profile
- Transaction Set 146 - Request for Student Educational Record
- Transaction Set 147 - Response to Request for Student Educational Record
- Transaction Set 152 - Statistical Government Information
  - \* Common Core of Data (CCD)
  - \* Integrated Postsecondary Education Data System (IPEDS)
  - \* Library Survey

NCES's expectations were defined in the following requirements:

- Obtain wide adoption of the standards.
- Ensure the standards are developed and maintained in accordance with the expressed needs of the educational community.
- Create a self-supporting organizational structure enabling long-term sustenance of the standards.

The SNAP contract was awarded October 1, 1996 to Sierra Systems Consultants Inc. Since that point in time, Sierra has been establishing mechanisms to ensure the goals of the project are met.

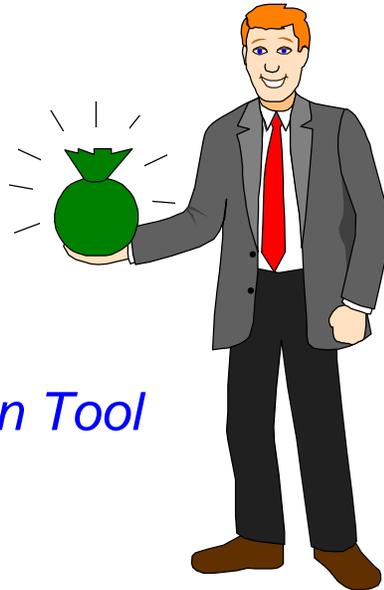
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## ***BUSINESS Case Purpose***

By presenting a business case for the use of ExPRESS standards we can provide schools with a cost/justification tool to determine whether implementation of this standard would reap benefits for their institution. As with any change, implementors must be able to clearly articulate why they are engaging in this activity and what they hope to accomplish. This report explores the issue from multiple perspectives in an attempt to provide both quantitative and qualitative information that would support such initiatives.

## ***Business Case Purpose***



## ***Cost Justification Tool***

## **Reengineering through Electronic Commerce**

Faster. Cheaper. Better. Society has come to expect that business, government, and education must march to those words if they expect to remain viable. To gain a better understanding of the dynamics behind these expectations one only needs to look at trends in business and industry. In order to sustain a competitive advantage in the global marketplace, business and industry have engaged in a process commonly referred to as “reengineering”. Michael Hammer in his book “Reengineering the Corporation-A Manifesto for Business Revolution” defines reengineering as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed.”<sup>1</sup> What this translates to is re-inventing business practices from the ground up with a solid understanding of the latest tools and technology as well as the fundamentals of basic business needs that must be sustained.

### ***Re-Engineering through Electronic Commerce***

***“The fundamental rethinking  
and radical redesign of  
business processes to  
achieve dramatic  
improvements.”***

Michael Hammer, 1993  
“Re-engineering the  
Corporation”

One critical technology being successfully utilized by business is electronic commerce (EC). Electronic commerce is revolutionizing the way business is conducted. Electronic mail, electronic data interchange, electronic funds transfer, and the other computer-based technologies increase productivity by lowering costs, reducing lead times, and improving communication time. The private sector has long recognized the benefits of electronic commerce and has moved ahead of the government and education.

### ***Electronic Commerce***

- ***Electronic Funds Transfer***
- ***Electronic Document Exchange***
- ***Network Information Services***
- ***Electronic Mail***
- ***Electronic Data Interchange***

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<sup>1</sup> M. Hammer, and J. Champy, Reengineering the Corporation: a manifesto for business revolution, HarperCollins Publishers, Inc., New York, NY 1993. ISBN 0-88730-640-3. p 32.

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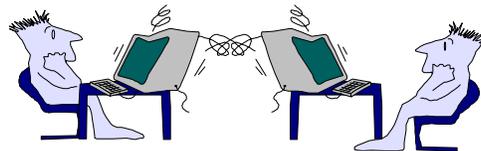
Government and education are dependent upon the public to fund their enterprises through taxation. Costs to run these agencies continue to escalate and the public perception is that the systems are over-wrought with personnel costs and not running as efficiently as they should. The evidence of this sentiment is demonstrated at both the local, regional, and national levels in the form of reduced funding. The federal government is engaged in a program to reinvent itself and technology is playing a vital role. State governments and education must do the same.

The huge benefits that computer-based technologies provide are promoting their development and implementation throughout the world. Because benefits accrue on both sides of any electronic transaction, education must promote implementation throughout the business process. With these lofty goals in mind in 1989, the SPEEDE and ExPRESS committees set forth to define an electronic data interchange format for student educational records to enable the sharing of information in order to serve students better.

## **What is EDI?**

Electronic data interchange is the computer-to-computer exchange of common business documents. Typical implementations involve an application system, translation package, and network so that organizations which have a need to share information but are running on totally different software and hardware platforms can communicate. The function of the application system is to house and manage information for the specific business purpose. To implement EDI, the application system must produce a file that feeds into a translation package that will format it into the standard. Once a file is formatted it is transmitted over a network to be received by another translation package that will translate it back into a format that can be process by the receiving application.

### ***Electronic Data Interchange***



***The direct computer-to-computer exchange  
of standard business documents.***

## **Types of EDI**

There are several types of EDI in production throughout the world. The predominant forms include: proprietary, ANSI X12, and EDIFact. Proprietary EDI is a format that is agreed upon by organizations interested in exchanging information in a limited arrangement. ANSI X12 EDI is the most commonly used format in the U.S. because it has gone through a rigorous, formalized standards process which is dictated by the American National Standards Institute. EDIFact is the International Standards Organization (ISO) version that represents international interests.

### ***Types of EDI***

- ***Proprietary***
- ***American National  
Standards Institute  
Accredited Standards  
Committee X12***
- ***EDIFact***

## ***History of EDI***

Twenty years ago industry began using proprietary forms of EDI to share information between one another more efficiently. As the success of this technology grew, more of industry attempted to adopt it and management of the proprietary formats became difficult. In 1985, the American National Standards Institute was approached to consider adding a standards committee to oversee the development of EDI data formats. This brought about the birth of the ANSI Accredited Standards Committee X12 which functions as the oversight group to review and approve EDI standards within a democratic structure.

### ***History of EDI Technology***



***1970's - Proprietary EDI***

***1980's - Standardization***

***1985 - Accreditation by ANSI***

***1995 - International EDifact***

## ***Cost/Benefits of EDI in Business/Government***

Over the past 10 years private industry has realized substantial benefits from integrating technology into their business operations for accounts receivable, accounts payable, order entry, scheduling, inventory control, material processing and shipping. Because of the economic advantage, those same companies are now working toward automation of their external business operations using EDI. They are experiencing financial rewards between \$2 and \$10 or more in direct savings from every transaction transmitted electronically to their trading partners.

### ***EDI in Business & Government***

- ***Accounts Payable***
- ***Accounts Receivable***
- ***Order Entry***
- ***Scheduling***
- ***Inventory Control***
- ***Material Processing***
- ***Shipping***

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## ***Increasing Competitive Edge Through EDI***

Even though direct cost savings achieved through EDI are impressive, many advocates note that the best benefits come from its utility as a tool for simplifying and streamlining business procedures through process reengineering. Reports of indirect cost savings from \$4 - \$5 for every \$1 in direct costs savings from various business improvements made possible through EDI are common. Examples cited include: improved auditing procedures, competitive pricing strategies, streamlined business operations, and improved decision-making due to the delivery of timely and accurate information.

### ***Cost/Benefit Realization***

#### ***Direct Savings:***

***\$2 - \$10 per transaction***

#### ***Indirect Savings:***

***\$4 - \$5 for every \$1 in direct savings***



### ***Indirect Benefits Realized***

- ***Improved Auditing Procedures***
- ***Competitive Pricing Strategies***
- ***Streamlined Business Operation***
- ***Improved Decision Making***
- ***Timely Delivery of Information***
- ***Accurate Information***

## ***Federal Government Reengineering w/Electronic Commerce***

Through the defense and civilian sectors, the Federal government recognized the strategic and economic advantages of EDI. Last October, President Clinton declared electronic commerce would be a major tool in his efforts to reengineer government. As Federal budgets become more constrained, the advantages of this technology become more apparent. The adoption of common Federal Implementation Conventions and the promotion of “better business practices” are expected to play a key role in re-inventing government and also assist in promoting national and international electronic commerce.

## **Successful Implementations**

When implementing EDI, costs come early while savings come later. The dilemma is that costs are easy to measure while benefits are not. These points often tend to be true with any significant information system implementation, particularly if organization or work flow change accompanies the system. In addition, costs are usually fixed while benefits are variable. Costs associated with design and implementation can be determined early in the implementation process. However, benefits are often based upon the number of trading partners and the volume of transactions. It is usually more difficult to financially justify EDI if only a few trading partners are used for a limited number of transactions.

### ***Specific Examples***

There are many examples of calculated financial return described within the EDI industry literature. The examples vary widely primarily based upon the degree to which EDI is implemented in concert with redesign and reengineering of the related business process, together with the scope of how the particular business process affects other business systems and other organizations within the enterprise. A Department of Veterans Affairs (VA) study provided examples of economic benefits realized by some organizations that implemented EDI:

- The Veterans Administration (VA) found that using EDI for delivery orders can save an estimated \$75 million over 5 years. The VA also estimates that implementation of EDI invoices reduces the per invoice costs from \$3.48 to \$1.55 for a discounted net savings of \$12 million (discounted) over 5 years. They found the use of EDI for government bills of lading would net \$388,541 in discounted savings over 5 years; the cost of GBLs would drop from \$10.07 to \$4.52 each.

#### ***Cost/Benefits of EDI***



***Veteran's  
Administration:  
Projecting: Over  
\$87 million in  
savings over 5  
years***

#### ***Cost/Benefits of EDI***



***VA Savings Potential  
Delivery Orders: \$75 million  
Invoices: From \$3.48 to \$1.55  
Savings: \$12 million  
Bills of Lading: \$10.07 to \$4.52  
Savings: \$388,541***

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- Pacific Telesis (PacTel) eliminated 51 percent of its paper-based systems and lowered its cost per transaction from \$78.00 to \$.48.

## ***Successful Implementations***



### ***Pacific Telesis***

***Eliminated 51% Paper-based systems***

***Cost Per Transaction:***

***From \$78.00 to \$.48***

- The Long Island Medical Center reduced its inventory of medical supplies by 25 percent over a 2-year period, while at the same time the number of orders (per year) increased from 22,000 to 35,000.

## ***Successful Implementations***



### ***Long Island Medical Center***

***Reduced medical supplies inventory by 25% over a two-year period during a period of substantial growth in orders.***

- The Department of Defense, in its Business Case for Electronic Commerce, identified \$1.2 billion in savings by automating 16 most-used forms over a 10-year

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period. The Defense Management Review Decision 941 identified that \$4 million spent in FY92 saved \$60 million in FY93.

## ***Cost/Benefits of EDI***

### ***Department of Defense***

***Identified savings potential of \$1.2 billion by automating 16 forms over 10 years.***



- The Defense Logistics Agency General Supply Center in Richmond identified \$24.5 million in savings with its Paperless Order Processing System (POPS), which eliminated paperwork and reduced inventory and depot costs.

## ***Successful Implementations***

### ***Defense Logistics Agency General Supply Center***

***Paperless Order Processing System savings: \$24.5 million***



- Texas Instruments implemented EDI in its procurement organization and reengineered its business process, lowering its average cost to process a purchase order from \$49.00 to \$4.70.

## ***Successful Implementations***

### ***Texas Instruments***

***Lowered average cost to process a purchase order from \$49.00 to \$4.90***



- It costs the Internal Revenue Service an average of \$82.00 to process a tax return manually, while it costs an average of \$8.75 to process a return electronically.

## **Successful Implementations**



### **Internal Revenue Service**

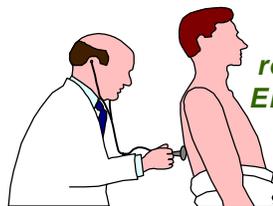
**Reduced processing costs for tax returns from an average of \$82.00 to \$8.75**

- The EDI work group convened by HHS in November 1991 concluded that between \$4 billion and \$10 billion could be saved each year in the administrative costs for the nations health care system through the use of EDI. The US health care system costs \$900 billion, of which \$120 billion is for administrative costs.

## **Cost/Benefits of EDI**

### **Health Care Reform**

**Between \$4 billion and \$10 billion annual savings could be realized through use of EDI in the United States.**



- Insurance companies say that processing worker's compensation claims cost anywhere from \$3 to \$11 per claim to process. Implementation of EDI to do this work is expected to cost less than \$2 per claim. Each year 12,000,000 new claims are filed.

## **Successful Implementations**



### **Insurance Industry**

**EDI will reduce claim processing costs from \$11 to \$2 per transaction.**

**Annual Savings: \$180 million**

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Given these examples and others, the economic savings can be significant. However, most organizations do not implement EDI exclusively to save money. While they recognize that EDI is an excellent method to contain costs for the future, and even possibly reduce costs in the near term, most organizations implement EDI primarily to enable them to perform their business and mission more effectively.

A key determining factor for the method of EDI implementation is the tradeoff between the cost and effort required against the benefits expected. Many organizations use formal cost-benefit analyses to quantify this tradeoff. Functional economic analysis has evolved more recently to combine the evaluation of information systems with the effect of business process reengineering. In any case, the economic benefit attributed to EDI can vary widely. The benefits are highly dependent upon the degree to which information technology (and EDI specifically) is integrated into a reengineered work flow.

Even though EDI is often associated with improved efficiency of operations, cost savings are not the primary reason that most organizations implement the technology. One study found that improved information management and customer service were cited as the most important benefits of EDI.

Another study, in which MIS managers of Fortune 1000 firms were interviewed, found that the most common reason for implementing EDI is strong demand by customers. The chief executive officer of a Fortune 100 firm stated that any organization that implements EDI just to save money will not realize the full potential of EDI.

Nevertheless, an economic analysis can be useful for selling EDI implementation internally, selecting an implementation approach from among the alternatives, and estimating EDI implementation costs. A financial analysis is particularly important when EDI implementation is being sold upward within the organization. The proponents will often require a sound business plan to gain support not only for the expenditures involved, but also to implement desired organization and/or business process changes. The following are benefits often cited when EDI is implemented:

- Dramatically improved responsiveness, i.e., better customer service.
- More information available more quickly resulting in better informed internal and external customers.
- Reduced errors and resultant higher quality/accuracy of information.
- Improved efficiency and reduced costs.

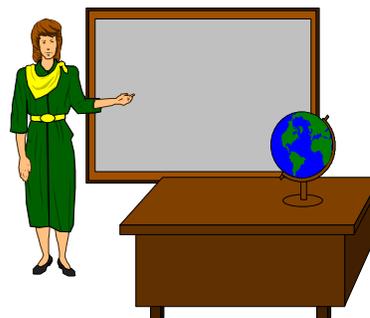
## **Why EDI in Education?**

Greater efficiency, accountability, and improved delivery of educational services to students are the primary drivers as to why EDI would be of benefit to education. The public continues to expect greater efficiencies on the administration of both government and education. The public also expects these organizations to be accountable on how they spend the precious resources and what the results of those expenditures are. Because EDI can deliver timely, comparable, and more accurate information to schools, students can expect to receive better educational services aligned to their needs. In response to all of these pressures, schools need to look at reengineering their business processes incorporating the latest in technology in an effort to accomplish more with less.

Over the past 30 years the promise of technology was to make our lives better by allowing computers to take over mundane tasks so that we might concentrate on either leisure activities or other human talents. The reality has been that we are working more and faced with additional tasks that exploit the technology further. The real breakthroughs await us in the application of networked technology where computers can work with other computers to accomplish the task of automatically sorting, formatting, and shipping information without human intervention.

### ***EDI Benefits to Education***

- ***Responsiveness***
- ***Efficiency***
- ***Accountability***
- ***Better Decisions***
- ***Improved Services***
- ***More with Less***



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## **The Vision of SPEEDE/ExPRESS**

### ***Benefits to Students***

Mary Smith is a 17 year old student from New York City whose family has decided to move to the west coast for economic reasons. Because of difficulties obtaining employment, her family has been on public assistance and is having trouble making ends meet. Word of job opportunities out west has motivated the family to re-locate. They timed their move to occur over the summer so that Mary and her siblings could begin their new schools in the Fall.

### **Today - Without Electronic Data Interchange**

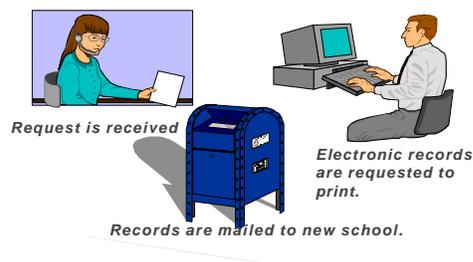
Mary is upset about the move because she has many friends and is involved in many school activities. She's on the honor role, a cheerleader, President of the Junior class, and captain of the volleyball team. Her academic performance and enrollment in an advanced placement curriculum ensured her potential admittance into a prestigious university.

#### ***Enrollment at the New School***



Mary and her parents meet with officials from her new high school. They are informed that Mary will be placed in temporary holding courses until her “official” high school records are received from her previous high school. An official request for records is completed and sent via postal mail to the school in New York. Later Mary’s previous high school receives the request and proceeds to pull together the requested information. The school officials either pull the information from paper files or initiate a request to print the records from their automated student information system.

#### ***Sending School Processes Record***



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If the records are in paper files, most schools make a copy of the records to send to the new school. Once that is done, the records are officially signed and placed in an envelope to be mailed to the new school. The amount of time involved will vary according to resource availability of the records clerks.

If the records are in computer files, the records clerk will request a printed copy from the computer that houses this information. Some schools have these systems located within their building and others reply upon a data center housed elsewhere. Turnaround time on these documents will vary according to location of printers and system load consideration.

If the output is printed locally in a timely fashion, the records can be printed, packaged up and sent within a matter of hours. If the output is to be delivered from another center, it could take several days for receipt of the documents.

Meanwhile, because school policy dictates that placement in advanced classes can only occur if the student has presented “official” documentation of prior performance, Mary is likely sitting in classes that are not appropriate for her. She is already suffering from the trauma of moving to a new place and trying to adjust socially. Academically, she has been put on hold. It is possible that she will remain in this status for weeks.

Mary also has a strong desire to attend a prestigious university. Deadlines for application are quickly approaching. If her records do not get to the university by the deadline, Mary may not be considered for her school of choice. She is also losing precious academic time and experience that could make the difference in gaining entrance to the university.

Because of her family’s low income status, Mary would also be eligible for financial aid. In order to be considered for this opportunity, more paper-work and evidence of performance will also be required. This causes further stress and pressure for Mary, her family, and school officials.



Three weeks go by and the records have not been received. School officials place phone calls to the New York high school who indicate that the records were “in the mail”. After several more weeks and phone calls, a determination is made that the records were lost in the mail. New records are generated and sent to the new high school.

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Finally, the new school receives the records and school officials review the information. Because the previous school used a different coding scheme for the student information, several phone calls are made to gain a better understanding of what it means. Comparability decisions are made and the information is cross-walked into terms understandable to Mary's new school. It is determined that Mary is indeed eligible for advanced placement classes, however, because of the timing Mary will not be able to enroll in the classes until second semester.

Now that the information is available, Mary can apply to the prestigious university. The deadline for application is several weeks away and Mary rushes to get the paperwork together. Because this process takes several weeks and the dedicated involvement of many parties, Mary gets her application and associated records in on time.

After the new year, Mary receives a letter from the university indicating that she will not be accepted. She later finds out it is because she was not enrolled in advanced placement during the fall term thus could not compete with students who were.

### ***Records are Received***



### ***Tomorrow: With Electronic Data Interchange***

Upon arrival, Mary enrolls in her new school indicating basic information about her previous school to a counselor, who enters that information into a computer that immediately makes a request for electronic copies of her student record. Within seconds, a copy of her student record is transmitted to the new school. The counselor sees how well Mary has performed in her previous school and creates an advanced placement schedule of courses that will meet Mary's need. A call is then made to the volleyball coach who arranges to meet with Mary to sign her up for the team.

A month later, Mary is in the process of deciding which ivy league school she would like to attend. She approaches her counselor who suggests she make multiple electronic applications to schools of interest. Mary sits down at a computer and fills out an electronic form and requests that a copy of her transcript be attached and sent out with each application. Upon form completion, the computer program sends a request to the

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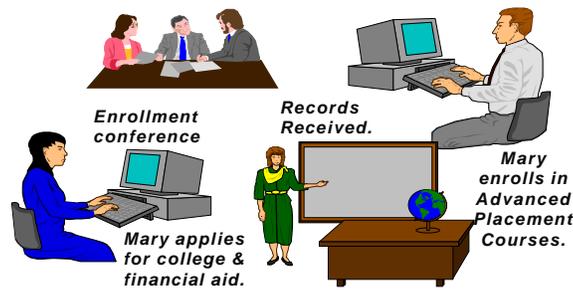
computer holding current transcript information to attach the record. Once the other computer has responded to the request, the originating computer sends the applications off to the schools of interest.

Several days later Mary's high school receives notification that Mary is indeed eligible and, if her high marks continue, will certainly be welcome at their institution. At the end of the first semester and at the end of the school year, school officials will submit updated electronic transcripts to the university to keep them apprised of Mary's progress.

Because Mary's family has limited income, it will be necessary for Mary to search for scholarships and loans. She is told by her counselor that the school has a computer program that will allow for electronic application for a student loan. She completes the form which is immediately sent off to the student lending agency. Because it is apparent that Mary qualifies, approval is obtained immediately.

In the end, multiple electronic transactions have occurred between three different organizations and Mary is well on her way to college. The schools have realized a significant reduction in their workload in assisting Mary and possess accurate and up-to-date transcript information.

## ***The Vision of SPEEDE/ExPRESS***



## **The Vision of SPEEDE/ExPRESS**

### ***Benefits to Schools***

#### **Increased Staff Productivity**

The electronic movement and processing of enrollment data results in more efficient execution of educational services for a student. It would eliminate many functions, such as reproduction, mailing, handling, repetitive data entry, and telephoning. With an EDI system, staff can better manage their resources by eliminating time consuming tasks. They become more professional and can use the opportunities the technology offers.

Since EDI will permit staff to process student information without having to deal with a document on paper, the matriculation process will be faster. As internal systems are created or reengineered to permit records to be sent and received electronically, the entire records management process will become faster, more efficient, and more responsive.

Full implementation of EDI will reduce the number of times the same data are entered into a record or "file." Paper handling, filing, and photocopying time at multiple locations will also be reduced. By reducing the processing time for student records, EDI will produce a secondary benefit—faster delivery of educational services to the customer - the student. Yet another benefit of EDI is the reduced transaction cost, which frees funds for front-line operations of a school.

#### ***Benefits to Schools***

#### ***Increased staff productivity***



#### **Increased Morale of School/District Staff**

Professional image would be enhanced and frustrations reduced if staff could depend upon this technology as a tool to provide quality work. Access to this technology would allow individuals to concentrate on more creative endeavors, thus developing a positive feeling about their jobs. This positive feeling would increase self-esteem, reduce stress, and help to retain quality staff.

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## ***Benefits to Schools***

### ***Increased Morale of Staff***



## **Program Improvement**

Staff could provide more effective educational programs for students because the technology would increase time for planning, encourage creativity, and improve instruction to students. Access to more timely, accurate information allows for immediate feedback for better decision-making about programs.

## ***Benefits to Schools***

### ***Program Improvement***



## **Improved Image of District/School**

Taking the lead in adopting a technology that promises to reduce costs and improve services, greatly enhances the image of the district in the eyes of the taxpayer. The district/school also can serve as a model for others who could benefit from this technology.

## ***Benefits to Schools***

### ***Improved Image of District***



# **SPEEDE/ExPRESS**

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## **Improved Relations with the General Public**

External relations with the public would be greatly improved if the district were able to provide timely services and information to its community. EDI can enable this by ensuring that accurate information about students is available.

### *Benefits to Schools*

#### *Improved Public Relations*



## **Better Management Information**

Producing and moving data electronically can greatly enhance management of those data. With EDI, specific transactions can be tracked from registration to receipt. Further, control during internal processing is enhanced with reliable status information, flexible reporting options, and resource planning. Understanding the needs of the students as soon as possible and being able to bring resources in to best meet those needs in a timely fashion are critical to the educational process. Schools that experience a high level of turn-over among their student body are often those that are poorly funded, minimally staffed, and faced with the challenge of serving a turbulent population with many special needs. Having data that can clearly document these needs to upper management provide a compelling case that resources are sorely needed.

### *Benefits to Schools*

#### *Better Management Information*



# **SPEEDE/ExPRESS**

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## **Improved Information Accuracy**

Manual processing of records requires intensive handling and interpretation by humans which can lead to errors. Streamlining the flow of information by channeling the information from computer to computer reduces the rate of error and results in better information on the receiving end. Schools only need to map their educational terminology to the standardized format once which reduces the overhead of having to do this each time a student educational record is sent.

### *Benefits to Schools*

#### *Improved Information Accuracy*



## **Improved Delivery Time**

A cost benefit study conducted by Far West Laboratory found that the average student record transfer rate utilizing the mail approached 4 weeks. Adding this to the trauma of moving, students must face the challenges of inaccurate placement, social adjustments, and unclear instructional expectations. A survey of district readiness assessment also revealed that most school staff are frustrated with the current turn-around time for records. This problem is amplified in schools experiencing a high turnover rate due to such factors family configuration changes and residential moves.

### *Benefits to Schools*

#### *Improved Delivery Time*



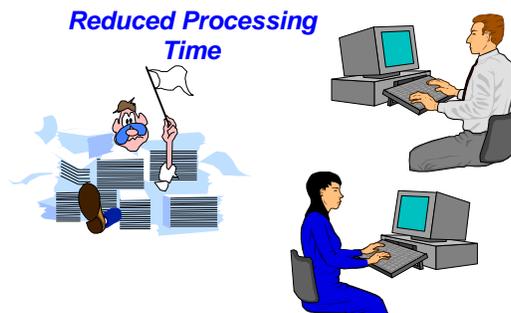
# **SPEEDE/ExPRESS**

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## **Reduced Processing Time**

In large part, because the time it takes to move the data between the parties involved is reduced significantly, EDI reduces the processing time needed to get students into appropriate programs. Many of the benefits of electronic processing realized by the sending school are also realized by the receiving school. These all combine to reduce the entire life cycle student matriculation significantly.

### *Benefits to Schools*

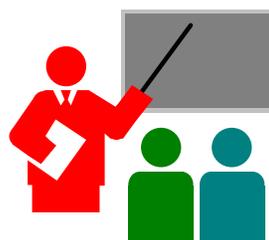


## **Better Classroom Management**

The ability to employ “just-in-time” enrollment techniques, promote the ability to control class sizes so that teachers are not overwhelmed with more students than they can handle. This promotes improved classroom management and results in better delivery of instructional services. Students and teachers can begin the term confident that there will be minimal disruptions caused by rescheduling students inappropriately placed because of lack of historical information.

### *Benefits to Schools*

#### *Better Classroom Management*



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## **Improved Membership Counts for Funding**

Many schools get their funding based on student membership counts. Inaccurate counts can result in loss of funding which can prove to be devastating to a school district. Having timely and accurate information is critical to ensure the financial resources needed are delivered. Utilization of EDI combined with the electronic commerce technology - electronic funds transfer (EFT) - can boost a district's financial capabilities tremendously. EDI ensures that student information systems are current so that state reporting is accurate and EFT can be used to appropriate the funding in a timely manner.

### *Benefits to Schools*

#### *Improved Membership Counts for Funding*



## **Increased Operating Efficiencies**

In much the same way that EDI makes the receiving school staff more productive, it allows the sending school to operate more efficiently. The manual functions involved with the processing of paperwork are eliminated. This speeds the process and virtually eliminates the errors inherent in keying and re-keying data.

### *Benefits to Schools*

#### *Increased Operating Efficiencies*



## **Increased Opportunity for Students in Higher Education**

The use of EDI gives all students an improved opportunity to gain entry into an institution of higher learning. Electronic application to schools of interest puts students at the head

# **SPEEDE/ExPRESS**

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of the line for potential acceptance into highly competitive schools. These students receive immediate feedback as to their status and often have their application fees waived or reduced significantly because of reduced processing costs at the college site.

## ***Benefits to Students***

### **Increased Opportunity for Students in Higher Education**

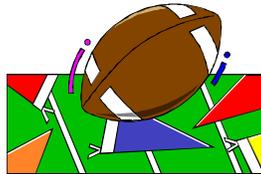


### **Leveling of the Playing Field**

Regardless of school size, geographic location or economic condition, all students will have instant and equal access to participating institutions of higher learning.

## ***Benefits to Students***

### **Leveling of the Playing Field**

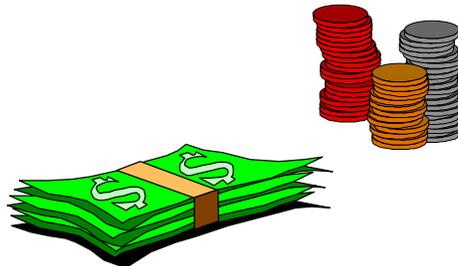


### **Reduced Direct Costs**

The EDI process will reduce the amount of time and resources used in handling paper documents, managing the operation of a paper-based system, keying and re-keying data into information systems, paying postage, maintaining stocks of supplies and storage systems for paper products, and maintaining a manual audit trail for transaction reconciliation.

## ***Benefits to Schools***

### **Reduced Direct Costs**



### **Reduced Indirect Costs-Auditing**

With implementation of EDI schools will realize indirect costs associated with reengineering a business process. Because EDI can provide an automated audit trail of transactions, state auditors have documented evidence concerning the entire process. The auditor's time at task is also greatly reduced resulting in substantial savings to the institution.

## ***Benefits to Schools***

### **Reduced Indirect Costs-Auditing**



### **Reduced Indirect Costs-Streamlined Internal Operations**

Because staff is relieved from the mundane duties of paper work handling, they can participate in more meaningful activities such as streamlining other parts of their business operations. It is common for an organization, upon successful implementation of one EDI transaction type, to look for other areas that the technology could assist in. Though indirect, this technology transfer process results in cost savings throughout the

# **SPEEDE/ExPRESS**

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organization. In schools, the business office is an ideal place to begin looking at EDI potential in streamlining processes to gain efficiencies. Electronic generation and transmission of purchase orders from schools to the business office and from the business office to vendors would be a natural application.

## ***Benefits to Schools***

**Reduced Indirect Costs**  
**Streamlined Internal Operations**



## **Better Problem Resolution**

EDI minimizes the time spent identifying and resolving inter-school informational issues. Many problems come from data-entry errors somewhere along the way, and EDI eliminates this situation because data needs to be entered only once.

## ***Benefits to Schools***

**Better Problem Resolution**

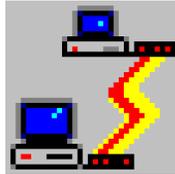


## **Other Benefits: Inter-Agency Data Coordination**

Many of the benefits realized on one side of an EDI partnership are found on the other as well. In addition, schools could use EDI to report student information to state agencies such as the State Education Agency and/or State Department of Health. School districts should also be poised to take full advantage of the benefits of EDI throughout their internal organization, such as benefits of linking, purchasing, accounting, inventory, and human resource systems to the EDI systems. As districts build up their wide area networks and link into the Internet, vast new opportunities to reengineer business processes utilizing electronic commerce technology can be exploited.

## *Other Benefits*

### **Inter-Agency Data Coordination**



## **Cost/Benefit Analysis**

In order for any agency to determine its range of economic savings, an agency-level analysis will be required. In most cases, agencies must reengineer the procurement processes to obtain optimum savings. There are two requirements for cost-benefit analysis: near-term analysis without reengineering and long-term analysis with reengineering. Full implementation of EDI may not be cost effective until reengineering of the processes is completed. For the near term, agencies should select those opportunities to implement EDI which indicate a clear cost savings. This two-tier approach will allow agencies to benefit from near-term cost savings while developing the long-term solution.

Cost can be measured using any number of techniques. However, to assess the actual costs and savings associated with EDI, an organization must thoroughly examine internal and external systems, personnel, and other associated cost drivers. Economic analysis should address what it costs schools to process a student's record under the current paper-based, manpower-intensive process and compare these figures to a fully automated process that enrolls a student. The section summarizes some of the economic considerations. However as the technology evolves, and becomes more mature, and as more schools implement EDI, more information will be available for further economic analysis.

The major areas having a cost impact are:

- student information system modifications,
- implementation conventions,
- EDI translation software,
- value-added network (VAN) agreements, and/or
- network entry point capability to the Internet.

# **SPEEDE/ExPRESS**

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Each school district and/or vendor must modify its agency system to provide the data necessary to generate EDI transaction sets. The cost of the modifications will vary depending on the student system architecture. A simple case may require the redirection of a system file, while a complex situation may require the development of an interactive system to access the existing data base.

## **SPEEDE/ExPRESS: A Case Study in Washington**

### *SPEEDE/ExPRESS Case Study*



The case study that follows is intended to serve as a template to be applied to any schools that might be entertaining the use of EDI technology to send and receive student education records. Any school or group of schools should engage in a similar exercise to determine if SPEEDE/ExPRESS would provide benefits for them.

### ***Background***

In November of 1993, a pilot project to explore the feasibility of electronic student records transfer was launched. Project participants included officials from the Higher Education Coordination Board, Office of the Superintendent of Public Instruction, Communications and Technology Center (representing all community and technical colleges), the Washington School Information Processing Cooperative (representing 276 of 296 school districts and nine educational service districts), University of Washington, Edmonds Community College, Edmonds School District, City University, Seattle Pacific University, Kent School District, Seattle University, Bellevue School District, and Vancouver School District.

The design of the pilot called for solicitation of EDI vendor involvement to assist five pilot sites in the implementation of EDI within their systems. The pilot sites represented public and private colleges and school districts. It was hoped that the knowledge gained from this exercise would provide participants with the necessary ingredients to proceed toward a state-wide implementation strategy.

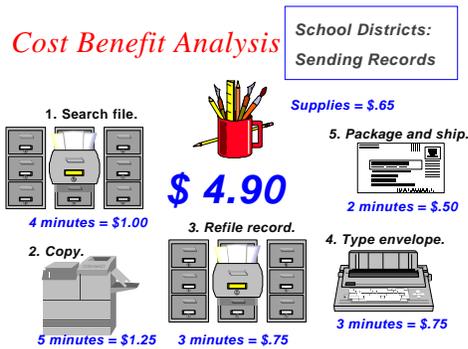
# **SPEEDE/EXPRESS**

In order to assess the impact of this technology, it was important to understand what it cost today to send and receive electronic transcripts in paper form. Sites were asked to conduct cost analysis on their current processes to determine resource utilization. Most peer institutions followed similar procedures so costs were categorized by elementary, secondary, and postsecondary.

These analyses were divided into groups: elementary, secondary and postsecondary for both sending and receiving electronic records. All schools already have student information systems in place for management of their records.

## **Elementary/Secondary - Sending Records**

The following process documents how schools typically go about sending electronic records to another school district via paper forms:



<i>Task</i>	<i>Time</i>	<i>Cost @ \$15/hr.</i>
<i>Clerk retrieves record</i>	<i>4 minutes</i>	<i>\$1.00</i>
<i>Makes copy</i>	<i>5 minutes</i>	<i>1.25</i>
<i>Re-files the original records</i>	<i>3 minutes</i>	<i>.75</i>
<i>Types the envelopes</i>	<i>3 minutes</i>	<i>.75</i>
<i>Envelopes &amp; mails records</i>	<i>2 minutes</i>	<i>.50</i>
<i>Miscellaneous Expenses</i>		
<i>Envelope = \$.14 each</i>		<i>.14</i>
<i>Form = \$ .22</i>		<i>.22</i>
<i>Mail costs = \$.29</i>		<i>.29</i>
<i>Total estimated cost per record.....</i>		<i>\$4.90</i>

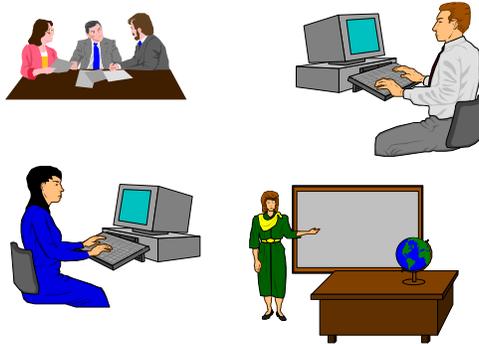


# **SPEEDE/EXPRESS**

<i>Task</i>	<i>Time</i>	<i>Costs@\$15/hr</i>
<i>Clerk requests record on official form</i>	<i>5 minutes</i>	<i>\$1.25</i>
<i>Clerk receives record and reviews contents</i>	<i>5 minutes</i>	<i>\$1.25</i>
<i>Clerk crosswalks appropriate information</i>	<i>30 minutes</i>	<i>\$7.50</i>
<i>Counselor reviews course crosswalk @ \$36/hr.</i>	<i>10 minutes</i>	<i>\$3.60</i>
<i>Clerk enters information into computer system</i>	<i>20 minutes</i>	<i>\$5.00</i>
<i>Total labor time/costs for processing</i>		<i>\$18.60</i>
<i>Indirect Costs for Official form/ mailing</i>		<i>\$.40</i>
<i>Total Estimated cost per record.....</i>		<i>\$19.00</i>

## **Total Estimated Processing Costs: Elementary/Secondary**

The table below summarizes the estimated cost for processing student records both incoming and outgoing. The average cost attempts to assign a cost that could be applied across a district and/or state to estimate current costs.



<i>Summary of Associated Costs to Process Electronic Student Record Information</i>		
<i>Processing Costs</i>	<i>Elementary</i>	<i>Secondary</i>
<i>Sending</i>	<i>\$4.90</i>	<i>\$4.90</i>
<i>Receiving</i>	<i>\$7.50</i>	<i>\$19.00</i>
<i>Total</i>	<i>\$12.40</i>	<i>\$23.90</i>
<i>Average Cost Per Student Pre K-12: \$18.15</i>		

## Postsecondary Education - Sending Records

The following task analysis was done at a community college to assess what processing costs were incurred when sending a transcript to another college.

### Cost Benefit Analysis

Postsecondary:  
Sending Records

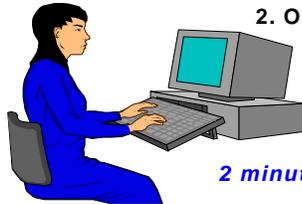
1. Request record.



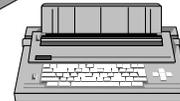
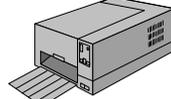
**\$2.94**

2 minutes = \$.56

2. Order/print record.



2 minutes = \$ .56



2 minutes = \$.56



Supplies = \$.70

4. Package and ship.



2 minutes = \$.56

3. Type envelope.

### Estimated Processing Costs for Sending Transcripts

Task	Time	Costs
Student & clerk negotiate send	2 minutes	\$.56
Clerk receives record print	2 minutes	\$.56
Clerk types the envelope	2 minutes	\$.56
Envelopes & mails records	2 minutes	\$.56
<b>Total labor time per record</b>	<b>8 minutes</b>	<b>\$2.24</b>
<i>Miscellaneous Expenses</i>		
Envelope = \$.14 each		\$.14
Form(s) = \$.27		\$.27
Mail costs = \$.29		\$.29
<b>Total Estimated cost per record.....</b>		<b>\$2.94</b>

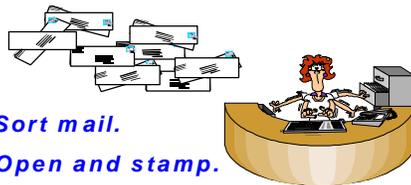
## Postsecondary Education Costs - Receiving Records

### High School Transcripts

The following analysis illustrates the typical processing of a high school transcript when received by a postsecondary institution.

### Cost Benefit Analysis

Postsecondary:  
Receipt of High  
School Transcripts



1. Sort mail.
2. Open and stamp.
3. Alphabetize transcripts.
4. Log into database.
5. Evaluate subjects, gpa.
6. Route to advisor.

**\$ 6.95**

<i>Phase I - Receipt &amp; Distribution (Office Asst III@\$.28 minute).</i>		
	<i>Min.</i>	<i>Cost</i>
<i>1. Sort mail &amp; identify transcripts</i>	<i>5</i>	<i>.14</i>
<i>2. Open and date stamp transcript</i>	<i>1.5</i>	<i>.42</i>
<i>3. Alphabetize transcripts</i>	<i>1.0</i>	<i>.28</i>
<i>4. Inquire upon data base, log receipt</i>	<i>2.0</i>	<i>.56</i>
<i>5. Match transcripts to admissions</i>	<i>7.0</i>	<i>1.96</i>
<i>Phase II - Admissions Processing (Admissions Spec. @\$.23 minute)</i>		
<i>1. Initiate core subject requirement evaluation</i>	<i>3.0</i>	<i>.69</i>
<i>2. Re-calculate GPA</i>	<i>12.0</i>	<i>2.76</i>
<i>3. Route to advisor</i>	<i>.5</i>	<i>.14</i>
<i>Total cost per transcript</i>		<i>\$6.95</i>

# SPEEDE/EXPRESS

## Costs for Receiving College Transcripts

As is illustrated in the following, the processing of college transcripts is labor intensive because of the need to conduct a more detailed analysis.

### Cost Benefit Analysis

Postsecondary:  
Receipt of College  
Transcripts



7. Articulate courses.
8. Complete evaluation form.
9. Copy & route to data tech.
10. Complete transcript form.
11. Data entry into system.
12. Verify information.

**\$25.23**

<i>Phase I - Receipt &amp; Distribution (Office Asst III@\$.28 minute)</i>		
1. Sort mail & identify transcripts	.5	.14
2. Open and date stamp transcript	1.5	.42
3. Alphabetize transcripts	1.0	.28
4. Inquire upon data base, log receipt	2.0	.56
5. Match transcripts to admissions files	7.0	1.96
<i>Phase II - Admissions Decisions (Admissions Specialist @\$.23 minute)</i>		
1. Core subject check by admissions spec	3.0	.69
2. Calculate grade point average	12.0	2.76
3. Route to appropriate handling agent	.5	.14
<i>Phase III - Transfer Credit Evaluation - (Evaluation Specialist @\$.25 minute)</i>		
1. Determine course equivalencies	10.0	2.50
2. Prepare evaluation form	15.0	3.75
3. Copy & route to advisor & data tech	3.0	.75
<i>Phase IV - Process data into student data base - (Data Technician @\$.23 minute)</i>		
1. Complete form for transcript office	4.0	.92
2. Enter student/school information	8.0	1.84
3. Enter session information	15.0	3.45
4. Enter course records	20.0	4.60
5. Enter degree/certificate information	2.5	.57
6. Enter transfer schools/credits	15.0	3.45
7. Verify courses	15.0	3.45
<i>Total estimated cost to process each transcript</i>		<b>\$25.23</b>

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## **Summarization of Costs to Process Electronic Records in Postsecondary**

<i>Summary of Associated Costs to Process Electronic Student Record Information</i>		
<i>Processing Costs</i>	<i>High School</i>	<i>PostSecondary</i>
<i>Sending</i>	<b>\$4.90</b>	<b>\$2.94</b>
<i>Receiving</i>	<b>\$6.95</b>	<b>\$25.23</b>
<i>Total</i>	<b>\$11.85</b>	<b>\$28.27</b>

## **Costs Applied to Mobility**

Student mobility is a significant factor in education today. For purposes of this paper, mobility is defined in several categories: residential/school moves and movement from elementary/secondary to higher education. Applying the estimated costs for processing electronic records on paper to student mobility demonstrates the potential savings that could have been realized if EDI had been in place.

### ***Mobility: A National Perspective***

According to a study conducted by the US Department of Commerce, Economics and Statistics Administration, Bureau of the Census, entitled “Geographic Mobility: March 1991 to March 1992” 42.8 million persons out of a total population of 247,380,000 moved from one residence to another. This amounted to 17.3% of the total population 1 year or older. It was noted that 26.6 million residential moves occur within the same county and it is likely change in neighborhood will result in change of school.

The study also concluded that mobility rates are higher for younger children. Preschoolers under the age of 5 have the highest rates of moving at 22.4%. Children from 5 - 9 years old have a residential mobility rate of 18% while children from 10 - 17 move at a rate of 15%. Given these factors, assigning a national mobility rate of 17% for the purposes of this study would give some sense of potential savings that could be realized upon full implementation of SPEEDE/ExPRESS to assist the transition of mobile students.

#### ***National Residential Migration for School Age Children***

<i>Total Migration</i>	<i>5 to 9 Years Old</i>	<i>10 - 17 Years Old</i>	<i>School Age Moves</i>
<b>42,800,000 people</b>	7,704,000 people	6,420,000 people	14,124,00 people

If one were to apply the rate described in this report to mobile children of school age, the total would add up to 14,124,00 for that year. Assuming that all of their schools were

# **SPEEDE/ExPRESS**

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already had automated student records systems, the average estimated cost to process information at \$18.15 per student move would be approximately \$256,350,600.

## ***Estimated National Records Processing Costs From March 1991 to March 1992***

<b><i>Total Student Moves</i></b>	<b><i>Records Cost Per Student</i></b>	<b><i>Estimated Total Cost</i></b>
<b><i>14,124,000 students</i></b>	<b><i>\$18.15</i></b>	<b><i>\$256,350.600</i></b>

Obviously, the above scenario describes complete implementation by all of the 87,000 schools as well as private and home schools, doesn't account for the costs of development of an EDI solution, and assumes that paper exchanges of information would cease. A more realistic scenario is more grass-roots in nature involving a state-wide implementation.

## ***Mobility: A State Perspective***

### **Elementary/Secondary: School-to-School Mobility**

Enrollment for the K12 public schools in the State of Washington in the Fall of 1992 was 896,475. If one were to apply the 17% mobility rate to that population the total would be 152,401. Assuming that these students moved to schools within the state that had automated student records systems, the total processing costs at \$18.15 per move are estimated to be \$2,766,078.15.

#### ***Elementary/Secondary***

#### ***Estimated Costs for Processing Electronic Records on Paper***

#### ***1992/93 School Year***

<b><i>Fall Enrollment 1992</i></b>	<b><i>Mobility (17%)</i></b>	<b><i>Total Cost @ \$18.50</i></b>
<b><i>896,475 students</i></b>	<b><i>152,401 students</i></b>	<b><i>\$2,766,078.15</i></b>

### **Mobility: High School to College Perspective**

In the fall of 1993, 7643 high school seniors from Washington State schools entered four year institutions. It is estimated that each student submitted a minimum of three transcripts throughout their senior year in order to gain entry into their school of choice. In most cases, transcripts were also sent for students who opted not to attend one of Washington's four year schools but these numbers were not readily available. Using the fall enrollment and assuming that three transcripts were sent for each freshman each costing the school districts \$4.90, the total cost for processing transcripts for the 1992-93 school year is estimated to be \$112,352.10. It should be noted that the higher processing costs are being

# **SPEEDE/ExPRESS**

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realized at the colleges where rigorous review and handling of the documents take place. This has been estimated to be anywhere from \$20 to \$30 per record.

### *Estimated Costs for High Schools to Send Transcripts 92/93*

<i>HS/College Fall '93</i>	<i>Cost Per Transcript</i>	<i>Total Estimated Cost to Process</i>
<i>7,643 students</i>	<i>\$4.90</i>	<i>\$112,352.10</i>

### **Mobility: College Perspective**

#### *Summary of Costs to Process Postsecondary Transcripts - Fall 1993*

<i>Migration Path</i>	<i>Transfers</i>	<i>Est. Cost</i>	<i>Processing Cost</i>
<i>HS to Community College</i>	<i>13,490</i>	<i>\$11.85</i>	<i>\$159,856.50</i>
<i>Community College to 4 Yr.</i>	<i>7,350</i>	<i>\$28.17</i>	<i>\$207,049.50</i>
<i>High School to 4 Year School</i>	<i>7,643</i>	<i>\$11.85</i>	<i>\$ 90,569.55</i>
<i>Transfers Between 4 Year Schools</i>	<i>4,026</i>	<i>\$28.17</i>	<i>\$113,412.42</i>
<i>Transfers from 4 Years to CC's</i>	<i>2,932</i>	<i>\$28.17</i>	<i>\$82,594.44</i>
<i>Total</i>	<i>21,951</i>		<i>\$653,482.41</i>

If you were to apply the cost estimates per transfer to the mobility numbers for Fall of 1993, the total estimated cost of processing would be \$ 653,482.41. This only quantifies the total processing costs of a single transcript per student. Analysis at the high school level indicates that up to three transcripts will be sent for a single student enrolling in a given college.

## **Cost Realization Potential: Washington**

The following chart illustrates estimated costs for manually processing electronic student records in the State of Washington during the 1992/93 school year. Annual mobility for K12 was calculated based on beginning of year enrollment factoring in a 17% mobility rate for the school year. Annual mobility for the 92/93 school year was not available for the Postsecondary community. Once this information becomes available, it should be added in to assess the full potential impact SPEEDE/ExPRESS could have had on the educational community in Washington State.

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## *Estimate of Total Processing Costs for 1992-93*

<i>Migration Path</i>	<i>Transfers</i>	<i>Est. Cost</i>	<i>Processing Cost</i>
<i>HS to Community College</i>	13,490	\$11.85	\$159,856.50
<i>Community College to 4 Yr.</i>	7,350	\$28.17	\$ 207,049.50
<i>High School to 4 Year School</i>	7,643	\$11.85	\$ 90,569.55
<i>Transfers Between 4 Year Schools</i>	4,026	\$28.17	\$ 113,417.42
<i>Transfers from 4 Years to CC's</i>	2,932	\$28.17	\$ 82,594.44
<i>Estimated Mobility in K12 92/3</i>	152,401	\$18.15	\$2,766,078.15
<b><i>Total</i></b>	<b>172,064</b>		<b>\$3,419,565.56</b>

### ***School District Mobility***

The decision to adopt this technology will likely take place at the district level and needs to be considered from that perspective. In order to pursue the argument, a close analysis was conducted using data from Edmonds School District, a suburban district located approximately 20 miles north of Seattle, Washington.

The analysis followed the student enrollment trends for the 1992-93 school year. The data indicates that the beginning population was 15,771 with 2,610 students entering the district and 2,415 leaving. The analysis which may be found in Appendix A, revealed that the total cost for processing the records of this mobile student population is estimated at \$44,454 for that year. What is not reflected in this analysis is the cost of processing in-district transfers. The district utilizes electronic transfer for this task, thus incurs minimal costs for processing.

### ***School Level Analysis***

The school selected for this study was Edmonds/Woodway High School and the data reviewed was that for the 1992-93 school year. During this year EW High School received 146 students from out of the district and lost 118 students to other school districts. The total associated costs to handle this mobility is estimated to be \$2,957.40.

Edmonds-Woodway High School also sent transcripts to colleges for their students. Records indicate that it sent 253 for the seventh semester, 141 for the eighth semester, and 145 following graduation. The total number of transcripts sent was 539 costing \$4.90 each adds up to \$2,641.10 which is just under the amount spent to handle the mobile students.

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<i>Migration Path</i>	<i>Occurance Number</i>	<i>Cost Per Record</i>	<i>Total Cost</i>
<i>Incoming Students</i>	146	\$19.00	\$2,774.00
<i>Outgoing Students</i>	118	\$ 4.90	\$ 578.20
<i>College Transcripts</i>	539	\$ 4.90	\$2,641.10
<i>Total</i>	803		\$5,993.30

## **Determining Costs to Implement**

Costs for implementation vary widely and cannot be determined without careful analysis of the environment it will be operating within. It is therefore highly recommended that a pilot project be conducted to overcome the learning curve introduced by a new technology and to assess the impact. Long term implementation plans will be much more effective with this experience serving as a base. The following section explores implementation cost factors that must be considered when implementing EDI.

### ***Software, Hardware, & Telecommunication Costs***

Most of the costs of enabling for EDI center around software, hardware, and telecommunications issues. There is a substantial upfront cost that can be incurred, however, cost recovery can be achieved within the first year of implementation if transaction volume is high enough. Once the process has been put in place, clerical labor and material/ mailing costs, for all practical purposes, go away. In addition to hardware and software, there will be on-going costs incurred for training, system administration, software maintenance, hardware upgrades and telecommunications.

#### ***Implementation Costs***

- ***Software***
- ***Hardware***
- ***Telecommunications***
- ***Training***
- ***System Administration***
- ***Support***

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## **Software**

The 137 school districts using the Washington School Information Processing Cooperative Student Information System could become EDI capable by applying one person year worth of programming effort. Estimating that cost to be around \$80,000 and applying that number to the estimated number of transfer records that would be transmitted (17% of 500,000 = \$85,000) within a year easily justifies the expenditure. The cost per student would be a little over \$1.00 per student but the return on that estimate would average \$17.15 in savings in time and materials in the schools.

Another implementation scenario might be to purchase a PC-based EDI translator to run at a school district office. If the translator cost \$2,000 and interface programming for two months cost \$10,000, a district like Edmonds could be up and running for \$12,000. Given the estimate for processing records for the district was \$44,000 without EDI, one can quickly see cost recovery is accomplished within the first year.

The Office of the Superintendent of Public Instruction in Washington State is seriously considering collecting individual student records electronically via ANSI X12 EDI to reduce the overall aggregate reporting burden to school districts. Through this initial investment, districts would realize immediate savings in time and materials.

As is surely apparent at this point, costs are relative and savings are determined by the volume of transactions. Each school needs to educate themselves on EDI and assess their own situations to determine the potential cost/benefit that they might be able to gain.

### *Software Costs*

- *Student Information System*
- *EDI Translation Software*
- *Mapper Software*



### *Internally Developed Solutions*

An institution may determine that the most cost/effective solution for them is to develop the software themselves. Because of the unavailability of marketplace solutions when Florida, Washington, and California began this process, they developed their own. Costs for development varied considerably between the sites. It is recommended that schools considering this option assess the costs of long-term maintenance and support along with initial development to determine the feasibility of implementing their own solution.

Experience around the country indicate it will minimally take approximately one person year to develop a solution that handles the student education record and associated transaction sets (TRS 130, 131,146,147). This assumes that a student information system

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is already in place and that mapping, translation, and transport are the problems being solved.

## ***Commercial Solutions: EDI Translators***

The availability of translators varies according to platform and level of functionality. There are many available on multiple platforms. The solution most appropriate for a school is highly dependent on the current environment for deployment and future directions the district and/or state is considering for this technology.

Discussions with commercial software firms specializing in EDI translation solutions indicate costs can be anywhere from \$500 per site up to \$40,000 dops (depending on platform and services). Most of these vendors support all of the ANSI X12 transaction sets and some will handle EDIFACT as well as proprietary formats. They all have varying levels of functionality which should be reviewed and prioritized by the customer before making a purchasing decisions.

It is recommended that an institution consider the following factors: functionality, costs, standards supported, operating system compatibility, annual maintenance charge, typical start up time, ease of use, customer support services offered, help desk hours/call handling, communication protocols supported, special features, method used to update standards, source code, customization process, value-added services, network compatibility, and hardware requirements.

For a pilot project, EDI translation software for a personal computer can be purchased in the \$500-5,000 range depending on functionality required. Negotiations with vendors could bring this cost down. Warning: make sure a mapper is part of the package.

## ***Commercial Solutions: Student Information Systems that are EDI Enabled***

There are a number of commercial Student Information Systems on the market and several have integrated ANSI ASC X12 into their packages. The pressure to do so is upon them due to the need for their systems to communicate with others. The problem is based in the fact that Student Information Systems can be deployed in many different configurations. Schools can opt for systems that are based in buildings, districts, regional service centers or some combination thereof. Student systems run on stand-alone computers while others run in a networked environment. There are “home-grown” systems, commercial packages, and combinations of both. As more computers populate the schools, the demand for access to critical student information accelerates. At the same time, people are running different software packages on multiple platforms using different networks (or not) and they wonder why they can’t get the information they need in the time they need it.

ANSI ASC X12 Electronic Data Interchange standards exist to solve the problem of inter-system data communication. They provide a common format that can be used to exchange

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electronic information that is platform and software independent. They also provide a democratic process that allows all stakeholders to participate in the development and maintenance process so there are no surprises for those who invest in the technology. Vendors need these kinds of assurances before they will accommodate a new technology into their packages.

Because of the growth in desktop systems, currently student information software developers are being inundated with requests to enable the downloading of information to other related applications in proprietary formats and it's overwhelming them. In response, a number of the more popular student information systems are incorporating the ability to exchange student information in accordance with ANSI ASC X12 formats within their packages. Other software vendors that have packages dependent on student information systems for data would be well advised to do the same. These developers need to recognize that students are not static. They move and change programs regularly creating the need to share critical information with staff that are trying to serve them.

Schools should check with their SIS vendor to see if a solution is available or under development. Access to an integrated solution could reduce the cost of a pilot and implementation.

## ***Interface Programming***

Experience has shown that some programming may be required to interface with commercial EDI packages. In a study conducted by the Far West Labs, this cost could be as high as \$1,300 per district based on 20 hours of effort at \$65 per hour.

## **Hardware**

Schools may opt to install an EDI control center with dedicated hardware or enable hardware currently on hand. Costs will vary dependent on the most desirable computing environment. They need to work with their software vendor and/or development staff to determine what the best solution will be. Issues such as memory, disk space, processing speed, expected transaction volumes, schedules, and telecommunications must be considered. If the district has a vision of growing their use of EDI to other applications, selection of computing platform in that environment should be assessed.

### ***Hardware Costs***

- ***Memory Requirements***
- ***Disk Space***
- ***Processing Speed***
- ***Transaction volumes***
- ***Schedules***
- ***Telecommunications***



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## **Telecommunications**

To realize the true potential of EDI, a school should have dedicated access to a wide area network. In the commercial world value-added networks are the mode of transport most often used. These networks are proprietary and charge their customers according to level of subscribed services. The actual costs of sending records is based upon number of characters sent.

Many schools have access to public networks such as Prodigy, CompuServe, America On-line, or the Internet. Prodigy, CompuServe, and America On-line charge according to connect time and host disk space storage, and there is no charge for characters sent. Internet users, dependent on their provider, may be charged for connect time and disk space utilization but aren't charged for characters sent.

Costs for telecommunications can involve purchase of a modem, phone line, installation of a local area network, and/or network link to the network of choice. Schools need educate themselves on telecommunications and networks in order to make the most cost/effective decision to support this technology and other network technologies they plan to make available to their students and staff. This decision cannot be made based on the isolated needs prescribed by doing EDI.

Finding a network solution is a large undertaking for a school and/or district. In order to provide an opportunity to learn about network technology and applications such as EDI, it is advisable to pilot the process using the least expensive option available to the school and then applying what is learned to the larger network picture. This may mean initially using a modem and phone line to reach another school's computer to pilot the exchange.

### ***Telecommunications***

- **Modem**
- **Phone line**
- **Value Added Networks**
  
- **Public Networks**
- **Internet**
- **Sneakernet**



## **Training**

Staff involved in generating and receiving electronic student records need to understand the basics of EDI technology and how to operate the system. The dynamic nature of staffing and software changes prescribe that this function must be on-going and should be planned for accordingly. As with any change in the way an organization does business, it is extremely critical that the user community receive adequate training before the system is implemented.

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The training functions that need to be planned for include: education of the user community; liaison with technical support; marketing; and coordination between the entities that are sharing the data.

## ***Training***

- *Educating user community*
- *Liaison with Technical Support*
- *Marketing*
- *Coordination between schools*



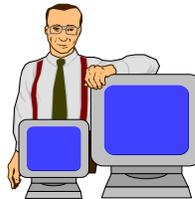
## **System Administration**

In order to assure successful system implementation, the role of system administrator must be filled. This individual will be responsible for data articulation, management of revisions and technical architecture, and troubleshooting technical issues.

The systems administrator will need to conduct data articulation which is the mapping of local data to the standards. They must also ensure that revisions are kept in alignment with the standard. A good example is the need to map the school's course catalog into the NCES National Course Classification Codes. As new courses are introduced to the school, they need to be crosswalked to the classification that best describes the course.

## ***System Administration***

- *Data Articulation*
- *Management of Revisions*
- *Oversight of Technical Architecture*
- *Troubleshooting technical issues*



## **Troubleshooting/Support**

As with any system, there will be problems that will need to be resolved. These could be software, hardware, and/or data problems which cause the process to stop. The responsibility needs to be assigned to an individual within the school who may not know

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the answers to the problem but knows where the resources are to solve it. It would also be advisable for a district counterpart to be assigned to negotiate district-wide issues.

## *Support*

- *Help Desk*
- *Troubleshooting*
- *Training*
- *Consulting*



## ***Conducting a Pilot Project***

In order to reduce risk and assess the feasibility of engaging in this technology, it is highly recommended that a pilot project is conducted. The following is based upon the experiences of similar pilots that have occurred in educational institutions within North America.

### ***Template for a Pilot Project Using Commercial Software***

<b>Item</b>	<b>Description</b>
Commercial EDI Package	Mapper & Translator for PC
Hardware	Personal Computer
Programming/Administration	Interfacing to Application
Telecommunications	Modem
Training (could be shared)	Up to 3 Days (depending on the complexity of the software)
Travel/Per Diem for Trainer	Airfare, Lodging, Meals

## **Pilot Considerations**

The appropriate solution comes down to a matter of economics and scalability. EDI translation software for the PC is much cheaper than their mainframe counterparts. EDI translation software running on a larger platform can handle more users and higher volumes of records. Those who have successfully implemented EDI in business recommend that the first deployment of this technology be done on a small scale in pilot mode. This provides a “low risk” opportunity to learn about the technology and assess the impact on both the system and internal operations.

Due to the autonomous nature of schools, there are no cookie cutter solutions. Costs are dependent on the type of solution that best fits the school’s technology architecture and strategic direction for implementing electronic commerce in their organization. As with

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any new initiative, cautious approach is advisable and serious consideration should be given to piloting the process before jumping in with both feet. There are alternative approaches which may be deployed including: internally developing a solution or purchasing a commercial solution. Both of these are highly dependent upon the environment dictated by a school's automated student information system.

## **Conclusion**

As outlined in this report, there are many compelling reasons for considering this technology as a means for providing higher quality services to our students. Schools first need to gain an understanding of the overhead they are currently absorbing in order to process student information for their incoming and outgoing students.

Each school will have their own processes for accomplishing this and need to assess what their actual costs are today. This should be done for each application of student records transfer (e.g. school-to-school, school-to-college, school-to-work, college-to-school teacher records, school-to-state agency, if appropriate). Once that has been determined and applied to the number of transactions taking place, the school can research what implementation costs will be and make the appropriate decision. It is recommended that projections of costs and savings over a five year period be calculated because initial implementation is likely to be the heaviest investment.

Electronic data interchange of student records is a concept which now sits on the "leading edge" of technology. Schools experiencing a significant volume of turn-over stand to gain back precious human resources if they leverage their current investment in technology to achieve this goal. In the process, they will improve their delivery of educational service to their students and their community because they will have timely, accurate, and comparable information from which to base decisions. Our children cannot afford to wait. Their education is our future and every moment wasted disrupts the instructional process that is critical to their success.

## ***Conclusion***

***Electronic  
Commerce:  
the enabling  
tool of the  
21st Century!***



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## Appendix A

### Edmonds School District 1992/93 Entries

<i>School</i>	<i>FTE</i>	<i>Entries</i>	<i>Cost Per</i>	<i>Cost</i>
<i>Edmonds/Woodway HS</i>	1205	146	\$ 19.00	\$ 2,774.00
<i>Scriber</i>	205	164	\$ 19.00	\$ 3,116.00
<i>CLIP</i>	3	19	\$ 19.00	\$ 361.00
<i>Terrace</i>	1189	150	\$ 19.00	\$ 2,850.00
<i>Meadowdale HS</i>	1029	74	\$ 19.00	\$ 1,406.00
<i>Lynnwood HS</i>	1040	147	\$ 19.00	\$ 2,793.00
<i>Brier Terrace MS</i>	639	48	\$ 19.00	\$ 2,793.00
<i>College Place MS</i>	643	67	\$ 19.00	\$ 1,273.00
<i>Meadowdale MS</i>	664	47	\$ 19.00	\$ 893.00
<i>Alderwood MS</i>	710	79	\$ 19.00	\$ 2,166.00
<i>Beverly Elementary</i>	352	105	\$ 7.50	\$ 787.50
<i>Meadowdale Elem.</i>	311	69	\$ 7.50	\$ 517.50
<i>Lynnwood Elem.</i>	350	80	\$ 7.50	\$ 600.00
<i>SV Elem.</i>	271	60	\$ 7.50	\$ 450.00
<i>SW Elem.</i>	271	62	\$ 7.50	\$ 465.00
<i>Westgate Elem.</i>	310	62	\$ 7.50	\$ 465.00
<i>MtLake Terrace</i>	266	76	\$ 7.50	\$ 570.00
<i>Brier Elem</i>	378	46	\$ 7.50	\$ 345.00
<i>CW Elem.</i>	344	71	\$ 7.50	\$ 532.50
<i>WW Elem.</i>	224	43	\$ 7.50	\$ 322.50
<i>Hazelwood Elem</i>	325	67	\$ 7.50	\$ 502.50
<i>Cedar Valley</i>	179	61	\$ 7.50	\$ 457.50
<i>LW Elem.</i>	413	182	\$ 7.50	\$ 1,365.00
<i>SP Elem.</i>	171	60	\$ 7.50	\$ 450.00
<i>ML Elem.</i>	339	114	\$ 7.50	\$ 855.00
<i>Cl Elem.</i>	263	66	\$ 7.50	\$ 495.00
<i>OH Elem.</i>	392	103	\$ 7.50	\$ 772.50
<i>HT Elem</i>	347	99	\$ 7.50	\$ 742.50
<i>ED elem.</i>	231	47	\$ 7.50	\$ 352.50
<i>CP Elem.</i>	286	74	\$ 7.50	\$ 555.00
<i>EG Elem.</i>	309	71	\$ 7.50	\$ 532.50
<i>MADNG</i>	346	19	\$ 7.50	\$ 142.50
<i>MPW</i>	196	26	\$ 7.50	\$ 195.00
<i>CH/CW</i>	107	34	\$ 7.50	\$ 255.00
<i>Total</i>	14308	2638		\$ 33,152.50

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## **Edmonds School District 1992/93 Leavers**

<i>School</i>	<i>FTE</i>	<i>Leavers</i>	<i>Cost Per</i>	<i>Cost</i>
<i>Edmonds/Woodway HS</i>	1205	118	\$ 4.90	\$ 578.20
<i>Scriber</i>	205	191	\$ 4.90	\$ 935.90
<i>CLIP</i>	3	20	\$ 4.90	\$ 98.00
<i>Terrace</i>	1189	177	\$ 4.90	\$ 867.30
<i>Meadowdale HS</i>	1029	130	\$ 4.90	\$ 637.00
<i>Lynnwood HS</i>	1040	177	\$ 4.90	\$ 867.30
<i>Brier Terrace MS</i>	639	51	\$ 4.90	\$ 249.90
<i>College Place MS</i>	643	65	\$ 4.90	\$ 318.50
<i>Meadowdale MS</i>	664	57	\$ 4.90	\$ 279.30
<i>Alderwood MS</i>	710	79	\$ 4.90	\$ 387.10
<i>Beverly Elementary</i>	352	102	\$ 4.90	\$ 499.80
<i>Meadowdale Elem.</i>	311	48	\$ 4.90	\$ 235.20
<i>Lynnwood Elem.</i>	350	55	\$ 4.90	\$ 269.50
<i>SV Elem.</i>	271	38	\$ 4.90	\$ 186.20
<i>SW Elem.</i>	271	39	\$ 4.90	\$ 191.10
<i>Westgate Elem.</i>	310	48	\$ 4.90	\$ 235.20
<i>MtLake Terrace</i>	266	54	\$ 4.90	\$ 264.60
<i>Brier Elem</i>	378	46	\$ 4.90	\$ 225.40
<i>CW Elem.</i>	344	91	\$ 4.90	\$ 445.90
<i>WW Elem.</i>	224	75	\$ 4.90	\$ 367.50
<i>Hazelwood Elem</i>	325	63	\$ 4.90	\$ 308.70
<i>Cedar Valley</i>	179	46	\$ 4.90	\$ 225.40
<i>LW Elem.</i>	413	115	\$ 4.90	\$ 563.50
<i>SP Elem.</i>	171	82	\$ 4.90	\$ 401.80
<i>ML Elem.</i>	339	105	\$ 4.90	\$ 514.50
<i>Cl Elem.</i>	263	46	\$ 4.90	\$ 225.40
<i>OH Elem.</i>	392	43	\$ 4.90	\$ 210.70
<i>HT Elem</i>	347	61	\$ 4.90	\$ 298.90
<i>ED elem.</i>	231	41	\$ 4.90	\$ 200.90
<i>CP Elem.</i>	286	41	\$ 4.90	\$ 200.90
<i>EG Elem.</i>	309	37	\$ 4.90	\$ 181.30
<i>MADNG</i>	346	33	\$ 4.90	\$ 161.70
<i>MPW</i>	196	6	\$ 4.90	\$ 29.40
<i>CH/CW</i>	107	7	\$ 4.90	\$ 34.30
<b>Total</b>	<b>14308</b>	<b>2387</b>		<b>\$ 11,696.30</b>

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## **Edmonds SD - Total Records Transfer Cost 92-93**

<b>School</b>	<b>Total Cost</b>
<b>Edmonds/Woodway HS</b>	\$ 2,957.40
<b>Scriber</b>	\$ 4,051.90
<b>CLIP</b>	\$ 459.00
<b>Terrace</b>	\$ 3,717.30
<b>Meadowdale HS</b>	\$ 2,043.00
<b>Lynnwood HS</b>	\$ 3,660.30
<b>Brier Terrace MS</b>	\$ 3,042.90
<b>College Place MS</b>	\$ 1,591.50
<b>Meadowdale MS</b>	\$ 1,172.30
<b>Alderwood MS</b>	\$ 2,553.10
<b>Beverly Elementary</b>	\$ 1,287.30
<b>Meadowdale Elem.</b>	\$ 752.70
<b>Lynnwood Elem.</b>	\$ 869.50
<b>SV Elem.</b>	\$ 636.20
<b>SW Elem.</b>	\$ 656.10
<b>Westgate Elem.</b>	\$ 700.20
<b>MtLake Terrace</b>	\$ 834.60
<b>Brier Elem</b>	\$ 570.40
<b>CW Elem.</b>	\$ 978.40
<b>WW Elem.</b>	\$ 690.00
<b>Hazelwood Elem</b>	\$ 811.20
<b>Cedar Valley</b>	\$ 682.90
<b>LW Elem.</b>	\$ 1,928.50
<b>SP Elem.</b>	\$ 851.80
<b>ML Elem.</b>	\$ 1,369.50
<b>CI Elem.</b>	\$ 720.40
<b>OH Elem.</b>	\$ 983.20
<b>HT Elem</b>	\$ 1,041.40
<b>ED elem.</b>	\$ 553.40
<b>CP Elem.</b>	\$ 755.90
<b>EG Elem.</b>	\$ 713.80
<b>MADNG</b>	\$ 304.20
<b>MPW</b>	\$ 224.40
<b>CH/CW</b>	\$ 289.30
<b>Total</b>	\$44,454.00

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