Information System Implementation in Schools using Rogers’ Innovation Process in Organizations as a Conceptual Model: A Case Study

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[Abstract]

This is an interpretive case study of two school systems that implemented an integrated curriculum and administrative information system. Rogers’ Innovation Process in Organizations was used as a conceptual model for understanding information systems implementation. During the redefining/restructuring stage of the innovation process, issues that emerged were identified when the schools tried to create a fit between the new information system and their organization. Major findings were that 1) a poor match between the capabilities of an information system and the needs of the organization make redefining/restructuring difficult or not possible, 2) An information system that has not been tested is a challenge to full implementation, and 3) the organizational structure of the implementation needs to be adapted to each organization’s technological abilities. From the findings, the author proposed a conceptual model that identifies information systems and school needs on two axes—administration and curriculum. The model would allow schools to better match their needs with prospective information systems.

Keywords: Information systems in schools, Assessment management, Management information systems, Information systems implementation, School administration

In the first stages of implementing an information system, the organization has a limited timeframe to adapt the information system to its organization before it must adapt the organization to the system (Tyre and Orlikowski, 1994). Failing to fully implement the system at the beginning of implementation may limit how the organization uses the system (Thorn, 2003; Smith & Wild, 2001; Reyes, 1997; Telem, 1996). Rogers’ (1983, 1995) innovation process in organizations bounds this phenomenon as the redefining/restructuring stage. In the redefining/restructuring stage an organization creates a fit between itself and an organization (Zaltman, Duncan, and Holbek, 1973) by either redefining an innovation that has recently been adopted to fit their organization, restructuring the organization to fit the new innovation, or some combination of both. The redefining/restructuring stage is an area of diffusion theory that has not been extensively researched (Rogers, 1995) but plays an important role in information systems implementation (Vischer, 1996; Telem, 1998).

The purpose of this qualitative case study was to identify the issues school districts encountered during the implementation of a comprehensive curriculum and student management
system, and to examine how these issues affected the schools’ ability to create a fit between their organization and the information system. The study also attempted to discover 1) what school district factors affected how it created a fit, 2) how the IOSystem software package affected the redefining/restructuring stage, and 3) how outside organizations impacted the redefining/restructuring stage.

Review of Literature

Management Information Systems in Schools

There is little empirical research on the use of information systems for administrative purposes in elementary and secondary schools. In 1993, Telem found there were only a handful of articles on Management Information Systems (MIS) in schools published from 1983 to 1991, and only three educational administration books published that had more than a couple of pages devoted to MIS in schools. Although there has not been an extensive survey of literature done on MIS in schools since 1993, my review found there was not an abundance of articles, books, or chapters published on MIS in schools since that time. Much of the literature available was normative research focused on how a system evolved in a particular district or in field studies where an implementation of an MIS was documented.

In respect to Telem’s literature review, empirical research of information systems in schools is even more rare, and a common model or theory to conceptualize implementation does not exist. Vischer and Wild (1995) claim there is a need for research to determine how educational organizations react to information systems:

The fit of the interface between an IS and the organizational context in which it is meant to be used, is crucial. We should find out which organizational features play a role and how we can take these into account as prerequisites for successful system implementation. (p. 510-511)

There needs to be more research conducted in the area of information systems implementation (Zmud and Apple, 1992), especially in schools (Vischer, 1996). Because there is not an accepted theoretical model for studying implementation in schools (Vischer, 1996), Rogers’ (1983, 1995) innovation process in organizations, part of the larger diffusion theory, provides a common model to understand this phenomenon.

Innovation Process in Organizations

Rogers’ early documentation of innovation diffusion focused on the process individuals go through in adopting new innovation from early to late adopters. Much of the research done in diffusion theory has studied individuals adopting an innovation, such as villagers adopting the innovation of boiling water or of women in India adopting birth control. This research has spanned the century and now includes disciplines such as anthropology, communications, marketing, public administration, psychology, and education (Rogers, 1971, 1983, 1995). Rogers (1983) points out that many individuals cannot adopt an innovation unless the organization they
belong to first adopts the innovation. The example used by Rogers was that of teachers using computers; if the school district does not purchase the computers, then the teachers would not be able to use the computers. From this and other research, primarily that of Zaltman, Duncan, and Holbek (1973), came Rogers’ innovation process in organizations, a five-stage process for how organizations adopt and implement an innovation.

In his 1983 book, Rogers noted that the early work with innovation and organizations that focused on issues concerning the innovativeness of organizations and the factors that affected their adoption no longer provided valuable data. Rogers (1995) believed the primary difference in innovation research between studying organizations and studying individuals is the dependent variable. Whereas the dependent variable when studying individuals is adoption, the dependent variable when studying organizations is implementation. Therefore, he concluded new research on innovation and organizations needs to study the implementation of innovations.

In his 1995 book, he mentioned there has been new research done with concern to the innovation of organizations and much of it, as well as diffusion literature in general, is in the area of computer technology.

![Figure 1. Diagram of Rogers (1983, 1995) innovation process in organizations.](image)

The Innovation process in organizations has five ordinal stages: Agenda Setting where organizations determine needs, Matching where those needs are connected with innovations, Redefining/restructuring where the innovation is redefined to fit the organization, the organization is restructured to fit the innovation, or a combination of both, Clarifying where the new innovation is further refined and finally routinizing when the innovation becomes another part of the organization. In the third edition (1983) Rogers stated that an organization could not progress to the next stage until it had completed the current stage. An organization therefore, could not skip a stage. After further research, Rogers stated in the fourth edition (1995) that this still holds true when an organization adopts an innovation from outside the organization, but when the organization adopts an innovation developed within the organization, the innovation may progress through the stages irrespective of the order.
Methodology

The Case

For this case study, I studied two school districts from a group of five that had recently adopted the IOSystem information system. I selected two districts to aid in what Bryman (1989) considers generalizability, and Guba and Lincoln (1982) refer to as transferability. Having two sites, or cases, allowed for “special features of cases to be identified much more readily” (Bryman, 1989, p. 171)

*Sherman public schools.* Sherman Public Schools (Sherman) is located in the village of Sherman, in the rural southeast part of the state. Sherman has approximately 400 students in an elementary school and a junior-senior high school. The district leadership was comprised of a superintendent, high school principal, and elementary principal. Also involved in the IOSystem implementation were two secretaries— one in the elementary school and one in the high school. When I first visited, district personnel were just beginning to use some of the basic functions of the IOSystem, such as the grade book feature and attendance. They had also transferred data from their old system to their new system the summer before the school year had started. Sherman had previously used another information system in their district, and some of the team members had experience with information systems implementation and the nuances that come with operating information systems.

*Douglas Public Schools.* Douglas Public Schools (Douglas) is a consolidated, multi-community, school district located 20 miles from the state capital. The district has an enrollment of approximately 350 students located in a junior-senior high school and an elementary school both located in Douglas, though the district encompasses three rural communities. Some team members in Douglas, like Sherman, had experience implementing and using a school information system. The district leadership included a superintendent and high school principal. The superintendent also served as the elementary principal, although the high school principal had responsibility for curriculum issues in both schools. Also involved in the initial implementation was a secretary and two high school teachers who had experience with technology, although the role of the teachers was minimal.

The schools in the case, Sherman and Douglas, adopted the IOSystem in August of 2001 through a grant provided by a consortium of four Intermediary Educational Consultation Units (IECU) from the southeastern part of the state. Both schools were in the first stage of the implementation phase of the innovation process in organizations, the redefining/restructuring stage. Because the system was new at each school district, there were only a few people who were responsible for implementation, although teachers were beginning to use certain features of the system. This small core included the superintendents, principals, and secretaries and only those personnel who worked on the redefining and restructuring of the system were included in this case.
Superintendents were contacted by phone to learn how each district was planning to implement the system and to schedule a face-to-face interview. As part of the first face-to-face interview, I learned more about who was involved in the implementation and created a list of participants to interview. I sent each potential participant a letter inviting them to participate in the study. Only one member from the entire implementation team opted not to participate. There were eight participants, four at each school system. They consisted of superintendents, principals, and administrative support staff. During this stage there was only minimal teacher involvement.

Data were gathered using a semi-structured interview protocol (See Appendix A), with each member of the implementation team in a district being interviewed. Because the study focused on a process, interviews were scheduled at different times during the implementation, allowing me to investigate what was occurring as the district progressed through the redefining/restructuring stage. I conducted three phases of interviews with implementation team members from each district, approximately six weeks apart starting in mid February and ending in mid June. Data collection finished shortly after the end of the school year during a pause in the implementation. I employed member checking when possible, something Stake (1995) thought necessary in case study research. In this case study, I discussed the themes that emerged with the superintendents of each district to give them the opportunity to provide feedback concerning my analysis.

All forms of data collected including the interviews, observations, documents and archival data were analyzed. The interviews were transcribed shortly after they were conducted and codes for the data were created. While analyzing the data I was looking for themes that influenced how the implementation team members at the schools redefined the system or restructured their organization to create a fit between their organization and the IOSystem. Stake (1995) proposed using categorical aggregation and direct interpretation for case study analysis; therefore I focused on sequences versus single instances as they happened. The data were further analyzed by looking for correspondence and patterns. I “winnowed” the data, as Creswell (1998) suggested, to a set of five themes that became the narrative.

Findings

The Implementation

Douglas Public Schools and Sherman Public Schools were two of five districts that implemented the Instructional Organization System (IOSystem) as part of a grant through a consortium of Intermediary Educational Consultation Units (IECU) in a Midwestern state. As part of the grant, the school districts were provided with the IOSystem free of charge for five years, which included free training and support through the IECUs. The IOSystem is an instructional management information system that enables districts to organize their curriculum and monitor progress of student achievement according to local or state standards. The districts formally adopted the system in the summer of 2001 and implementation began immediately with the
transfer of data from their older systems to the new IOSystem. Sherman’s former system was no longer supported and Douglas was never able to get its older system fully operational.

There are 19 IECUs in the State, lettered from A through R, which provide a variety of services to schools, including technology support and curriculum and staff development, as well as contracting out specialized teachers. IECUs are property-tax funded political subdivisions, and membership is dependent on whether a school falls within the IECU geographic boundaries. The IECUs frequently bring their member schools together to create consortia that pool grant dollars across regions of the state. The money for the IOSystem was part of a larger consortium grant that was primarily focused on distance education. Members from the four IECUs in the grant consortium (C, D, E, and F) felt that the IOSystem, with its strength in curriculum, would help them support local districts that were improving their curricula because of the new state standards.

While transferring data, the schools were able to import most of the basic student information into the IOSystem from their old systems. The process generally went well, although some data could not be transferred. The secretaries at Sherman thought there was going to be a lot of “manual” data entry, but they were able to import the bulk of the data from their old systems with help from IECU personnel. The first phase of implementation included an attendance module in which teachers would input attendance data using their classroom computers. The data could later be used by the secretaries and administrators to produce attendance reports. The second phase of implementation was a grade book feature, which was driven by the fact that neither district had a functioning administrative information system and both needed to organize grades and print report cards. Sherman pushed hard to implement the grade book feature and have teachers use it on a daily basis, which was done for the third quarter but made voluntary for the fourth quarter. Douglas opted to input only quarter grades throughout the entire school year. At the end of the first year, the grade book feature had yet to be fully implemented at either Douglas or Sherman, although quarter grades were put in the system to create report cards.

According to district personnel, the next phase of implementation had to do with linking standards to assessments, but at the end of the school year plans for the implementation were in limbo. The districts and the coordinating IECU were not satisfied with the product or support that the software developer, Educational Technology Innovations (ETI), was providing for the IOSystem. Training had been put on hold at both schools until the administration was more certain about the future of the IOSystem implementation. At the time of writing, the consortium of IECUs recently adopted a different information system to be used for administrative functions such as management of student data including attendance, discipline, grades, and demographic information. The new system can also print report cards, prepare transcripts, and schedule classes for the junior-senior high schools. Since the implementation began, the districts have learned that other schools that adopted the IOSystem have been able to use a separate administrative package along side the IOSystem, so the grant will keep the IOSystem for curriculum and instructional management.
Discussion

There were five themes that emerged in the implementation during what Rogers (1983, 1995) calls the redefining/restructuring phase of the innovation process in organizations. The redefining/restructuring stage is when an innovation is “re-invented to accommodate the organization’s needs and structure more closely and when the organization’s structure is modified to fit with the innovation” (Rogers, 1995). In the case of an information system, Reyes (1997) noted that the beginning of an implementation is important if the organization is to achieve its goals of full implementation. If a school moves to the next stage without creating a fit with the new information system, they run the risk of never fully implementing the system or implementing the system improperly. In any case, the school might not achieve full advantage of the system and eventually drop it.

Matching

To pursue the idea of a poor match I need to look at the first two stages of the innovation process that are part of the initiation phase and precede the implementation phase. The first stage of the initiation phase is Agenda Setting where the organization defines a perceived need for an innovation. According to Rogers (1995), this is an ongoing process where members in an organization identify needs and look for innovation. In the case of these two districts, the superintendents perceived a need for a new information system because their current systems were either unsupported or not functioning. They also felt there was a need to have a system that could help them report their student achievement on the state standards.

Figure 2. The Matching stage in the Innovation Process in Organizations

School Information Systems Axis. Based on what emerged in the analysis, I have developed a conceptual model that information systems in schools and the needs of schools can be measured on two separate constructs-- administration and curriculum. The first construct underlies the administrative needs of an information system and includes functions like a grade book, student demographic data, attendance, and other data needed for the day-to-day functioning of the school. The second construct focuses on curriculum management and includes a system’s ability to organize the school’s curriculum, including lessons, standards, objectives, and assessments that measure them. The needs and visions of the two districts in this case, as well as the
capabilities of the IOSystem, can be measured using the two constructs found in the diagram below.

Figure 3. The Administration and Curriculum Axis of Information System Functions

As seen in the diagram above, school information systems can be strong in curriculum (upper left quadrant of the diagram), strong in administration (lower right corner), have elements of both constructs (upper right corner), or weak in both administration and curriculum (lower left corner).

The differences between the schools’ needs and the system’s capabilities had an important role throughout the redefining/restructuring stage, because the schools in the study needed an administrative system to replace their older systems and went into the implementation with the impression that the IOSystem would fulfill their administrative needs. The participants at each district discovered during the implementation that the IOSystem was not strong in administrative functions, and time and resources were devoted to redefining the system to fit the needs of the districts. The system was designed as a curriculum management tool that has had administrative functions added during later revisions. The districts did not have a match going into the redefining/restructuring stage of the implementation and eventually the IECU consortium made the decision that redefining the system was no longer a viable option for the implementation. As a result, they adopted a new administration system. In the long run, the decision will create an entirely new implementation.

Rogers (1995) considered the matching stage “reality testing” where organizational members determined if an innovation would meet the organization’s needs. Therefore, schools need to have a strong outline of their needs and vision for a system and need to fully understand the
capabilities of the system they are adopting. In the end, the ideal system is elusive and can be compared to a unicorn in that there is a great deal of myth but no tangible evidence of its existence.

There were two factors that had an additional impact on the mismatch between the district needs and the IOSystem capabilities—cost and communication.

Cost. An important factor in the mismatch was that the system was offered free of charge to these schools, saving them tens of thousands of dollars on the implementation, which was a powerful incentive to find a match between the district and system. Both of the superintendents talked about how the IOSystem saved them money and how schools their size have less money to purchase information systems, which can easily cost tens of thousands of dollars. The superintendent of Sherman had mentioned that “the main draw initially… was that it wasn’t going to cost us anything.” In fact both schools lost state aid money during the year, making the purchase of a system even more difficult. One wonders if either district would have implemented the IOSystem if it had not been free. The superintendent of Douglas stated, “If it was us paying for it, it would have been gone a long time ago because of the frustration.”

Communication. Cost was not the only factor that contributed to the mismatch, and the mismatch between the districts’ needs and the system’s abilities was not intentional. The superintendents did not blatantly disregard the limits of the IOSystem. In fact, they felt they had found a match in the IOSystem, and only after implementation did they find out that the IOSystem did not match their needs. Some of the participants felt that the full capabilities of the system were not communicated very well and that the system they adopted was not the system they received as the superintendent of Sherman said “The product that we were told we were getting wasn’t the product that we got.” Somewhere there was a lack of communication between what the system could do and what the districts needed from the system, which became an issue when the districts tried to redefine the system and restructure their organization to create a fit. In other words, buyer beware.

Untested Software

Another important conclusion is that the limited development of the web-overlay of the IOSystem contributed to the difficulty these districts had in creating a fit between the system and their organizations. Every information system that is implemented by a school is going to be at some point in its software development life-cycle. Some systems are mature and have had most of the bugs worked out, and others, like the web overlay of the IOSystem are new and rather “buggy”. In the implementation the IECUs and the schools adopted an untested version of the IOSystem that placed the schools in a position where they needed to use their limited resources to redefine the system to fit their needs.

These schools implemented a prototype of the web overlay for the IOSystem, not a tested, mature system. In this kind of prototyping, also referred to as a “beta test” by the implementation team leader, a software system is implemented by an organization and the bugs are worked out during actual use. During this method of prototyping, Robey & Markus (1984) claim “the user and developer are brought together and communicate more accurately by referring to the
physical prototype” (p. 8). Unfortunately, prototyping was not part of the deal as far as the IECU and schools were concerned, who were both under the impression that the IOSystem was a mature software system. According to them, that is how the IOSystem was sold, and only after implementing the system did they realize that it was untested. The participants at both districts frequently used the term “guinea pigs” when describing themselves and the implementation, and that is what they were. These schools were finding the bugs in the web overlay so that ETI could correct them and make revisions to the program.

The fact that the system was untested made creating a fit between the schools and the system more difficult and maybe impossible. The implementation team leader was aware that each time something did not work with the system, frustration increased and enthusiasm decreased. According to Rogers, the innovation being brought into the organization will need to be redefined or the organization will need to be restructured to create a fit between innovation and organization. Rogers (1995) wrote “both the innovation and the organization are expected to change, at least to a certain degree.” In the end, the consortium of IECUs made the decision that redefining the IOSystem to fit the administrative needs of the districts was too great a change to make and that adopting a mature system stronger on the administrative side was a better option. They will keep the IOSystem for curriculum management, but that implementation will focus on the perceived curricular strengths of the IOSystem.

Knowledge Deficit

The knowledge deficit issue pertains to the knowledge base of the school and IECU personnel that implemented the IOSystem. From the issues that emerged it was obvious that schools and the IECUs going through an implementation needed to have employees well versed in working with the technology associated with the IOSystem. Telem (1998) wrote that schools in general do not have the same staff resources to implement information systems as their counterparts in business. In this case study, lack of qualified personnel was an issue both at the schools and at the consultant level with the IECU staff. When implementing computer innovations, Rogers (1995) believes that “a lack of technical knowledge often is a barrier to implementation” (p. 397) and in the case of the IOSystem there was a need for more technological know-how to redefine aspects of the system. Although secretaries, administrators, and teachers had the technological know-how required to use the system under ideal circumstances after only a few hours of training, the knowledge for redefining the system required specialists who were not part of the original implementation. Much of the need for personnel was due to the web overlay of the IOSystem, which is based on complex queries that find the data and present it using a web browser.

The web queries that the IOSystem uses are complex, and few were actually provided in the original package. Many of the queries needed to be written specifically for each school according to what information they needed to pull from the system which used a database that did not support SQL, an industry standard query language. The implementation team leader at the IECU, had said that “We’d always hoped that we would have a query writer in every school and maybe someday we will, but realistically that’s not going to happen right away. The query writing is much more difficult than I thought it would be.” The superintendent at Douglas came to the same conclusion “I went to a report writing workshop all day and found out the average Joe can’t do
that." As part of the grant, the IECUs were able to hire a part-time query writer who would receive requests from the schools and write queries that would have to be downloaded into each school’s server and then debugged by school personnel. The process worked, but was frustrating to school staff because they were not able to make the majority of adjustments themselves. It became evident that a complex information system requires schools to have staff with strong technology skills.

The IECUs planned to support these schools and the IOSystem for at least five years, and each time a query needs to be modified or new information extracted, a specialized query will be needed requiring someone proficient at query writing. There is some chance that school personnel will eventually be able to learn how to write these queries, but if we use the current staff as an indicator, then it will be a long time before they are able to develop those skills.

Three-Tiered Structure. In an information systems implementation, there is often a three-tiered structure where an intermediary consultant helps the software vendor implement the system in an organization. Educational Technology Initiatives (ETI), the company that developed the IOSystem, normally uses a third company, Data Partners, Inc., to manage training for implementations. As part of the grant that was written to purchase the IOSystem for free distribution to the schools, the IECUs became the third party implementation consultant. Because this was the first time the IECUs worked as an implementation consultant, they knew only a little more than their client schools. Whenever there was a question from the schools about the system, it had to go through the IECU, whose staff often did not know the answer, and then to ETI, which often had to create a new query to fix the problem. The original idea was to have a trainer at each participating IECU that would support the schools, which did not happen as planned because the implementation team leader did most of the training and support for the first five schools and the other IECU training personnel did not get involved. As Cindy said, the other IECUs in the consortium were in a “wait and see” mode and wanted to see how the implementation went before getting involved. Support was also to be provided through the three-tiered implementation design, whereas in other implementations ETI provided direct support to clients using its own trained personnel. Again, the people providing the support were also learning the system, which created frustration for the participants at the schools. The principal at Sherman summed up his feelings about not receiving direct support from ETI when he called it “second hand support.”

Best Practices

The concept of best practices as a part of educational information systems developed out of an issue that did not fully emerge, but was still found throughout the implementation. The semi-emergent issue focused on how the minute organizational issues of the schools had a subtle negative affect on creating a fit in the redefining/restructuring stage. It may be subtle only because the other issues were dominant in comparison; in another implementation it may have emerged as a central issue. Best practices is an issue that any school district may encounter when implementing an information system, especially one as complex as the IOSystem and includes such things as deciding the information to collect about students and teachers, and how absences are defined. Each one of the schools had to define these issues as they went through the
implementation, but it was something that they felt did not cause a difficulty in creating a fit. I later confirmed this with follow-up calls to the superintendents.

An information system like the IOSystem magnifies any weakness a school district has in their policies concerning student administration, but it can also provide schools with structure that they may not have had. In the case of Sherman and Douglas, the system provided them with a more structured way of doing business across the district from attendance to grading. If the schools continue to use the system they could also hope to structure their curriculum. If there is something good that comes about after the work that these schools have put into restructuring their policies, it is that they now have well-documented policies that better organize their schools.

The issue was overshadowed throughout the implementation by the other issues of software and the initial mismatch, but there needs to be more research into how information systems help schools restructure and align their policies. In the business world there is a growing body of literature that covers Enterprise Resource Plan (ERP) systems and how they help businesses reorganize their operations around best practices that have been embedded in the new information system. ERP systems “integrate data and communications on planning, scheduling, purchasing, forecasting and finance” (Buckhout, Frey, & Nemec Jr., 1999, p. 117), which in many ways is what the IOSystem and other large-scale school information systems are trying to accomplish without the focus on finance. ERP systems are very complex and cannot be tailored to each business that adopts one. Therefore, the systems have been developed around best business practices. When firms implement an ERP system they integrate their operations around one system and hopefully gain competitive advantage based on the best practices of that system.

In education the reality is not much different. If information systems are based on best practices, then the schools that implement them can restructure their organizations around the systems and improve the way they do business. At least, that was how the participants envisioned the IOSSystem in the long run. The superintendent of Sherman had said “I think the system fits into the way we need to do the business in the future; It wasn’t necessarily the way we are currently doing business.” Best practices in information systems is an area that could be studied in greater detail as there is little literature in educational research about information systems and best practices, or whether schools gain any advantage from the new system. Kathleen Cotton (2000) in her book “The Schooling Practices That Matter Most” investigated best practices for schools in the literature and came up with a number of contextual and instructional attributes. One of the contextual attributes that is important for information systems is “Monitoring Student Progress,” a section in which she lists eight best practices for schools to organize their collection and use of student data. These best practices could be a good start for investigating whether information systems are built around educational best practices.

**Revisiting the Innovation Process as a Conceptual Model**

I feel it is important to revisit the conceptual model used to structure this study as there is a need for a conceptual model for understanding information systems implementation in schools (Vischer, 1996). In qualitative research we do not try to test theories, rather we feel that we add to them and in this case I feel that the Innovation Process in Organizations helped structure this
study and that this study provides valuable information to the model. Rogers’ Innovation Process in Organizations provides a conceptual model to study the time frame when an information system is first introduced into an organization. The five part model allows a researcher to focus on the entire process from the first steps in agenda setting to full routinization. Rogers’ diffusion theory, from which the Innovation Process was developed, is a well-accepted theoretical basis to study information systems implementation (Fichman, 1992), although Fichman’s viewpoint is from outside the field of education.

In the study, Rogers’ model allowed me to conceptualize the implementation, which in my case was focused on the redefining/restructuring stage, and also provided an opportunity to conceptualize the initiation phase, which included the matching stage when the districts made the original choice for the IOSystem. The five-part model facilitates shorter, more specific studies as well as longitudinal studies of an entire implementation. What occurs at the redefining/restructuring stage of the implementation has serious effects on how the system is used in the future (Telem, 1998; Reyes, 1997). Rogers’ believed that when an innovation is brought into an organization from the outside, the organization must “settle” each stage before moving to the next stage. The schools in the study chose a system that was not a proper match for their needs, and yet they proceeded into the implementation phase.

On a theoretical level the concept of moving to the next stage may have merit, but real world situations are much messier. In the case studied, the issue based on conflicting visions was a holdover from the matching stage. Eventually a new system was adopted to cover the needs that the IOSystem could not, but the schools still initially implemented a poorly matched system. Theoretically the matching stage was not settled, but in reality these schools felt they had found a match in the IOSystem. Had the IECU consortium not adopted the new administrative system, at least one of the schools was committed to making the IOSystem work. We can only speculate whether this decision would have “snow balled” as that school progressed from the redefining/restructuring stage to the clarifying stage, in fact clarification may not have been possible. In the end, a school could, as Reyes (1997) points out, not completely implement a system and never achieve the full benefits of the system because, as we found out in this case, the system was not properly matched or fit was not possible.

Conclusion

Implementing an information system in an educational setting is a complex undertaking and researching this process is equally complex. This process is not helped by the lack of a common model for understanding the process, therefore Rogers’ Innovation Process in Organizations can provide a structured framework for understanding information systems implementations in schools. From this case study of two school systems implementing a complex information system, three major themes emerged.

First, implementing a system that is not fully developed can prevent an organization from moving beyond the redefining/restructuring stage because frequent system changes make
restructuring difficult and some organizations do not have the knowledge base to help developers redefine the system.

Second, the Matching stage of the innovation process is key to an implementation and if a proper match isn’t made during this stage, the organization may never get beyond the redefining/restructuring stage. Two primary dimensions emerged where schools need to find a match: 1) Administrative needs and 2) Curriculum Management needs. If a school doesn’t match their organizational needs with the system, redefining/restructuring may not be completed. Although this may seem like common knowledge, many schools, especially smaller districts, do not have an effective resource base to develop a proper fit-gap matrix and many information system being marketed to schools are not fully documented which is true in even the largest ERP implementations.

Finally, a major question emerged as to whether information systems being implemented truly follow educational best practices. The real question that needs to be answered is whether school are able to improve the way they operate when implementing an new information system, or are they merely adopting a fancy database that will help themcrunch some numbers and modernize their grade books.

These themes are specific to the case studied, yet by using the innovation process we are able to provide a certain transferability that can be applied to additional cases. There is a need for future research in the area of information systems implementation and adapting the innovation process to schools can help create a common tool set to develop stronger research in this field.
References


Appendix A

Interview Protocol:

Bring me up-to-date on the implementation of the [IOSystem].

- Talk about your decision to adopt the [IOSystem].
- What happened first in the implementation?
- Where do you feel the district is at in the implementation?
- How has the staff viewed the implementation?
- How would you describe your role been in the implementation?
  - Who is taking the lead for implementation?

Talk about the relationship between the system and the school.
- How would you describe the fit between the [IOSystem] and your organization?
- Do you anticipate any changes in your organization?
  - The system?
- How are you handling the need for new hardware?

Talk about the role district employees have in the implementation.
- How has the staff adapted to new roles?
  - Talk about the training necessary for the use of the [IOSystem].
  - Who has gone through the training so far and how many staff members do you anticipate will go through the training?

Describe how the system is currently being used?
- What do you see as the use of the system in the future?
  - How do you anticipate getting their?
- Talk about the software and its impact on the implementation
  - What functions are currently being used?
  - Policy development?
  - Talk about the level of computer know-how required for the system.

Who else is playing a role in the implementation?

- Talk about the support you are receiving.
  - What role has the [IECU] taken?
  - Talk about the relationship between state standards and the implementation

Is there something that has happened during the implementation that you didn’t expect?