Achieving Systemic Change with Universal Design for Learning and Digital Content

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Abstract: Systemic change may be achieved through a combination of the Universal Design for Learning (UDL) principles in instructional delivery, the integration of accessible digital materials, and the use of state-of-the-art technology tools. To demonstrate this premise, the Kentucky Department of Education (KDE) partnered with the University of Louisville to develop a statewide initiative that addresses the implementation of UDL. This initiative included accessibility to statewide accountability testing (CATS), digitized text system, and UDL model schools. The Kentucky Model demonstrates how systemic change can be achieved through the combination of several parts. After consideration of all factors, the authors conclude that there was an overall positive systemic change for the majority of the model schools included in the project.

Key Words: Accessible digital content, Universal design for learning, Systemic change

The lack of access to curricula is often cited as a primary reason for unacceptable educational outcomes for children with disabilities. In viewing the current types of materials used in education, one finds that the textbook is the primary conveyer of the curriculum (Rose & Meyer, 2000). Essentially, the print whether it is found in a book, handouts, or a variety of other formats has created a barrier for some individuals with disabilities. With the current practices, children with disabilities are falling far behind in comparison to their peers who are non-disabled. In addition, students in special education have lower school completion rates than do their peers who are non-disabled (Benz, Lindstrom, & Yovanoff, 2000; Blackorby & Wagner, 1996; Flexer, Luft, Baer, & Simmons, 2007). Therefore, these practices in the education of children with disabilities must change in order to provide greater opportunities as adults to be productive members in their communities.

Warger (1999) reports that in the Individuals with Disabilities Act of 1997 (IDEA '97), there was a move to ensure that children with disabilities have access to the general curriculum. The rationale behind this move was one of providing better education opportunities and higher expectations of the education of children with disabilities. This has appeared to be a daunting challenge for educators, administrators, and parents as they reconsider how children with disabilities are educated while ensuring access to the general curriculum. Furthermore, the determination of what constitutes access, and more specifically, how to provide children with disabilities meaningful access to instruction that is aligned with high-level standards and supported by research based interventions is a

major concern (President's Commission on Excellence in Special Education, 2002; U.S. Department of Education, 2002; Wehmeyer, Lattin, & Agran, 2001).

To ensure meaningful access, there is the challenge to provide the curriculum with supports, modifications, and accommodations that can guarantee that curriculum goals are achievable (Pugach & Warger, 2001; Stahl, 2004). Furthermore, in the greater scheme of instruction, IDEA '97 demands that educational supports and services provided to students with disabilities "lead to clear and measurable outcomes in adulthood" (Dymond & Orelove, 2001).

In light of the emphasis placed on access to the general curriculum, it is imperative for regular and special educators to work together to serve all students including those with disabilities in the regular education program. A way this can be accomplished is by providing equal access to knowledge through adjusted or altered curriculum and instruction. One approach to curriculum alteration is through the application of Universal Design for Learning (UDL) principles (Rose & Meyer, 2000). This approach to curriculum and instruction emphasizes the methods for teaching that are compatible with how the brain works and the importance of flexible materials and curriculum to allow access for all students (Rose & Meyer). The goal to implement these ideals should be school wide to promote access to the curriculum for every student. In order to be successful, systemic change needs to be planned, acted upon by the school personnel, and evaluated through student outcomes.

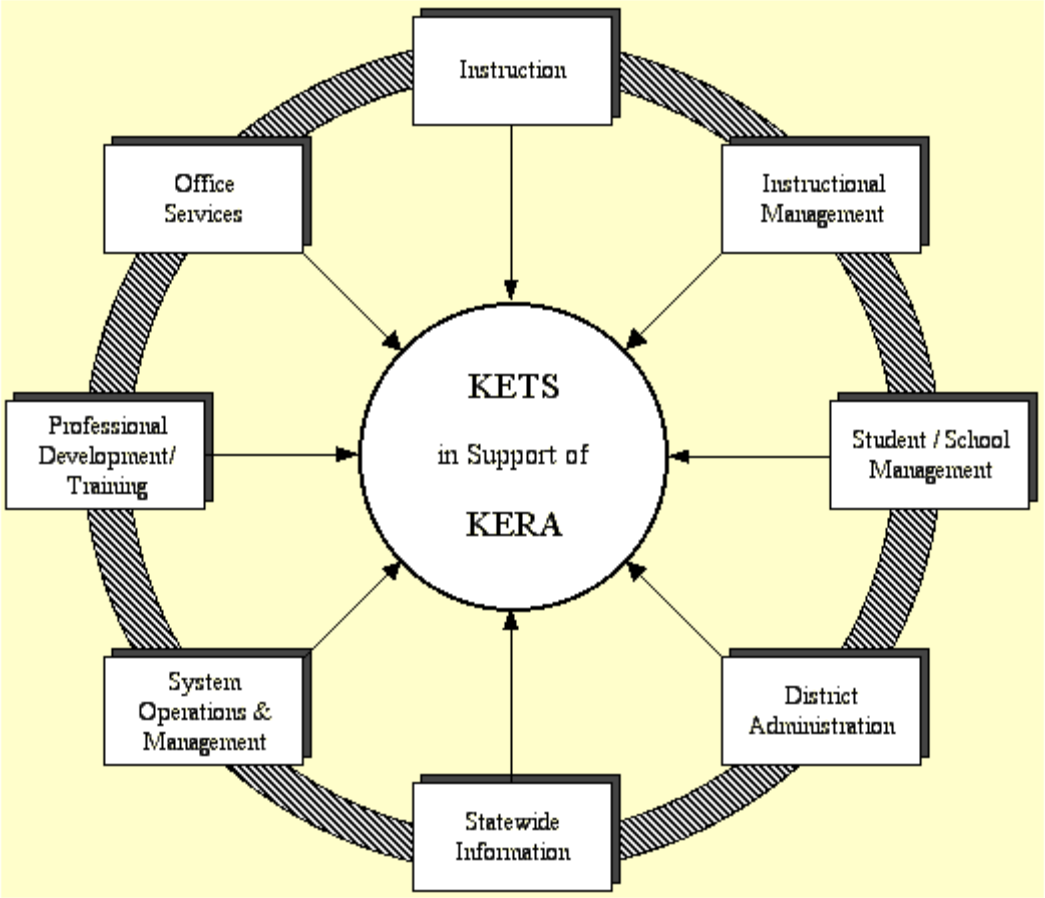
One avenue for systemic change to be successfully achieved in addressing access to the general curriculum is through a combination of the UDL principles in instructional delivery, the integration of accessible digital materials, and the use of state of the art technology tools. The Kentucky Department of Education (KDE) partnered with the University of Louisville (UofL) to provide three year grants at $30,000 annually to six schools. The ultimate goal of these grants was to develop a unique school wide model program utilizing best practices of UDL principles across the curriculum.

In order to understand how Kentucky arrived at the premise under consideration for the grants, it is important to look at some of our state history within the area of education and technology. The Master Plan for Education Technology 1992 (Kentucky Department of Education, 1992) was enacted two years after the Kentucky Education Reform Act of 1990 (KERA, House Bill 940). The 1992 Master Plan addressed "the need to ensure equitable access to education technology by establishing a state standard for the level and type of technology within each school…provide financial and technical assistance to each and every school until the school attains the standard." In addition, the legislative assembly clearly understood this would be an ongoing process and not a one time event and sought to provide the finances for the endeavor (Kentucky Department of Education).

Kentucky Educational Technology System (KETS)

The main objective for the KETS was to (a) develop an integrated process for both the instructional and administrative aspects of all levels of the public school system, (b) enact equitable and efficient use of technology in instruction and administration, (c) improve teaching and learning, (d) improve instructional outcomes for children, and (e) enhance operation of the public school system. The 1992 Master Plan called for a system of educational technology that would encompass both the instructional and administrative aspects of all levels of the public school system so they would be in sync

Figure 1. Schema of the KETS Support System. Source: Kentucky Department of Education. (1992). Master plan for education technology. Frankfort, KY: Author. Used with permission.



as one system (Kentucky Department of Education, 1992; see Figure 1).

KETS consists of two major infrastructure components: the (a) Education Communication Network (ECN), the highway over which the users will interface with each other and the information will flow; and (b) Education Information System (EIS), the application tools that assist students in learning, help teachers to teach and provide the entire local education community access to information and communications. Approximately $346 million in one-time costs were estimated as the shared cost between the state and local districts on a 50/50 matching funds basis. This was prescribed in HB 698 enacted on April 2, 1992, for the first stage of implementation. Specific objectives were proposed for five phases of implementation in two-year increments through 2000 (Kentucky Department of Education, 1992).

The Master Plan of 1992 was updated in 1996 and 1998. Changes to the 1992 Master Plan enabled the expenditure of state technology funds on assistive and adaptive technology. (Cody, Kimbrough, & Coffman, 1998). Being able to purchase assistive and adaptive technology with state technology funds helped ensure that all schools were fully aware of their responsibility to provide an equal educational opportunity for students with disabilities as the schools obtained technology hardware and software for learning. The Kentucky Department of Education routinely provides for an update of a matrix of proven assistive/adaptive technologies which schools

may procure with state funds to provide equitable access to the instructional network (Cody et al.).

By 1998, the goals of the original 1992 plan had been incorporated into most of the technology plans for school districts in Kentucky (Cody et al., 1998). By 1998, it was necessary to address new issues arising from experiences gained during the previous five years implementation. It was recognized that federal programs and other external factors were having an impact upon Master Plan implementation. There was renewed emphasis on the preparation of teachers to be able to use technology effectively, which included the issue of program evaluation. As stated in the updated plan (Cody et al.), the primary objectives for equity and equitable access for Kentucky for the next stage of implementation were listed as: (a) one high-performance, networked computer for every six students; (b) one high-performance, networked computer for every teacher and an ability to access the network from home; (c) all teachers will have training and support; (d) every school will have a building-wide, full-function local area network; (e) every classroom with at least four to six active network drops capable of delivering data services, Internet and email; (f) a cordless phone and video in every classroom; (g) instructional software available to every desktop from the network; (h) every school directly connected to the wide area network; (i) every district office with complete local and wide area networking; and (j) every district using a standard, fund-based accounting system (Cody et al.).

The infrastructure of support personnel throughout the state includes two full-time KETS professionals (an instructional technology specialist and a network engineer) are assigned to each of the eight 8 Regional Service Centers. Each district has a District Technology Coordinator (DTC) and each school a School Technology Coordinator (STC). The roles and responsibilities of the DTC includes leading the integration of technology into the curriculum, creating and implementing a vision for improved student learning through technology, and planning for the effective preparation of all teachers to use technology well. The STC performs a similar function at the local school level.

Kentucky is making a significant investment of time and money to prepare teachers to integrate technology into daily instruction for every child. KERA "makes it clear that the preparation of teachers to use technologies effectively is a long-term, recurring obligation shared by state, district, and school leadership. The preparation and support of teachers is critical. As noted by Cody et al. (1998), "the enlightened and appropriate use of technology in every classroom, in every area of the curriculum, and with every age level is not an option but a responsibility" (p. 24).

In 1994, the Student Technology Leadership State Advisory Council created the Student Technology Leadership Program (STLP) with the objective of empowering all students in all grade levels to use technology to learn and to achieve. It is a project-based program with four categories: instructional, community, technical, and entrepreneurial. Approximately 1,100 schools with more than 5,000 students participate in all 176 school districts in Kentucky (Harrison, 2005).

Some students take leadership roles in providing technical services as Junior Engineers. Individuals selected as Junior Systems Engineers participate in a competitive application process and become part of a cadre which receive advanced training in such things as installation and maintenance of local area networks, support for wide area networks, installation of software, and troubleshooting highly-technical problems. Throughout the year they provide support at

special events and are treated as contracted professionals.

Less technical programs provide a focus on service to communities and projects for these communities. Such projects include leading basic computer skills courses for groups who may not otherwise be engaged with the school; constructing and supporting web sites for their schools and communities; and serving as technology mentors for student groups in lower grade levels.

As schools advance in their ability to engage in technical and instructional projects, STLP students may take on projects that encourage entrepreneurial aspects. By taking an idea, or providing a product or service, they can turn it into a business which can provide financial support for some of their STLP events or activities. Regional and state showcases are appropriate staging arenas to display all four categories of projects (Harrison, 2005).

With the development of an online assessment program, the Commonwealth Accountability Testing System (CATS), acquisition of accessible curriculum materials was an important element when considering flexible instructional materials for all students (Lewis, 2005). The need for access to digital content was legislated in 2002. At this time, Senator Casebier sponsored Senate Bill 243 of Kentucky Revised Statutes, providing the legal basis for acquiring student ready accessible digital curriculum through the amended textbook adoption law. This state mandate provided an opportunity to strongly encourage publishers to provide such materials offered for adoption within the state (Abell, Bauder, & Simmons, 2005; Casebier, 2002).

The Kentucky Accessible Materials Consortium (KAMC) was formed in partnership with the Department of Education and the University of Louisville to provide a number of services to schools and publishers. The Kentucky Accessible Materials Database (KAMD) was developed as a repository for the accessible digital content available to qualified students from participating publishers.

Now, Kentucky had an integrated technology structure for instructional and administrative needs, a vibrant student leadership program, an extensive network of district and local technology coordinators in place, instructional practices, online assessment, and availability to accessible digital content. The importance of expecting teachers and staff to have a basic level of technology competence was addressed in hiring practices and teacher/staff professional development (Cody et al., 1998).

Yet, there still was an inconsistent ability to integrate technology with learning across all districts into effective classroom instruction. The Kentucky Department of Education investigated current research looking for the best way to achieve the objective of effective instruction. The answer appeared to be found in the principles of UDL. Dolan and Hall (2001) explained that the concept of universal design was first used in the area of architecture as a way to design structures so that they can be used by anyone. Therefore, it is better to anticipate the needs of all possible users before building something than to try and retrofit the same structure at a later date. An unexpected benefit arose when other populations benefited from those same considerations. Dolan and Hall noted that curb cuts and wheelchair ramps are classic examples of universal design. The curb cut was originally designed for individuals in wheelchairs to be able to handle the obstacle that curbs presented, but is widely used by individuals with strollers, skateboards, skaters, a delivery person with a rolling cart or those individuals who prefer a graded approach over a step up or down.

This approach toward design on a universal basis for all individuals was adapted for instructional use in the classroom. By acknowledging the diverse ways that individuals learn and how the brain handles input of information in the process of learning, the opportunity exists to devise a learning atmosphere in which all learners will be effective.

Burgstahler (2007) describes the work of Ron Mace who coined the term "universal design" in 1997 along with his group of architects, product designers, engineers and environmental design researchers, who developed the seven principles of universal design at the Center for Universal Design at North Carolina State University. These seven principles are: (a) equitable use, (b) flexibility in use, (c) simple and intuitive, (d) perceptible information, (e) tolerance for error, (f) low physical effort, and (g) size and space for approach and use.

Dolan and Hall (2001) examined Vygotsky's (1962) work which identified the areas of recognition of information to be learned, application of strategies to process the information and engagement with the learning task as important elements in the process of learning. They recognized that Vyogtsky's work reflected the three principles of UDL commonly expressed as multiple means of recognition, multiple means of expression, and multiple means of engagement. By combining the previous seven principles of universal design with the three principles of UDL, Burgstahler (2007) developed eight performance categories that portray a good universally designed classroom of instruction. They are:

1. *Class Climate*. Adopt practices that reflect high values with respect to both diversity and inclusiveness.
2. *Physical Access, Usability, and Safety*. Assure [sic] that activities, materials, and equipment are physically accessible to and useable by all students and that all potential student characteristics are addressed in safety considerations.
3. *Delivery Methods*. Use multiple accessible instructional methods.
4. *Information Resources*. *Assure* [sic] that course materials, notes, and other information resources are flexible and accessible to all students.
5. *Interaction*. *Encourage* effective interaction between students and the instructor. Assure [sic] that communication methods are accessible to all participants.
6. *Feedback*. Provide specific feedback on a regular basis.
7. *Assessment*. Regularly assess student progress using multiple, accessible methods and tools and adjust instruction accordingly.
8. *Accommodation*. Plan for accommodations for students for whom the instructional design fails to meet their needs.

It is important to realize that utilizing universal design principles does not negate a school's responsibility of providing specific accommodations for individuals with disabilities.

Kentucky took the position that UDL is the process of designing and delivering curricula, materials and environments in a manner that makes them flexible, accessible and useable to all students. UDL has its roots in differentiated instruction. A key difference though, is that UDL is about leveraging the use of technology to achieve effective instruction. The digital tools and materials used in the application of curriculum and in the delivery of content are critical. Students are empowered to differentiate their own instruction to support personal learning styles. The burden is no longer solely on the teacher

because the curriculum is innately flexible by its design (Lewis, 2006).

UDL Model School Project in Kentucky

Currently, UDL in Kentucky is supported by a number of stakeholders including the KAMC, the KAMD, text reader and text-to-speech software, Commonwealth Accountability Testing System (CATS) Online assessment, and UDL Model Schools. The UDL Model Schools are financed through the State Improvement Grant.

In 2004, the University of Louisville partnered with the Kentucky Department of Education to offer three-year grants to three K-12 public schools throughout Kentucky. The goal of these grants was to develop a best practices model of how UDL can be integrated and implemented throughout the school population and across the curriculum.

Twenty-nine counties responded and 34 grant applications were received from a wide variety of school settings – elementary, middle and high; urban and rural; large student population; and small student population. All applications were reviewed and scored by personnel at both the University of Louisville and the Department of Education based on the following criteria: the (a) importance of the project's impact on access to the general curriculum; (b) quality of the project as it relates to the use of accessible curriculum materials; the integration of technology into instruction; the involvement of low incidence students and parents; the development of professional development and training; and the dissemination plan; (c) quality of the project personnel and overall administrative support; (d) quality of the management and evaluation plans; and (e) adequacy of resources.

Even though the original plan was to fund only three schools, the Kentucky Department of Education decided to fund an additional three schools for a total of six Model Schools, each receiving $30,000 annually. Although the Kentucky Department of Education chose to fund the six schools which scored the highest during the review process, it was a pleasant surprise to find that we had funded across a continuum which included at least one elementary, one middle, one high school, both rural and urban schools with both large and small student populations.

UDL Project Roadmap

Year 1. The grant ran from January through September, 2005. The primary objectives and activities in Year 1 revolved around getting the UDL team oriented to the project and to begin purchasing hardware and software.

Year 2. The grant ran from October, 2005, through June, 2006. The primary objective and activities of Year Two revolved around training and professional development of faculty and staff at the respective schools as well as an initial implementation process.

Year 3. The grant began in July, 2006, and ended in June, 2007. Year 3 was designated as the dissemination year in which each school was expected to present its project to other schools on a local, state and national level. They were also expected to assist other schools in designing and implementing their own projects.

Technology Tools – Hardware

Although each school plan was unique, there were common elements which included the selection of hardware and software. Presented in Table 1 is a list of technology tools being utilized by Model Schools.

At this point, it should be pointed out that there is a range of costs presented in this

Table 1
Technology Tools Utilized by Model Schools

Keyboard/Digital Devices	Auditory Devices	Productivity Tools	Interactive/Wireless Devices	Visual Response Devices
Laptop Alternative (e.g. Alphasmart™ Keyboard) Laptop Personal Digital Assistant (PDA; e.g., Palm Handheld® Blackberry®)	Listening Devices (e.g., Telex Scholar, Digital Talking Book Player, Mp3 Player, Daisy Player)	Scanner Projector CD/DVD Duplicator Digital Document Camera Digital Still/Video Camera	InteractiveWireless Graphic Tablet (e.g., InterWriteSchool Pad™) Interactive White Boards (e.g., SMARTBoard™, Promethean Board™) Wireless Mouse and Keyboard	Personal Response System

partial list of technology tool, ranging from a simple MP3 player to an Interactive White Board. Although UDL means leveraging technology, it does not necessarily require an enormous outlay of money or financial resources by a school. There is a low to high range in both cost and sophistication of devices.

Technology Tools – Web-Based and Software

The use of digital text and textreader software along with the items in Table 2 are examples of software products and web-based technology tools that are being utilized by the UDL Model Schools as they implant their Project Plans on a systemic level.

Importance of Digitized Text

Since technology has become increasingly important for teachers and students (Berhmann & Jerome, 2002; Edyburn, Higgins, & Boone, 2005), it seems reasonable to integrate technology use to promote curriculum access. One approach is use of digitized text. Digital content offers ease of use and flexibility in the delivery of information. The flexibility and ease of use can be demonstrated by the different formats that content can easily be rendered into, such as an audio file played on an MP3 player to an HTML version of text that is readily available and speaking onscreen of a computer. Different text reader software programs will empower the student by allowing (a) personalized voices; (b) speech options; and (c) varying speeds, screen and color choices. There are a number of options in these software programs that aid the student with the use of word selection, word prediction, spellchecking, dictionary for basic and advanced definitions, homophones, standard calculator, scientific calculator, mapping, scanning ability, capturing of facts, text, citation material, identification of foreign words, search engines, and other options.

The use of accessible digital content and its different forms can be tailored to the individual learner. If a student has physical disabilities that require switch access, as long as the material can be accessed with a tab and enter key, it is accessible to that student. This accessible digital content can be formatted to show scaffolded instruction that can serve to individualize instruction for students with cognitive disabilities, but also stay within appropriate age content as required by many State of Education agencies. (See work by Lynn Inman Anderson at http://ces.uoregon.edu/intersect/default.html and http://ces.uoregon.edu/; and Kentucky

Table 2
Software and Web-based Technology Tools Utilized by UDL Model Schools

Software Products	Web-based Technology Tools
Achieve 3000 Differentiation Software Program™	BrainPOP®
Boardmaker®	Compass Learning®
Curriculum Mapper®	Criterion Online Writing Evaluation Service
Geometers Sketch Pad®	Encyclomedia
Inspiration®/Kidspiration®	Quia
Intellitools®	QuizStar
Read, Write & Gold®	Rubistar
STAR Reading	WISE (Web-based Inquiry Science Environment)
Riverdeep DestinationMath®	United Streaming Video – Discovery Education
Riverdeep Destination Reading®	School Center
Piano Suite	Track Star
Thinking Reader™	Think Link Learning ™
Writing With Symbols	Scholastic Reading Inventory™
	Start To Finish Books®
	State Technology Directors Association (SETDA)

examples at http://kysig.louisville.edu/kyschools.htm)

Acquiring Digital Text

While professionals may acknowledge the value of accessible digital content, the more pragmatic concern expressed by many is where to locate such material. If it is copyrighted material and part of the adopted textbooks cycle, then a likely place to locate such materials would be the KAMC (see http://kamc.louisville.edu/kyecontent/). The KAMC works with publishers to supply content that is on the state adoption list to students who qualify for its usage. To qualify, a student must have a current individual education program (IEP) or Section 504 remediation plan that identifies appropriate accommodations. This is a free service to students in Kentucky, K-12 grades if eligibility is met. The KAMC also works to acquire content material that is not on the adopted text list, but is being currently used by students in the Commonwealth.

Another resource is Bookshare.org, a subscription based group that provides access to individuals with (a) print disabilities, including visual impairment; and (b) learning disabilities or mobility impairments to copyrighted/non copyrighted materials (e.g., popular fiction, books and newspapers). In December, 2006, the National Instructional Materials Access Center (NIMAC) began to accept files using the National Instructional Materials Accessibility Standard (NIMAS) format. These files have an .xml format and the package has specific criteria. NIMAS files are not student ready and must be downloaded and converted by an authorized state user into a student ready format. The cost of the service is to be determined by the state. Currently in Kentucky, this service is free.

Non-copyrighted material is no longer protected by copyright and available for use by anyone. It is often used in classrooms for instructional purposes such as book reports or research. Much of this content can be found on Internet sites such as the KAMC, Electronic Text Center at the University of Virginia, and the Gutenburg Library among others. An appropriate individual to consult in this area would be one's local librarian or media specialist.

Developing Accessible Digital Content

There are numerous ways to incorporate content once it is digitized. Teachers routinely develop materials to use within their classrooms for instructional purposes. With a little forethought, this material can be made accessible to all students with a minimum of work using commonly owned software. For example, a unit plan could include all of the important information distilled from the content material within a chapter or group of chapters, along with any quizzes, test questions, and assignments. If the teacher excerpts this information out of copyrighted material and places it in a Microsoft® Word or .PDF format, then it is accessible for use by any student. Any passages that are quoted should be given the proper citation from the text.

Key words and definitions are often used by teachers. Work tasks and assignments can be completed by student groups and posted for everyone in the class. Study questions and study guides can be treated the same way as a Unit Plan. Homework is another example. The questions can be posted and then answered by students in a Microsoft® Word document, printed or sent as an email or attachment. Answers can be submitted online to a Web page set up by the teacher or as an STLP project by students. Students can experiment with Web pages, updating and changing them to reflect their interests. Blogs have become very popular and could be a way to increase writing by the student. Several of the model schools share their unit plans online on school web sites as they are developed as part of their dissemination plan for Year Three.

Evaluation Methods

Each school was required to develop their own evaluation process. Although they varied slightly from school to school, there were common evaluation methods used. At the School Level, there were survey and interviews with faculty, staff and students; classroom observations; monthly or quarterly reports; review of products (e.g., curriculum maps, lesson and unit plans, school/district improvement and teacher growth plans, and student products).

At the Project Level, evaluation methods included (a) Individualized Classroom Environment Questionnaire; (b) review of CATS scores and NCLB Adequate Yearly Progress (AYP) reports; and (c) monthly and year-end reports. The monthly and year-end reports were submitted to the Grant Coordinator for documentation. The CATS scores and AYP reports were monitored for the model schools as well as a group of control schools to provide additional feedback. The Individualized Classroom Environment Questionnaire by Fraser (1990) was chosen and adapted for use as a measure of change in the classroom environment as a result of this project. This questionnaire was administered at the beginning of Year 2 and was re-administered at the conclusion of Year 3.

Outcomes and Benefits

There have been a number of outcomes and benefits that are in common across the participating UDL Model Schools. Although these schools took a variety of paths to achieve similar goals, all of the Model Schools have shown various levels of progress. These areas of progress can be grouped categorically as (a) planning, (b) training, (c) participation, (d) resources, and (e) support.

Planning included the development of a lesson/unit template with a UDL component, embedment of UDL principles in school/district improvement plans, inclusion of UDL instructional strategies in teacher growth plans, and inclusion of UDL on all

faculty and site based decision making agendas. Although the planning at each school was unique, planning across the aforementioned areas provided a consistent basis for the project to be implemented. By having all shareholders included in the development and implementation, there was shared ownership of the project, increased collegiality among staff and support from the local and district administration.

Training was paramount. Important common threads were authentic professional development to facilitate understanding of the philosophy and premises of UDL that pertains to education. The actual practice of embedding UDL components and strategies in real lesson plans and learning units provided hands-on practice, training, and mentoring by teacher trainers who were more proficient in understanding UDL. According to interview surveys, it was important for teachers and staff to have a baseline and to start at their functioning levels both in understanding UDL principles as well as training in any new or unfamiliar technologies and software.

Training occurred both during the school day, after school, and during the summer. Substitutes were provided for teachers during in-school training. Financial compensation for out-of-school work was motivating and placed value on the efforts expended by the staff. It was very important that the work environment be one where teachers and staff felt comfortable trying new strategies and technologies and the experiencing real 'possibility' of initial failure.

Participation was also crucial to the successful outcomes and benefits of the project. Expectations were raised by the administration, the staff, and the students. Teachers and staff were expected/required to demonstrate knowledge and skills subsequent to training that had been presented. Students were expected to access and use the equipment, software, and materials that the school and their teachers were providing both at school and home. Special education students were expected to have access to needed equipment and materials and be included in the normal school day and program. Students expected their instruction to be universally designed, flexible, and integrated with technology. Teacher training groups and cadres were expected to provide training and mentorship for their colleagues. Administrators were expected to participate, observe, and provide leadership for their staff.

Of course the allocation and use of resources was one of the most crucial aspects of the project. Without resources, there would be no project. The allocation of finances and in kind support from the district was as important as the financial resources from the grant. Each school determined its unique needs in terms of equipment, software, and professional development for the school. There was no set or fixed list of items for each school, but rather a melding of what was already at the schools and what was needed for each to achieve their particular goals. For example, some schools spent more on equipping classrooms with computers, while another school purchased interactive whiteboards. The purchases were determined by the types of technology integration that the school was pursuing.

Within the schools, equipment and software resources were distributed equitably to those teachers who were actively using them. There was active solicitation for resources such as digital text from the KAMC, and the publishers and from the Internet. The teachers and staff worked together to provide scanned materials and to convert in house content such as teacher made tests, quizzes, study guides, and units to digital form which was shared through an intranet in the schools. Common planning time was important for

teachers and staff to effectively manage their time while sharing information, exploring, practicing, training, and mentoring. Increased collaboration across the curriculum was very prevalent in the UDL schools.

Support at both the local and district levels played a large part in determining the success of each school that participated in the project. By providing financial and in-kind resources, the district gave the local schools additional resources to help ensure successful outcomes. At the local level, the administration's support was reflected in varying ways. Establishing a clearly developed management plan gave teachers and staff a sound basis for developing their portions of the project. Strong leadership was needed to facilitate progress, and to smooth out conflicts and disagreements over implementation of the plans. Clear needs for data gathering was articulated and used to identify strengths and weaknesses which were evaluated on a monthly basis. Adjustments were then made to alleviate perceived weaknesses.

Outcomes at the model UDL Model Schools were successful, in part, due to the active participation of parents, student personnel, trainer cadres, support teams, and staff. As the schools publicized their successes at local, regional, and state levels, more requests for information and mentoring came in from other schools.

It must be noted that not all six schools have been successful. One school was terminated at the end of Year 2 based on lack of progress in their designated project. One of the remaining five schools struggled to make progress in Year 2 and continued to experience implementation difficulties in Year 3. Despite the fact that only one of the schools has demonstrated consistent improvement in regard to CATS scores and NCLB reports, we still consider this project a success given that systemic change occurred both in schools and their respective districts. Indeed, two of the model schools were so successful in their endeavors that the local school districts appropriated additional funds to replicate the model classroom for other local schools. In addition, one principal has even committed 10% of his discretionary funds to continue maintenance of the UDL Model within his school.

What Did It Take at the Different Levels of Participation?

Classroom level. A successful project will have a teacher who is a risk taker and willing to put in the time it takes to become comfortable with the concepts and instructional strategies related to UDL as well as the technology involved. The teacher also needs to have a willingness to learn from others and to share knowledge and skills with peers. Being able to learn in context is also critical for a successful project. There needs to be a support person available to teachers at all times for technical support.

School level. For a successful project, the principal will be key player. She or he will need to understand the goals of the project and see the potential value. This principal needs to be one who is willing to commit to being in the classrooms on a regular basis and who is willing to commit personnel and financial resources to the project. The principal will also need to be willing to clarify standards and expectations, allocate resources, direct policy, offer support, and intervene if necessary. There needs to be cohesion among the faculty, with regular collaboration and communication. The school needs to be a safe environment where teachers feel comfortable in taking chances and know that their efforts will be recognized and rewarded. Finally, the project needs to have a pair of co-directors who have good leadership and motivational skills (not to mention, never taking "no" for an answer).

District level. A successful project will have the support of targeted district personnel. As with the principal, these district personnel must understand the goals of the project and be willing to devote personnel and financial resources toward ensuring its success. Another important element is the technology support staff, who must be knowledgeable in both technical and curricular expertise as well as how to integrate both elements.

Replication of Successful Systemic Change – Key Elements

There are five common elements among all of the efforts at systemic change that were also found in our most successful Model Schools. Each of these is described below.

System review. A thorough review needs to be conducted to identify the key weaknesses of individual schools and devise specific strategies to correct each one of them. Then, professionals should monitor the implementation of the school improvement plan and hold regular reviews of the progress. Data should be used to drive decision making. Accountability should be built internally and linked to the accountability externally.

Detailed road map. A detailed road map is needed (i.e., identification of the features of the project and the key stages). Objectives and outcomes, with indicators of progress need to be specified, along with a system and schedule for measuring and monitoring progress. Everyone's role on the team needs to be clarified, as well as the behaviors, tasks, and targets for all members of the team.

Capacity building. The best person should be working on the problem. After identifying specific weaknesses and strategies to deal with the problem/s, the most qualified individual should be appointed to lead that strategy. The team needs to have a shared vision and an ownership of the project. There needs to be a shift in mindset from talking about the project and activities (i.e., from "my" to "our"). Change will never happen until teachers stop thinking "my classroom" and start thinking "our school," until school leaders stop thinking "my school" and start thinking "our school" and so on. The best place to begin will be in assuming that one of the reasons that the identified specific weaknesses exists is either because other people don't know how to change the situation or that they don't think it can be changed. The definition of capacity building is to first change the person and then work on building change within the system.

Change by doing. Often professionals get stuck in endlessly meeting about or discussing a problem. They must realize that change can only happen when action takes place. Making elaborate plans doesn't serve much purpose except to use up time that could be better spent in action.

Sustainability. Last but not least, sustainability is essential. There is no change if it cannot be sustained. The team leaders need to foster and maintain the development of relationships and to build professional learning communities. Establishing conditions that will support the development of positive pressure to change is important. The leaders also need to be thinking in terms of "leaders developing leaders" if the project has a chance for sustainability.

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