
Appendix A White Papers***Introducing the Virtual Education Space*** by Greg Nadeau**I wake up every morning in the year 2003.**

Ed Reform is in full swing. Ten years after the Act was signed, MCAS, 12-62, school accountability, and Foundation funding are all fully implemented.

I see two divergent scenarios.

In the first,

teachers struggle to implement curriculum based on the state standards.

The martyrs work seventy hours a week to piece together the best curriculum they can find from an array of different sources. They use primary texts, software, videos, and interactive activities to capture their kids' imagination. They stay after school every day to give their kids a small portion of the individualized attention they need. The kids flourish, excelling on MCAS and in life, but the teachers burn out or scale back after a few short years.

The rest of the teachers content themselves with textbooks that their districts have selected as good enough. They teach to the middle, boring the advanced kids and providing inadequate attention to the kids who need extra help. MCAS scores improve incrementally as teachers and kids get increasingly used to the test, but, large portions of the student population are left behind. In some schools, 50% of the 12th graders are not able to graduate with their class. The state has put a half dozen districts into receivership, but the districts in receivership are not doing much better than their cohorts. The public continues to lose faith in the public education system, turning to Foundation vouchers and other initiatives that further destabilize the schools dealing with the kids who remain in the system.

In the second scenario,

teachers across the state are collaborating to develop, share, and improve the best lesson plans and curriculum materials available for teaching the content called for in the Frameworks. Students receive individualized attention and extensive feedback on their work, which is evaluated by their teacher and by others against rigorous scoring rubrics. The work that has been judged to have met the district and state standards is kept in a portfolio. Students whose work does not meet the standards, receive extra assistance and assignments until they exhibit proficiency. When they sit for on-demand assessments the vast majority are able to translate their knowledge and skills into proficient or advanced work.

The difference between the two scenarios is VES.

The Virtual Education Space is a suite of on line applications that teachers and students can use to support standards-based curriculum. VES will do for schools what the Microsoft Office-type applications and e-mail did for the typical adult working environment.

Up until now, computers have yet to impact student achievement.

Even the most ardent EdTech advocates would agree that the over \$200 million a year Massachusetts schools are putting into technology would have had more of an impact on student achievement if spent on high touch instruction like after school tutors rather than high tech. In fact, taking all of the computers out of our schools would most likely have no measurable statewide impact on MCAS results – one important measure of student achievement.

However, anyone who does not believe that computers will profoundly transform the information intensive public education industry, has not been paying attention to what is happening in similar industries such as publishing, news, entertainment, and finance.

For close to 20 years the other industries mentioned above have been going through fundamental changes. While an array of technologies had sizable impacts, two stand above the rest. First, in the 80's, the PC transformed the way that so-called "office" tasks such as writing, managing numbers, and storing information were done. Second, in the 90's, the Internet transformed the way that people and organizations communicate with each other. The result has been societal changes of a scale not seen since the Industrial revolution.

Yet schools today look and function basically the same as they have for a hundred years.

So what's going on here?

Schools never got personal computers.

We are only now getting to the National target of a 1 computer to 6 student sustainable ratio. That means that at any time, students who want to use a computer (as I am now to write this document) have to wait their turn. More importantly, if they are working on a document across multiple sessions, they typically need to carry around floppy disks with their files neatly organized. Going from class to class and school to home creates additional technical and logistical barriers. The result is that when students use computers they typically use them less as tools to create documents over multiple sessions and more as single session, self-contained, edutainment games. While browsing the web has changed the way that student research, the work that results from the research (student achievement) is still pretty much the same.

If you work in a typical office setting, imagine trying to get things done in an environment in which you share a computer with six other employees and move every 45 minutes to another environment where you share a computer with six new people. Would the computer be the essential tool that it has become for you? Or would it be a trivial device tangential to your work?

Can we do anything about it?

One option which should eventually be investigated is providing every student with some type of mobile computer. However, for now at least, this is simply not financially practical. School IT expenditures would need to double again and the price of an appropriate device would need to get cut in half.

There is another option: use the `Net to give every student a virtual PC.

Introducing VES.

The virtual personal computer (VPC) is one of the core technologies that underlie VES. VES is made possible by the high level of on line teacher access that MassEd.Net created, the plummeting costs of broadband to the classroom access made available through Mass Community Network, and, for the first time, a single source of reliable individual student and teacher data from the Department's Information Management System (IMS). VES builds on the proven successes of CLASP, QuickTime, and the Virtual High School, each of which serves as an important prototype, establishing proof of concept, for the three main components of VES:

CLASP On Line

will provide Massachusetts K-12 educators with a workspace to build and plan standards-based curriculum.

Mass NetWorks Educational Partnership, Inc. and North Andover Public Schools have worked together for the past twelve months to build a database of state and district standards for teachers to plan lesson plans with. Already in its sixth iteration, CLASP v6.0 has refined the data model for standards-based curriculum and resulted in a functional design for which CLASP On Line can be built.

If the state says that kids should be at a certain levels in 4th and 8th grades, what is the 7th grade teacher accountable for?

Already over a third of Massachusetts districts are using CLASP to develop district specific learning objectives for each grade and subject, filling in the sizable cracks left by the state's Curriculum Frameworks. CLASP On Line will dramatically expedite the process in which districts complete this task and begin sharing and improving the resulting conclusions.

Teachers will be able to go on line to their personal Workspace and view the 50 or so learning objectives that their districts have said they are accountable for. For each objective, they can access an on line database of lesson plans that other teachers across the state have used to teach that objective. Each lesson plan will have associated content, classroom activities, assignments, scoring rubrics and examples of students work at each level of the rubric.

When teachers already have lesson plans in mind that they have successfully used in the past, they can go through a series of templates to place their lesson plan into their private Workspace. If they want to share it with others in the district, they need only click a button. If they or their district believe that the lesson plan has potential value for other educators, another button click adds the lesson plan to the statewide database.

Since the goal is to make it as easy as possible for educators to share their lesson plans, the resulting database will include lesson plans of varying quality and completeness. However, Amazon.Com and other successful on line business have shown that the power of the Web is that users can efficiently search otherwise overwhelming options to find just what they want. Trusted endorsement, aggregated evaluations, user profiling, intelligent agents, threaded discussions, and other on line tools make will empower teachers to locate the lesson plans which are the best fit for their classroom.

No longer will teachers work in isolation. The power of the profession to create innovative curriculum will be unleashed. Like the web-enabled Human Genome Project that the science community has created through distributed collaboration, educators will be able to work together to build lesson plans that excite the imagination of students and inspire them to do their best.

When enough lesson plans have been placed in the statewide database to make it an indispensable destination site for tens of thousands of teachers, an e-commerce site will be developed to enable districts to delegate purchasing authority for copyright protected curriculum materials from textbook publishing companies and other sources. In addition, teachers who use their summers and weekends to perfect lesson plans that surpass the quality of commercial work no longer need million dollar printing presses to disseminate their work. Teachers whose lesson plans have been purchased through the e-commerce site will be able to expand their compensation through royalties on their work.

MaCRO

will establish a portal to all publicly available digital media content.

WGBH Boston and WGBY Springfield are leading the way for the Commonwealth in developing the Library of Congress of the next century. WGBY will start by creating an on line catalog of their physical video and software assets. Teachers will be able to go on line when ever it is convenient and request that the media library of the Teacher Center mail them the asset for a set period -- like borrowing a book from a library.

Sister station WGBH will begin developing on line streamed video previews of the videos so that teachers can get a better sense of the asset before it is mailed. Next the two stations will begin parsing out 30-180 second clips of particularly powerful “teachable moments” to present to the class through computer or television monitors as focal points for classroom activities. In addition, these always-available, on-line, teachable-moment video clips will serve as powerful research tools for both students and teachers.

But the real power of MaCRO comes when it is combined with CLASP to develop standards-based lesson plans that are assigned on line to students through the Virtual Classroom.

The Virtual Classroom

will become the core tool that educators and students use to work on student achievement.

Based on many of the core concepts pioneered by Hudson Public School and the Concord Consortium’s global Virtual High School, the Virtual Classroom will provide every public student and teacher in Commonwealth with their own personalized WorkSpace which they can access on line from any computer on the planet with a Web browser.

From their classroom, library, community computer center, or home, students and teachers will be able to go on line and continue their work.

In the past, teachers who wanted to develop their own curriculum spent endless hours in copy room negotiating for copy paper and working machines and preparing materials for the kids. 25 copies of the article for the class with a one page assignment attached. Some time later, the teacher receives a printed document back from the student with the essay or problem set or whatever. The teacher carries the folders of student work around nights and weekends until enough time is stolen from their home life to correct the work and give it back. When the student receives their C+, A-, or check +, they glance at the seemingly random grade briefly on the work that they have already forgotten about and quickly discard it in favor of their current assignment.

With VES, teachers will be able to assign a streamed video clip of Lawrence Olivier’s performance in Shakespear’s *Othello*, or a primary text on the Holocaust from *Facing History and Ourselves*, or an on line excursion with the Woods Hole Jason Project.

Students can view, listen, or read the content and then follow the directions for the assignment. Work on the assignment could begin in one class and be saved through the browser based virtual PC to the server farm hanging off MCN. From any other place where they can access the Internet, they can to the VES web site, insert their username and password, and access their WorkSpace to continue their work.

When the work is completed and ready for feedback, it does not sit in a pile in the teacher's desk waiting for review. Since it is a digital document, access to the document can be provided to other students in a working group, older student tutors, parents, community mentors, and, eventually, the teacher. While the teacher is no longer the sole reviewer, the teacher is the final reviewer.

The teacher's primary job is to compare the students work to examples of student work laid out in the scoring rubric of the lesson plan in CLASP. Perhaps there are no more letter grades. Instead, the teacher has one of two grades: "Done" or "Not Yet Done". If the work is judged to not demonstrate proficiency on each learning objective detailed in the scoring rubric, the work is not yet done and the student continues to revise the work, receive feedback from others, and re-submit it to the teacher. When the work demonstrates proficiency on all objectives, the teacher declares that it is done and places it in the on line portfolio of work demonstrating what the student is capable of achieving.

Teachers will be able to view summary information on all their students' portfolios providing them with a matrix showing which objectives the majority of the class needs additional classroom activities and which objectives the Title 1, SPED, and bilingual specialists should focus more individualized attention on.

In the on-line digital world, cheating may be easier than ever. However, if a student submits work that is not their own for final review, they are only cheating the amount of assistance they receive. When they go into more tightly controlled, on demand, testing situations, they will be on their own. As the focus of accountability and advancement continues to shift to these outcome-based measures, everyone's incentive is to have kids be as prepared as possible.

VES will be launched on January 1, 2000.

Within 18 months, over 50% of the teachers in Massachusetts will have begun using VES.

The Department of Education's EdTech Group is using the \$1 million it received through the recent Capital Supplemental budget to coordinate the development of a comprehensive plan to roll out VES over the next few years. Commissioner Driscoll will request \$3 million in next year's budget to roll out VES to every school in the state. MCET and DOE will work together to mesh VES together with MCN.

Working together, the VES consortium will develop the on line tools that students, educators, and parents need to implement curriculum based on standards, not seat time. We will finally harness the transformational potential of networked information technology to make real increases in student achievement.

In fact, in my mind, as I complete this white paper on a sunny porch in 2003, VES is already in place.



***CLASP White Paper by Leslie Hazle Bussey
and Kimberly Joyce***

Prologue

"I have to teach all seven frameworks? I can hardly find all of the standards in one framework, let alone teach all seven!" This was Mrs. Jonask's response to her principal's expectations of her under the Education Reform Act. Mrs. Jonask has been teaching fourth grade for 15 years and along with her peers across the state was overwhelmed with the enormity of the task before her.

Where would she start? She began by reading the seven frameworks documents each of which are uniquely organized and structured. She then looked over her 15 years of lesson plans and materials, and kept trying to think back to standards she had read in the Frameworks documents. But which Framework, and what standard? It was hard to clearly document where she was teaching and assessing standards, and where there were standards that her students weren't learning.

It was then that the curriculum director distributed a small stack of handouts that he called their District Curriculum Guidelines for PreK - 4 Math. He explained that the curriculum guidelines were developed by a committee of Mrs. Jonack's colleagues from across the district, and that they were meant to help teachers plan their lessons to address the standards uniformly and thoroughly. At the top of each page were listed one or two standards from the Mathematics Curriculum Framework. Under the learning standards, there were three columns. In a column on the left side of the page were listed grade specific curriculum objectives that the district committee agreed were reasonable and developmentally appropriate for students in the district, to meet the standards by the end of grade four. The center column was titled, "Instructional Strategies", and left blank. On the right side of the page, assessment criteria were listed describing what student work should encompass in order to meet the district's expectations.

Turning quickly to fourth grade, Mrs. Jonask read, "Students will identify the types of quadrilaterals. Students will show how one quantity determines another quantity in a functional relationship." In the middle column she wrote down some notes referring to lesson plans she already had that she knew would be effective in meeting those expectations. She was able to begin to identify areas where she needed to modify old or create new lesson plans to meet some learning expectations. She had a chance to look at expectations at the third grade and the expectations at the fifth grade. That gave her a sense of the "boundaries", what the next year's teachers would be expecting of her students and her role in ensuring that the skills and knowledge learned in her fourth grade classroom would be an appropriate foundation for fifth grade, and beyond.

At the next faculty meeting, the curriculum director introduced the staff to CLASP, the software tool that the math team used to create and print out the Curriculum Guidelines. CLASP would be available on all their computers and included an electronic database of the Massachusetts Curriculum Frameworks that teachers could use (both at school and at home) to help navigate all of the standards. Through CLASP, Mrs. Jonask could view Curriculum Guidelines in every subject for all grades. She remembered her observations about her lesson plans that seemed more appropriate for the third grade. With CLASP available to all teachers, the shift to standards-based education in her classroom didn't have to be her sole responsibility. She could share those lesson plans and materials with the third grade teachers. For the first time she felt that her colleagues were partners in the shared task of building a continuously developing set of skills and knowledge in their students. This was a tremendous relief given the burden Mrs. Jonask previously felt was hers alone in preparing her students for the fourth grade MCAS test.

Executive Summary

Academic standards are open and public statements about what all students should know and be able to do in academic subjects including mathematics, science, English, history, geography, arts and second languages. Academic standards are high and rigorous in order to adequately prepare students for productive work and lifelong learning.

The public nature of standards means that parents or community members can make sure that schools work for their students. The public can take the standards document to a school board meeting, or to parent conferences, point to the elementary, middle school, or graduation benchmarks, and ask: "How are you getting our children to reach these standards? What instructional support, materials, and resources are you providing?" (The Education Trust, 1996)

The adoption of academic standards across the U.S. has brought about a paradigm shift in the way educators must think about, prepare, and assess student learning. In classrooms that already demand that teachers consider hundreds of variables when preparing learning activities, the introduction of hundreds of academic standards in five or six disciplines is simply overwhelming. School systems need tools to make the process of creating curriculum aimed to meet standards more simple.

CLASP Online is a project that helps teachers and school administrators ensure that student learning meets state academic standards. Using a combination of technology and face-to-face professional development, CLASP Online permits teachers and other stakeholders to organize and visualize the many variables introduced with the adoption of standards: written curriculum, classroom practice, assessment strategies, examples of student performance, and the standards themselves. Focusing on student performance – rather than on “what teachers teach” – lays the foundation for educators to make data-driven decisions about how to change curriculum documents and classroom strategies to impact student learning.

Two core strategies drive CLASP Online. First is to break down the isolation educators often work in, and instead foster a collegial environment. When working together, educators can build a shared understanding of expectations for one another and for students. They can co-create and disseminate strategies for excellence. They can be recognized for their own and their students’ successes. All of these are essential pieces to sustained high academic performance.

The second core strategy driving CLASP Online is to build in a meaningful professional development opportunity into every use of the CLASP Online technology. CLASP Online simplifies, organizes, and models the thinking and working process of developing teaching and learning activities that address standards. As a result, users of CLASP Online learn to think of classroom activities as the means to facilitate student learning rather than as ends in themselves. This is a key component of the CLASP Online philosophy: that teachers must be empowered to navigate the maze of standards, local curriculum, teaching strategies and evidence of student learning. Without individual teachers’ active and intentional design of their students’ classroom experiences, meaningful learning – and achievement of standards – will only be accidental.

CLASP Online makes the daunting task of preparing *every* student to meet academic standards more manageable because it: 1) facilitates sharing of curriculum work between educators and so minimizes unnecessary “reinventing the wheel;” 2) communicates expectations of teachers and students clearly to all teachers and education stakeholders; and 3) makes the steps for meeting the mandate of standards clear and do-able to teachers and school leaders. This white paper will describe in more detail how CLASP Online makes this possible for users, whether teachers, principals, state or district leaders, DOE staff or parents.

THE CHALLENGES

To prepare students to meet academic standards and to meet state-mandated expectations for written curriculum, districts across the nation are identifying best practices and creating local curriculum documents aligned to state standards. Often, teachers and districts are working on their own even though their colleagues in neighboring districts are engaged in exactly the same process. This isolation is even more troublesome given the enormity of the task of creating a document that articulates grade-by-grade expectations of student learning from preschool to grade twelve in six disciplines, all designed to meet state academic standards. In large and well-funded districts, this task can take several years and hundreds of thousands of dollars. For small or struggling districts, such work stretches curriculum dollars and teacher time to the limit. Yet, alignment of curriculum documents is only one part of the larger task that districts must take on for student learning to truly meet state standards.

Another piece of the change equation is the teacher. Traditionally, a teacher's job was to "cover" curriculum materials. Teachers were assessed based on their classroom performance – ability to maintain order in the classroom, ability to discipline students, quantity of material covered, enthusiasm of students. With the introduction of standards, teachers are collectively responsible for *every* student's mastery of standards, regardless of socioeconomic background, learning or behavioral challenges, and limited proficiency with English. Teachers are now assessed in part based on the academic performance of their students. At the same time that standards demand more of our teachers than ever, the message "teachers are the problem" and the resulting public disrespect of teachers has had a devastating impact on teacher morale. Though students are the learners, teachers are in the front lines of the struggle to improve student learning outcomes. Teachers are students' guides and mentors. Without the care and expertise of teachers who take into account the needs of their students and design learning opportunities appropriate for them, the goal of student achievement of standards will only be a policy, not a reality. For education reform to be successful, teachers have to be empowered and mobilized. Teacher engagement is the key to student engagement.

Even a teacher's capacity to shape the learning environment of students is limited, however. Reforming a school system so that *all* students have adequate opportunity to learn and can demonstrate achievement of standards requires shifts outside of the classroom. Standards impact how instruction is planned, delivered, and assessed. It impacts what types of professional development must be available to teachers, how schools are governed, the nature of communication about student progress with parents, and ways that schools are accountable to the public. The education system is just beginning to work through the practical implications of this paradigm shift. Outside of school, parents, businesspeople, media commentators and other stakeholders have only just begun to grasp the depth and scope of the require transformation.

As if all this weren't enough, there is also a national push to tap the power of today's information and communication technologies (ICTs) as a tool and catalyst for education reform. Since 1913 and the advent of the motion picture when Thomas Edison declared "Books will soon be obsolete in the schools...It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in ten years" (Saettler, 1990), educators have turned to emerging technologies as *the* solution to transform teaching and learning. Research of the most effective applications of technology in educational settings indicates that technology makes no significant difference in students' learning when simply used because it is there. However, when technology is thoughtfully and appropriately applied to a real need – managing information, facilitating communication, illustrating concepts that cannot be illustrated otherwise, simulating –there *are* measurable impacts on learning, even if only increased efficiency (ETS, 1998). Given the escalating demands on schools and school budgets, new technology applications must be cost-effective and generate genuine impact on administrative efficiency, teacher professional development or student learning. Schools can no longer afford to experiment with technology just because it is there.

CLASP Online offers schools a tool and support system for addressing each of these challenges, often several at once, to make progress toward transformation of classroom practice and student learning to reflect standards. The ultimate goal in all educational endeavor is improved student learning. The strategy that CLASP Online takes is to focus on key policy and instructional issues that shape classroom activity, modeling best practices in teacher professional development, standards-based instruction, and integration of technology into the fabric of day to day school functions.

TOWARDS A SOLUTION: A BRIEF HISTORY OF CLASP

The challenges of curriculum alignment, empowering teachers, shifting to a student-centered standards-based paradigm of teaching and learning, and integrating technology into school practice are challenges that every school and district across the United States face. When the teachers and administrators in North Andover, Massachusetts started wrestling with these challenges in 1994, they created a database to help them compile a list of what they were actually teaching at every grade level, analyze how coherent it was from grade-to-grade on a continuum from preschool to grade twelve, and determine how it compared to the requirements of the new state standards (called the Massachusetts Curriculum Frameworks). North Andover shared this database with a few other districts and the technology evolved with the input of those other districts.

Over the course of the 1998 – 99 school year, Mass Networks Education Partnership brought together curriculum leaders from over 160 school districts – nearly half of the state’s school districts – to share insights, experiences and curriculum alignment materials – and to learn how to use the database program developed in North Andover now called the CLASP CST (Curriculum Library Alignment and Sharing Project Curriculum Sharing and Support Tool) to facilitate that process. Over the course of the school year and summer of 1999, the CST was revised over ten times by North Andover teacher Kimberly Joyce based on feedback generated at monthly statewide meetings facilitated by Mass Networks. The CST that emerged was a standalone relational database built in FilemakerPro. The application could be shared over a LAN or WAN or could be run on individual workstations without any additional software. The CST was developed on both a Mac and PC platform.

Introduction to CLASP Online

Some technology projects are intended to concretize a new vision of what education could be like if information and communication technology were fully integrated into the education process. These are important Research and Development pilot projects that help us see what is potentially possible. Their weakness is that they too often assume an advanced technology infrastructure, a high degree of educator technology proficiency, as well as a pre-existing commitment to the new paradigm being demonstrated. These projects tend to be adopted by the pioneers – the “techies” and revolutionaries – in the education profession. One of the issues facing those who see technology as a powerful tool for improving student’s learning outcomes is how to “go mainstream,” how to “cross the chasm” and win the support of the “pragmatists” who are only willing to risk new approaches if they are relatively confident it will successfully solve a real problem.

CLASP Online is designed to address the needs of the mainstream. It is intended to be immediately useful to teachers. While it is a technology-facilitated project and does require the use of a computer, it is intended to solve currently pressing problems. It creates a “bridge” between where most educators are at right now and a more technology-rich future. CLASP Online takes advantage of both the power of computer networks and the collaborative tradition in the education profession. It is a technology-facilitated process that uses the power of digital systems to empower professional interaction. As a computer program, the use of CLASP helps expose educators to the value of information and communication technologies (ICT) and helps promote its integration into the curriculum. At the same time, educators get real value from using CLASP since it facilitates five vital processes:

FIVE VITAL PROCESSES:

1 Provides Concise and Easy Access to Standards-Related Material.

Reading and meaningfully using all the information contained in the state standards documents is a Herculean task. Massachusetts elementary teachers, for example, are supposed to cull the relevant standards and information for their students from a pile of documents that is nearly two feet high. There are multiple documents for each discipline. There are national, state, district, and school documents. There are documents about skills and knowledge that students should master and documents about how to teach and assess mastery. There are documents about technology integration; documents about creating lesson plans that embody the standards. And more.

Using CLASP Online, a teacher need only know what subject and grade he or she teaches to view a list of sub-topics, called “strands” in the Massachusetts documents, and then view the appropriate standards associated with each strand. As a relational database, it can gather specific information from all kinds of state-level documents in response to very simple point-and-click instructions from a teacher.

In many states, including Massachusetts, the documents defining the required student learning standards have been repeatedly revised – and probably will continue to evolve in the future. Not only are these “living documents” whose content and overall structure has radically changed from version to version, there are a separate set of documents for each discipline area. In Massachusetts, there are seven disciplines: English Language Arts, History and Social Science, Health, Fine Arts, Science and Engineering Technology, Mathematics and Foreign Language.

CLASP Online allows educators to manage the constant flow of new versions. All the work they have previously done can be quickly re-aligned with each new version of the state standards.

CLASP brings together all the relevant documents and allows educators – and all stakeholders in the broader educational community – to quickly see all the material that specifically relates to, for example, helping 4th graders learn fractions.

2 Helps with the alignment of local curriculum to national and state standards.

Most standards are relatively high-level statements describing expectations of what students will know and

be able to do across a span of three or four grades. In a historically decentralized system such as Massachusetts, it is up to districts to turn the standards into a grade-by-grade, discipline-by-discipline outline of learning objectives. For some districts, this is an opportunity to do a complete survey of their content offerings in order to create K-12 coherence so that all required topics are covered at some point, in the desired order, and without unwanted duplication. In addition, some districts have over-reaching concerns, expressed through concepts such as “reading across the curriculum” or “information literacy” or “multi-cultural appreciation” or “inter-disciplinary learning” that they want integrated into every discipline and grade. Some systems emphasize community service, some multi-cultural learning, some career preparation, etc.

In addition, state standards only provide suggestions about the pedagogy or instructional approach that should be used to help students achieve the desired learning objectives. Many districts have strong visions of the kinds of activities, the roles that teachers will play, the methodological philosophy, and the classroom process that they want in their classrooms. Some districts have adopted various projects or curriculum systems that seem to work well with their students.

The state MCAS tests are only component of an overall assessment system. Many districts have explicit approaches, instruments, and philosophies for conducting individual and classroom assessment at different grade levels.

Many districts have extensive libraries of books, software, and references to outside resources such as websites, national projects, and other content enrichments that they want teachers to utilize.

CLASP Online helps districts weave all of this together into Curriculum Guidelines that provide coherent and useful information to classroom teachers. CLASP Online provides a framework around which this curriculum revision and professional development process can occur – including tools, resources, and a process flow.

3 Encourages collaboration and the upgrading of expectations within and among districts and states.

Few districts have the time or ability to revise and align all curriculum for all disciplines or even all topics within one discipline. However, educators usually work in isolation – teachers in their own room, Principals in their schools, Superintendents in their districts. Sharing effort and material has two benefits. First, it lets teachers, schools, districts, and states jump-start the revision process by building on what others have already done rather than inventing every wheel all over again. Second, it forces everyone to measure themselves against others, a process that has already proven its power to stimulate each person and group to raise their own expectations when faced with superior performance by others.

CLASP Online is designed to facilitate collaboration among educators. Curricular materials (district guidelines, course outlines, assessment strategies, lesson plans, activities, assignments, etc.) can be developed by an individual or a team, reviewed by one or many people, made available to selected categories of people (who are always able to provide feedback to the creators) or to the general public. All submitted material must be evaluated against criteria the district has developed and published for excellence in that area. CLASP inherently exposes teachers and districts to the best of what their peers have to offer, stimulating the defining and ratcheting-up of assumptions about “what is possible.”

From the classroom perspective, CLASP Online is a powerful tool to help teachers create standards-aligned lesson plans consistent with their district learning objectives. Teachers can start by searching through the CLASP Online library to view already entered lesson plans, units, or courses and find lists of many kinds of standards-aligned resources ranging from books to videos to software to websites to curriculum projects. By combining this material with appropriate state standards and District Guideline, CLASP Online instantly – and with no additional effort – gives teachers a context for the class activities.

If the existing material is good, but not exactly what they need, teachers are able to copy CLASP Online

material into their person workspace and then adapt it for their own use.

Teachers and curriculum development groups are also able to use CLASP Online to create new lesson plans, units, or courses. Curriculum creation is usually a collaborative effort, and CLASP Online facilitates the sharing of ideas and drafts among the creative group. But the collaborative tools don't stop with the first draft. In most districts, curriculum needs to be reviewed – sometimes by a group of teachers, sometimes by an Principal or central office administrator, sometimes by outside experts or community members, sometimes by all of the above. CLASP Online is designed to allow for a back-and-forth conversation among the reviewers and the authors, and then facilitates the incorporation of agreed-upon changes into the curriculum materials.

Once a district has reviewed curriculum materials, it can be made available to the entire district as a “draft work in progress.” At some point, however, the district may decide that the curriculum has been tested enough and is of a high enough quality to represent the district's best efforts. At that stage, it can be “endorsed” and made available to teachers in other districts across the state – who then get to see the material when they first go to CLASP Online looking for ideas.

One of the most powerful aspects of CLASP Online are the examples of student work it contains. If standards are the text description of what students will know, student work is the visible embodiment of the standard. When teachers see exemplary student work done in schools that are demographically similar to their own they are immediately drawn into the best kind of conversation – “how did they get their kids to do something this good?” That question, delivered in the CLASP Online context of immediate access to the background curriculum materials, is what can motivate change.

4 Simplifies access to standards-aligned resources.

The market (both for-profit and non-profit) is full of wonderful resources provided by museums, PBS stations, libraries, the web, commercial publishers and other sources. The trick is knowing what material -- books, websites, projects, archives, video, audio, textbooks, curricular packages, projects, and more -- can help students master which learning standards, and then getting access to that material.

CLASP can help resource providers identify the standards most relevant to their material. It then provides a mechanism that lets the provider let teachers become aware about the material exactly when it is most needed. It also allows educators to link their own lesson plans to appropriate external resources, making it easier for themselves and others to re-use the lesson in the future. As a web-based product, CLASP contains live links to many networked resources, thereby encouraging their use within the curriculum. CLASP is also compatible with possible e-commerce uses.

Many districts have invested heavily in particular text books. Many national organizations have created and validated extremely powerful curricular projects and materials. CLASP Online gives classroom teachers access to these materials in a useful and focused manner that is directly tied to the delivery of standards-based education.

5 Encourages data-driven evaluation and accountability.

Assessment of student work takes many forms and serves many purposes. In-process assessment provides instant feedback to the student and teacher, allowing them to adjust their instructional activity. Portfolios allow for a review of progress over time covering a wide variety of dimensions of individual learning and growth. And there are also final exams, in which students are required to demonstrate their mastery in a format capable of evaluative judgement. Among these final exams are the state tests such as the MCAS (for Massachusetts Comprehensive Assessment System).

CLASP Online contains all the MCAS questions from previous tests that the state Department of Education has publicly released. Like SAT reviews, these provide insight into the type of problems that students will be

required to do on the next round of MCAS examinations.

CLASP Online also contains all MCAS results, at the state, district, school and even individual student levels (individual student data is only available through a highly secure, double-password process). When combined with other data, this allows local leaders to pinpoint their district or school's areas of strength and weakness. For example, drawing on the Department of Education's data warehouse, CLASP Online lets users cross-tabulate test results by demographic and other patterns. Using MCAS results to identify curriculum areas that need to be worked on allows for the kind of data-driven decision-making that is one of the strongest strategies for successful improvement.

Continuous improvement requires a constant cycling of attention from standards to curriculum to classroom activity to student assessment to student exemplars and back to standards, as well as in the opposite direction. But completing this circle is difficult because of the difficulty of establishing aligned connection between each of the elements.

CLASP creates the needed correlations. It allows teachers and their supervisors to move from student scores on official assessments back to their curriculum, identifying curriculum areas that need improvement or where more teacher training or other activity is called for. Provides an invaluable and somewhat unique basis for research into the impact of various pedagogues, including the use of technology, on student learning outcomes.

A TECHNOLOGY-FACILITATED PROCESS

CLASP Online facilitates two processes, neither of which has anything to do with technology. The first is curriculum development, which at its heart is a process of discussion, exploration, dissention and agreement about what educators and stakeholders believe students should learn and be able to do throughout an education experience. What this most commonly looks like is a meeting of teacher teams (often grade-level teachers at the elementary level, and departments at the high school level). Depending on the curriculum philosophy of the district, these teachers will either start by exploring the standards and describe how students should demonstrate those standards at each grade, or they will start by examining the existing curriculum and describe how it meets the standards.

CLASP Online transparently supports this process by furnishing the team with three valuable tools: 1) CLASP Online pushes to the team only information that is relevant to their work (e.g. fifth grade science standards or fifth grade science expectations articulated by a different district); 2) CLASP Online gives the team a structured step-by-step process to guide their discussion and help them to know which questions to ask; and 3) CLASP Online provides a place for the team to record their thoughts and store the curriculum they complete, keeping it until the next time they meet to revise or continue working. The vision is not that every teacher on the team be sitting behind a laptop, but more likely, that one team member has launched CLASP Online and inputs the work of the team into the database, while also sharing the information CLASP Online displays with the larger team.

The second process is one of human networking and professional development that set the stage for use of the CLASP Online software within individual districts and schools. Mass Networks staff have conducted intensive on-site needs assessment, training and consulting to help districts create the human organization needed to successfully create and more importantly effectively teach standards-based curriculum. Using insights generated through these district relationships, topics for bi-monthly statewide curriculum conference are identified. These conferences are available to all Massachusetts districts as rare opportunities for curriculum teams to commiserate, share lessons learned, and begin to develop a common knowledge base of best practice in making standards real in student learning. Some participants come with a great deal of knowledge of one particular framework; others come having done their own number crunching and correlating of standards to MCAS questions. All participants leave having forged valuable relationships with other educators across Massachusetts, increasing the collective capacity of all participating districts by identifying sources of expertise in specific curriculum areas.

The other bi-product of these meetings are the reports, papers, and syntheses of discussions authored by Mass Networks staff that archive the valuable lessons learned exchanged at each meeting. Without this larger human process to frame the sharing facilitated by the software, there would be no way of answering questions of *how* districts effectively organize themselves, *where* did they find resources, *why* did they make particular curriculum decisions, *how* did they fund their efforts. In this way, the face-to-face component of CLASP Online seeks to build *sustained* capacity in districts to help students achieve high academic standards, whether a curriculum director takes a job elsewhere, whether the frameworks change, or whether student performance shifts dramatically.

Combining Curriculum and Professional Development

CLASP Online is deliberately intended to facilitate a process that combines curriculum alignment, curriculum development, professional development, and the strengthening of collegial interaction both within and across districts. This is based on an explicit rejection of the belief that “teachers are the problem” and that the solution is giving them “teacher proof” materials – whether it be textbooks or websites – that they are required to mechanically pass on to their students. To the contrary; CLASP Online is based on the premise that teachers’ creativity and connection with their students are the education systems most valuable resources and the key to successful implementation of education reform. But tapping into those resources requires giving teachers the tools and time they need to master the change to a standards-based mode.

CLASP Online allows educators to build on what others have done. It fosters communication around “criteria of excellence” for every document, from District Guidelines to Lesson Plans to Student Work.

One of the constant problems keeping educators from effective collaborative is the babel of terminology that has developed. Each district has its own dearly-held words for key concepts. What students are expected to learn is called “Student Learning Outcomes” in one district and “Essential Learnings” in another and “Objectives and Skills” in yet another. The type of information that should be included in lesson plans differs from elementary to High Schools, along with the order in which each type of information should appear. Conversations often get stuck in long bouts of saying the same things using different words, resulting in enervating arguments that leave everyone wondering why they’re wasting their time. As a relational database, CLASP Online provides a standard format for the development of standards-based instructional planning documents across disciplines & grades. At the same time, because it has a very flexible user interface, CLASP Online allows each district to use their local vocabulary while preserving the ability to communicate across districts.

One of the most important types of support that teachers need is exposure to concrete examples of what standards-based instruction and student work actually look like. The best thing would be for teachers to visit each other’s classrooms followed by focused discussions around how what they had seen related to their school’s goals and standards-based concepts. But it is seldom possible for every teacher to take this kind of time. CLASP Online provides a way to see other educator’s practice without actually being there. Most significantly, users of CLASP Online can see examples of student work along with the rubrics used to evaluate them.

LEADERSHIP AND ACCOUNTABILITY

The decentralized governance traditions in states like Massachusetts have been paralleled by similarly decentralized control over classroom practice in districts and schools. Districts were, by and large, allowed to set their own criterion for promotion and graduation. Schools were, by and large, allowed to establish their own academic affairs. Teachers were, by and large, seldom told what to do with their students.

As a result, the vocabulary used to describe the learning process and student outcomes varies greatly from district to district. In many districts, there has been little coherence across the grade spans. Each grade, each school, sometimes even each teacher set their own curriculum so that students entered a new class with widely varying preparation, the same topics were often repeated year after year, and other topics were not covered at all.

The move to a standards-based education changes this in at least one fundamental way: every teacher, school, and district is now held responsible for getting all their students to know enough to pass the required state assessment tests. This requires creating district-wide guidelines to ensure that all required topics are taught in an effective sequence. It requires extensive teacher training to ensure that they can adequately cover topics they may not have previously taught.

The challenge of curriculum alignment and revision, coupled with professional development and team-building, creates many opportunities. It is a chance for districts to think through their vision of the nature of the overall learning, instruction, and assessment processes that they wish to employ. It is an opportunity to change the nature of professional supervision, moving from a focus on discipline to an emphasis on collegial support and emulation. It is an opportunity to change the culture of professionalism in a school or district, by using the need for collaborative creation and review of new curricular materials as a path to peer-group accountability.

But all this won't happen by itself. It takes sophisticated leadership and the right tools. CLASP Online is intended to be part of the tool-kit. It is designed to foster interaction and communication around key educational issues.

CLASP Online also provides an opportunity to bring other community stakeholders into the education reform process. It makes the district's curriculum visible, along with the examples of student work that turn the sometimes abstract standards into concrete models of what is going on in the classroom. This allows people to have a more sophisticated understanding of the connection between results (e.g. MCAS test scores) and the instructional approach that underlies it.

CONCLUSION

CLASP Online grew out of the needs of educators and has been developed through a slow and careful process of continually testing new software tools with the people who will be using it. It is intended to be useful not only for the technology-savvy pioneers but for "the rest of us," the mainstream educators and administrators who need help dealing with today's real problems. By using technology as part of the solution, CLASP Online helps prepare them for other kinds of technology integration.

CLASP Online is designed to help raise the quality of student learning outcomes by raising the quality and appropriateness of the relevant inputs. It contains built-in rubrics and evaluation criteria for district guidelines, lesson plans, technology integration, student exemplars, outside resources, and other elements. By facilitating a collaborative process, CLASP Online helps focus educators attention on these success factors.

CLASP Online facilitates a large number of key education reform processes required to meet the challenges of standards-based education. It is not meant to provide a complete solution to any of these challenges, but to be an important catalyst for the larger efforts that will be required.

CLASP Online as a Model of Education Technology Development

The failure rate of major software development programs is astoundingly high; some estimates put it at over 75%. Not only are big projects inherently complex undertakings, with all the problems that entails, they often loose touch with the real needs of the people who will be using the final product. This sometimes happens because high level managers approve an application design based on their perception of what is needed, when their staff's front-line reality actually is quite different.

In order to solve these problems, a variety of new methodologies have been created. Participatory design, based on a Scandinavian approach, holds that all major software projects should go through an iterative prototyping process that repeatedly give final users a chance to test various modules of the product in real-life situations.

The design for CLASP Online has been created using Participatory Design principles, and it is anticipated that the final software development will be done in the same manner.

Another common problem with software is ease of use. There is often a trade-off between giving users all the functionality they might need to deal with every possible situation and making the application too complicated for normal use. In CLASP Online, this tension has been managed through a two-level User Interface (UI) design. Users can get useful information from the application with minimal input. The UI is designed to provide visual connections between related types of information, and to provide visual reminders of where the user is in the curriculum preparation process. As a result, users don't have to keep it all in their minds. However, as they become more sophisticated users, ready to take on more complex problems, they can change the UI to get quicker access to more functionality, or begin using secondary areas of the screen to tap into the deeper power of the product.

Most fundamentally, CLASP Online does not try to be a stand-alone product. It is designed to facilitate collaborative efforts, both on-line and face-to-face, among many different groups. The database at the core of CLASP Online is designed to be part of a system of communication that uses the software to facilitate, structure, and document the interpersonal process. In this sense, CLASP Online "stands on two legs" by connecting both the virtual and "real" worlds.

Virtual Education Space - A Vision by T.S. Vreeland

In the beginning, all new technologies are perceived as magic.....

Arthur C. Clarke

VES is an opportunity for the "**reengineering of the educational enterprise**". It is a synergistic way to knit together the diverse, and seemingly disparate, information technology initiatives of DOE, to identify new opportunities for synergy, and to build a blueprint for the missing but complementary initiatives, which should be built or funded in the future. Building a virtual learning landscape involves conception and creation of online virtual processes, tools, and spaces that mirror the real world elements of our enterprise: public education in Massachusetts. While the virtual landscape is not intended to supplant the real-world enterprise, it can greatly contribute to the accomplishment of our enterprise mission in the 21st century. Real estate in the virtual landscape is cheaper, edifices can be built in days instead of years, rich 'any to any' network connectivity replaces limiting hierarchical connectivity, and communication occurs at the speed of light.

The DOE **Virtual Education Space (VES)** can provide Massachusetts students and teachers with their first and best introduction to 21st century **virtual workspace, playspace, and learningspace** and it can help prepare them to excel there.

AUDIENCE: As a first evolutionary stage in the development of the virtual learning landscape, VES, should be targeted to serve those with enough connectivity, and enough hardware and infrastructure to use it. (the big middle) The two groups least able to be served by it initially might be the technology "have nots" and those districts and schools with advanced technology capabilities who have or will be creating their own intranet learning landscapes.

It is not enough to just serve that middle though.... because it would create greater inequities in those underserved districts and because much of the energy, creativity, and critical mass active in the advanced technology districts is needed by VES for its success.

A VES strategy which works for "the technology middle" could work for the technology "have-nots" if grant funding activity, technology professional development funding, and leadership services were targeted on those schools.

A VES strategy targeted to "the technology middle" **MUST** understand, contemplate, and embrace the diverse experiments and implementations of advanced technology districts in their attempts to create a learning landscape. How do you create synergies (which strengthen VES) in place of costly competitive (but "invented there") solutions (which will eventually weaken VES)?

I believe that there are three important answers to this question:

- 1) Have a large enough vision
- 2) Assure that your vision is architected to be inclusive and scalable without breaking
- 3) Make sure there is an "economy of beneficial participation" In such an economy, small tentative participation yields immediate benefit, investment in full scale participation yields both startup and ongoing benefit, and decisions to substitute VES for existing initiatives must be supported by tangible and substantial ongoing benefits.

POTENTIAL: If we take a few steps backward, we probably all agree that VES together with MCN promises to have a **profound, but initially subtle, impact** on the way we educate in Massachusetts. In a similar way, finally providing teachers with tools that enable them to create, deliver, and manage standards based instruction in their classrooms, aligned to district curriculum and state learning standards, is a really quite a radical thing to do, and it will have **revolutionary consequences**. But, to be used, to be of value, to become a real focal point in the daily life of educators, and those being educated, VES needs to answer **real needs**.

What are some of the needs it could answer?

- 4) One of the greatest needs teachers have as they begin to build electronic lessons and interactive activities for their classes, is to be able to make the substantial investment of time and effort required to do it thoughtfully and well pay off.. For teachers who teach the same class to different groups of students in the day or year, there is a built-in payoff through an economy of scale, for their investment in developing quality materials. For other teachers, it will be in the sharing of quality teaching tools and materials developed by other teachers that will enable them to begin to receive substantial value from VES.
When instructional resources are modularized, keyed to the state learning standards and district curriculum, accompanied by rubrics and complemented by validated assessment tools, and are available in large numbers and are easy to access and use, teachers will contribute their best work in return for access. VES could provide a "instructional unit of study banking metaphor". The metaphor will not work if it is not supported by a rich knowledge architecture that goes beyond being simply an organizing principle based on the frameworks. A knowledge architecture must make it possible to organize curriculum and instructional modules, tools for their creation, and the learning interfaces which make them accessible, in ways which respect diverse teaching and learning styles.
- 5) Teachers need better tools for their craft.... **building, transforming, and transferring knowledge architectures** is their craft. They need a new generation of productivity tools that will enable them to reduce duplication of effort, make them more efficient, and will enhance their creativity. Teachers need a common suite of administrative tools which are integrated with student information resources to do their jobs better, with less effort of skilled professionals being siphoned off to accomplish mundane repetitive activities (copying worksheets, writing and grading quizzes, giving students and parents frequent feedback.) Teachers need better tools for management of learning, which will keep them consistently appraised of individual student progress, achievement, and difficulties.
The "killer app" which VES will bring into reach, is the opportunity for all teachers, in regular classrooms, to be able to set high but achievable standards, and individualize instruction for **every** student. Teachers also need better tools, once they have diagnostic knowledge about student difficulties, to help them to prescribe appropriate remediation (or to fix the instructional modules, which caused the difficulty). Teachers today have far too little time to collaborate with their peers, communicate one-on-one with their students, and interact with parents. VES needs to help teachers communicate and collaborate better.
- 6) Learners (whether they be teachers or students) already understand that the online world is a potential source of rich learning, playing, and working experiences. While they are frustrated by the **organic disorganization of cyberspace** they also recognize that with effort they can explore and mine its riches. Learners need better organizational and presentational metaphors for accessing online-resources - they need smart Information and Knowledge Portals. Learners need online curriculum modules, which they can use together with their class, or individually, to inquire, to seek, and to learn. Learners need rubrics and assessments, starting with self-assessments, which lead to true competencies and mastery. Learners need challenges, and recognition when they meet or exceed those challenges. Learners need to be able to select learning resources and strategies that match their personal learning styles. Learners need to control the pacing of their learning, and students want to be free to go deeper than the curriculum (time and scope) permits, in areas that interest them.
To deny them these things, is to deny them the greatest gifts of learning. Learners want to share their work, ideas, and accomplishments with others. And, all learners want to learn more about other learners, especially those whose lives, surroundings, challenges are different from their own.
- 7) The teaching and learning community, and those in the larger community that care about teaching and learning, need ways to know more, share more, and participate more. One of the greatest unmet needs and opportunities, is the extension of our teaching and learning communities in time and in space.

Communication between parents and teachers, teachers and teachers, students and students can be enhanced by technology. Infusion of community resources through tele-mentoring, virtual field trips, video-conferencing, and other technologies becomes possible. Year round and round the clock communications capabilities can truly create a virtual community school without walls.

Public education's primary mission remains the same: to set high standards and to meet those standards, challenging every student to meet them, too. Public schools are also being challenged, today, to take on a new, and extended, set of roles in the 21st century as a provider of just-in-time education to government and business, adult learners, and all in the community in need of basic literacy.

ARCHITECTURE: One architecture for VES could answer these four sets of critical needs within four essential spaces.... **KnowledgeSpace, TeachingSpace, LearningSpace, and CommunitySpace:**

KnowledgeSpace -

Architecture of content, connections, and structure mapped to the frameworks (and beyond?)
Tools for content creation, management, validation, and pruning
Learning interfaces, independent of content, supporting a variety of learning styles and users
Dynamic filters, maps, and portals for connection with other knowledge spaces (www, etc)

TeachingSpace -

Standards based models and templates to help teachers design their instruction
Tools for creation of curriculum resources modules - and links to content
Teacher productivity applications and tools workspace - (tightly integrated with StudentSpace)
Assessment, Diagnostic and Prescriptive tools to help individualize instruction

LearningSpace - (for teachers and students)

Inquiry, Tutorial, and Reference Interfaces to KnowledgeSpace respecting different learning styles
Learning Portals and standards based Instructional Modules to organize and present
KnowledgeSpace
Exhibition and Portfolio Spaces and tools for creation and presentation of work
Competency and Mastery Ladders as benchmarks for Learning that transcend simple assessments
and connect to real world skills and transportable credentials

CommunitySpace -

Teacher collaboration space
Learner collaboration space
Learning community space