

Change Management Plan

“21st Century Professional Development” Program for Pender County Schools

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This change management plan utilizes the Concerns-Based Adoption Model as a process for implementing a professional development program identified as an intervention through a needs assessment process. The plan outlines the design and development of a “21st Century Professional Development” program whose components include a suite of tools, a course/knowledge management system, a new professional development designation and a district technology showcase to highlight teacher accomplishment and promote district collaboration.

INTRODUCTION

In response to the impending revision to the Pender County Schools (PCS) 2008-2012 Technology Plan as mandated by the State of North Carolina, a needs assessment (NA) was conducted to determine appropriate strategies to guide the Instructional Technology professional development for the next five years (the required scope of the plan). Using Allison Rossett's Training Needs Assessment as a framework for the NA, the team utilized focus groups, interviews and a teacher survey to determine both optimal and actual performance for teachers and administrators in the district.

In collaboration with the Superintendent and Instructional Technology Coordinator, a list of optimal tools was developed and tools for the NA were designed. Through analysis of both qualitative and quantitative data, a list of recommendations was determined to guide the development of measurable strategies that will be included in the Technology Plan.

These strategies all align to Goal 2 of the State Strategic Plan, "Future-Ready Schools for the 21st Century," which is intended to drive professional development initiatives in state school systems. The general purpose of the recommendations is the establishment of a "21st Century" professional development program that promotes collaborative learning communities through the use of emerging web-based tools. The intention is that teachers will utilize these tools in their own professional development, gain access to them in their classrooms, evaluate possibilities for classroom use, and begin to use them in their own instructional design.

A DISCUSSION OF RECOMMENDATIONS

As a result of the NA, the following strategies were recommended as strategies to be included in the PCS 2008-2012 Technology Plan ([Appendix A](#)):

- Research, approve and install a district collaboration and communication suite.
- Design and develop a "21st Century" professional development curriculum designation.
- Expand the use of Moodle (or other course management system) to provide online professional development.
- Promote and launch a district technology conference to increase teacher collaboration and communication of "best practices."

The above recommendations point to the development and support of a professional development designation labeled "21st Century." The "21st Century" label is an attempt to design, develop and deliver a comprehensive (standards, tools and support) professional development program that is aligned to both the vision of the district and the North Carolina State Board of Education's (NCSBOE) "Future Ready Students for the 21st Century" strategic plan. As the vision was set by the NCBOE, the strategies to reach that vision are determined by the school district. The development of this program will force those responsible for teacher professional development in PCS to re-examine their current training programs and, in aligning to the new standard, upgrade them using new approaches, strategies and tools. Although other plans that address approaches and strategies will need to be developed, the PCS Technology will address the tools needed to support school, district and global communication and collaboration.

This professional development upgrade will require an analysis and adoption of new tools, the development of a knowledge/course management system and a way to highlight and support the work of individuals within the system. The adoption of a web-based collaborative suite will allow PCS teachers to communicate and collaborate with colleagues within their school and district, while providing the knowledge and skills to collaborate globally. By expanding the use of Moodle, the district professional development leaders will be able to manage a knowledge base, teach online and hybrid courses, manage project teams and provide support for district and school-based learning communities. Showcasing projects, approaches and strategies by hosting a district “technology conference” will serve as both incentive and support for individuals to adopt. This event will also help sustain and extend the “21st Century Professional Development” program.

MODEL FOR CHANGE

To implement these changes, the Concerns-Based Adoption Model (CBAM) will be used. CBAM (Hord & Hall, 1987) is a model of systemic change used primarily in public school systems on the national, state and district levels. Currently, CBAM is being used by the National Academy of Sciences to aid in science teaching reform.

CBAM is similar to other change models in that it identifies both the process of change and characteristics of potential adopters. CBAM identifies seven “stages of concern.” Like many models, CBAM appears to be based on Everett Rogers’ (1962) Diffusion of Innovations which identifies knowledge, information-seeking, decision, implementation and confirmation as the stages of adoption. CBAM uses a similar approach, but, like Burkman’s (1987) User-Oriented Development Model, the adopter is the center of the process.

Hord and Hall’s (1987) Stages of Concern



At each “stage of concern,” strategies have been designed and will be described as the implementation analysis is discussed below. Strategies will address not only the stages of concern, but also attempt to describe approaches appropriate for variety of potential adopters. Like Rogers (1962) and Burkman (1987), CBAM also describes five different “types” of adopters, but uses different terminology.

Comparison of Potential Adopters Identified by Rogers (1962) and Hord and Hall (1987)			
Rogers (1962)	Hord and Hall (1987)	Percentage	Description (CBAM)
Innovator	Innovator	8%	Eager to innovate, open to change, willing to take risks
Early Adopter	Leader	17%	Open to change, but more thoughtful of process of change
Early Majority	Early Majority	29%	Cautious and deliberate about innovation adoption
Late Majority	Late Majority	29%	Skeptical of change, somewhat “set in their ways”
Laggards	Resisters	17%	Suspicious and opposed to new ideas

Not only will the implementation plan account for the varying characteristics of potential adopters and strategies for each phase of adoption, it will also address common organizational characteristics favoring and combating the diffusion of this program, identify a core implementation team, break the project into stages.

IMPLEMENTATION ANALYSIS

FORCES FOR AND AGAINST THE PROJECT

Supporting and opposing forces exist with any proposed change. For the implementation of this change, an analysis of these forces has been done ([Appendix B](#)) in order to help identify possible risks to the project and opportunities on which to capitalize as the project progresses. An analysis of research in staff development (Loucks-Horsley et al. 1987) suggests that effective professional development programs have the following characteristics:

- Effective research-based content;
- Collaborative approach;
- Based on teacher needs and their participation in the needs assessment process;
- Administrative support for experimentation and risk taking;
- Time to practice;
- Integrated approach to professional development goals;
- Clear expectations and ongoing support;
- Appropriate and sufficient incentives and rewards; and
- Knowledge about learning and the process of change.

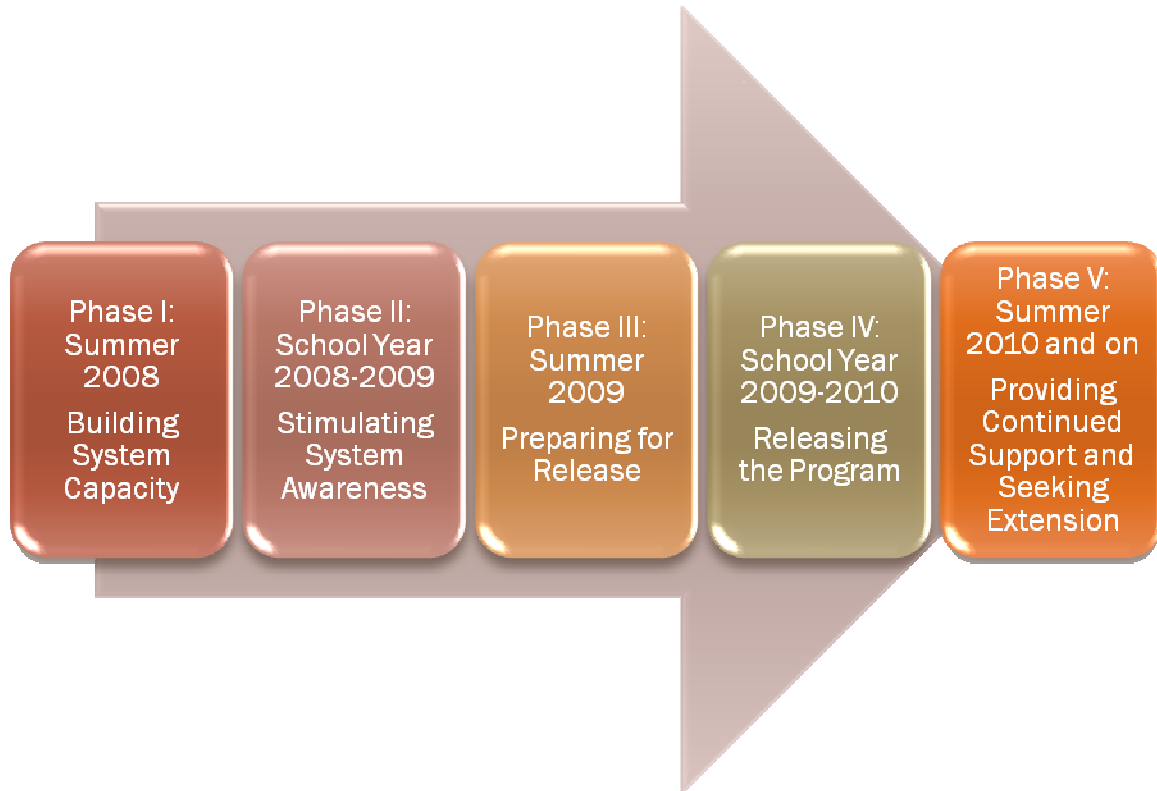
In developing this plan, consideration was given to the above characteristics and many were included as favoring forces. The driving force for this project is that a change in focus has been mandated by the North Carolina State Board of Education in their strategic plan. In implementing the changes, the ability to show alignment with a State initiative is critical to their understanding of why the change is occurring. From the needs assessment, teachers are also very interested in the collaborative tools included in the suite, but felt that their access to them was limited. This intervention will directly correlate to that problem and hopefully be a visible sign that someone has listened to their feedback. Since PCS is a geographically large district, one major concern of past needs assessments is the requirement for some teachers to drive to meetings and professional development opportunities (sometimes the travel time is 45 minutes). The inclusion of a collaborative communication suite will be a welcomed change. Time to practice and create materials will also be included as part of this initiative, which is always welcomed by teachers, who feel that they never have enough.

In addition to favoring forces, several opposing forces have been identified. One problem that always arises in school district initiatives is time – time for teachers to understand, learn and implement new practices. To combat this, the project will include work sessions and other opportunities for teachers to have time to develop materials. Another issue that will arise is the limited knowledge that system stakeholders have of the State Board strategic plan and how to implement it. Strategies to create awareness and provide information about the “Future Ready Students” plan will be implemented to increase awareness among stakeholders. The implementation of this innovative program will also require stakeholders to change the way that they will participate in professional development. Rather than traveling to a two-hour workshop, listening and taking notes, teachers may be involved in workshop extensions, collaborative projects or be required to participate in a learning community to receive CEU credit. Another issue is placing professional development requirements on teachers. Since the needs assessment process revealed that technology credit no longer being required of PCS teachers was identified as a problem, a requirement for “21st Century” CEU’s would serve as a substitute where teachers will gain technology integration skills. In order to establish this requirement for PCS teachers, the BOE will have to approve it. This presents a challenge to the implementation team.

IMPLEMENTATION STAGES

A five-phase, three-year plan has been developed to implement the plan ([Appendix C](#)) and utilizes CBAM’s seven stages of adoption to assist in strategy development ([Appendix D](#)). Since this plan is designed to drive systemic professional development change, a certain level of flexibility has been built into the timeline and only macro-level milestones or micro-level projects are identified. As each stage of implementation is executed, a project plan and timeline should be developed to identify benchmarks, workflow, milestones and products of each strategy. For example, the process of researching and selecting a collaborative suite must be broken into subsequent steps and processes to ensure a true evaluation was conducted and that software meets requirements. This will ensure that, if a package needs to be purchase, it will be done in a fiscally responsible manner. Implementation will occur in five stages:

General Overview of Implementation Phases



The above graphic describes the implementation of the PCS “21st Century Professional Development” program. Each stage of the process is populated with strategies designed to meet the overall phase objective. Components were used to develop the strategies (i.e. District Collaboration and Communication Software Suite (component) → (Phase 1 Strategies - 1. Research and select collaborative suite. 2. Identify any needed financial or technical resources to install suite.) → (Phase 2 Strategies – 1. Install collaborative suite on district computers. 2. Design and develop collaborative suite training. 3. Train ITAT to use collaborative suite. 4. Implement collaborative suite training to teachers.). Resources, constraints and risks have been identified for each component of the overall process (see [Appendix A](#)).

To implement the program, eight groups of stakeholders have been identified. Some of these are identified as change agents, or instrumental stakeholders in the planned change. They include the Instructional Technology Coordinator, Superintendent, Assistant Superintendent and District Instructional Team since these stakeholders are directly responsible for the district vision and design of the professional development program. They will be directly responsible for creating awareness of, disseminating information about and providing support for the change. They will also define the “21st Century” professional development standards and design/choose appropriate strategies to meet them. In addition to the identification of roles, a strategy ([Appendix D](#)) has been developed to determine in which order to utilize the strengths of each. This “stepping stone strategy” will help change agents to understand who the most critical stakeholders are at each phase of implementation.

The Instructional Technology Assistance Team (ITAT) is a group of innovators and school leaders who have been identified by principals to train and support teachers. In past initiatives, they have been extremely helpful in both formative evaluation and implementing district initiatives through training and support. As a whole, they value and embrace change. They receive a small stipend for acting in this role in their school. They were used in needs evaluation and will conduct product evaluations, help create awareness of new tools and initiatives, train and support teachers as the program and tools are executed.

Principals as initiative leaders are critical to the success of an initiative. In a school, the principal not only serves as the instructional leader, but also the building manager, teacher evaluator and financial controller. Their support for and understanding of an initiative is critical to the change process in a school system. Their participation in Phases 2 and 4 of the implementation is critical to teacher awareness, understanding and adoption of the new tools and professional development program. They must have a clear understanding of why the initiative is taking place, how it will involve them and how their teachers will be affected. Principals in PCS fall into all categories of potential adopters in their own right, but must be used as leaders for their schools. The ability of the Superintendent to communicate this will also be a critical piece of the process. As the ITAT was identified as stepping stone 1 in diffusing the innovation, principals will be involved very shortly after. The reason for not involving the principals first is because having a member of the ITAT (mostly innovators and early adopters) at the school will increase the chances of an initial conversation about the initiative or demonstration of tools from a positive perspective.

Three groups of teachers will follow the principals in the “stepping stone” strategy. The first set of teachers that should be included will be the “resisters.” Having the change agents and leaders provide information, build relationships and drive the opinions of this population of teachers will be helpful in developing strategies for both the early and late majority adopters. Resisters are typically categorized as suspicious and opposed to new ideas. In a school system, this includes teachers who are nearing the end of their career and others who have felt “left out” of previous initiatives (either in non-tested curriculum areas or underfunded program areas such as the arts). Developing an awareness and understanding of the initiative among this group may not facilitate their adoption, but it will help to contain the spread of misconceptions among the early and late majority groups (the targets of any initiative – representing approximately 58% of the district population).

Groups E and L (early and late adopters) will be primarily targeted during the stages that involve training and support, although developing awareness, providing information and helping them to personalize the initiative will assist in their adoption. Trainings will be developed to focus on this group and after training, the ability of the change agents to nurture and support their use and acceptance will also be critical.

SUPPORTING, REFOCUSING AND EXTENDING THE INITIATIVE

Burkman (1987) identifies four levels of support designed to build capacity for change within an organization: moral, tactical, training and material. Moral support can come in forms of encouragement, either material, verbal or through recognition. Not only will change agents work on a personal level with adopters to offer support, but the introduction of the “PCS Technology Conference” will provide adopters with an opportunity to showcase their work as well as earn

CEU's. Tactical support includes removing or changing organizational practices that impede implementation. The installation of a district collaborative software suite will provide adopters with tools to aid them as they investigate ways to personalize the proposed changes in their own work. Training support will be offered in the form of workshops, work sessions and one-on-one assistance from change agents and school-based leaders. Material support will include the development of a "21st Century" knowledge base that will provide teachers with theoretical articles, plans, lesson-sharing and forums to communicate with colleagues about their change process and provide an environment for collaborative project development.

As the project is implemented and adopters begin to progress through the CBAM stages, change agents will focus on refocusing adopter thoughts to how they can improve their use of the tools and strategies. The goal is to develop learning communities among teachers where they will share new ideas, enhance their own instructional strategies and work together to solve new instructional problems using knowledge, skills and attitudes acquired from the "21st Century Professional Development" trainings, materials and support.

EVALUATION OF THE PROCESS

As the phases of the project progress, each component of the project will be evaluated based on the "levels of use." Hord and Hall (1987) identify seven levels of use and behavioral indicators in the CBAM change model:

Levels of Use	Behavior Indicators of Level
VI. Renewal	The user is seeking more effective alternatives to the established use of the innovation.
V. Integration	The user is making deliberate efforts to coordinate with others in using the innovation.
IV. Refinement and Routine	The user is making changes to increase outcomes. The user is making few or no changes and has an established pattern of use.
III. Mechanical	The user is making changes to better organize use of the innovation.
II. Preparation	The user has definite plans to begin using the organization.
I. Orientation	The user is taking the initiative to learn more about the innovation.
0. Non-use	The user has no interest, is taking no action.

The above levels will be used to develop evaluation tools that will be used by change agents on a yearly basis to conduct formative evaluation of the change process. Data from this evaluation will be used to adjust the change plan or continue on the planned course of action. The tools will evaluate the implementation of identified components and require change agents to collect data through the use of focus groups, surveys and interviews with different categories of adopters. At the beginning of each summer, a meeting will occur that will include a discussion among change agents and school-based leaders, analysis of data and development of interventions to ensure the success of all components of the adoption process. At this meeting, products and processes will be analyzed, strategies for working with specific adopter groups will be discussed and developed and the project timeline will be critically evaluated.

APPENDICES

Description of Components A

Identification of Common Forces within the District B

Proposed Project Phases C

Key Project Roles D

Identification of Adoption Stages E

Project Timeline F

APPENDIX A: DESCRIPTION OF COMPONENTS

Recommendation 1: District Collaboration and Communication Software Suite	
Description	Research, approve and install a suite of collaboration and communication applications (wiki, blog, instant messaging, online whiteboard application, and discussion board) to facilitate both teacher collaboration and classroom use. This software suite should be used in three ways to encourage use – learning communities, online professional development activities, roll-out to early adopters. Research will include a network feasibility, security and risk evaluation for each identified tool.
Projected Timeline	6 Months (includes time needed to secure funding and purchase)
Resources	Personnel: Instructional Technology Coordinator, Network Coordinator, Technology Director, (3) School-based Technology Leaders – Elementary, Middle, High School Tools: Evaluation Tool for each application.
Constraints Identified	Financial: Money is always a constraint in school district projects. This initiative may determine subscription service offers best package. This will require funding. Policy: Package must integrate with current network and security software. All tools must be deemed appropriate for use with students (content, accessibility, security, etc.)
Risks	No package offers the amount of needed security. Package is identified, but money is not allocated to purchase it.

Recommendation 2: “21 st Century” Professional Development Designation	
Description	Design “21 st Century” professional development curriculum. Begin with listing characteristics of a course. Develop two model courses and use as models of “21 st Century Learning Environments.” Continue to develop and utilize teachers to develop more professional development in this manner by identifying a number that will be developed per year over a 5-year period. Develop an approval process for out-of-district courses by designing standards.
Projected Timeline	1 year
Resources	Personnel: Assistant Superintendent for Instruction, District Instructional Team, Teacher Focus Group; Material: Current research on “21 st Century” teaching and learning
Constraints Identified	Financial: Instructional Team and Focus Group registration for workshops and seminars to gather information to define the curriculum. Personnel: No instructors or courses are currently identified. Materials: No model currently exists for this type of initiative. Policy: Curriculum must integrate into current professional development program and policy must reflect its inclusion. Board of Education (BOE) should approve of this initiative. BOE must approve any requirement placed on teachers to earn Continuing Education Units (CEU).
Risks	BOE does not approve initiative. Curriculum design takes longer than expected. Curriculum becomes “watered-down” and does not accurately distinguish this designation from “normal” professional development.

Recommendation 3: Expanded Use of Moodle (or other Learning Management System)	
Description	Train Instructional Team to use Moodle and deliver online courses and develop online learning communities as extensions of face-to-face professional development. Expand this training to teachers to use in their classrooms - starting with innovators and early adopters.
Projected Timeline	2 years
Resources	Personnel: Assistant Superintendent for Instruction, District Instructional Team, Teacher Focus Group, Technology Director/Network Coordinator; Instructors to teach the courses must be identified. Materials: Courses already under development and a list of courses to be developed. Tools: Moodle Online Course Management System (CMS)
Constraints Identified	Financial: CMS's other than Moodle will be quite expensive (\$15,000+ per year) and not affordable unless district determines it to be a priority. May need funding for course development and facilitation. Materials: Not many courses have been developed for professional development. Tools: CMS must integrate with existing network infrastructure. Policy: Courses must align with "21 st Century" professional development designation;
Risks	Moodle interface deemed too complex for teacher use and district will not approve purchase of alternative system. Not enough courses are developed to sustain demand.

Recommendation 4: Annual District "Technology Conference"	
Description	Design and launch a district "Technology Conference" to promote learning and sharing of ideas.
Projected Timeline	6 months
Resources	Personnel: Instructional Technology Coordinator, Technology Assistance Team and other potential instructors/presenters Financial: Small budget from Title II, Part D Enhancing Education Through Technology (EETT) to cover expenses Materials: Printing (marketing, programs, posters, etc.) Tools: Laptops, desktops, peripherals, classrooms for presentations/workshops
Constraints Identified	Personnel: In the past, recruiting workshop instructors has been a challenge, especially if they aren't paid. An incentive must be developed. Teachers must also see a personal benefit for attendance. Financial: Only EETT budget is currently identified to support this initiative.
Risks	<ul style="list-style-type: none"> • Turn-out at conference does not justify the expense. • Teachers are not motivated to attend. • BOE doesn't approve "21st Century" professional development initiative or district requirement. • Number of workshops/seminars cannot support attendance.

APPENDIX B: IDENTIFICATION OF COMMON FORCES WITHIN THE DISTRICT

Forces Favoring Innovation	Forces Against Innovation	Importance to system	Ease of Change
		Rating: 1 (least) to 10 (most)	
State Board Strategic Plan has mandated that districts implement change.		10	5
With web-based collaborative tools, teachers will be able to communicate and collaborate in professional learning communities without having to travel.		10	3
Teachers are generally interested in using proposed tools.		9	8
Plan will include time for teachers to practice identified skills		10	10
	Currently, teachers and administrators have limited knowledge of the State Board Strategic Plan and how to implement it.	8	5
	This innovation will require teacher to change the way they participate in professional development.	3	3
	This program will require approval from the BOE, which can be a process.	9	3
	This change may place an additional professional development requirement on teachers.	9	3

APPENDIX C: PROPOSED PROJECT PHASES

Project Stages	
Year	Strategies
Phase I: Summer 2008 Building System Capacity	<p>Research and select collaborative suite.</p> <p>Identify any needed financial or technical resources to install suite.</p> <p>Introduce “21st Century Professional Development” initiative to district and school-based administrators.</p> <p>Install Moodle to a district server and learn how to use it.</p>
Phase 2: School Year 2008-2009 Stimulating System Awareness	<p>Present initiative and components to BOE, administrators and teachers.</p> <p>Install collaborative suite on district computers.</p> <p>Instructional Team identifies standards for “21st Century Professional Development.”</p> <p>Develop two online courses using Moodle.</p> <p>Design and develop collaborative suite training.</p> <p>Train ITAT to use collaborative suite.</p> <p>Implement collaborative suite training to teachers.</p>
Phase 3: Summer 2009 Preparing for Release	<p>Develop more online courses and formatively evaluate the two existing courses.</p> <p>Develop district expectations for “21st Century Professional Development” and present to BOE for approval.</p> <p>Design and develop more “21st Century Professional Development” courses.</p>
Phase 4: School Year 2009-2010 Releasing the Program	<p>Design “PCS Technology Conference” and recruit presenters.</p> <p>Promote “PCS Technology Conference” to school-based personnel.</p> <p>Implement local “21st Century Professional Development” requirement.</p> <p>Implement use of Moodle for online courses and knowledge management.</p>
Phase 5: Summer 2010/School Year 2010-2011 Providing Continued Support and Extension	<p>PCS “Technology Conference” Implementation</p> <p>Continued support for and development of “21st Century Professional Development” program.</p>

APPENDIX D: KEY PROJECT ROLES

Key Players in Initiative and “Stepping Stone” Strategies			
Names	Role in innovation	Resources/Constraints	“Stepping Stone” Strategies
Instructional Technology Coordinator	Change Agent	Resource – can plan and bring about change Constraint – seen by teachers as an innovator, tech-savvy	
Superintendent/Assistant Superintendent	Change Agent	Resource – sets vision for district Constraint – must act and speak carefully as position is largely political	
District Instructional Team	Change Agent	Resources – have built relationships with teachers and are seen as curricular experts Constraints -	
Instructional Technology Assistance Team (ITAT)	Leaders/Innovators	Resources – teachers identify with them because they are school-based Constraints – may not always be a political leader in the school	Stone 1
Principals	Leaders	Resource – have the power to drive school change Constraint – cannot devote too much time to the project, must also manage the school	Stone 2
Teacher Group R	Resisters	Resource – can help identify “holes” in strategies Constraints – are unwilling to change behavior	Stone 3
Teacher Group E	Early Majority	Resource – willing to change, may have influence over others	Stone 4
Teacher Group L	Late Majority	Resources/Constraints – may or may not “buy in” to change	Stone 5

APPENDIX E: IDENTIFICATION OF STAGES

Stages of Innovation							
Intervention Strategy	Awareness	Information	Personal	Management	Consequence	Collaboration	Refocusing
District Collaboration and Communication Software Suite			Suite will be integrated into existing professional development.	Use of suite will be a component of designated “21 st Century Professional Development.” Leaders and others wishing to deliver the courses will be trained to use of the suite.			Additional training/work sessions will be offered to teachers who wish to use software with students.
“21 st Century” Professional Development Designation	Instructional Technology e-Newsletter will be published to highlight this and other initiatives on a monthly or quarterly basis.	Identified strategies will be presented and demonstrated at the monthly principal meetings and to the BOE. This information is usually disseminated to school-based personnel.	Teachers will be sent standards for “21 st Century” professional development via email. They will be informed of potential district requirements.	Teachers identified as instructors will be trained in the components of “21 st Century Professional Development.” CEU’s will be offered for their development time.			Continued development of courses aligned to this designation.

Intervention Strategy	Awareness	Information	Personal	Management	Consequence	Collaboration	Refocusing
Expanded Use of Moodle (or other Learning Management System)			Use of Moodle to extend current professional development and as a platform for online courses	Use of Moodle will be a component of designated “21 st Century Professional Development.” Additional training/work sessions will be offered to teachers who wish to use software with students.			Additional training/work sessions will be offered to teachers who wish to use software with students.
Annual District “Technology Conference”	Instructional Technology e-Newsletter will be published to highlight this and other initiatives on a monthly or quarterly basis.	Identified strategies will be presented and demonstrated at the monthly principal meetings and to the BOE. This information is usually disseminated to school-based personnel.	Identified leaders will be approached to present, then a call for proposals will be sent to others using the email system and in the newsletter.	An identified number of CEU’s will be offered for teachers who are presenting at the conference.	Teachers would receive Continuing Education Credits (CEU’s) for attending conference, “21 st Century” CEU’s for presenting a technique or teaching a skill.	A learning community will be created to highlight conference presentations and provide resources to teachers wishing to get more information, participate in a future presentation or find other teachers hoping to collaborate on a project.	A student conference will be developed to highlight innovative student use of technology will become a component of the conference.

REFERENCES

- Burkman, E. (1987). Factors Affecting Utilization. In R.M. Gagne (ed.) *Instructional Technology: Foundations*. Hillsdale, NJ: Lawrence Erlbaum Associates. pp.429-455.
- Hall, G.E. & Hord, S.M. (1987). *Change in Schools: Facilitating the process*. Albany: State University of New York Press
- Loucks-Horsley, S. et al. (1987). *Continuing to learn: A guidebook for teacher development*. Andover, Massachusetts: The Regional Laboratory for educational Improvement of the Northeast and Islands.
- National Academy of Sciences, (2005). *Professional Development of Science Teachers*. Retrieved April 15, 2008, from National Academy of Sciences Web site:
<http://www.nas.edu/rise/backg4.htm>
- Rogers, Everett M. (1962). *Diffusion of Innovations*. New York , NY: The Free Press.