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**A MODEL FOR INSTRUCTIONAL CHANGE: AN APPROACH
IN INQUIRY-BASED SCIENCE EDUCATION**

by
Kimberly Thompson

A Master's Thesis

Submitted in partial fulfillment of the requirement of the
Master of Arts Degree of The Graduate School of
Rowan University
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Approved by

Date Approved May 1999

Abstract

Kimberly Thompson

A Model For Instructional Change:
An Approach in Inquiry-Based
Science Instruction
1999

Dr. Ronald Capasso
Supervision and Curriculum

The focus of this study to describe the effectiveness of a change model on schools implementing an inquiry-based science program. Findings indicated that a model incorporating input from all of the stakeholders in the learning community and offering training and continuous support realized the most sustained and successful implementation. The model used included training upon request, turnkey trainers, parent meetings, teacher input on instruction, principal meetings, and opportunities to revise the program within the school year. Teachers, parents, and principals were surveyed and interviewed throughout the implementation. This data determined the focus of the training and support. The study was conducted in Pemberton Township School District. It involved sixty-eight, third through sixth grade teachers, in eight elementary schools. The final survey of participants found that eighty- eight percent of the teachers agreed that the change process involving the new science program was successful. The parents attending home-school meetings as well as the principals of the eight elementary schools also responded in unanimous agreement that the change model successfully implemented the inquiry-based science program.

Mini-Abstract

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Chapter 1

Introduction

Focus of the Study

Change is inevitable. Organizations, corporations, and schools must continuously undergo change in order to compete in an ever-evolving society. Human nature has a tendency to avoid change. Members of a group may recognize the need for change but feel anxious when faced with it.

The focus of this study is to describe the effectiveness of various change models on schools implementing an inquiry based science program. It is proposed that a model incorporating input from all of the stockholders in the learning community, as well as, training and continuous support, will realize the most sustained and successful implementation.

The stockholders have been identified as supervisors, principals, teachers, parents, and students. These members will be involved with the implementation of the program and will be utilized in gathering data through periodic meetings. The study will also rely on observations, interviews, surveys, and meetings to generate informative data. The information will be analyzed to determine the important characteristics of a change model. The study will include training upon request, turnkey trainers, parent meetings and support, teacher input on instruction, principal meetings, and opportunities to revise the program within the school year.

Purpose of the Study

The purpose of this study is to understand and describe the change process and its effect on the successful implementation of a program. In this study, the implementation of a constructivist science program will be analyzed using an action research process that will involve interviews, surveys, case studies, and observations. The results will be published in a Master's thesis that will be available for districts implementing a change innovation in their school district. The state standards are being implemented in many districts; thus many schools are undergoing change. The data will be presented to districts, in order to facilitate successful change and transitions for their learning and teaching communities.

As Beverly Anderson writes (1993) People need a sense of what to expect when a change innovation takes place in their school. Change can be very complex and confusing. The ability to see patterns of change can be a difficult task. The challenge of this study is to analyze change structures in place in schools and to compare Pemberton's new change model's effectiveness to said schools. This will afford stakeholders an aerial view of the process. Often teachers may not understand an administrator's perspective on change. Parents may not see change from a teacher's perspective. Anderson (1993) states "that by analyzing where they are on the continuum of educational change, stakeholders can see where they still may need to go".

The aim is to educate those involved in the change process. Many teachers have been involved with districts where change was compelled by regulatory mandates or they were expected to carry out reform with out understanding it. (Evans 1993)

Seymour Sarason (1991) asserts that the chronic failure of school reform is not in the ideas, but in the implementation of ideas. Educators, especially principals involved in the process of change within their schools must study the change process in order to understand how schools and individuals change.

The intern's leadership role in this project will assist in developing the following skills: conduct a needs assessment for a student population, analyze test data, draw conclusions, and write reports, help establish goal analysis session based on data from students, parents and teachers, lead discussions with parents and community leaders regarding instructional goals, help write curriculum based on recommendations from citizens' committee and consensus of professional opinion, help identify criteria that will be used to determine if goals have been attained, arrange for more staff participation in the decision-making process, involve staff in planning activities for organizational changes implemented, conduct follow-up study of success of organizational changes implemented; revise or terminate unsuccessful organizational changes.

This project will give Pemberton Township a working model to implement change successfully. The direct change the district will incur, as a result of this model, will be the implementation of an inquiry-based science program.. The objective of the study is to substantiate a model for change that incorporates the input and education of all the stockholders in the learning community, as well as, training and continuous support. It is proposed that this model for change will realize the most sustained and successful implementation.

Definitions

Constructivism – Constructivism is a theory about knowledge and learning. Constructivism supports the belief that students must acquire knowledge and build understanding through their own interactions with the environment. Constructivism supports encouraging student-to-student interaction, initiating lessons that foster cooperative learning, and providing opportunities for students to be exposed to interdisciplinary curriculum. Students challenge their preconceived notions and either accommodate or assimilate the new information that they constructed through their hands-on interaction. The emphasis is on active development of knowledge by the learner.

Constructivist Assessment - Assessment based on constructivist theory must link the three related issues—student's prior knowledge, students learning styles, and teaching for depth of understanding rather than breadth of coverage. Teachers have traditionally focused on discrete facts and principles. Meaningful assessment now concentrates on exploring the learner's entire conceptual network. Assessments include performance tasks that require students to create or take an action related to a problem, issue, or scientific concept. Extended projects that require the application of knowledge and skills in an open-ended situation and written tests that call for students to synthesize what they did in an experiment with what they read in a resource.

Discovery Works – Science Program that offers a constructivist approach to science. It has a balance of process and content. The National Science Standards are used as the framework of the program.

Limitations of the Study

This is a district-wide study. It will encompass teachers, parents, students, and principals involved with grades three through six. The change will entail a staggered implementation, so that, during the second year grades kindergarten through second grades. It is proposed that this model can be utilized during the second year of implementation. Pemberton is an Abbot district and receives state support. Districts that do not have a tax base or that do not have financial support may not have the ability to directly implement and support the model as proposed.

Setting of the Study

Pemberton Township is geographically 64 square miles and contains 31,342 people. It contains two large federal reservations, McGuire Air Force Base and Fort Dix. Fort Dix was formerly an Army Base and is now becoming a federal prison. This rural area includes multi-cultural families, multi-lingual families, families with urban backgrounds, diverse economic experiences, as well as being clustered with rural poor.

The Pemberton Township School district serves approximately 5,900 students in grades pre-school through twelve. These students attend nine elementary schools, a middle school and a high school. The district is supported through local, state, and federal funding with a total annual budget of approximately \$71,000,000. Seventy-four percent of the budget is spent for instruction. Over the past five years, with the downsizing of the Fort Dix military base, both the enrollment and federal funding has decreased substantially.

Pemberton Township offers a multi-cultural atmosphere with a 57% White, 29% African American, 4% Asian, and 10% Hispanic population. The average class size for

these students is twenty-two. Furthermore, 18% of the student population is identified as needing special education services and 5% is identified as gifted and talented.

The total number of teachers in the district is four hundred and forty one. The average number of years teaching among the teachers is fifteen. Twenty four percent of the district's teachers hold a master's degree.

The district offers a Pre-K through 12 curriculum. Pemberton prides itself in its state of the art technology that offers full access to computers for all students in grades Pre-K through 12. The district's curriculum in grades Pre first through eight focuses upon the core subjects: reading, language arts, mathematics, science and social studies. Students, also, have special subjects in the areas of physical education, art, and music.

The third through sixth grades will be implementing a new science series in the 1998-1999 school year. The kindergarten through second grades will implement the program in the following year. The teachers are coming from a traditional content centered program. The former program was text based and did not reflect the National or State standards in Science.

Significance of the Study

This study will make a contribution to recurrent educational issues as well as the needs of districts involved in any type of change or innovation. Fullan (1993) proposes that new and practical perspectives on the dilemmas of implementing the change process are essential to understand. He states, "It is only by raising our consciousness and insights about the totality of educational change that we can do something about it". As Marsha Speck further clarifies the significance of study in this field:

Without discussion of the change process people involved do not understand the power of problems change creates. Understanding the dynamics and implications of change becomes a powerful means for the successful implementation of educational innovation...

Currently, educational leaders are unable to articulate their methods of achieving successful change. (Salisbury & Conner, 1994) Being able to manage change is an essential skill for all parties involved. Organizational readiness (Fullan, 1991) factors have been identified in order to distinguish the potential for an institution to undertake change. Factors (Beach, 1993) that have an effect on sustaining change have also been identified. The significance of this study is to generalize those factors and make the information available to teachers and administrators in districts undergoing change.

Organization of the Study

Chapter Two will present a Review of Literature on Educational Change theory. Literature will be presented to support the need for change in the field of education. The Design of the Study will be presented in Chapter Three. Chapter Four will include a Presentation of the Research Findings. In summation, Chapter Five will submit conclusions and implications for further study.

Chapter 2

Review of Literature

The focus of this review of literature is to determine the effectiveness of a Sustained Educational Change Model on the implementation and longevity of a constructivist teaching format in elementary science classrooms. The purpose of the model is to avoid the “Future Shock” phenomena from occurring and to provide continual support and a sense of vision to the teachers.

Change can be viewed as a process involving many variables. The purpose of this paper is to explore many of the factors involved in successful change agents. First, the need for change will be presented. Next, resistance to change will be explored. Then, an overview of individuals’ attitudes effected by change will be presented. Finally, various change models will be discussed and examined. It is proposed that if all stakeholders are involved and supported through staff development and communication meetings, successful change will be maintained.

The Need for Change

In an ever-evolving complex society, change can be seen as a commonplace necessity in the business community as well as in society as a whole. It is a school’s responsibility to prepare its students to become productive members in society. Thus, schools must undergo change to meet the demands of society and the future’s workplace. Ruth Jordan (1991) contends change is the order of the day in American education. We must institute innovations that will enable us to produce a new generation of competent and capable citizens and workers.

The cry for change rang out in 1992 when President Bush professed his America 2000 program that called for “a new generation of American schools” – schools that break the mold of the traditional educational models. David F. Salisbury and Daryl R. Conner (1994) point out that as the year 2000 approaches school districts throughout the country are initiating efforts to restructure their education systems.

Beverly Anderson (1993) also found that administrators from around the country acknowledge that the educational system needs “fundamental changes to keep pace with and increasingly complex global society”. Marsha Speck (1996) furthers the notion by stating:

Initiating, effecting, and institutionalizing change in a school learning community does not just happen. Success for all students and school improvement are continuous challenges that each school and district work toward achieving. Improving schools and developing school communities require change.

Resistance to Change

Change is not easy. Tradition and familiar routines and practices of schooling are easy to maintain and follow. Human nature has a tendency to avoid change. People’s resistance to innovation and change is deeply rooted in individual psychology and group culture (Schein 1985). It is agreed upon in principle at times, but it is seen as a challenge to our stability. This produces a double standard. Change is advocated for others as long as it does not interfere with the individual’s routine. Many educators resist change, “holding fast to nostalgic memories of schools they attended”(Jordan 1991). Bolman and Deal assert that teachers’ ambivalence toward change is sensible, when they state:

Change raises hope because it offers growth and progress—but it also stirs fear because it challenges competence and power, creates confusion and conflict, and risks the loss of continuity and meaning.

Change theorists stress that lack of change is comforting, so there is little incentive for intrinsic change because change is painful. (Fox, 1992) Robert Evans (1993) found that when institutions undergo change, people are apprehensive about adjusting, because they may lose status, influence, or even their job. Change reshapes and disrupts the stability of the workplace. Evans furthers the notion by stating that in order to preserve stability, schools build culture which is defined as “a set of strongly embedded assumptions, values, and customs that ensure continuity and sustain meaning. Schools are conservative institutions –comfortable with the status quo. As Sarason (1990) notes, schools, accommodate in ways that require the least amount of modification because “the strength of the status quo – its underlying axioms, its pattern of power relationships, its sense of what seems right, natural, and proper—almost automatically rules out options for change.”

Likewise, educators at times focus on maintaining the system as it was originally designed because they are unaware that it is out of sync with new knowledge about teaching and learning (Anderson 1993). Dr. Al Mamary (1995) has identified other resistance factors. These include fear of making mistakes, fear of failure, not being apart of the decision making process, the change has been mandated or superimposed, feeling their ideas don't count, and believing that some staff are favored over others. Dr. Mamary also found that about fifteen percent of the staff would decide that change is not for them and

perhaps for no one else. As Bobby Kennedy said, 20 percent of the people oppose everybody all of the time.

The challenge is to bring about change that overcomes these obstacles. The change must be adhered to and make a real contribution to the quality of learning and life for students, teachers, and the school community. These challenges must be met to prepare our children for the twenty-first century. Implementing and managing these changes has become a top priority. Change must be approached systematically. C. A. Fawcett Fox writes about the necessity of a systematic approach:

Change is a process whereby one's thinking and doing are altered.

To change a procedure or method, other procedures and methods must be examined...Once the appropriate change is selected, the it must be implemented systematically so that the ways of doing things becomes permanently altered.

New and useful perspectives on the difficulties of implementing the change process are important to understand. "It is only by raising our consciousness and insights about the totality of educational change that we can do something about it". (Fullan 1993) Marsha Speck reports, most schools study the issues surrounding the issues without understanding what happens to the school learning community and the people involved. In order to facilitate change it must be understood on a personal level. In other words, how do those involved in the change react to it. Hord and colleagues (1987) describe seven stages of concern in learning from change. These ranked from an "awareness" or "level 0" to "Refocusing" or "level 6". Robert Evans (1993) dimensions of change will supplement these levels. Evans focuses on the faculty's willingness and capacity for change.

Attitudes Toward Change

Basically, change involves learning that is incremental. At level 0, individuals have no concern about change, proposed or otherwise. In Level 1, known as the “Informational stage, people would like to know more about the change. Evans (1993) states that restructuring invites teachers’ skepticism. Teachers feel that in substance most proposals are not new, but resemble previously attempted efforts. This creates cynicism in many. Teachers are more accepting when change is espoused by someone they trust, its content linked to values they hold important, and its target focused and practicable. (Evans1993) Models for change should remain cognizant of this component. All members of the learning community should be involved in the identification of needed change. This enables all respective parties to be on the same level.

At Level 2 or the “Personal” level, people want to know how they will personally be affected. Again, human nature resists change. Evans proclaims, “most of America’s teachers find themselves, in midlife and mid-career, a time when the stresses of life and work commonly intensify the natural reluctance to change. Teachers begin to ask what they must give up or alter.

Level 3, or the “Management” level, is the point where change activities begin. This is the point where many feel overwhelmed. They feel that most of their time is being spent getting materials ready. This is the point where many change agents are the most vulnerable to abandonment. This is where a strong, supportive, and systematic model for change illustrates its strength.

The fourth level, or “Consequence” stage, is one that reveals resistance as well. Users question how the use of the change is affecting their students. If a positive attitude

is revealed, than teachers begin to refine the agent to have a greater impact on student performance. Again, an appropriate model would support and foster this refinement.

The next level is “Collaboration” or Level 5. Users have mastered the skills involved in the change to go beyond rote usage. Confidence and skill are high enough that users now seek ideas on how others approach similar situations. They begin to collaborate.

The highest stage of concern is “Refocusing” or Level 6. This point arrives when users are comfortable enough to refocus the new methods or changes based on what they have been taught. As Mathew Miles (1965) wrote:

A healthy system would tend to invent new procedures, move toward new goals, produce new kinds of products, diversify itself, and become more rather than less differentiated over time.

In a sense, such a system could be said to grow develop and change, rather than remain routine and standard.

Change is a process not an event. Without discussion of the change process, people involved in it do not understand the power and problems change creates. (Speck, 1996) Salisbury and Conner (1994) identify four distinct roles critical to the change process: *sponsors*, *agents*, *advocates*, and *targets*.

Sponsors are individuals or groups that consider the challenges facing their organization and assess the liabilities and opportunities these challenges reflect. They determine which changes will happen, inform the people in the organization, and provide the proper funding and reinforcement to ensure success. Sponsors are responsible for

creating an environment that enables these changes to be accomplished on time and within budget.

Salisbury and Conner have identified agents as the individuals or groups who are responsible for making the change happen.

An agent's success depends on his or her ability to diagnose potential implementation problems, to develop a plan to accomplish the change, and execute the change effectively. The participation of change agents who possess these skills is a crucial factor in the success of any change project.

Advocates are individuals or groups who want to make a change but who lack the power to sanction it. Advocates need the support of sponsors who can approve and sanction their ideas. The advocates could be used on committees, turnkey trainers, or to present the information on change to the learning community.

Targets are the individuals who must actually change. The individuals at the second level or "personal" level discussed earlier are personally experiencing or working within the context of the change. Salisbury and Conner use the term target because:

"...these people are the focus of the change effort and play a crucial role in the short-term and long-term success of the change, To increase the likelihood of success, targets must be educated to understand the changes they are expected to accommodate. They also must be involved appropriately in the implementation process."

At times these roles may change for the groups or individuals. Each role requires unique skills and abilities. The focal point is to identify the players and utilize the skills necessary to effect positive change for the students.

David F. Salisbury and Daryl R. Conner (1994) identified three key questions along with their description of the characteristics of major change. The first question being: "What motivates major change?" The response to the first question can be used to motivate individuals at level 0 or no concern. Salisbury and Conner contend:

There are two primary prerequisites for successful organizational change:

Pain and remedy. The type of pain referred to is a critical mass of information that justifies breaking from the status quo. A remedy is a desirable, accessible, alternative that would solve the problem or take advantage of the presented opportunity.... Organizations typically do not sustain major change unless it is perceived that remaining in the present state will be more costly than changing.

Basically, the organization has to perceive the cost of the transition as less painful than maintaining the status quo.

Beverly Anderson (1993) describes this as a stage of Awareness. Stakeholders become aware that the current system is out of sync with the conditions of today's world based on this bombardment of information. The individuals are unsure about what is needed to bring about the change. The group may be made up of sponsors, agents, advocates, and targets.

According to *School Change Models and Processes: A Review and Synthesis of Research and Practice* by Marshall Sashkin and John Egermeier the source of information is critical. These can be described as three different approaches:

1. *The rational-scientific, perspective.* This approach operated on the assumption that people will adopt methods that have been scientifically shown to work.
2. *The political perspective.* This approach assumed that if law mandated changes those changes would be made.
3. *The cultural perspective.* This approach Shaskin and Egermeier write, “emphasizes changes in meaning and values within the organization undergoing change... reflecting current approaches in the business sector.”

Seymour Sarason wrote in 1971 in his book *The Culture of the School and the Problem of Change*:

If the stimulus for change came primarily from outside the school culture; there was little attention to the characteristic regularities of the institutional culture and their possible social and psychological correlates; and there seemed to be the un verbalized assumption that the goals of change could be achieved independent of any change in these regularities.”

Namely, if the state mandates a curriculum that focuses on political priorities, it must pay attention to how the schools and the people in them work. Sarason also remarked on change introduced from within by universities. These programs are often rejected because they do not meet with the school’s culture. Members working from the either outside or from within must remain cognizant of the school’s culture. The culture being, the procedures, beliefs, traditions, and habits of mind that makes a school what it is. (Zakariya, 1995)

Models of Change

The literature and information put forth calls for change, thus a model for change is needed. A review of most research overwhelmingly favors involving the stakeholders involved in the change from the inception. Involving the stakeholders will enable the school's culture to be taken into consideration.

Past experience in school change had inherently postulated that change would be planned, sold to teachers, and managed by the principal. (Miles, 1993) Research began to reveal the importance of empowering the stakeholders, with the entitlement to take control of the change process and content during planning and implementation. (Miles, 1993)

Seymour Sarason (1991) maintains that "the chronic failure of school reform is not in the ideas but in the implementation of ideas". He contends that change can not be sustained unless all stakeholders are involved. Insiders (teachers, staff, administrators) and outsiders (parents, business, and the community) must be involved in the change efforts. Many change efforts begin and end within the school, involving only teachers and staff, never really generating input and assistance from the other important members of the community. The change often fails because the outsiders can not understand the innovation. Thus, they can not provide assistance with the innovation, or see the educational innovation as needed. Discussion with all parties leads to an understanding of the power and problems change creates. (Speck, 1996)

Ruth Jordan (1991) concurs with the concept of involving the entire educational community by conveying the spirit of change. Talking openly about

educational goals, progress, teaching techniques, learning styles, and curriculum does this.

Jordan states:

A school communicates its mission when students and parents see that new ideas about education are subjects for intellectual inquiry, and come to accept the notion that learning is about trying new and different things.

The development of ownership and commitment to improved practice is critical to secure positive participation by faculty. Those influenced by change must have input into the changes. Teachers must make an individual and collective commitment to and feel ownership of, the new programs and practices before they will participate. (Berman and Pauley 1975; Goin 1991; Sly 1992; Sparks 1983; Withall and Wood 1979; Wood and Thompson 1993)

Robert Evans (1993) proclaims participation not paralysis is needed. Evans acknowledges the value of collaborative decision making in schools and understands that participation is the primary path to commitment, and further that implementation improves when teachers help shape reform. Evans cautions that advocates may expect teachers to “embrace enthusiastically any opportunity for participation”. But if teachers have sparse backgrounds of meaningful involvement they may engage less readily.

Articulating a vision or focus for the change may assist the teachers in becoming involved. The creation of a vision should include developing a common language and conceptual picture of the process and goals of the proposed change. (Anderson, 1993) Marsha Speck (1993) describes a school’s vision as “the collective vision of the school learning community developed over time to become the heart and

passion of the school.” Vision in a school learning community is not just the principal’s personal vision of schooling. (Speck, 1996) Miles (1993) suggests a steering committee or site based management group that includes “cross-role” members, with the empowerment to take control of the change process and content during planning and implementation. Whereas, Dr. Mamary (1995) proposes that every person should be involved in every major decision that affects him or her. He states, “[One should] strive for 100 percent agreement even if it takes longer. It may not be possible but it is important to strive for this level”. Mamary suggests a series of questions that must be asked of the stakeholders.

1. What do we really want?
2. What do we know? What do we need to know? What does research and best, proven professional practices tell us?
3. What do we believe? What should we believe?
4. What action are we going to take and is it aligned with what we know, want, and believe?
5. Is what we are going to do psychologically safe and nurturing for everyone involved?

The collective school vision, with its principals, values, and underlying beliefs about students, should compel the need for the necessary skills and capacities needed to make the change, as well as the required incentives, motivations, and resources to bring about change. (Speck, 1996)

Beach (1993) put forth a list of organizational variable that have an effect in the change process. The list of variables were developed from various studies and include:

institutional leadership; staff stability; curriculum articulation, and organization; continuing staff development; district support for change; school climate; institutional history with change efforts; collegial relationships sense of community; clear goals and expectations; order and discipline teacher demographics; ability to observe the innovation; and plan flexibility. (Bishop, 1977; Fullan, 1982; Hopkins, 1990; Purkey and Smith, 1993; Rosenblum and Louis, 1979) These are the organizational readiness factors that describe an institution's potential for change. The assessment of these variables in a school is a logical precursor to any change agent. The success of the planning process may depend on previewing specific knowledge of the state of the organization through the aforementioned readiness factors and may require the pre-implementation change of those factors. (Beach, 1993)

Managing the Transition

At this point stakeholders realize the need for change exists and have established a shared vision. The next step is to manage the transition. Marsha Speck (1996) describes transition as the "personal, internal, psychological reorientation that an individual goes through in coping with change, whereas change is the external event." Unless the transition takes place at the individual level, change will not work. Managing the transition of each individual will help personalize the change process. Fullan (1993) reinforces the importance of the individual educator, as the critical starting point. Each educator must have some dominion over what he or she does. Every educator must strive to be an effective change agent. The support for change can be greater through the aggregate striving of all individuals. (Fullun, 1993; Speck, 1996)

According to some theorists, dealing with the transition, the internal psychological reorientation of an individual coming to terms with change, is key. (Bridges 1991; Salisbury & Conner 1994; Speck 1996) Speck (1996) writes, transition management is about helping each individual, develop new mindsets, new outlooks, and new identities when dealing with a change. This means ending the old way of doing things and ensuring that the new way takes hold. Bridges (1991) states that situational change hinges on new things, but psychological transition depends on letting go of the old reality and the old identity.

Human nature doesn't like endings and educational change must start with endings. The sponsors, agents, and advocate of the change, which are comprised of the principal, key staff, parents and the community must manage the transition. Speck (1996) notes that, " the principal, as the leader of the school , with the help of the school leadership team, must plan how to end what used to be." Speck put forth a series of questions to be used to frame how to deal with the transition of change

Questions to Answer in Managing Transitions

1. What will end because of the change?
2. Who will lose what with the change?
3. How do individuals accept the reality and importance of their losses due to the change?
4. How does a leadership team recognize individual and group losses to help with the transition?
5. How can leaders help individuals not overreact to change?
6. Do individuals understand the proposed change?

7. How will information be communicated during the transition and change?
8. What plan is there to celebrate progress in the change transition?

The response to these questions will enable the principal, supervisor, and constituents to formulate a plan for the transition of change. Developing a transition process for change will assist in monitoring the impact on individuals. Again, "The single biggest reason organizational changes fail is that no one thought about endings or planned to manage their impact on people." (Bridges, 1991)

The transition management will continue as resources are identified, time lines are established, skills and the capacity for change recognized. Transition management was largely ignored in earlier models of change processes.

Some features of earlier models have remained. An exploration of various models will be presented. One of the earliest models was rational planning. In Rationalism, goals and means are presented in a linear fashion, or a series of logical steps, whereby the ends and means are assumed to be separable and capable of eliciting extensive organizational support. (Beach, 1993) Simon (1957) puts forth that this theory implies that the administrator, alone, must look for the solutions to problems. This is not a common practice in today's learning community. Another constraint is that the consequences of a plan can be only partly determined. This will limit the ability to find the "optimum" alternative. The example Beach (1993) furnishes is that we seldom know the effect a new reading program will have on reading scores. Therefore, two programs can not be qualitatively compared.

Charles Lindblom (1959) criticized the comprehensive-rational approach to planning. The problems he attributed to this approach to change were:

Comprehensive-rationalism assumes intellectual capacities and sources of information that men simply do not possess, and it is even more absurd as an approach to policy when the time and money that can be allocated to a policy problem is limited, as is always the case.

March and Simon (1959) altered this early model to include a feasible alternative solution which is substituted for the optimum. In other words, an administrator finds a good solution and accepts it. The Comprehensive and Bounded Rationality are both goal-driven models. They are both sequential and assume that through a logical set of actions a future goal can be achieved. These actions move consecutively from the articulation of the goal(s), through the need and resource assessments, to the selection of problem solutions, and conclude with the attainment of the stated goal. (Beach, 1993) The present day result of this model would be strategic planning. (Beach, 1993) Two instruments based on this model remain widely used. The instruments are the Program Evaluation and Review Technique (PERT) and Critical Path Methodologies. Beach (1993) has found that “these are instruments that with application to specific planning problems and come into and recede from accepted practice over time.”

In an effort to institute the realities of practice into the planning field and as a counterpoint to rationalism, Lindblom (1959) proposed a planning system of successive limited comparisons, now known as Incrementalism. This theory proposes that the planner builds on past and current achievements and moves on in small incremental steps. Beach (1993) states that the “planner reflects on past policies of the organization and makes only marginal changes for a future course of action.” The shortcoming of this theory is that it

lacks long term direction. One piece of this theory that is considerable is that of reflection. A planner looks of the school's past experiences and salvages what works for its culture.

Beach (1996) reports that a "less goal dependent or even goal-free paradigm" emerged in the late 1960s known as Developmental Planning. This paradigm relates to organizations from a behavioralistic perspective. Beach gives the example, "...Persons seriously concerned with bringing about a particular change – must consult with the people who would be affected by the change. This step is crucial..." (Morphit, Jesser and Ludka, 1971) The need for input from all stakeholders was substantiated early in this paper and it can be seen that this is practiced in many change models.

The planning in non-rational is not primarily driven by goal attainment. Developmental Planning believes that all parties should be allowed to directly and openly recognize the issues and express how inhibitors or stresses can be balanced. Walter (1983) observed that the consensus-building aspect of this process was accommodating but a goal paradigm would better explain organizational performance.

Both models rely on readiness factors identified earlier these included factors that may work against implementation such as, an ambiguous project plan. Both plans also relied on internalization. Utilizing teacher feedback would harbor internalization and clear goals should minimize ambiguity. Both models suggest shortcomings, yet both models suggest usable suggestions. Fullen (1991) resolved that in following a determined process, the planner comes to "...discover that there are no hard and fast rules, rather a set of suggestions or implications given the contingencies specific to local situations."

In reviewing the literature. It is understood that in order to have all members of the learning community buy into the proposed change they all must be involved in its

implementation. A change agent may be dictated on a state or federal level, so members of the learning community may not be given a choice to turn it away. All parties still should be given a voice on how it should look in their schools. School culture is an important aspect to take into consideration. A vision should be created for the change. This should include the school's expectations and a proposed time line. Keeping in mind that change does not happen over night. Readiness factors should also be taken into consideration. These include inventorying resources. In some cases smaller changes have to occur to ready the school for change. Transition management is also a critical piece to any change model. A support team must be established to assist the teachers in ending old routines and begin to embrace the new way. Skills/capacities, motivation, resources, time, and politics must also be taken into consideration. (Speck, 1996) The next step is to develop a plan of action for change. This describes what is going to be done and how it is going to be accomplished. This would include staff development and the dissemination of materials. Finally, the questions have to be asked, "How is the Action Plan for Change reviewed, evaluated, and revised on a regular basis to make modifications that help the change process take place and become sustained within the school learning community? – How will we know the new program implemented was successful for students?" (Speck, 1996) Remaining cognizant of this process, with an understanding that changes must work against human nature will lead to and understanding that this is a fluid process that may need adjustment midstream.

Chapter Three

Design of the Study

The design of the study is based on the action research method because as Martin and Wilson (1990) state “it is the conventional approach for a study, which intends to provide information, which is practical and directly relevant to an actual situation in the working world”. The increased flexibility in action research allows the study to be slightly redesigned as results from activities deem it necessary.

In selecting this course of action, there were several steps to follow. The first was to define the problem, which was done in chapter one of this paper. The next step is to select the design. The design is loosely based on Marsha Speck’s “Best Practice in Professional Development for Sustained Educational Change”. The model is quite thorough but does not appear adequate in defining the roles of all stakeholders in the change process. Involvement by all stakeholders is a crucial element to successful change. A component that addressed the involvement of principals, parents, and students was added to the design to address these concerns.

The impetus for change and this study began as a result of the issuance of the state and national standards in science. The elementary schools received a copy of the standards and were informed that they would be implementing a new science program. Teachers were invited to attend one of three science expositions being held in the district. This allowed all of the teachers an opportunity to view the materials available for adoption. The teachers were afforded the opportunity to vote on the program that they believed would best enable the standards to be delivered to their students.

Initially the teachers appeared to buy into the change in science instruction. The district had asked the teachers to conduct change in the past and initially the change had appeared to take place. The problem appeared in sustaining the change.

The emphasis of the change model was to have the teachers take ownership of the change and to support the teachers so that the change could be sustained.

Development of the Research Instruments and Sampling Technique

Surveys were used in conjunction with the district's goals, and the district's report card to establish where the district was in terms of science education. The information further determined the needs of the district. The need-assessment along with the state and national standards defined the focus of the change that was needed in the district.

The first research instrument was issued prior to implementing the new program. The survey contained questions that were grouped into two categories. The first was a reaction to a specific statement in terms of the degree to which the participant agreed or disagreed with the statement. The second type of question asked the participants to make a more complete statement relating to certain aspects of the previous category. This survey allowed for data to be gathered both qualitatively and quantitatively. The survey asked teachers to evaluate science instruction in their classroom. After the teachers were given the survey, they participated in the Summer Science Institute. The "Institute" provided training on the new program. The intern/educational consultant and turnkey trainers from the district conducted the training. All teachers of grades three through six attending the training completed the survey. The nine teachers who did not attend the

Institute received make-up training in early October. They were given the survey at that time.

The principals were given an instrument that was similar to the one given to the teachers during summer training. A few of the questions were changed to reflect findings in the data generated from the original teacher survey. The Principal Survey Questionnaire was given at the conclusion of the Superintendent's September meeting. The intern gave the principal's an overview of the new program and demonstrated what they should anticipate in the way of science instruction.

The data gathered from the Teacher and Principal surveys determined the needs of the district. This data drove the design of the change model. The teachers, principals, and parents' recommendations for assistance during the transition into the inquiry-based program drove the types of services that were provided to the stakeholders. It was determined that the majority of the teachers bought into the process of inquiry-based science but lacked the confidence or skills to implement such a program. The teachers would need a support system in terms of training and materials.

After the program was implemented for four weeks, the first wave of surveys was distributed. If a teacher needed assistance in instruction or was missing materials they simply put in a request. The teachers that indicated they needed help were visited in their classrooms and given assistance

During the second wave, which took place during the eighth week of implementation, the principals were interviewed. This generated a few leads and those teachers were visited. It was during the principal visitation that parent nights were set-up.

Attendance at the parent nights was low. Data was gathered from the parents and it was determined that the district would televise a program that would assist and encourage parents in their involvement in their children's science education.

After twelve weeks, the third wave of support was offered in three formats. The first was in-class support. At the request of a teacher or in one case a principal, the intern/supervisor would observe a class to gain an understanding of the classroom dynamics. Then, the teachers on that grade level would be given release time to observe a model lesson conducted by the teacher/intern. The second format was informal visitation to address issues such as pacing. The final format was voluntary grade level support meetings. An example of this would be a hands-on walk through of the electricity and magnetism unit.

Finally, the Principals were given another survey to determine if they perceived a change in science instruction. This survey consisted of the same format as the original questionnaire but some statements had been altered to reflect alterations in the format of the change model. The survey was distributed to the principals by way of school visitations. One principal had two teachers fill out the survey and the information was deemed invalid.

Teachers were also systematically surveyed. The survey was enclosed with a master list containing the teachers' names in each of the building to ensure the sampling was of the entire population.

The results of the surveys were tallied and presented in terms of the percent of the population of stakeholders that agreed or disagreed with a particular statement. The

comments were gathered and analyzed to determine if a certain theme was of concern to a majority of the participants.

Chapter Four

Presentation of Research Findings

Teachers' Perceptions

Surveys were given to all teachers of science in grades three through six. Sixty-eight surveys were distributed and sixty-one surveys were returned. There may be a variance in certain sets of data, due to lack of a response on specific item.

The initial teacher survey revealed a dicodemy in teachers' thinking about the change they were about to embark upon. Teachers believed that hands-on activities are critical to understanding, yet many responded that "they would prefer to demonstrate an activity instead of allowing students to do it" and were uncomfortable assessing performance during activities. The preliminary survey was given after the teachers voted on having an inquiry-based program. The survey disclosed that some teachers did not have an understanding of the underlying nature of an inquiry-based program. It was necessary to have the teachers develop a comfort level so that their initial buying into the program could be sustained and develop into ownership.

The majority (eighty-two percent) of the teachers agreed that the change process involving the new science program was successful. Questionnaires (Table 1) revealed that the success was related to the support the district offered in terms of types of training and the availability of resources. Eighty-eight percent of the teachers agreed that the district supported the implementation of the new program through training and resources. Teachers stated that the program is best served when training is done prior to beginning a new program. Teachers also noted that the change process included their input and concerns through out its implementation. Seventy-two percent of the teachers agreed that

Table 1

Teacher Survey Results
(N = 68)

Statement			
Overall Change	Agree	Disagree	UD
In general science instruction has improved in my classroom this year.	72%	8%	20%
The district has supported the implementation of the new science program through training and resources.	88%	2%	10%
The program has asked me to change the way they have been teaching science.	72%	15%	13%
I am, for the most part, comfortable with the new science program.	84%	8%	8%
In general, I feel the change process involving the new science program was successful.	82%	3%	15%
Inservice			
The inservice for science to date has been of good quality.	93%	2%	5%
I attended a science-related workshop this school year.	93%	7%	
Activities			
Students spend MORE than 25% of science class doing activities.	82%	7%	11%
Hands-on activities are critical for understanding.	90%	3%	7%
School level support			
I have been informally observed teaching science.	49%	31%	20%
Teachers have a support system within the school for assistance in teaching science.	51%	35%	14%
I receive support in science instruction from teachers in my grade level.	66%	34%	
Other			
My students seem to enjoy science.	97%		3%
I integrate technology in my science lessons.	70%	15%	15%
I understand and use performance assessment.	73%	10%	17%

UD - Undecided

the program asked them to change the way they had been teaching science. During classroom visits it was surmised that some of the teachers had been utilizing inquiry-based instruction prior to implementing the change model. These teachers embraced the resources and continued their practice.

Eight percent of the teachers still felt uncomfortable with the new science program and eight percent believe that science instruction had not improved in their classroom this year.

Questionnaires revealed staff development as the one of the top indicators of successful change. Teachers felt that many programs were “dumped on” them and at times they were given initial training. They lacked continual support. Ninety-three percent of the teachers attended inservice training. The teachers with the exception of one believed the inservice to be of good quality. Teachers stated that many of the inservice programs were directly related to concerns they had which they communicated on their surveys.

The research exposed an area of concern, in terms of school level support. Thirty-one percent of the teachers had not been observed teaching science. Thirty-four percent did not feel as though they received support in science instruction from teachers in their grade level. Finally, thirty-five percent were not cognizant of a support system within their individual school. There was a concentrated effort in two of the schools to establish a school level support team. The principal held grade level meetings on the change topic. There were also opportunities available for the teachers to participate in peer observations. Teachers in these two schools responded favorably (one hundred percent) to the notion of a school-based support system.

Research revealed that ninety-seven percent of the teachers felt that their students seem to enjoy science. Parents that were surveyed responded that their children enjoyed science this year.

Teachers had been asked to utilize performance assessment since the onset of the Elementary Science Performance Assessment. The change model has increased the use of performance assessments in routine lessons. Teachers' perception of their understanding and use of performance assessment rose from forty-five percent to seventy-three percent after implementing the change model.

Furthermore teachers responded that in order to sustain the change in their practice, resource must continue to be available. These resources must be in the form of materials as well as instructional support.

Principals' Perceptions

A survey was given to all eight elementary building principals. The data (Table-2) represents information gathered from seven of the eight surveys. One survey was not used because a classroom teacher completed the survey. The information was thus deemed invalid.

A moderate variance in perceptions of the change model stood between those of the teachers and those of the principals. One hundred percent of the principals felt the change model involving the new science program was successful but twenty-nine percent of the principals felt that science instruction had not improved in their schools. Eight percent of the teachers felt that science instruction had not improved.

All of the principals surveyed agreed that their school offered a support system for teachers. Thirty-four percent of the teachers felt they did not receive this support on a

Table 2
Results of Principal Survey
(N = 8)

Statement	Agree	Disagree	UD
Teachers, for the most part, are comfortable with the new science program.	71%	29%	0%
Students spend MORE than 25% of science class doing activities.	86%	0%	14%
In general science instruction has improved in my school this year.	57%	29%	14%
Increased noise during hands-on activities is understandable.	100%	0%	0%
Science success is a shared responsibility in my school.	14%	0%	86%
Teachers integrate technology in their science lessons.	86%	0%	14%
Teachers have been formally observed teaching science.	86%	14%	0%
Teachers have a support system within the school for assistance in teaching science.	100%	0%	0%
The program has asked our teachers to change the way they have been teaching science	100%	0%	0%
The district has supported the implementation of the new science program.	100%	0%	0%
The teachers in my building practice a planned and deliberate self-assessment of their science instruction.	71%	0%	29%
Hands-on activities are critical for understanding.	100%	0%	0%
Teachers understand and use performance assessment.	86%	0%	14%
In general, I feel the change process involving the new science program was successful.	100%	0%	0%

UD - Undecided

building level. Principals recorded on the questionnaire that teachers should be provided with time to meet together or observe lessons. Teachers from three of the buildings reported that they were offered monthly grade level support meetings.

The survey revealed that the principals were unanimous in their agreement that the change model asked the teachers to change the way they had been teaching science. Eighty-six percent stated that students spend more than twenty-five percent of science class doing activities. This is a marked increase over last year's program. Activities are at the crux of inquiry based instruction. The questionnaire also revealed that the principals were in agreement that one of the major indicators of successful change is adequate training for the teachers. The training was suggested in the form of inservices, demonstration videos, and grade level support meetings.

Parents' perceptions

Data (Table 3) was gathered from parents attending the Parents Night meetings. It is not suggested to be representative of the total population of parents. It is being presented to reveal insight only. All of the parents within the district were invited to attend the evening meetings. A total of approximately forty parents were in attendance. All of the parents were aware of the format of the new science program. Parents reported that their children were said they enjoyed doing the activities in the new program. Approximately twenty-five percent said they were not aware of how to help their children with critical thinking skills. The parents attending felt that most parents are not adequately involved in their children's science program. Questionnaires reported that parents felt the district attempts to obtain parental support. Most of those surveyed did not suggest ways the district could increase parental involvement. Some of the parents did suggest that the

Table 3

**Results of Parent Survey
(N = 40)**

Statement	Agree	Disagree	UD
I am aware of the format of the new science program.	100%	0%	0%
My child enjoys science class this year.	95%	0%	5%
My child is struggling with science this year.	5%	90%	5%
I would like to see more science homework.	48%	30%	22%
My child and I do science activities other than those the text.	48%	33%	19%
I would attend a Saturday district wide Science Day.	75%	0%	25%
I have access to the Internet.	25%	0%	75%
I am aware of how to help my child with scientific thinking skills.	20%	23%	57%
My child talks about the science activities he/she is doing in class	100%	0%	0%
I would like to learn more about helping my child improve critical thinking skills.	100%	0%	0%
I feel parents are adequately involved in the science program.	38%	30%	32%

UD - Undecided

district continue to offer workshops to parents. One parent suggested that the district's television system broadcast an overview of the new program along with suggestions on how parents can become more involved.

Chapter 5

Conclusions, Implications, and Further Study

According to the literature review on successful change all stakeholders in the change model must agree the change is necessary. The entire staff voted on the new model yet it has been presented that perhaps all members did not have an understanding on how the change model would directly effect their roles. This was addressed through an articulation session during staff development. This paper suggests the need for the staff to articulate how they perceive their individual roles changing throughout the process prior to adopting change. This would allow insight as to the level of understanding of all of the stakeholders.

The data further suggests that a critical component of change is continual support that is driven by the concerns of the individuals involved in the program. The entire staff received training on inquiry based science. This was further supported through the use of turnkey trainers who taught in the district and understood the needs of the district's population. The principals and parents were also presented with awareness sessions.

Teachers were given opportunities throughout the study to request assistance in the form that best supported their needs. Assistance came in many forms. Teachers were able to take advantage of voluntary after-school training sessions. These sessions offered a step-by-step look at the activities and skills that were now required of the teachers. The sessions also allowed for time for professional discussions. The sessions were not mandatory and the teachers stated they felt comfortable sharing and receiving information. This feature is recommended to any district embarking upon change.

Teachers also requested in-class visitation from the Intern. Some these teachers were typically the type that felt uncomfortable sharing their concerns in front of a group. Their questions were addressed individually. It has been suggested to the district that the email system should be used to expedite this process of having requests submitted. Schools that do not have an email system may wish to establish a "hotline" to the supervisor or lead teacher. The process that was used in this study involved sending inventories to all of the schools and then individually collecting the papers.

Two of buildings established grade level support meetings. These meetings were at times attended by the principal, supervisor, and or the intern. The teachers in these buildings felt that provided additional support for their practice. The study suggests that grade level meetings on the building level should be held during the first year of implementing a change within a district. These committees would give the principal a building level view of what was needed to sustain the change. Another way to increase building level awareness is through informal observations. Many teachers reported that they were not observed on the building level implementing the new program. Through monitoring teacher practice principals can keep their fingers on the pulse of the change process.

Teachers were also offered demonstration lessons. Each of these lessons were offered in one classroom and teachers from that grade level were invited to watch. Teachers viewed this as being helpful. It is recommended that teachers are given release time to watch their peers teach a demonstration lesson. This recommendation is being made because a teacher understands the dynamics of his or her classroom and an outsider teaching a lesson would not have that insight.

The schools were also given a videotape of a teacher from the district teaching her class using inquiry-based science and performance assessment. An abbreviated version of this videotape will also air on the district's broadcasting system in order communicate information pertaining to science program to the district's parents.

This study afforded the intern many learning and leadership opportunities. In order to begin the change process a needs assessment for the student population and district was conducted. It was determined that the district should follow the state recommendations of implementing an inquiry-based science program. An assessment of the teaching staff revealed a traditional approach to teaching science. This created the need for a change model emphasizing staff training, support and ownership in the process. The criterion that was used to determine if the goals were met was feedback from the stakeholders. State test results will also be analyzed when they are published.

The intern collected data on staff-training needs through the use of surveys. This helped to maintain vigilance to assure that the change was based on public opinion and professional consensus. Sample workshop guidelines were studied throughout the training process. The intern planned training sessions and adapted training exercises to fit the needs of the staff. An instrument was used to evaluate the training sessions and that information was used to conduct future training sessions. The principals were briefed on the training before and after it took place. The turnkey trainers were also given briefing sessions and were assisted in developing activities. Furthermore they received a planning checklist and a list of the agreed upon objectives.

The intern conducted two parent conferences to inform the parents about the school's new program and to gather data that represented parental concerns. The intern is also developing a media program to deliver information about the program to a greater number of parents. Parents were given suggestions on how to increase their involvement in their children's science success.

The intern introduced techniques appropriate to teachers' instructional situations through the use of demonstration lessons. The teachers also received assistance in instruction in the form of informal observation and visitations.

Resource utilization was determined through these informal visits as well as through formal surveying techniques. This information was used to determine how to increase utilization of the resources. The recommendations were then forwarded to the appropriate supervisor for review.

The organization where the change model took place, Pemberton Township School District, experienced a positive organization change. The district now has the information to support the need for staff ownership and training in any new program that it is to embark upon. It was clear that this program experienced more success than previous programs due to the contributions of those involved. Previously programs asked teachers to change their practice without adequate understanding or training. These programs could not sustain themselves. The district is about to undergo whole-school reform. The success that was experienced during this program has given the district a model for understanding the process of sustaining change.

Previously in this chapter recommendations were made. It is proposed that these recommendations would suggest the need for further study. This study concentrated on the use of the stakeholders' feedback to guide the change process. Teachers and research suggested the use of mentors or lead teachers. The district could not financially support the position of a lead teacher so this was not studied. The position could provide the teachers with the building level support that they sought.

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Appendix A
Research Instruments

Teacher Survey Questions

The questions are grouped into two categories. The first is a reaction to a specific statement in terms of the degree to which you agree with the statement. For these indicate 1 through 5 depending on the degree to which you agree.

- (1) = I strongly agree
- (2) = In general, I agree
- (3) = I have no strong feelings
- (4) = In general, I disagree
- (5) = I strongly disagree

The second type of question follows the agreement indicators and asks you to make a more complete statement relating to certain aspects of the category. Lines are provided. The information collected is being used to best address the needs of the district.

1. _____ I am, for the most part, comfortable with the new science program.
2. _____ Students spend MORE than 25% of science class doing activities.
3. _____ In general science instruction has improved in my classroom this year.
4. _____ Hands-on activities are critical for understanding.
5. _____ I understand and use performance assessment.
6. _____ My students seem to enjoy science.
7. _____ The district has supported the implementation of the new science program through training and resources.
8. _____ The inservice for science to date has been of good quality.
9. _____ I integrate technology in my science lessons.
10. _____ I have been informally observed teaching science.
11. _____ Teachers have a support system within the school for assistance in teaching science.
12. _____ The program has asked me to change the way I have been teaching science.
13. _____ I receive support in science instruction from teachers in my grade level.
14. _____ I attended a science related workshop this school year.
15. _____ In general, I feel the change process involving the new science program was successful.
16. Please fill in the approximate amount of time per week, you spend teaching science, next to the appropriate grade level : 3rd _____ 4th _____
5th _____ 6th _____

Please respond to the questions on the following sheet.

18. In your opinion how was the implementation of this science program different from the implementation of other programs?

19. How could the district aid in the change process (implementing a new program) in the future?

20. How do we encourage teachers to make more use of each other as valuable resources for teaching science?

21. How can the district continue to support the science program in the future?

Principal Survey Questions

The questions are grouped into two categories. The first is a reaction to a specific statement in terms of the degree to which you agree with the statement. For these indicate 1 through 5 depending on the degree to which you agree.

- (1) = I strongly agree
- (2) = In general, I agree
- (3) = I have no strong feelings
- (4) = In general, I disagree
- (5) = I strongly disagree

The second type of question follows the agreement indicators and asks you to make a more complete statement relating to certain aspects of the category. Lines are provided. The information collected is being used to best address the needs of the district.

1. _____ Teachers, for the most part, are comfortable with the new science program.
2. _____ Students spend MORE than 25% of science class doing activities.
3. _____ In general science instruction has improved in my school this year.
4. _____ Increased noise during hands-on activities is understandable.
5. _____ Science success is a shared responsibility in my school.
6. _____ Teachers integrate technology in their science lessons.
7. _____ Teachers have been formally observed teaching science.
8. _____ Informally, teachers have been observed teaching science.
9. _____ Teachers have a support system within the school for assistance in teaching science.
10. _____ The program has asked our teachers to change the way they have been teaching science.
11. _____ The district has supported the implementation of the new science program through training and resources.
12. _____ Teachers in my building practice a planned and deliberate self-assessment of their science instruction.
13. _____ Teachers understand and use cooperative learning in science instruction.
14. _____ Hands-on activities are critical for understanding.
15. _____ Teachers understand and use performance assessment.
16. _____ In general, I feel the change process involving the new science program was successful.
17. Please fill in the approximate amount of time per week each grade level teaches science each week: 3rd _____ 4th _____ 5th _____ 6th _____

Please respond to the questions on the following sheet.

18. Characterize how a principal can help teachers become more effective science educators?

19. How do we encourage teachers to make more use of each other as valuable resources for teaching science?

20. How could the district aid in the change process (implementing a new program) in the future?

Parent Survey & Questionnaire

Science

The questions are grouped into two categories. The first is a reaction to a specific statement in terms of the degree to which you agree with the statement. For these indicate 1 through 5 depending on the degree to which you agree.

- (1) = I strongly agree
- (2) = In general, I agree
- (3) = I have no strong feelings
- (4) = In general, I disagree
- (5) = I strongly disagree

The second type of question follows the agreement indicators and asks you to make a more complete statement relating to certain aspects of the category. Lines are provided. You may use the back of the paper.

- _____ 1. I am aware of the format of the new science program.
- _____ 2. My child enjoys science class this year.
- _____ 3. My child is struggling with science this year.
- _____ 4. I would like to see more science homework.
- _____ 5. My child and I do science activities other than those the text.
- _____ 6. I would attend a Saturday district wide Science Day.
- _____ 7. I have access to the Internet.
- _____ 8. I am aware of how to help my child with scientific thinking skills.
- _____ 9. My child talks about the science activities he/she is doing in class
- _____ 10. I would like to learn more about helping my child improve critical thinking skills.
- _____ 11. I feel parents are adequately involved in the science program.

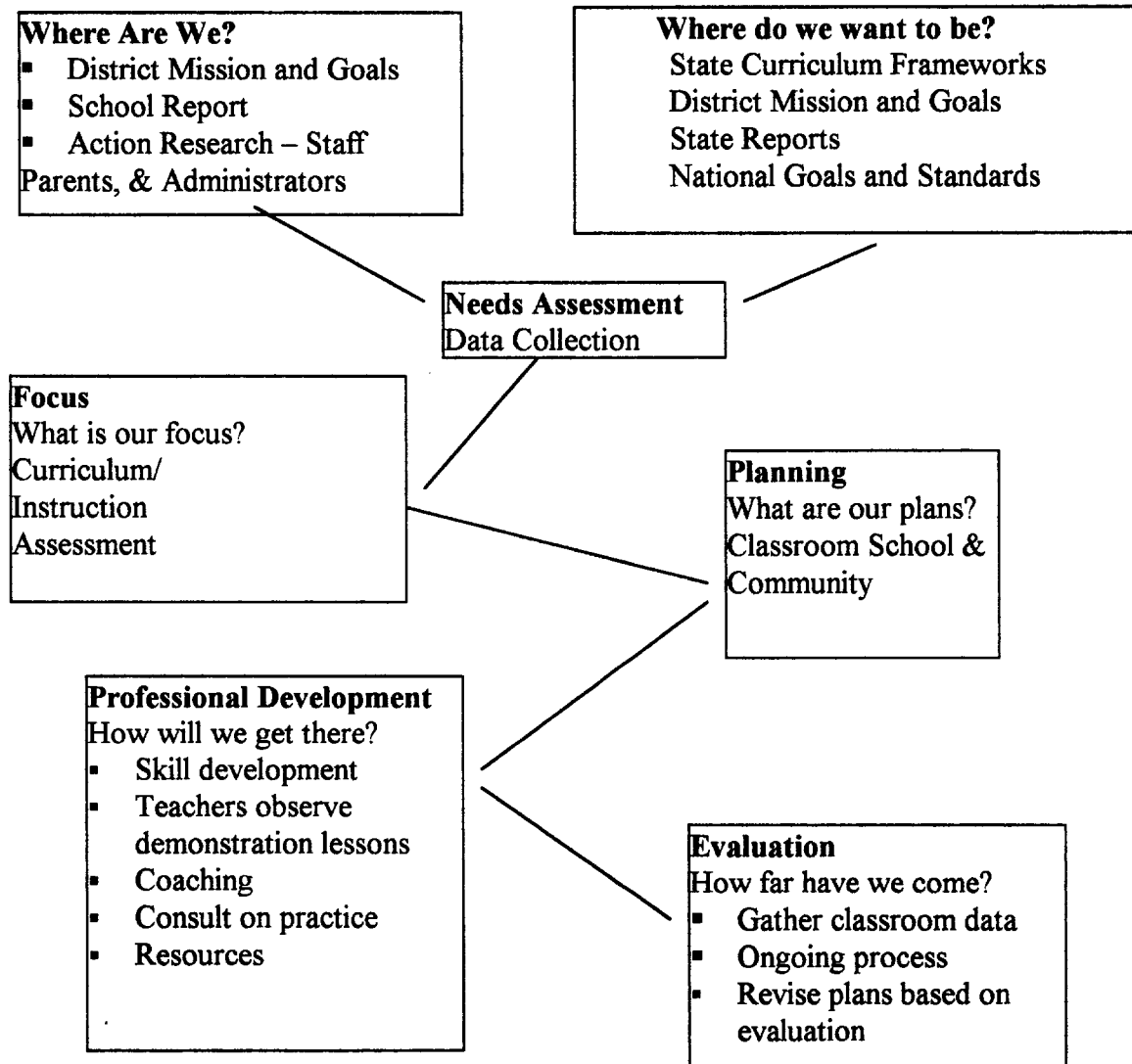
A. What recommendations would you make for the science program?

B. What could the district do to increase parental involvement in the science program?

Appendix B
Educational Change Model

Model for Educational Change

Figure 1 –Based in part on Marsha Speck’s Essentials of Best Practice in Professional Development for Sustained Educational Change Model



Biographical Data

Name	Kimberly Thompson
High School	Cherokee High School Marlton, NJ
Undergraduate	Bachelor of Arts Elementary Education Rowan University Glassboro, NJ
Graduate	Master of Arts Supervision and Curriculum Rowan University Glassboro, NJ
Present Occupation	Educational Consultant Pearson Education Parsippany, NJ