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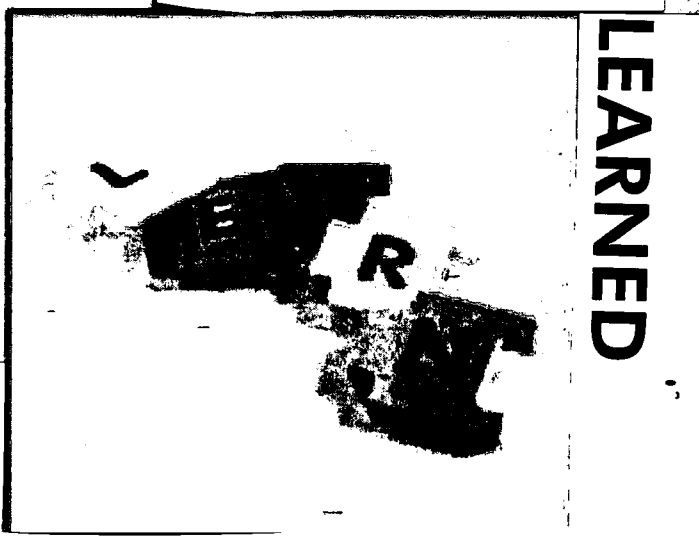
ABSTRACT

From 1995 to 2000, the SouthEast Initiatives Regional Technology in Education Consortium (SEIR-TEC) provided technical assistance and professional development to 12 schools, referred to as intensive sites. Typically, this effort entailed a member of the SEIR-TEC staff spending three or four days per month working with teachers and administrators on various aspects of technology integration, especially professional development and technical assistance. The nature and extent of the initiatives were determined in large measure by the needs of local teachers and administrators, such as technology planning, teaching with technology, and program evaluation. Most of the intensive sites have made substantial progress toward technology adoption and integration. This booklet sheds some light on factors that influence technology adoption by sharing some of the lessons learned and observations made from work with resource-poor schools across the region. Accompanying each of the eight lessons are suggested steps that educators might take in order to move their technology programs forward and a story from one of the SEIR-TEC intensive site schools. (Contains 14 references.) (AEF)

Factors Influencing the Effective Use of Technology for Teaching and Learning

LESSONS LEARNED



from the SEIR♦TEC Intensive Site Schools

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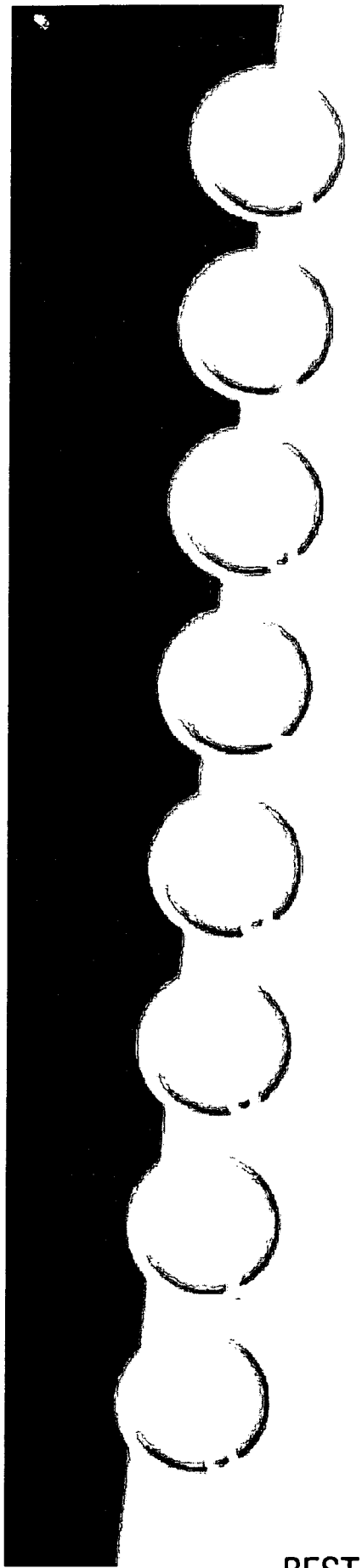

Factors Influencing the Effective Use of Technology for Teaching and Learning: Lessons Learned from the SEIR♦TEC Intensive Site Schools

2nd Edition, 2001

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Improving Learning through Research & Development

Associated with the School of Education,
University of North Carolina at Greensboro

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Lakeside School District, Lake Village, Arkansas
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Jordan Hill Elementary School, Griffin, Georgia
Booneville Middle School, Booneville, Mississippi
Central Middle School, Whiteville, North Carolina
Antonio Pedreira School, San Juan, Puerto Rico
López Sicardó School, San Juan, Puerto Rico
Rosemary Middle School, Andrews, South Carolina
East Side Elementary School, Brownsville, Tennessee
Ricardo Richards School, St. Croix, Virgin Islands
Halifax Middle School, South Boston, Virginia

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This second edition of *Factors Influencing the Effective Use of Technologyfor Teaching and Learning: Lessons Learned from the SEIR•TEC Intensive Site Schools* is produced by the SouthEast Initiatives Regional Technology in Education Consortium (SEIR•TEC), which is a partnership of national, regional, and university-based organizations that work collaboratively to help communities of learners use technology effectively. *Lessons Learned* is based on work that SEIR•TEC conducted from 1995–2000 and involved the following organizations:

SERVE
Southwest Educational Development Laboratory (SEDL)
Learning Innovations at WestEd
AEL, Inc.
Florida Instructional Technology Resource Center (ITRC) at the University of Central Florida
National Center on Adult Literacy (NCAL) at the University of Pennsylvania
Southern Regional Education Board (SREB)

Lessons Learned

Why is it that some schools are effectively using technology for teaching and learning while other schools are not? This question is often asked as educators and technology supporters seek ways to enhance educational opportunities for students. In this booklet, members of the SEIR♦TEC staff shed some light on the factors that influence technology adoption by sharing some of the lessons learned and observations made from work with resource-poor schools across the region. Accompanying each lesson are suggested steps that educators might take in order to move their technology programs forward and a story from one of the SEIR♦TEC intensive site schools.

From 1995 to 2000, SEIR♦TEC provided technical assistance and professional development to 12 schools, which we refer to as *intensive sites*. Typically, this effort entailed a member of the SEIR♦TEC staff spending three or four days per month working with teachers and administrators on various aspects of technology integration, especially professional development and technical assistance. The nature and extent of the initiatives were determined in large measure by the needs of local teachers and administrators, such as technology planning, teaching with technology, and program evaluation. Most of the intensive sites have made substantial progress toward technology adoption and integration. By "progress," we mean that technology is integrated into the curriculum, and teachers and students use technology in meaningful ways to enhance learning. We hope that by sharing lessons learned and observations about the factors that affect the schools' successes, SEIR♦TEC can provide a way for educators in other schools to gain insights that will help them develop and improve their own technology programs.

LESSONS LEARNED

Lesson #1
Leadership is the key ingredient.

Our experiences in working with the intensive sites confirm what the research literature says, that leadership is probably the single most important factor affecting the successful integration of technology into schools. This is true at all levels—state, district, and school. For example, the states with the most successful technology programs are those that have had visionary governors, legislators, and department of education staff who are committed to the use of technology as a tool for teaching and learning. Similarly, the schools that have made the most progress, including our intensive sites, are those with energetic and committed leaders. What do effective leaders do? Here are some specifics.

a. **Start with a vision.**

It is especially important at the school level for the principal to have a vision of what is possible through the use of technology and to be able to work with others to achieve the vision. Without this vision and the translation of the vision into action, lasting school improvement is almost impossible. The schools in which SEIR♦TEC has had the greatest impact are the ones with the strongest leaders—leaders who are committed to helping their teachers and students use technology effectively.

b. **Lead by example.**

Effective principals lead by example. They have a clear idea about how technology can support best practices in instruction and assessment; they use technology fluently; and they participate actively in professional development opportunities. The leader who expects to see technology used in the classroom but does not use e-mail or find information on the Internet sends, at best, a mixed message.

c. **Support the faculty.**

In addition to modeling the use of technology, supportive school principals highlight the efforts of teachers who attempt to use technology to improve teaching and learning. They do so in meaningful ways, such as providing opportunities for teachers to make presentations at state technology conferences or to participate in technology demonstration projects. Effective leaders also attend professional development sessions with their teaching staff.

Research on teaching and learning in technology-rich environments and SEIR♦TEC members' experiences in technology-poor schools support the notion that educators go through incremental stages on their way to becoming technology proficient (cf., Dwyer et al, 1991; Apple Computer, Inc., 1995; Lemke and Coughlin, 1998.). Research

and experience also indicate that teachers and administrators need support from school and district leaders as they go through the stages. As teachers try new strategies and adopt new technologies, they are bound to stumble; it is up to the principal to assure them that it is okay to be less than graceful as they are learning.

d. Focus, focus, focus.

Real reform takes a lot of time and energy. Faculty who are bombarded with a constant stream of new initiatives quickly become overwhelmed and resentful. Effective school leaders focus on reform initiatives that offer the most promise for improving teaching and learning, and they ensure that faculty have the resources, skills, and time necessary for turning the promise into reality.

e. Share leadership roles.

School technology committees can play an important role in making decisions that reflect the needs of a total school community. Administrators help this happen by showing both interest and trust in decisions that the group makes. Committee members should be those who are representative of the total faculty and staff and selected by a method other than principal-appointment. Committee meetings should not begin with the principal or technology coordinator announcing his or her software decision and who will get the new computers that just arrived. Shared input and decisions are critical for committee members to feel that they serve a real role and to increase the chances that decisions will be implemented.

f. Use evaluation to further professional growth.

Professional development is necessary as school teams strive to reach their vision for technology. Sometimes, teams depend on evaluation instruments for selecting and planning the most appropriate professional development models and strategies, but not many of the teacher evaluation instruments currently in use encourage effective teaching with technology. Typically, instruments provide either a list of general requirements, such as "Teachers will conduct at least two technology-supported lessons per year," or they present a checklist, such as "Appropriate technology use: Yes/No." We have found that other tools can be more helpful, such as self-assessments of teacher technology skills and use and open-ended classroom observation protocols. Instruments that include indicators of good practice and rubrics of success are also useful in helping to identify next steps in an educator's professional growth plan. Some examples of useful instruments can be found in SEIR♦TEC's *Planning into Practice* document (www.seirtec.org/P2P.html) and on the High Plains Regional Technology in Education Consortium's website at http://profiler.hprtec.org.

Lesson 1—Leadership is the key ingredient.

Story to Tell:
Booneville Middle School, Booneville, MS

Leadership was the key at Booneville Middle School. The principal, Linda Clifton, had a vision of how technology could benefit the students of the school. She used this vision and a belief in what the staff and students could accomplish to obtain the first technology grant for the school. Supplemented with technical assistance from SEIR♦TEC, she leveraged this initial support to obtain additional resources. All the while, she urged, supported, and energized the teachers to incorporate technology into their classroom activities. Under her leadership, the school progressed from a couple of Apple IIe computers to a fully networked campus with a new technology-rich science building. In recognition of these accomplishments, the school was honored at the national SchoolTech Expo Showcase of Model Schools. When Ms. Clifton left the school, the faculty members who had been the most active technology users maintained the momentum she had created. By having a focus and by sharing the leadership with these faculty members, Ms. Clifton demonstrated that leadership is a key to effective technology use.

Ways to Apply this Lesson

1. Offer focused training on leadership for technology.
2. Provide models and examples of effective leadership.
3. Establish peer collaboration groups, such as groups of principals or technology coordinators.

2

Lesson #2

If you don't know where you're going, you're likely to wind up somewhere else.
—Yogi Berra

Yogi Berra may not have had technology plans in mind when he made his famous statement about knowing where you're going, but it certainly applies. Each organization, whether it is a district or an individual school, needs to spend time developing and updating a comprehensive plan—starting with its vision, mission, and goals. Every decision made should be one that supports the organization's vision. The degree of success that a school has in implementing technology will depend, in part, on the quality and maturity of its technology plan. A technology plan that reads like a shopping list cannot guide a school in making its hardest decisions. A useful plan reflects the ideas of an entire school community and is connected to overall school goals. It focuses on the use of technology to support teaching and learning. When we first began working with the intensive site schools, many needed assistance not only in writing a plan, but also in creating a process for developing, implementing, and updating the plan. After all, there's not much point in spending time and energy on a plan that's going to sit on a shelf and not be used.

We have noticed that the plans and processes created at some of the intensive site schools share some of the same problems as school technology plans everywhere. The first is a tendency for one individual or a few people to write the plan, a practice that flies in the face of the notion of stakeholder buy-in and community involvement. A second is that many plans lack a detailed component or plan for professional development that covers the broad range of skills teachers and administrators need. The third common problem is that most plans lack a component for evaluating the success and effectiveness of the program. The omission of components usually stems not from a lack of interest but perhaps from a lack of expertise in how to set up an effective professional development program in technology or how to conduct an evaluation that will yield meaningful and useful results. The chart on the following page is an outline of a technology plan that has all the essential elements.

Implementing the plan also requires working together in groups, devising new patterns for staffing, and many other organizational changes that are brought on by the use of technology. However, many plans never go beyond the early stages because no one is assigned responsibility for the implementation activities. Someone must be in charge for technology plans to be implemented.

Contents of a Technology Plan: An Example

Appoint someone in your school to be the technology coordinator.

I. Executive summary/Introduction

II. Our school's vision for educational technology
   A. Why are we interested in using technology?
   B. How will technology impact teaching and learning in our school?

III. Current status of educational technology in our school

IV. Planning focus areas
   A. Curriculum integration
      1. Overview of our curriculum integration strategy
      2. Goals and objectives
   B. Staff development
      1. Overview of our staff development strategy
      2. Goals and objectives
   C. Community engagement
      1. Overview of our community engagement strategy
      2. Goals and objectives
   D. Infrastructure
      1. Overview of our infrastructure strategy
      2. Goals and objectives

V. Technology infrastructure design

VI. Action plan by year (for five years)
   A. Curriculum integration
   B. Staff development
   C. Community engagement
   D. Infrastructure

VII. Roles and responsibilities

VIII. Budget summary/Funding strategies

IX. Evaluation

X. Appendices—Committee membership, inventories, survey data, glossary, bibliography

From: Sun, J., Heath, M., Byrom, E., Dimock, K.V., and Phlegar, J. (2000). Planning into Practice. *Durham, NC: SEIR•TEC*

A technology plan that reads like a shopping list cannot guide a school in making its hardest decisions.

Lesson 2—If you don't know where you're going, you're likely to wind up somewhere else.

Story to Tell:
Andrews Elementary School, Andrews, South Carolina
Andrews Elementary School had a good basis for setting the direction for technology implementation at the school. The administrators had a strong vision that students and technology were a match. The staff believed this, but there just had not been sufficient time to develop a technology plan that addressed this vision and belief. A SEIR◆TEC School Leadership Academy provided them the vehicle to accomplish this task.
The team from Andrews attended the SEIR◆TEC Academy for School Leaders in June 1999 with the goal of developing the beginning of a school technology plan and a job description for a school technology coordinator. They left the Academy with both documents in hand, and they returned to their school to involve the staff and administration. By the end of that school year, they had reached several important milestones:

- The school hosted a community-wide open house to celebrate the successful development of the new technology plan with almost all staff involved.
- A school technology coordinator was onsite.
- The county school board agreed to support the school's continued efforts.

Taking time to broaden their perspective, to involve a wide range of people in the plan development, and to create a plan—not a shopping list—all were steps to knowing where they wanted to go and getting started toward that destination.

Ways to Apply this Lesson

1. Take time to reflect on the current use of technology for teaching and learning.
2. Determine needs, create strategies for meeting the needs, and identify ways of monitoring progress.
3. Develop updated plans, coordinated with school, district, and state initiatives.
4. Network with people to gain a broader perspective.
5. Encourage staff to participate in conferences or to read grant proposals in order to learn new strategies from

3

Lesson #3

Technology integration is a s-l-o-w process.

Truly integrating technology into teaching and learning is a slow, time-consuming process that requires substantial levels of support and encouragement for educators. The Apple Classrooms of Tomorrow (ACOT) studies (Dwyer et. al, 1991) of what happens in technology-rich environments have shown that teachers go through predictable stages in their use of technology and that this process takes from three to five years. A similar set of stages was identified by the Milken Family Foundation report in 1998 (Lemke and Coughlin, 1998). We have found that in technology-poor schools, the process takes even longer. In our intensive sites, we have also noticed that there seems to be a correlation between the amount and level of technical assistance we provided and movement along the continuum of technology integration, i.e., the schools that received the most attention are making the most progress.

In most of the resource-poor schools in our region, teachers have only had access to the basic types of training in which they learned to use a single application. Follow-up and support are the exception rather than the rule.

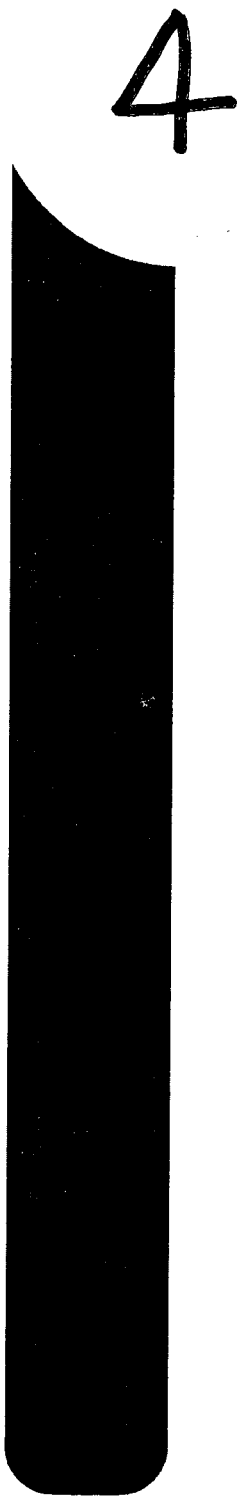
Lesson 3—Technology integration is a s-l-o-w process.

Story to Tell: Puerto Rico Schools

One of the highlights of SEIR◆TEC's work with two intensive sites in Puerto Rico has been a summer Academy. After the 1999 Academy, teachers from the sites and other schools returned to their schools to use their new ideas and technology skills for teaching and learning. Only later, when they came together for a one-day update meeting, did they begin to realize the full potential of what could be done with the skills they had acquired in the summer. By participating in the follow-up session to the training, the teachers began to recognize the stages of technology proficiency they were currently experiencing. They left the event with the knowledge to advance the integration of technology at their schools. The one-time summer event had not been sufficient to achieve this level of knowledge. They needed experiences over time to truly integrate technology in the classroom.

Ways to Apply this Lesson

1. Provide follow-up to technology integration training.
2. Recognize the stages of using technology in teaching and learning.
3. Acknowledge that using technology is an up-and-down process. You might be up in using one resource and technique but starting at the bottom with each new initiative.



Lesson #4

No matter how many computers are available or how much training teachers have had, there are still substantial numbers who are "talking the talk" but not "walking the walk."

When you consider that microcomputers have been in schools for over 20 years, and most teachers have participated in some type of professional development, it is still surprising to see how many teachers do not use technology at all. We know and appreciate that there are a variety of reasons, some of which we cannot do anything about and others that we can do something about. For example, there are a few research studies that indicate that some teachers have a natural proclivity toward using technologies in general and computers in particular, while others do not. And, like the general population, there are some teachers who embrace change, while others resist it. On the other hand, there are some research-based practices and common-sense strategies we can implement that enhance the likelihood that teachers will begin using technology. The listing of "Features of Effective Learning Experiences," which is provided below, is a research-based guide for professional development in general that can easily be applied to experiences leading to technology use.

Features of Effective Learning Experiences

1. Learners help plan the learning experience to fit their needs.
2. New information is received through more than one of the five senses. For example, learners may read text, hear an explanation, view a demonstration, or use materials.
3. Learners process information in more than one context and in more than one way. They may write in journals, analyze case studies, role play, hold small group discussions, conduct interviews, present lessons, solve problems, use art or music to express ideas, construct objects, etc.
4. Questions are thoughtfully and thoroughly discussed.
5. Learners are encouraged to reflect, wonder, suppose, and predict.
6. New concepts and information are related to current knowledge and experience. Learners may connect the new with the old by drawing on previous experience to illustrate new ideas; by comparing and contrasting new knowledge with previous knowledge; by applying new strategies or skills to familiar situations; by constructing metaphors for new concepts. Or new information may trigger a process of deconstructing previous knowledge.
7. The learning environment is collegial. Learners learn from one another. Ideas and perspectives reflect the ethnic and

gender diversity of the learners. Learners value and welcome diverse viewpoints.

8. Learners use new information over time, testing, comparing notes with other users, revising and refining understanding and practice.
9. Learners have access, when needed, to support and provide feedback from those with expertise.
10. Learners experience success.

From: Collins, D. (1997). Achieving Your Vision of Professional Development: How to Assess Your Needs and Get What You Want. *Tallahassee, FL: SERVE.*

When these features are incorporated into professional development and when the following common-sense observations from SEIR♦TEC's work in the intensive site schools are considered, changes can occur that lead to teachers walking the walk.

a. **Begin with teaching and learning, not with hardware and software.**

As technology-oriented professionals, we have a tendency to frame professional development and technical assistance around technology tools, such as word processing and databases. We tell teachers, "Now, what you need to do is integrate word processing into your lesson plans," which can work with motivated teachers but not with those who need a lot of support (or a gentle shove). In short, teachers have a difficult time applying technology skills in the classroom unless there is a direct linkage with the curriculum, teaching strategies, or improvements in achievement.

Professional development tends to have a stronger impact when we frame it like this: "Let's look at what students are learning this year and then see how technology can make their learning more effective."

b. **The training-of-trainers model means more than providing a workshop to a few people and expecting them to train their colleagues on what they learned.**

The training-of-trainers model for professional development might just be the most misunderstood or misrepresented model in education. Quite often, it is interpreted as one or two people delivering a workshop in which the participants are supposed to acquire the content knowledge and training skills needed for conducting turn-around training. Unfortunately, this seldom works because (a) the content is too complex to be mastered in a one-shot workshop, and there is no follow-up accommodation for the would-be trainers to become proficient; (b) there is no support for turn-around training; or (c) the would-be trainers are inexperienced trainers. For the model to work, all three barriers must be overcome.

c. **Use teachers as mentors and coaches.**

Teachers teaching teachers is usually more effective than technology specialists teaching teachers. Although we have seen some top-notch training conducted by people with good technical skills but no classroom teaching experience, educators with both the classroom experience and technical skills tend to make a greater impact, even if their technical skills are not as strong as those of a technology specialist.

Workshops and institutes aren't enough. Good professional development plans and programs incorporate a variety of strategies.

d. **It's a waste of time and energy to provide technology training when teachers don't have the resources, opportunity, and support needed to apply their new knowledge and skills.**

It should go without saying that it makes absolutely no sense to provide training on technology applications when teachers don't have access to appropriate hardware and software. Unfortunately, some school leaders continue to follow the tradition of sending teachers to workshops when it's convenient rather than when it's logical. All too many districts hold training during the summer even though teachers won't have the technology or support materials until January. On the other hand, districts with effective programs tend to use more thoughtful approaches, such as a district in Georgia that gives their teachers software two weeks before training events, so they will have time to get a sense of what it will do and how it works.

e. **Professional development is ongoing and comes in many sizes and shapes.**

Workshops and institutes aren't enough. Good professional development plans and programs incorporate a variety of strategies. Staff working with SEIR♦TEC intensive site schools report the following examples:

1. Staff development works well when designed for and provided to core groups of teachers, such as those in a particular curriculum area or grade level.
2. In some of our schools, half-day workshops have better attendance than 90-minute after-school sessions. If the workshops are held by grade level, teachers can share substitute teachers.
3. Professional development sessions on software applications should include time for teachers to explore the package, reflect on how they might use it in their teaching, and experiment with presentation options (e.g., data projector or individual computer). Follow-up, small group, and one-on-one sessions on effective classroom use enhance the likelihood that what teachers learn is applied in the classroom.

4. Helping teachers and students develop multimedia presentations for their local school board or PTA not only helps them tell their story but also helps them develop technology proficiency.
5. Teachers are motivated by staff development credit. One district awards credit when teachers complete a workshop, hand in a lesson plan integrating the new teaching strategy or software application, and are observed using the strategy or application effectively in the classroom.
6. A little bit of positive attention for teachers who embrace technology can go a long way. For example, when administrators allocate staff development funding for teachers to make presentations at state or national technology conferences, the resulting enthusiasm and support for technology integration is dramatically increased. Another reward strategy is to give technology-using teachers first dibs on new technologies in the school. It can cause bruised feelings in the short run but seems to increase technology use in the long run.

Lesson 4—No matter how many computers are available or how much training teachers have had, there are still substantial numbers who are "talking the talk" but not "walking the walk."

Story to Tell: Halifax Middle School, South Boston, Virginia

Although teachers often have a difficult time sitting through professional development activities after school, educators at Halifax Middle School found a way to turn the time into an energizing experience for all. They first identified members of the staff with certain technology skills and interests. Working with a SEIR◆TEC staff member, they assigned the faculty members to teams. Some were subject teams; some were grade level teams. The staff members with the selected skills became the teachers for interactive work sessions once a month. The entire group determined a classroom or grade level need that would benefit from the application of technology. Armed with a need, a fellow teacher to teach and mentor, and colleagues to share the learning, the faculty began their re-formatted afternoon staff development session . . . and experienced success! The ultimate beneficiaries were the students, whose achievement test scores in core content areas increased dramatically. The teachers at Halifax Middle had begun with the teaching and learning and had used their own colleagues as mentors to begin "walking the walk."

Ways to Apply this Lesson

1. Conduct staff development with a purpose and a plan.
2. Determine and leverage skills that staff members already have.
3. Tailor professional development to participants' skill levels, curriculum areas, needs, and interests.
4. Provide ongoing professional development by utilizing mentors, peer coaches, online courses, and certification programs through colleges and university teacher education programs.

5

Lesson #5

Effective use of technology requires changes in teaching; in turn, the adoption of a new teaching strategy can be a catalyst for technology integration.

While legislators often expect to see a direct correlation between the amount of money spent on computers and improvement in students' scores on standardized achievement tests, we have observed that there are several intervening variables, such as the amount and quality of technology use by the teacher and the student. Effective use of technology often requires changes in the way teachers teach. In many cases, this means that teachers embrace strategies for student-focused learning, such as tailoring instruction to meet individual students' learning needs, helping students develop problem solving and critical thinking skills, and providing opportunities for project-based learning. In SEIR♦TEC's work in the intensive site schools, we have observed that it is the combined effect of pedagogically sound teaching practices and appropriate technologies that lead to improvements in learning.

We have also found that when professional development and technical assistance start with a particular teaching or learning strategy that the teachers believe will benefit their students (e.g., project-based learning, cross-curricular thematic units, cooperative learning) and then help teachers discover ways technology is a tool that supports the strategy, teachers are usually eager to try both the new instructional strategy and the technology.

Lesson 5—Effective use of technology requires changes in teaching; in turn, the adoption of a new teaching strategy can be a catalyst for technology integration.

Story to Tell: Central Middle School, Whiteville, North Carolina

Central Middle School is one of the SEIR♦TEC intensive sites that made giant leaps forward in the use of technology for teaching and for student projects. Students developed multimedia reports and searched the Internet; teachers used computer teaching stations and incorporated websites in their lesson plans. The change in teaching strategies resulted from staff and administrators believing that the effective use of technology required a change from the typical teacher delivery mode. How did this happen? The technology director and the technology resource teacher for the district, working with SEIR♦TEC, determined what technology resources were available, worked with several teachers to design curriculum-focused training, supplied appropriate technology, and offered assistance from the coordinator. A few teachers changed their teaching style first. Then others began making changes, moving to student-centered, problem-based learning using technology. Now, students expect to

present multimedia reports, not paper ones. They turn in typical bug collections complete with HyperStudio stacks about the bugs. And, students are teaching each other not just how to operate the technology but also the content they are investigating. Their teachers have changed the way they teach as they integrate technology into their teaching. The students are learning now in a highly motivated, student-centered environment—regularly using technology.

Ways to Apply this Lesson

1. Conduct a technology audit of what resources are in place and their working condition.
2. Map technology skills and applications with curriculum and standards.
3. Modify existing materials first; then create new materials.
4. Identify models and examples of successful teaching with technology strategies.

Lesson #6

Each school needs easy access to professionals with expertise in technology and pedagogy.

6

Our experiences in the field confirm the notion that teachers need on-site and on-demand technical assistance with both the technology and the integration of technology into teaching and learning. Finding professionals who have expertise in both areas is difficult, and few schools have professionals with both. Many districts hire curriculum specialists and technology specialists and hope they work together. Sometimes they do; sometimes they don't. Resource-poor schools might have a curriculum specialist, but they seldom have access to anyone, in-house or externally, with the skills to assess their hardware requirements or troubleshoot problems as they start using new hardware and software.

One observation from the SEIR♦TEC intensive site schools is that in-house teams of teachers are often assigned the role of providing technical assistance to their colleagues. With a shared vision and training, they provide the on-site and on-demand assistance that is needed and are soon considered the professionals with the expertise. Yet, that assistance is an extra duty for these educators. The lesson learned here is that to have the access to professionals—who are not also full-time teachers—requires documentation of the type of needs and the quantity of requests. The teams of teacher helpers who document their work and share this with administrators are the ones who stand a better chance of obtaining access to additional professional assistance beyond that of their colleagues.

Lesson 6—Each school needs easy access to professionals with expertise in technology and pedagogy.

Story to Tell:
East Side Elementary School, Brownsville, Tennessee
In 1996, the assistant principal and two teachers at East Side Elementary School wrote a Goals 2000 grant for $89,000 to wire the school; purchase teacher mobile stations, tv/vcrs, and software; and conduct a bit of training. Three successful grants later, each member of the school staff had his own computer, printer, and Internet station, and the school had a newly renovated book-closet-turned-into-computer-staff-room for training, meetings, and sharing ideas. Yet, something was missing according to the assistant principal, Rhonda Thompson. Working with SEIR◆TEC staff, Ms. Thompson organized the school staff for team training on a variety of applications. The turning point to make the training by the SEIR◆TEC professionals pay off in increased teacher use of technology was when she selected a team of six teachers to be in-school experts. These in-school experts were to take the staff to the next level of use of technology. The six staff members were allowed time during the school day to practice with the software and Internet resources and to connect the curriculum standards to the resources. That summer, the team of six teachers offered training for the other teachers. When the training was completed, the team of six did not quit work. They were available to work with their colleagues during the next school year. East Side Elementary School now had access to professionals with expertise in technology and teaching, and in this way, they built a technology user support team from within.

Ways to Apply this Lesson

1. If you can't afford to hire new staff for technology support, build the support from within, but recognize the extra work this requires from the existing staff.
2. Connect to online technology support for technical problems and curriculum integration ideas.
3. Document the number and kinds of requests for technical assistance, and use the data to gauge the level of support needed.

7

Lesson #7

Barriers to using technology to support learning are the same for all poor communities, but some populations have additional issues.

It is very difficult to focus on integrating technology to support learning if you cannot overcome basic technological equipment and facilities issues. Insufficient number of electrical outlets...No furniture for the equipment...Facility structural and environmental problems that prevent placement of network cabling...Limited or no security for the building and the equipment...No secured room for a lab...Leaking roofs...And, the list goes on. In getting the basics in place, schools that serve students in economically disadvantaged areas typically have greater barriers than schools in affluent communities. Many of the schools in our region are cases in point. In some instances, the buildings are so old that establishing an infrastructure is very difficult. For example, there are many schools that do not have high-speed Internet access and even more classrooms that do not have Internet access at all. In other places in the Southeast, the lack of security is a problem. Some of our schools cannot put computers in classrooms unless the windows are secured, which usually means installation of iron bars. And, living in the Southeast, we are occasionally reminded of the impact that the weather has on schools, such as hurricanes that wipe out microwave communication towers or destroy entire school facilities.

Many schools also have access issues. One type of access issue is physical: basic electricity is not sufficient, and the electrical infrastructure of many schools is unable to handle the additional load required by computer networks. In Puerto Rico and several rural areas stateside, for example, there are long lists of schools that need major upgrades to buildings and wiring that require major infrastructure investments. Another access issue is centered around the general lack of technology-based resources for Spanish-speaking educators and students. Educational software and materials on technology classroom integration in Spanish are just beginning to appear (cf., Boethel et al, 1999).

A common barrier for underserved and resource-poor schools is continuity of staff and leadership. In schools struggling to improve student achievement with limited resources within the school and from the community, the staff turnover is often high. At one of the intensive site locations, the principal remained year after year, but a majority of the staff was new almost every year of the five years of the project. All previous plans and professional development efforts for using technology in the classrooms began anew each year. Teachers started with the same lessons on using technology and with the same beginning projects for the students. Without access to

technology resources in the community or at home to practice and extend the lessons learned, the students were caught in a cycle of doing the sameor similar technology projects each year.

Adult education and literacy is another area where there exists a barrier to using technology. Special materials are needed. As we strive to make resources available to the widest number and variety of programs, we try to enable constituent groups to build on each other's work rather than continuously reinventing the wheel. Adult educators benefit from opportunities to work with and/or learn from experienced, thoughtful K–12 educators. However, the adult literacy learners and settings are different enough from K–12 that the adult educators find that they also need to take these learnings and resources and then rethink and re-purpose them to create methods and materials that can be effective in their own instructional settings.

Lesson 7—Barriers to using technology to support learning are the same for all poor communities, but some populations have additional issues.

Story to Tell: Ricardo Richards Elementary School, St. Croix, U.S. Virgin Islands
In the U.S. Virgin Islands, the barriers to using technology for teaching and learning are different from those experienced by the mainland schools in the Southeast. How? Hurricanes are a yearly menace to the island schools and to the technology infrastructure—destroying the technology resources and disrupting the ongoing implementation of technology in the classrooms. Maintaining consistent, reliable Internet access to all classrooms across the islands presents constant connectivity issues that other communities just do not face. Scheduling training and technology planning sessions is difficult from the standpoint of having presenters and experts travel to the site. What lesson was learned by the SEIR◆TEC intensive site schools and SEIR◆TEC staff working with these schools? Focus. Focus technology planning on educational barriers and problems that can be solved with technology. Focus professional development to maximize and extend the existing staff technology skills before expanding to new ideas. Focus on building a core of learners who can sustain the initiatives and new ideas between the visits by the experts and the technical assistance providers. By focusing efforts in these ways, SEIR◆TEC assisted the intensive site schools on the U.S. Virgin Islands in addressing the barriers special to their setting.

Ways to Apply this Lesson

1. Identify the educational problem that technology can help solve. Then, focus on that problem.
2. Locate others with similar problems and learn how they are addressing them.
3. Learn what resources and funding are available for special circumstances or populations, and advocate the development of additional products and opportunities.

Lesson #8

Evaluation is often the weakest element of technology programs.

Most schools, districts, and states have technology plans, but many of these plans still lack strategies or tools for determining whether the efforts have had any impact. Some states are now calling for a way to document the cost effectiveness of technology decisions. Others are attempting to connect technology plan goals with expenditures and with impact on student achievement. Districts are seeking ways to document any progress they have made in implementing their technology plan and just hoping that in doing so they can discover the impact on teaching and learning. Our observations in working with the intensive sites, selected districts, and the states in the region tell us that now is the time to focus on evaluation of technology impact. However, even if educators are ready to tackle this task, very few know how to design and implement such an evaluation program. They need models, tools, and strategies to help them gauge the progress of technology integration over time and determine the program's impact on teaching and learning.

a. **Evaluation is a tiny aspect of most technology programs, for a variety of reasons:**

   All too often, technology plans lack a component for evaluating the success and effectiveness of the program. There may be a statement designating a person or committee with oversight for reporting technology progress, but little else is included in the plan. This stems perhaps from a lack of expertise in how to set up an effective evaluation program in technology and how to conduct an evaluation that will yield meaningful and useful results.

   Standardized tests seldom measure the kinds of things that technology is most likely to enhance, such as creativity, problem solving, critical thinking, design, school attendance rate, dropout rate, and discipline referrals. Yet, the documented impact on test scores as the result of technology use is what many political and community leaders are requiring. How to accomplish this daunting task of matching expectations with actual outcomes stalls many evaluations of technology's progress and impact.

   Evaluation is both an art and a science requiring substantial levels of specialized training. Designing an evaluation plan can be an intimidating process.

A rule of thumb is that ten percent of a project budget should be spent on evaluation. Many program leaders would rather spend the money on staff, infrastructure, or professional development than on evaluation.

There aren't many educators who have expertise in both technology integration and program evaluation, so finding a good evaluator can be difficult.

Educators sharing stories can help each other gain access to successful grants and technological rewards.

b. Educators want tools to track progress.

As we worked with state groups and with our intensive sites, we discovered that they need tools and processes to track and document their technology progress—tools that help them reflect on where they are and where they need to go with their technology initiatives. In the belief that helping educators reflect on their progress could accelerate the rate of progress, we developed the *SEIR♦TEC Technology Integration Progress Gauge* for use in the intensive sites. The *Gauge* is built around five domains of technology integration, principles of good practice for each domain, and indicators of progress for each principle. As the instrument was being developed, staff compared the domains and principles with other instruments such as the CEO Forum's *STaR Chart* and the Milken Exchange's *Frameworks for Technology Integration* to ensure that the *Gauge* covered all the bases. From using the instrument in our intensive sites, the teachers and administrators have reported that in addition to being a useful gauge for progress in general, the instrument is a good basis for discussing specific technology initiatives across the district. It also helped them see the bigger picture of technology integration by showing principles of practice that they have not yet addressed. Note: The *Progress Gauge* has recently been converted into a checklist and can be completed online through *Profiler*. *Profiler* is a tool developed by the High Plains RTEC that allows individuals or groups to respond to survey questions and immediately see their compiled data. To see the *Gauge* and other instruments that are available on *Profiler*, go to http://profiler.hprtec.org and select "sample surveys."

c. Success begets success.

Savvy education leaders recognize that good evaluation can provide data that can be useful for purposes beyond determining a program's effectiveness and impact. For example, leaders can find evaluation an important source of information that can be used for planning. Another potential use of evaluation data is what we call "evidence of success." When evaluations yield data showing that a program or a particular strategy has a positive effect on teaching and learning, educators have the ammunition they need to build a case for continuation or expansion. After all, legislatures, school boards, and funding agencies like to know that the money they provide for technology initiatives goes to schools and districts that have a successful track record and are therefore likely to put the money to good use.

SEIR♦TEC intensive site schools that have made the most progress are those that have parlayed recognition they have received for their efforts in SEIR♦TEC into funding opportunities. For example, the school board in South Boston, Virginia, was so pleased with the attention their middle school had received in the SEIR♦TEC newsletter and other venues, they appropriated $180,000 for technology for the school. Booneville Middle School in Mississippi parlayed the awards received by math and science teachers into a multi-million-dollar environmental learning center. It may take a while, but if teachers and administrators tell their stories—for example, when applying for grants and awards—their efforts will eventually be rewarded.

Lesson 8—Evaluation is often the weakest element of technology programs.

Story to Tell: Jordan Hill Elementary School, Griffin, Georgia
The teachers and administrators at Jordan Hill Elementary School implemented strategies for using data not only to monitor their progress but also to identify needs and to plan professional development. For starters, they used the SEIR♦TEC *Technology Integration Progress Gauge* at the beginning and end of the school year to identify areas where they had moved forward and others where growth was still needed. Next, they developed a self-assessment instrument for teachers. The items are drawn from the district's technology standards for teachers, which are based on the ISTE standards, and are aligned with the five levels of teaching with technology that were identified by the Apple Classrooms of Tomorrow research. Teachers completed the self-assessment at the beginning and at the end of the school year. They used the summary data to identify needs for the upcoming year and to plan their professional development for the following year. Teachers and administrators were very excited about having a way to show the progress they had made, and they appreciated being able to tailor professional development to their skills and teaching objectives. Without tracking their progress over time, they would not have achieved this sense of growth as well as documented the impact of their technology program.

Ways to Apply this Lesson

1. Think positively. Consider evaluation as a way of documenting success and identifying opportunities for growth.
2. Identify at least one evaluation question for each program goal or objective.
3. Locate evaluation tools and modify them for your local needs and constituents.
4. Pause from time to time in order to reflect on your progress.
5. Share your successes.

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Eight Lessons Learned:

1. Leadership is the key ingredient.
2. If you don't know where you're going, you're likely to wind up somewhere else.
3. Technology integration is a s-l-o-w process.
4. No matter how many computers are available or how much training teachers have had, there are still substantial numbers who are "talking the talk" but not "walking the walk."
5. Effective use of technology requires changes in teaching; in turn, the adoption of a new teaching strategy can be a catalyst for technology integration.
6. Each school needs easy access to professionals with expertise in technology and pedagogy.
7. Barriers to using technology to support learning are the same for all poor communities, but some populations have additional issues.
8. Evaluation is often the weakest element of technology programs.

About SEIR♦TEC

SEIR♦TEC is one of ten federally funded regional technology in education consortia (RTEC). The three focus areas for SEIR♦TEC are leadership for technology, curriculum-based technology initiatives, and authentic professional development.

SEIR♦TEC Partners
As a consortium of five organizations working together to support technology in underserved, resource-poor schools in the Southeast, SEIR♦TEC's lead organization is SERVE, which is affiliated with the University of North Carolina at Greensboro. Other partners are the Instructional Technology Resource Center at the University of Central Florida, Southern Regional Education Board, the National Center on Adult Literacy at the University of Pennsylvania, and Learning Innovations at WestEd.

www.seirtec.org
The SEIR♦TEC website is the place to check for information, links, and downloadable files applicable to technology for teaching and learning.
Four primary areas are

- Professional Development
- Technical Assistance
- SEIR♦TEC Initiatives
- Resources

SEIR♦TEC Academies...Authentic Professional Development
SEIR♦TEC offers two types of academies: the State Education Agency Technology Leadership Academy and the School/District Technology Leadership Academy. The academies are based on the Authentic Task Approach, developed by SEIR♦TEC partner, Learning Innovations at WestEd. These four-day, intense events are centered on teams of colleagues working on an identified issue in order to develop a plan of action or a product by the end of the academy. Academy schedules and initial information are posted on the SEIR♦TEC website and are available upon request.

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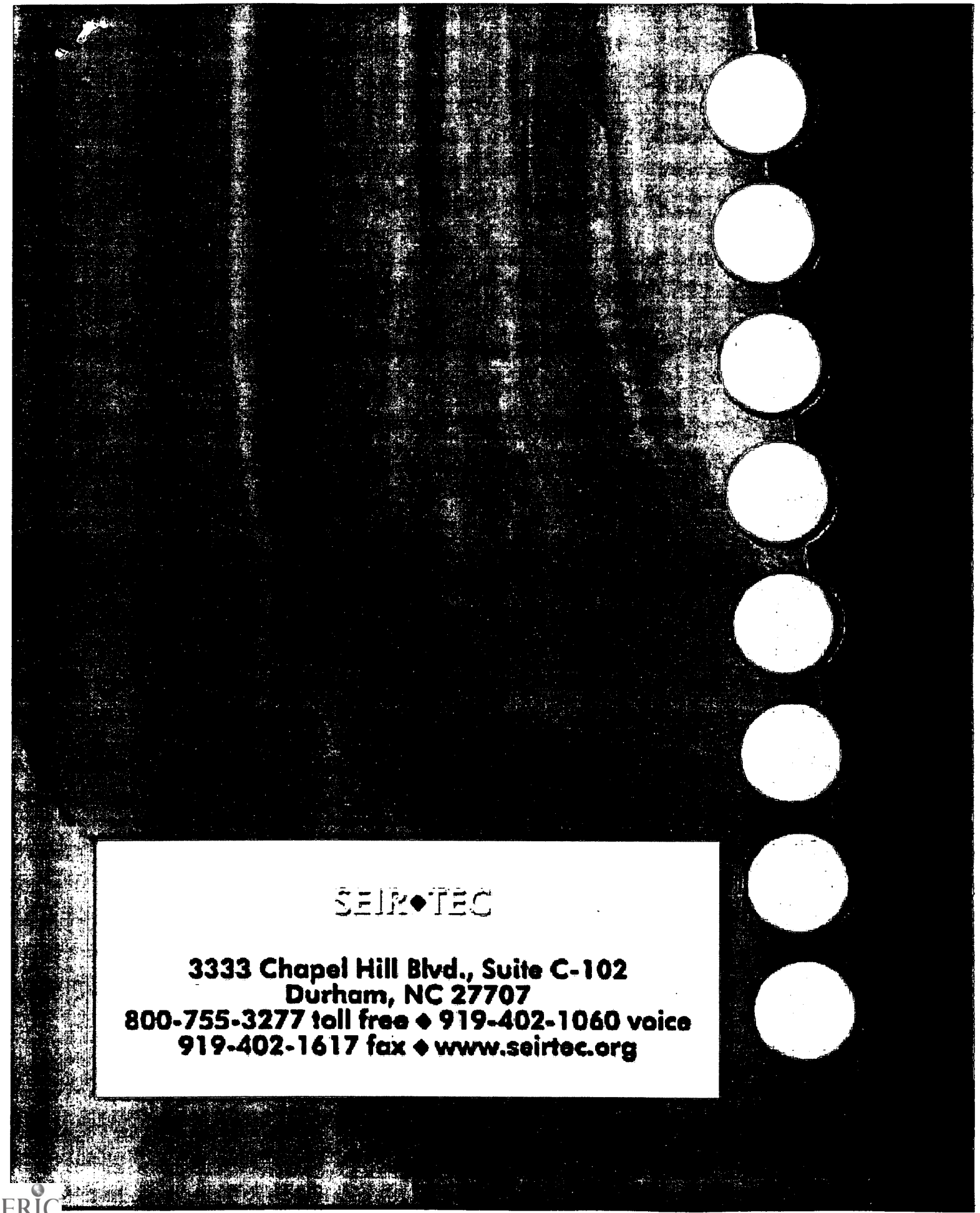

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