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## Technology planning in k-12 schools

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## Technology planning in k-12 schools

### Abstract

This review looks at the question, "What steps should be included in the technology planning process." Eight technology planning process models from state education departments, university education departments, and educational advisory agencies were reviewed and classified according to their process steps. Eight steps were identified in a majority of these plans as being necessary components to insure success in the technology planning process. Although not an actual step in the process, all the models reviewed stressed the need for technology to be integrated across the curriculum. Technology should not be taught in isolation, but rather should be taught as a part of all subject areas. In order to ensure technology is used to support teaching and learning it is necessary to engage in meaningful planning.

# TECHNOLOGY PLANNING IN K-12 SCHOOLS

A Graduate Review  
Submitted to the  
Division of Educational Technology  
Department of Curriculum & Instruction  
in Partial Fulfillment  
of the Requirements for the Degree  
Masters of Arts in Education  
  
UNIVERSITY OF NORTHERN IOWA

by  
Scott D. Seeger  
July 1996

This Review by: Scott D. Seeger  
Titled: TECHNOLOGY PLANNING IN K-12 SCHOOLS

has been approved as meeting the research requirement for the  
Degree of Masters of Arts in Education.

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## Abstract

This review looks at the question, "What steps should be included in the technology planning process." Eight technology planning process models from state education departments, university education departments, and educational advisory agencies were reviewed and classified according to their process steps.

Eight steps were identified in a majority of these plans as being necessary components to insure success in the technology planning process. Although not an actual step in the process, all the models reviewed stressed the need for technology to be integrated across the curriculum. Technology should not be taught in isolation, but rather should be taught as a part of all subject areas. In order to ensure technology is used to support teaching and learning it is necessary to engage in meaningful planning.

cookbook has recipes that, if are explicit enough and followed, will lead to delicious cuisine (Anderson & Perry, 1995).

Latimer, McCollum and Wampler (1995) see a definite need for the adoption of a set of national guidelines to follow when writing these technology plans. This would assist in the planning by schools who have yet to address the technology issue and would enhance the further development of technology planning in those schools who are already implementing their plans.

Currently a set of national guidelines does not exist. What does exist are numerous sets of guidelines produced by state education departments, university education departments, and educational advisory agencies. These existing guidelines need to be reviewed to ensure that they include the essential steps for school districts to follow when they create their own plan.

This review will be conducted using seven different sets of technology planning models. These models will be analyzed for the strengths and weaknesses of the steps involved in order to establish the essential principles that serve as benchmarks to success. The results from this review will help schools by identifying the steps and procedures that they should follow in their technology planning process .

This review should answer the question, "What are the critical components needed to put together a school district technology plan?"

## Review of Literature

This analysis of the steps involved in the K-12 technology planning process began by listing the steps contained in eight technology planning models (Appendix A). These planning models were analyzed to identify steps that shared a common theme. Of those technology planning models reviewed, the models shared eight common strengths. These strengths are the steps that help answer the research question concerning what should be included in a good technology planning process.

The eight common themes identified were the need for initial and continual staff development training; creating a technology committee; developing a district technology vision; assessing current technology status; developing technology goals; creating a technology plan time line; finding funding and establishing budget guidelines; and on-going assessment and evaluation of the plan. The eight steps are not necessarily listed in order of implementation, but rather are listed only as steps to be included in the technology planning process. In addition to the shared strengths identified, all the models reviewed stressed the need for technology to be integrated across the curriculum.

### Staff Development

There was one step that all of the plans shared. All planning processes included provisions for initial and continual professional development and training for all personnel in the educational environment. Sigmon (1995) suggested one method for staff



development is to have internal staff provide support, either formally or informally.

Positive results can be obtained by using internal staff to provide training. It allows the district to save money by hiring local trainers at a reduced cost. It also reduces the anxiety of the participants by having the training taught by someone they know and trust. Ohio Department of Education (1995) suggests training a few staff members who can be recognized as "resident experts." These experts can then be called upon to provide support and training for other staff members.

Research shows that there are four critical attributes to successful use of technology by teachers: 1. on-site technical support, 2. access to technology, 3. access to software, 4. long-term sustained staff development. A technology plan must contain a staff development program that is ongoing. A one-shot training session will not be effective (Ohio Department of Education, 1995). This is further supported by See (1995) who states that technology plans that are not tied to long-term staff development are destined for failure. Teachers will progress from a cycle of awareness to application to integration to refinement. Good staff development will support them in this cycle (Ohio Department of Education, 1995).

Other issues concerning staff development are individual questions that each district must answer as they write their own plans. Some of these questions include: 1. How much appropriate technology training is available? 2. Is there an opportunity for classroom teachers to

attend this training? 3. Does the district reimburse or prepay for classroom teachers to attend workshops? 4. Is research being done to see how much training staff may need (Anderson, 1995)? According to Cradler (1995) research continues to show that staff development matched to the needs of the teacher is a critical factor for the success of any project.

### Technology Committee

A second step that should be present in all planning processes is the creation of the technology committee. This technology planning committee should have input from representatives of the community, parents, teachers, students, administrators, and industry. Every strong technology plan has strong committees made up of key personnel. There should be room for outside consultants and other interested persons. The list above is only a list for consideration. It is imperative that all groups be represented (Anderson, 1995). The planning group should be representative of the district, be composed of interested parties, and involve people who will be directly effected by the plan. The committee should be open-ended and not closed to interested parties (Ohio Department of Education, 1995).

An example of how not to set up a technology committee was given by Seeger (1996) when he talks about a local school district technology planning committee that was made up of seven teachers. Each of these teachers would be considered a technology “resident expert.” The committee easily reached consensus on most issues and

had little trouble finding ways to spend money. The committee make up was not in the best interest of the school district as was evident at the time the technology plan went before the board of education for funding approval. With the lack of administrative and community membership numerous objections were raised to parts of the plan. Many of the objections could have been avoided if all groups had been represented on the committee. Ohio Department of Education (1995) was correct when it said planning is a process of creating a consensus. A committee must have a balance of proponents and skeptics. The purpose is to develop a reasonable plan, not to spend time connecting those who fight all attempts to reach consensus. If the educational community owns the plan, they will make it work.

### Creating a Vision

The first place the committee needs to reach a consensus is in deciding on its vision and how best to communicate that vision to others. According to Ohio Department of Education (1995), a plan should concisely state the consensus developed by the planning group about what schools and learning in a district will be like in the future. A vision is an idea that has been developed to foresee the future. This is a thought of how the future will appear and should be written in broad terms (Anderson, 1995).

A recommendation for a starting spot in creating a vision is to explore the literature. Keep in mind that no single document has all the answers, but finding varied and diverse opinions will provide the spark

for the formation of the vision (Ohio Department of Education, 1995). Seeger (1996) found this especially true in his district when they were building their vision. The technology committee looked at the vision statements in numerous other plans, took the parts of those visions that best applied to their situation, and used them in writing the district's vision for the plan.

Probably more important than creating the vision is communicating that vision to people outside of the committee. Both Malikowski (1995) and Massachusetts Software Council (1995) stress that communication and publication of the vision is essential for acceptance of the overall plan. They further recommend the committee be receptive to making changes in the vision if the feedback indicates that change is necessary.

The biggest challenge to planning is deciding what you want to do. Educators tend to focus on the obstacles instead of the possibilities. We are prone to the "yes, but..." syndrome. When approached with a new idea, we can usually list a dozen reasons why a new idea won't work and very few reasons why it will. Gaining a vision should be an on going as well as an exciting and rejuvenating process (Ohio Department of Education, 1995).

### Technology Appraisal

All planning processes need to include an appraisal of the district's current technology status. Before the committee begins to assess and plan for future technology needs, it must determine the

current status of the district's technology resources. The appraisal of a district's current technological resources should include not only a listing of hardware/software but should also include things like the attitudes of the staff and students toward technology, the attitudes of the staff and students toward change, and the attitudes of the staff and students toward learning (Ohio Department of Education, 1995).

The data collected from the appraisal of a district's current technological resources may be of many types, for example: demographic, descriptive, subjective, objective, and many others. Data may be collected from existing records, surveys, observations, and physical measurements. Data may describe: attitudes, abilities, capabilities, and the status and characteristics of people, processes, curricula and other soft items, hardware and equipment, budget and finances, and other entities. Data may be collected from various individuals at various locations. For example: the planning committee should visit all sites; office staff may extract information from student records; and students, teachers, and others can keep logs. Data may be analyzed by a variety of analytical, graphical, and holistic techniques (Anderson, 1995).

It is necessary to complete an accurate inventory of the districts current technological needs. Too often a technology committee is focused on buying new equipment to meet anticipated technology needs. The committee's main purpose is to insure that there is adequate technology to meet the curricular needs of the district. With an accurate

inventory the committee may be able to find ways to meet the curricular needs without ordering lots of new equipment (Seeger, 1996).

Include the use of technology in a technology assessment. Be careful to go beyond just counting computers. Emphasize how the technologies are used. Simply buying equipment does not necessarily produce results. People using technology properly produces desired results. It is important to identify human resources as well as physical resources (Ohio Department of Education, 1995).

### Stating Goals

All planning processes include a section stating the goals and objectives for the technology committee. It is important to write goals that will improve education, not just improve technology (Ohio Department of Education, 1995). Committees' needs to state in clear language what they want to accomplish. For many committees the first step in developing goals is to conduct some sort of needs survey. This is supported by Cradler (1995) who states: "A needs survey should be conducted. The plan should identify the student and staff needs to be addressed by the plan. Needs should be documented by the staff and be focused on discrepancies between existing and desired conditions for teaching and learning" (p. 3). Ohio Department of Education (1995) confirms this thought by stating the following: "Goals should not be written to merely increase the amount of technology available. Goals need to address the improvement of student learning. If you have

specific objectives you want to reach that fall under the goal, list the objectives in clear language” (p. 7).

See (1995) approaches the development of goals from a slightly different perspective. He believes the plan should be outcome-based, not input-based. He further states that committees should develop a plan that specifies what students, staff, and administration should be able to do with technology and let those outcomes determine the types and amount of technology needed.

Anytime goals are written, the next step is to develop objectives that will help meet them. It is important to develop goal statements for technology and then identify what factors will support those goals and what factors will hinder them. The critical step, however, is to develop specific objectives for each goal (Malikowski, 1995). Objectives indicate ways to achieve the stated goals. Make sure to state the objectives in measurable terms (Anderson, 1995). The objective should be directly linked to the documented learner and teacher needs. Studies consistently show that plans which include clearly stated objectives were more often used by staff as a guide for implementing technology. Clearly stated objectives make it possible to assess the level of implementation of the plan (Cradler, 1995).

The plan, ideally, shows to the total community that the school is dedicated to a particular goal, or set of goals, that will benefit the learners affected (Anderson & Perry, 1995).

### Create a Time Line

Another important step in the planning processes is the creation of a time line which provides parameters to accomplish the plan. A time line states the period of time in which the district will complete the plan or states approximate dates for completion of individual phases.

Establishment, and subsequent publication, of time frames help to ensure that the technology plan will be implemented successfully. When committee members understand time frames and can communicate them to the community, chances for success are increased and avenues of support are more readily accessible (Anderson & Perry, 1995).

Members of the planning committee will achieve individual and collective goals more readily if well-defined dates are established. Chances of acquiring and using information have been shown to increase significantly merely by setting a date (Green & Lamb, 1993). The technology planning committee must have a clear idea of the length of time required to prepare a written plan. Peterson (1989) reminds committees that an organization simply cannot know what it is doing and what it intends to do unless it establishes and monitors periodically its goals--and the concomitant time in which it measures achievement of goals.

Time frames to be considered for adoption include, but are not limited to: length of time it takes to assign committee members to subcommittees; assessment of district needs; assessment of district technology inventory; assessment of district physical facilities; polling



vendors to determine what technologies and related peripherals are available to address school needs; creating draft documents in the variety of areas addressed in the plan, acclimating district personnel to changes that may be recommended in the plan; educating community members; insuring equitable representation by all the constituencies in the district; preparing a financial proposal on costs; preparing a financial proposal for supporting investments required by the committee's recommendations; first-year implementation of the plan; potential for a phased-in approach to implementation; full implementation of the plan; evaluation of the plan; evaluation of the planning process; evaluation of the implementation process; evaluation of district personnel's response to implementation; and modification of the plan to incorporate findings from evaluations (Anderson & Perry, 1995).

### Set a Budget

All planning processes need to include a budget for implementing the technology plan and an idea of possible funding sources. Malikowski (1995) suggests you identify funding sources before you develop a budget and then secure the funding sources once the budget is in place. The plan should provide a budget that includes sufficient funding to provide release time for teachers to implement the plan and participate in needed in service training. The budget should describe all sources of funding ranging from the general school budget to any special grants or donations. The study showed that the least effective plans were those that did not allow enough funding for staff development and

release time (Cradler, 1995). When considering costs, include facility modifications which may be necessary. For example, schools may need electrical outlets in classrooms to provide electricity. Also remember that the purchase of technology must have on-going support and maintenance which must be included in a budget (Ohio Department of Education, 1995).

Some possible ways to raise funding were suggested by Massachusetts Software Council (1995). These suggestions included raising funds through grant proposals, corporate donations of equipment and services, local fund raising efforts, off-price purchasing, partnerships with outside organizations.

If a technology plan is going to have any chance to succeed the budget and financing portion of the plan must be thoroughly communicated to the district stake holders. District patrons will not support a large capital outlay when they feel they have not had a chance to give their input on how the money is allocated (Seeger, 1996).

If a long-term plan is derived, tie it to the district's budget cycle. Pull the plan out every year during the budget process and review it to make sure the plan has not tied your school into buying outdated equipment (See, 1995).

Finally it is important to remember that time and money are finite resources. You must determine how you spend both. Prioritize how you spend your time and money. Alternative funding should be used to

augment, not supplant, existing technology expenditures (Ohio Department of Education, 1995).

### Ongoing Assessment

Proper evaluation of any plan is essential. This is an accepted notion among educators. Certainly, then, the technology plan should be evaluated from numerous vantage points. While the plan itself should be scrutinized, the goals and objectives of the plan need perpetual evaluation, informally, and periodic evaluation, formally (Anderson & Perry, 1995).

Objectives and their delivery are of paramount importance. However, without evaluation, only gut-feelings can indicate if effort and expanded resources have produced the desired results. Evaluation should be built into the planning cycle and not be an afterthought. Evaluation should be continual and not just at the end of a cycle (Anderson, 1995).

The planning document should be reviewed annually, with the most stringent review coming at the end of year one (Randall, 1991). Subsequent reviews must take into account any recommendations that have been made during precedent evaluations (Tashner, Riedel, & Hutchinson, 1991).

The effectiveness of the plan in bringing about the desired vision should be evaluated. If the plan did not bring about the desired effects, an analysis should be made to improve the plan for next year. The evaluation should show whether you did what you wanted to do as well

as report any unexpected or serendipitous results. The evaluation must always be connected to purpose. Evaluation is a tool that provides data. The data should be used in conjunction with observation and knowledge of the district (Ohio Department of Education, 1995).

Anderson & Perry (1995) also believe the planning process itself should receive evaluation. Committees should evaluate their effectiveness and encourage an external evaluation of the process through which they went to arrive at the plan. Committee evaluation and process continuation is a necessary step in order to find out how you are doing. It is important to keep things current and keep the momentum going (Massachusetts Software Council, 1995).

When the plan is implemented the committee should provide support and monitoring of the plan. The plan should be viewed and treated as part of the overall school plan and be implemented, monitored, and evaluated within the context of the existing school-based program. The evaluation and assessment information should be used for making mid-course corrections and to report progress to the stake holders. The committee should make necessary adjustments to the plan as suggested by the evaluation. Planning should be an active and ongoing process. The committee must provide the support and advocacy needed to maintain interest and enthusiasm for those involved in implementing the plan (Cradler, 1995).

Often, evaluations are seen as the basis for continuation or elimination of the project. The evaluation is viewed as the end result

instead of being viewed as part of the process. The purpose of the evaluation is to make the plan better. It is an instrument of constant improvement. Evaluation must be viewed as a constructive, not destructive, process (Ohio Department of Education, 1995).

## Conclusions and Recommendation

Reading and reviewing the technology planning process models selected for this paper has been an enlightening and educational experience. The research completed has attempted to clarify the necessary components in a good technology planning process. This review began by looking to find the steps needed in a good technology planning process. The eight steps identified will assist schools who have not addressed this issue in their technology planning. The steps will also enhance the further development of technology planning for those schools who have already implemented their plans.

The common strengths of the plans reviewed included the need for provisions to exist for initial and continual staff development and training for all district teaching staff. The technology committee created to write the plan must have representative membership from all district stake holders. The technology committee needs to reach a consensus on its vision and must communicate that vision to others. There must be an appraisal of the district's current technology status. The technology committee needs to develop goals and measurable objectives for plan implementation. A time line which provides parameters to accomplish the plan must be written and followed. The technology committee can not overlook the need for a budget for implementing the technology plan and an idea of possible funding sources. Finally, the planning processes should include provisions for ongoing assessment and evaluation of the technology plan.

Any technology plan, whether written using the above process or not, will not succeed if it does not hold to an overriding belief in the place technology should have in a school district. Teachers often think technology is not important to their particular discipline, or become worried that they will have to “give up” something they currently teach in order to teach about computers. All of the models reviewed hold to the belief that technology must be integrated into the district curriculum. Technology will not survive if it is taught in isolation. See (1995) perhaps stated this best by suggesting that technology must be taught as part of an existing subject so students understand how technology can be a tool that makes them a more productive and powerful person in any subject area.

It was Seymour Papert (cited in See, 1995) who first brought this thinking to light by asking “Do schools have classes called ‘pencil’. If not, then why do they have classes called ‘computers’” (p. 2). Schools must integrate technology planning with the curriculum. Technology should be viewed as a tool to expand opportunities to learn. Technology is often promoted as the solution for improving learning before teaching and learning needs are even identified. In fact, research has consistently shown that technology per se does not make school reform happen (Means, 1993). Schools can not afford to buy new technology for technology’s sake.

The first question a lot of people ask when schools want more technology is, “Why do we need it?” A good technology plan will answer

that question by saying, "We want our students to be able to...." Then specifying the technology needed in order to accomplish those outcomes.

Too often a technology plan is written, approved and then filed away. If schools want their technology plans to be an effective tool it must be more than just a piece of paper. To prevent this it is recommended that schools who have yet to write a technology plan do so through the use of a technology planning process. Since most technology planning processes currently available include the eight steps identified, any of them would be a good starting point. However, as is the case with most educational reforms, they should not be taken as gospel. The model or models selected should be reviewed and personalized to meet the individual district's needs.



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## Appendix A

Below is a summary of the eight technology planning models that were analyzed. Each model is headed by its title and author. The models are broken down into a listing of their major components. Each step is identified by a star (\*) and some of the steps are briefly summarized.

Cradler, J. (1995). Implementing technology in education: Recent findings from research and evaluation studies. San Francisco, CA: Far West Laboratory.

\*Convene a school planning committee

members should include teachers, district administrators, parents, principals, business people and AEA personnel

\*Coordinate with existing district plans

technology plan needs to be part of overall school improvement plan

\*Identify student and school program needs

do a needs survey

\*Identify available technology and other resources

what technology currently exists in the district

\*Integrate school-wide technology planning with the current curriculum

\*Objectives and Activities

write school wide objectives with related activities

\*Classroom Level Technology Intervention

activities planned for each classroom

\*Staff Development

staff development and follow up training for implementing  
classroom activities

\*Prepare an Evaluation Plan

evaluation needs to be on going

\*Develop a budget and funding strategy

find adequate funding for the plan including teacher release time  
for training

\*Implement, monitor, and revise the plan

on going evaluation of the plan is necessary

Malikowski, S. (1995). CEE planning for technology model.

Bloomington, IN: Center for Excellence in Education, Indiana University.

\*Getting Organized

plan committee, write mission statement, set committee goals,  
subdivide responsibilities, establish time lines

\*Creating vision

write a vision for where you want to be in the future regarding  
technology usage

\*Assessing what exists

develop an instrument and assessment method to conduct a  
needs assessment of current technology

\*Setting goals and objectives

\*Creating a plan

identify which goals to do first and human resources, develop time line, funding, budget and evaluation method

\*Implement the plan

get approval, secure funding, make purchases, start staff development

\*Evaluate & revise goals, objectives and plans

develop evaluation method and instruments, gather and analyze information and determine revisions

Sigmon, T. (1995). Information technology plans. Charlottesville, VA: Information Technology Center, University of Virginia.

\*School or department mission statement

\*Current academic computing activities

instructional activities, current computing resources

\*Future academic computing activities

address future needs in technology

\*Support staff

identify any staff who could provide support either formally or informally

Massachusetts Software Council (1995). The Switched on classroom. Boston, MA: Massachusetts Software Council.

\*The Technology Team

Identify the stake holders, choose your technology team, provide a base of knowledge for all team members, define your tasks

\*Assessing Where you are

identify where the school is technologically and educationally and what the state mandates

\*Formulating a vision

develop and communicate vision to community

\*Exploring the available technology

multimedia, networking, on line communications, and telecommunications

\*Exploring the possibilities of technology

technologies integrated in the curriculum

\*Developing a technology plan

set goals and objectives, identify equipment needs, develop time line and budget, gain approval, involve community, check list

\*Funding and acquisition

grants, corporate donations, local fund raising

\*Staff development

general training, determine areas of need, provide support and feedback

\*The implementation process

Begin with the pilot program, build on success, have good PR

\*Evaluation and continuation

keep current, keep moving

\*Emerging technologies and issues

keep current with new items

\*Extending the use of technology beyond school walls

home-school connection, after school programs, adult and special programs

Ohio Department of Education (1995). Five steps to effective planning.

Columbus, OH: Ohio Department of Education.

\*Establish the planning group

identify stake holders, seek commitment, establish a communications plan

\*Create vision

learn from others, explore research, look at trends, communicate vision

\*Create plan

review vision, identify goals, write staff development, prioritize goals, assess current status of educational system

\*Create action plan

write steps to achieve goals, divide responsibilities, determine staff development, determine costs and funding, set time line

\*Evaluate plan and its results

did goals meet expectations, what can be improved

See, J. (1995). Developing effective technology plans. St. Paul, MN:

Minnesota Department of Education.

\*Effective technology plans are short term, not long term

tie plans to district budget cycle

- \*Effective technology plans focus on applications, not technology
  - let district outcomes determine technology needs
- \*Effective technology plans go beyond enhancing the curriculum
  - don't buy technology just to teach about technology
- \*Effective technology plans define technology as more than computers
  - include as many types of technology in a plan as possible
- \*Effective technology plans stress integration of technology into the curriculum

it's not effective to teach technology in isolation

- \*Effective technology plans are tied to staff development plans
- Anderson, L. (1995). Guidebook for developing an effective instructional technology plan. Mississippi State, MS: National Center for Technology Planning, Mississippi State University.

- \*Cover sheet and title page
- \*Table of contents
- \*Acknowledgements
  - recognize people or groups involved
- \*The executive summary
  - serves as the abstract for technology plan
- \*Vision
  - identify in broad terms how the future will appear
- \*Mission
- \*Demographics
  - describe both community and district



\*Committee membership

students, parents, community, teachers, administration, business

\*General introduction

include capacity of school, history of committee and short and long term goals

\*Data collection, analysis, and reporting

list current technology, develop needs assessment and goals and objectives, evaluation and revisions

\*Plan preparations

components include goals, objectives and time line

\*Critical issues

issues could include: public relations, equipment, maintenance, funding, security, incentives, networking, implementation, new technologies, curriculum, life long learners, facilities, professional development, purchasing, community resources, parent and community involvement, legal aspects

\*Budget

list available funds and where to find them

\*Evaluation

\*Bibliography

\*Glossary

\*Appendices

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\*Select technology committee

committee membership should include teachers, administrators, parents, and community members

\*Write mission statement

\*Decide on goals and objectives

\*Conduct a needs assessment

the needs assessment should cover current and future technology needs

\*Write the plan

include a time line, a budget, and staff development