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Implementing Technology in Schools: The Change Agent's Environment

Salvatore J. Corda, Ph.D.

In many schools the decision to use technology is usually made by a select group of teachers and/or administrators. They purchase hardware and software and then rely on the interests of teachers to begin using the technology. In other instances, formal plans provide a systematic approach to the use of technology. They examine the interplay among curriculum, staff development, budgeting, and software and hardware acquisition (Corda, 1988). Much of what has been written in journals devoted to technology concerns itself with new hardware innovations or reviews of software programs. More scholarly journals have sought to examine the impact of technology on student learning. Some have forced us to think about the impact of technology on how we think and who we are (Turkel, 1984).

I'd like to suggest a different approach i.e., looking at introducing and sustaining the use of computers and other technology as a process that requires the skills of the change agent to reach the desired outcome. From this perspective, additional insights into this phenomenon become apparent and a method of analyzing the effort to create and continue change provides needed support to those charged with the responsibility to effect the change. Using a model based on the work of Hall & Hord (1987), a process analysis can be developed to guide the change process.

The Concerns Based Adoption Model
The model is based on a series of assumptions outlined by Hall and Hord concerning the (technology) change agent. These are: 1) for teachers to change, there must be appropriate and promising practices and procedures; 2) that it is imperative to understand teacher attitudes and skills so that support activities can be directly related to what teachers perceive they need, and 3) that technology specialists must have a well developed understanding of what is going on in classrooms and in schools. 4) Most important, technology change agents must assist others in ways that are relevant to the concerns of the users so that the users become more effective and skilled in using new programs and procedures.

Hall and Hord use the schematic on the following page to illustrate the Concerns Based Adoption Model (CBAM). Using this model as a means to assess the process of infusing technology into schools is especially helpful. Indeed, the model is useful in monitoring any change effort. Administrators and technology coordinators can quickly evaluate the progress that has been made. The model allows the change agent to isolate and pay attention to particular components of the change process as necessary while still maintaining a perspective on the dynamics of the entire change process. Understanding the components of the model is essential if the design is to be helpful in the change process. Read Hall and Hord's excellent work in order to develop a better understanding of the CBAM scheme. The following presents an illustration of how the model may be helpful in the implementation of technology.

The Resource System
The resource system that supports the change agent includes more than the materials, equipment, and expertise he or she has. Most importantly, it includes the personal support system, which can take the form of a Superintendent of Schools or a key Central Office administrator who provides the status and prestige of that office in support of the change agent. This support is crucial in legitimizing and empowering the technology coordinator. Additionally, the resource system provided, in Tom Peters' words, by the champion of the change, helps the facilitator to maintain his or her resolve as the difficulties of change are encountered in going through the vagaries of implementing technology use. It is just as important for the individuals who are the resource system to understand the CBAM...
The Concerns Based Adoption Model

model in order to help the technology coordinator succeed. While a technical understanding of technology by the champion is helpful, but not essential, an understanding of how technology can be used to support curriculum decisions and impact student achievement is critical.

The Change Facilitator
The change facilitator is the individual who is charged with and is responsible for the implementation and development of the technology program. I believe there is an important point to be made when thinking about the role of the change agent. To many administrators who supervise the work of the change facilitator, that individual is viewed as resourceful, knowledgeable, and skilled in the process of change. While that must be true if the change is to be successful, the change agent must also be considered a part of the entire change process. In other words, there are times when the change agent is going through some of the stages described in the change process. The individual who is responsible for the success of the change facilitator must realize this and respond appropriately.

The technology coordinator needs to recognize the process of change that is also taking place within him/herself. Many of the same frustrations the innovators are experiencing will also be experienced by the change agent. Being able to take a step back and say, “Where am I in this whole change process?” is an important ingredient to success.

G. Hall & S. Hord, Change in School
Facilitating the Process, State
University of New York Press,
That the change agent must possess an extraordinary amount of patience is an understatement. Working with adult learners requires skills that are different from working with students. The change agent must have a vision, a sense of where the school or school district is going in the use of technology.

Understanding technology, however, is not enough. The effective technology coordinator needs to understand curriculum, principles of staff development, organizational development, good pedagogy and be especially skilled in understanding human dynamics. He or she must understand that technology supports instruction. It is not an end unto itself. The teacher who uses a computer ineffectively is better off not using technology if there will be no benefit to the student. The technology coordinator needs to understand good pedagogy in order to assist teachers in being able to use technology to support and improve a good instructional program.

Probing
Probing is a continuous process by the change agent to determine where individual staff members are in their attitude towards the change. Probing also identifies specific levels of concern about the innovation. Techniques of probing involve formal and informal meetings with users and non-users to obtain information; observing behavior; eliciting concerns through questionnaires, conducting needs assessments, etc. and then assessing where on a continuum of concerns an individual might be. Depending on the particular level of concern the individual is exhibiting, certain strategies become appropriate. For the technology coordinator, probing takes the form of talking about technology with staff to assess where they are in its use; meeting with principals and/or department chairpeople to develop support for and determine how technology might be used to support the instructional program, and finding pockets of opportunity for innovation with teachers who are ready to start using technology or move on to a more sophisticated use.

Havelock (1973) addresses the importance of the change agent building a trust relationship with the client, which takes place during this stage. What is also important for the facilitator to understand is not only to listen carefully to the user but to observe the user’s behavior. Observing behavior, i.e., what a person actually does, is the key assessment tool despite what an individual may say about a particular level of usage.

The Stages of Concern
Understanding the stages of concern of users and non-users is essential if the change agent is to be successful. Hall and Hord define seven stages of concern ranging from being uninterested in the change to being concerned about the impact of the change.

The first stage of concern is characterized as awareness where the individual has little concern about the innovation other than being aware that “it” exists. Along that portion of the continuum related to attitudes about self are the concerns for information and the impact the change may have on the individual. In the former stage, the individual is concerned about learning in more detail about the innovation, while in the latter the concerns shift to the demands the innovation may make on the individual, e.g., requiring time for learning about the innovation, the self perception of adequacy to meet the demands of the change, and personal conflicts that may emerge from using the innovation. In working through these stages, the individual then becomes concerned about the mechanical aspects of the task at hand, e.g., how to best organize one’s time to use the innovation or how to manage using the innovation in light of other responsibilities. When this stage is resolved, the teacher then becomes more concerned with considering the impact of the consequences of the innovation and how to collaborate with others in the innovation. Finally, the user begins to refocus on the impact of the innovation on the larger environment and begins to make modifications to the original innovation to become even more effective. At this point, the cycle of concerns may begin all over again.

Let’s use the utilization of interactive videodisc technology as an example of illustrating the stages of concern. Initially a staff member may have heard about videodisc technology and may be interested in finding out more about it (awareness/informational). At that point, if the individual is already using technology in some form, he or she may begin to think about what the impact on the present workload the use of another technology application may have, e.g., staff development time or actual planning for classroom use (personal). Once the individual has made the decision to use videodisc technology the teacher’s concern will shift to organizing lessons to allow for the use of the innovation, working out the logistics of arranging the equipment, and other organizational tasks necessary to use videodisc technology (management). When these mechanical issues are well in hand, the teacher will begin to assess the effectiveness of the technology. Are students responding in appropriate ways; to what extent are student learning outcomes affected; is the effort worth the result? (consequence). Assuming that the experience has been positive so far, the teacher will probably begin to interact with others who are also using the technology to share experiences, concerns, successes, etc. (collaboration). Finally, the teacher will begin to
experiment with videodisc technology in more refined ways, e.g., in conjunction with HyperCard or an individually programmed sequence to create a new innovation (refocusing). By understanding where the individual is in each of these stages, the facilitator can provide the specific support necessary to allow the individual to move to the next stage.

There are a number of important observations to be made about this aspect of the model. First, no individual ever moves from one cycle to another with regular and discreet beginnings and endings. The facilitator needs to be aware that some individuals may move from one stage to another easily while others take more time. In fact, the facilitator may observe that some appear to be moving through a number of stages simultaneously. Second, when a person seems to have gone through one level of concern does not mean that individual may not revert back to that level of concern at another time. Finally, the facilitator will be best served by spending time reflecting on the individuals who are engaged in the innovation and where they appear to be on the continuum.

Assessing the stages of concerns may be done using a variety of means. Hall and Hord suggest three: a “one-legged” conference, open ended concern questions, and a more formal questionnaire. They describe the “one legged conference” as an informal opportunity to find out how the individual is progressing using the innovation. This assessment may take place in the faculty room, at a brief encounter in the hall, or in any number of informal interludes that occur during the day. A facilitator may also use an open ended concerns statement such as “I passed your room the other day and saw you using an optical disk. How is it going? The more formal questionnaire is designed to assess where individuals are on the stages of concern continuum. It is a questionnaire which provides important data that can be used for a number of purposes: a “group” picture of where an entire staff is with respect to an innovation; formal evaluation, or formalized planning.

Levels of Use
Assessing levels of use is critical for the technology coordinator since interventions appropriate for the level of use must be determined. For the teacher new to using computers in a classroom, actually modeling a lesson may be necessary. For others who have a higher degree of expertise and comfort, suggesting new forms of technology, e.g., using laser discs in conjunction with active computer programs, may be appropriate. The intervention aspect of the model is most easily understood if it is discussed at the same time as assessing levels of use. Intervention is simply the actions or events that influence the use of the innovation.

Hall and Hord describe eight levels of use. In some ways these correspond to the stages of concern. The value of the model is in the interplay between the variables: probing, stages of concern, levels of use, and intervention.

Nonuse is the stage where the teacher has little or no knowledge of the innovation and is doing little or nothing to become involved. This may be the teacher who knows what a computer is, but has made no attempt to see how the computer may be used in the classroom.

Orientation is the stage where the user has recently acquired information about the technology and is contemplating whether or not he or she is willing to become involved. An appropriate intervention at this point may be an orientation workshop where potential users can see how one actually goes about using the computer to support instruction.

Preparation is the level where the commitment to use the innovation has occurred and the teacher is planning on how it will be used. At this time, for example, the teacher may be reviewing a piece of software to see how it will support a lesson. The technology coordinator at this point is working alongside the teacher to demonstrate the use of the technology, perhaps actually demonstrating via a lesson how technology can be used.

At the mechanical use stage, the teacher is engaged in the technology. The engagement, however, is a more step by step approach much as a new skier can be observed focusing on the mechanics of skiing rather than actually enjoying the sport.

At the routine level of use, the teacher is using technology in a regular fashion but without the thinking that goes into differentiating between the apprentice and the master. The facilitator at this point will continue to observe the teacher’s use and possibly suggest a more sophisticated level of usage, e.g., having students access information from a prepared database and using it to develop a student created database.

At the refinement level, the teacher has developed a deeper understanding of not only the technical aspects of using technology, but is applying this understanding in novel ways to support improved learner outcomes.

At the integration stage, the teacher is beginning to work in a collaborative fashion with colleagues to create greater student impact from the technology. The facilitator may suggest, for example, to a social studies, English, and music teacher that an interdisciplinary unit be developed
on the life, historical period, and music of Beethoven using a variety of technologies to support specific learner tasks and outcomes.

Finally, at the renewal stage the teacher may begin to investigate new and different forms of technology and become a trainer of other staff. Here the facilitator's intervention may be carried out in a collegial fashion providing information and ideas that may be jointly developed for use with other colleagues.

The chart below may help to illustrate the relationship among the variables. The list of intervention strategies is illustrative only. There are many strategies that may be used including securing assistance from outside the organization through private consultants, universities, etc.

In my judgment, above all else, the quality of the relationship between the facilitator and the innovator is a key ingredient in success. The trust level that must develop between the technology coordinator and the teacher is essential to teachers using technology comfortably and effectively. This trust comes from the honesty, expertise, compassion, humor, and patience of the facilitator. The teacher must believe that the coordinator's interest is in helping and that there are no hidden agendas.

Helping teachers to understand the innovation is, perhaps, one of the most difficult of the stages in effecting a meaningful change process. To many, technology is viewed as an addition to an existing environment. Getting teachers and administrators to recognize that technology can actually change the teaching/learning environment requires careful deliberation over what technology is and how it alters a previously limited repertory of instructional strategies. Understanding that technology requires that we think differently about the teaching process is a challenge that all of us are only beginning to accept. Because computers and other technology are more effectively used with group learning and participation, they requires a different set of teaching strategies from the individualization and the competition we are used to in our classrooms.

Only by examining our curriculum and making curricular decisions can we make effective technology decisions. The

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use of technology should be driven by our curriculum. Not the other way around! Once we have made up our mind about the skills and the content, then let us examine what hardware and software is appropriate to exploit that learning. This understanding by the facilitator and the ability to communicate that understanding to potential users of technology is just as important as instructing people in the technical aspects of using *HyperCard*.

Recognizing that change is a process that is different with every client will enable technology coordinators to assess the status of their clients' involvement with technology and plan the necessary strategies to facilitate the process. Understanding the interplay among the concerns of individual staff members and where they are in the process of implementation will allow the technology coordinator the luxury of being able to see the individual as well as the system in its process of change. The CBAM model provides that opportunity.

**References**


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