Instructional Materials for Teacher Educators: A Review of SCRTEC's *Active Learning with Technology*

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Abstract
In this paper, we will review and critique a package of instructional materials developed by a southern education consortium. The materials package is called *Active Learning with Technology,* and it is one of only a few instructional packages designed specifically for teacher educators.

There is an old rock and roll song from the sixties that is a dialog between a teenager and her boyfriend. We never hear what he says but from her responses we know basically what he is saying. At one point in the song she asks him how he liked the wallet she gave him for his birthday. Then, after a pause, she says "I'll put some money in it!!" which gives us the distinct impression that the boyfriend was the ungrateful recipient of a nice wallet.

We don't want to feel like that ungrateful boyfriend because we are going to review a package of materials designed specifically for use in teacher education. Other than standard college textbooks there are so few instructional packages available today, particularly for technology-related teacher education, that we feel guilty making any criticisms at all about this package.

For more than 20 years, educators have been interested in constructivist theory because of its potential for supporting student learning. The number of books, web documents, and papers published about constructivism in the last ten years is voluminous, but the number of instructional packages designed to help teachers explore this way of thinking about teaching and learning is quite small.

Who Developed This Package?

SCRTEC (http://www.southcentralrtec.org) is housed at the Southwest Educational Development Laboratory (SEDL) in Austin, Texas, and its team of professionals works in a five state region around Texas. SCRTEC is funded by the U. S. Department of Education, especially the Office of Educational Research and Improvement (OERI). It offers a range of services in its region and the development of this package is one of the services offered to its five-state region.

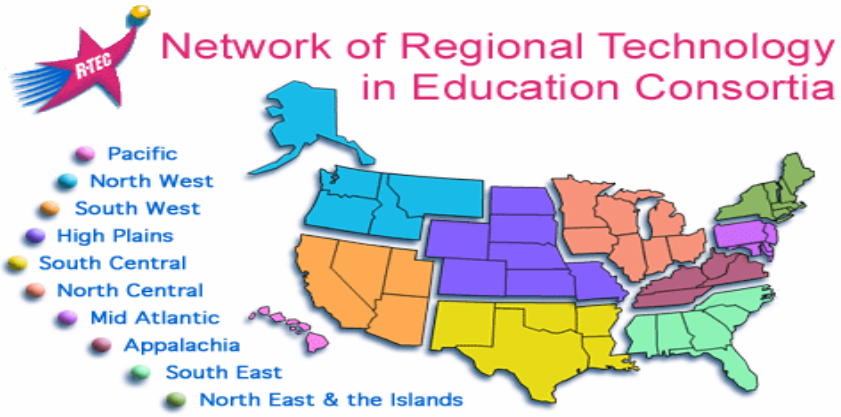

Figure 1: The Regional Technology in Education Consortia around the country (http://rtec.org)

What is Active Learning with Technology?

SCRTEC's web site (http://www.southcentralrtec.org/alt/alt.html) describes the package this way:

The Active Learning with Technology (ALT) portfolio is a set of materials and activities designed for educators who provide professional development to K-12 teachers. The materials in the portfolio were developed using research from current learning theory and have been field tested and carried out in a variety of settings by over 350 teachers. The goal of the portfolio is to assist teachers in developing and implementing learner-centered environments supported by technology.

Active Learning with Technology (ALT) has a number of components:

1. A set of 16 booklets, about 30 pages each in length, on topics like *Active Learning Environments* and *Building a Vision.* There are six booklets in a Foundations set, and ten additional booklets on topics like *Deconstructing Constructivism,* and *Using Web-Based Resources.* These are not for teachers, however, they are for facilitators who will offer workshops on the topics covered by the booklets.
2. Supplemental materials including participant handouts, copies of a newsletter, *TAP into Learning,* and a review of the literature, *Constructing Knowledge with Technology: A Review of the Literature.*
3. A set of eight classroom videos that illustrate how constructivism and active learning concepts are applied. They depict "students and educators in the Southwest in primarily high poverty and culturally diverse communities."
4. A very detailed set of directions on how to set up a two day workshop that covers the six Foundations booklets (called modules) and how to offer training on the other ten topics.
5. A CD-ROM that has electronic versions of all the instructional materials, including the classroom videos.

ALT was developed specifically for in-service teacher education. However, the material is also applicable to pre-service teacher education and we will emphasize the potential for that application in this review.

Format for Use

When it is used for in-service professional development, the SCRTEC recommends that the first six modules be covered in a two and a half day workshop. The remaining ten modules can then be taught in a variety of formats and in any order. For example, an in-service program might start with a workshop before school begins and then cover the other modules in sessions spread over the school year. For preservice teachers, the material could become the foundation for a course on constructivist teaching or other courses such as "Teaching Constructively with Technology."

Availability

The entire set of materials (the portfolio), including videos on cassettes, can be purchased from SCRTEC for $250. However, if you are in the five state region serviced by SCRTEC (Texas, New Mexico, Oklahoma, Arkansas, Louisiana) the portfolio is free. It comes nicely packaged in a canvas bag slightly larger than a standard notebook computer case. Each portfolio has a CD-ROM that includes all the videos, all the booklets, and the supplemental materials.

Another option is to use the materials on the SCRTEC web site http://www.southcentralrtec.org/alt/alt.html. Everything is also available there, in electronic format. The videos, for example, are in Quicktime and can be played on both Windows and Macintosh computers. All the documents are available in PDF format which means they can be downloaded and printed locally.

Both the printed and Internet versions include comprehensive directions for leading the workshop. Each module has a set of plans, illustrated with icons, for each major aspect.

As noted earlier ALT was developed for inservice teacher education, and the specific focus is the application of constructivism supported by technology. ALT is organized around 6 constructivist principles:

1. Learners bring unique prior knowledge, experience, and beliefs to learning situation.
2. Knowledge is constructed uniquely and individually, in multiple ways, through variety of authentic tools, resources, experiences, and contexts.

3 Learning is both an active and reflective process.
4 Learning is a developmental process of accommodation, assimilation, or rejection to construct new conceptual structures, meaningful representations, or new mental models.
5 Social interaction introduces multiple perspectives through reflection, collaboration, negotiation, and shared meaning.
6 Learning is internally controlled and mediated by the learner.

The developers used these principles, developed from a review of the literature, as a guiding framework for all the ALT materials.

A Contradiction: 'The Theory' versus 'The Workshop' Model

We will review the materials themselves in a moment, but before that we would like to comment on the workshop plans included in the package. Those plans are detailed, specific, and based on group objectives. Facilitators are given a linear series of tasks, supporting handouts, and the number of minutes that should be devoted to each task. There is very little, if any, room for building a workshop agenda by working with the participants to identify their needs and expectations. Consider, for example, the directions to the facilitator for the module on creating electronic presentations:

"Facilitator preparation:

Note: While this guide is designed for Microsoft PowerPoint in Office 97, the presentation template in the facilitator CD-ROM can be adapted for other software applications.

1. Create an electronic presentation in PowerPoint using the template provided in the Active Learning with Technology CD-ROM or create an original presentation following the steps in the activity sequence.
2. Prior to the activity, the facilitator and/or co-facilitator need to learn how to insert/import graphic images from the digital camera into the presentation. The process for inserting digital camera images will vary with the make of digital camera used to take the original pictures and will be affected by the compatibility of the presentation software with those images. Determine how your presentation software manages the digital camera images that you want to use in the presentation. PowerPoint 97 and later versions will convert these images automatically from JPEG to BMP. For users of PowerPoint version 4.0 or less, the digital camera JPEG files will need to be converted to BMP files before inserting them into a presentation. This can be done with an imaging conversion software application such as Adobe PhotoDeluxe. This process can be demonstrated for a representative from each group.
3. Create your own Handout 1 by printing a hard copy of your presentation. On the Print menu dialog box, choose 3 slides per page, and the option Pure Black and White.
4. Make copies of Handout 2: Basic Steps for Creating a PowerPoint Presentation for each participant.
5. Practice using the presentation with the projection equipment."

These directions, most aspects of the lesson plans, in fact, have a scripted feel to them. Facilitators do not even need to create their own handouts, they can use the ones created by the developers. Many people who use these materials will probably appreciate all the work that went into the lesson plans. They even tell you how much time to spend on each of the activities.

Here is another example:

"Samples of responses from previous sessions:

Question 1

How would you use this activity in your classroom with your students? What would you change for your students and your classroom? How would you extend this activity to other curricular areas or as a unit?

Community Profile: Based on introduction to U.S. Census, have students develop their own classroom census, doing individual charts, then collaborating for class chart. The data gathered could be: hair color, height, ethnic background, gender, eye color, age, handedness (left/right) family membership, language dominance

Other activities to use with a spreadsheet:

Language arts: Keep a family log for a family biography

Science: Make predictions based on data.
Math: Cost analysis, weather analysis, rain analysis

Question 2
What particular station has the most value or appeal for you and your classroom? Why?
One group replied, "The camera, because it's a very concrete activity for small children."

Question 3
Reflect on the "whole session." That is, using a computer station in an interdisciplinary, collaborative environment with multiple activities taking place at the same time.
One group suggested, "We would use the same format, except the activity with the camera would be with the whole class."

Follow-up activity
If *Foundations 1: Active Learning Environments* is to be followed by *Foundations 4: Creating Electronic Presentations,* remind participants to keep the diskettes and information they gathered. They may also want to gather additional information from outside resources."
The Content of ALT
In this section of the review we will focus on the content of the16 modules that are organized into two major sections: Foundations, and applications.

Foundations of Constructivist Learning Environments (CLE) supported by Technology. The goal of these six modules is to provide general information about active and student-centered learning with technology to K-12 teachers, and to introduce teachers to methods of creating and implementing active, constructivist learning environments. Before starting to work the directions call for the facilitator to request a *letter of intent* from each participant to increase their commitment to this workshop. Then they begin work on the six foundation modules. Here are short descriptions of the modules:

Active Learning Environments. This module is based on a set of *learning stations* that participants will rotate through to become familiar with some basic forms of technology. A set of assignments requires each small group (learning community) to use the technology at each station. For example, at a station with digital cameras they use them to take pictures of the group in response to a teacher-posed question: "What does our community look like?" Like many of the modules in ALT the basic content and even the proposed structure is quite good. Essentially, participants (teachers) participate in a collaborative learning activity that involves "gathering information and planning exhibits for a proposed community museum." As they work on this authentic activity they use a range of technology including tools like the Internet, digital cameras, databases, and a spreadsheet. Left as a general idea that can be shaped and molded by the participants to fit their particular interests, this would be a very good illustration of constructivist learning.

Draw Learning. For this module participants explore their ideas and beliefs about learning, start to work on a group definition of learning, and learn about basic constructivist principles. Much of this module is based on group discussions. It begins with a discussion of the first module, Active Learning Environments, and uses it as an anchor for exploring the concept of learning and active learning. Two additional activities, creating a graphical representation of learning in small groups, and presenting the drawings to the whole group, set the stage for a final discussion of what learning is. In a discussion after the graphics are presented to the group, participants collaborate on a set of "essential" or "common elements" of learning.

The module ends with a presentation by the facilitator of the six principles of constructivism. This final activity is not, however, a teacher-centered lecture. Instead, "the facilitator asks for volunteers to read each principle aloud, one by one, and asks the group to make comparisons with the list of essential elements they have just compiled."
Applications for Learning. In this module participants look at two types of instructional software – Type 1 programs that "generally stimulate relatively passive intellectual involvement on the part of the user" and the "software developer predetermines almost everything that happens on the screen" and Type II programs that "generally stimulate relatively active intellectual involvement on the part of the user" and "the user, rather than the software developer, is in charge of almost everything that happens." The participants explore two geography programs to see how different Type I and Type II software is in the classroom. One program, Geography Explorer, is a drill on

geography knowledge. The other, Navigation Exploration" poses a problem and asks students to work in small groups to solve the problem.

Creating Electronic Presentations. In this module participants create an electronic presentation (PowerPoint) to support the first module. The teaching strategies and the content are quite "teacher-centered." An alternative would be to create a module that helps teachers develop strategies for creating PowerPoint presentations that represent the progress of group discussions, or to help teachers think through how they can support small groups that want to create electronic presentations themselves as part of collaborative or problem-based learning activities.

Building a Vision. This module is anchored around one of the videos that comes with the program, *Engaged Discoverers: Kids Constructing Knowledge with Technology.* Participants view examples of constructivist classrooms and then use that as a common framework for discussing a set of facilitator-supplied questions in small groups. The questions are general (What roles did the teacher play? What roles did the students play? What were some examples of how technology supported learning? What instructional strategies did you observe?). This module ends with a whole group discussion of the answers to the questions.

Analyzing Lesson Plans. In this final module of the Foundations workshop, a major goal is to "critique lesson plans that focus on the use of technology in promoting student learning in a constructivist learning environment that are appropriate to participants' grade level or subject." Participants view one of the videos, *Engaged Discoverers,* and then work in small groups to review some sample lesson plans. They read material that helps them critique the plans and they answer a set of questions provided by the facilitator. The module ends with a whole group discussion.

Application. The remaining ten modules all address an issue of application or professional practice. These modules use the same organizational structure and format as the six foundation modules. The titles and topics of the remaining ten modules are listed below:

1 *Getting the Word Out*. Teachers develop instructional materials using word processors.
2 *Deconstructing Constructivism*. This module shows how to use concept mapping software and how it contributes to learner-centered environments.
3 *Analyzing Our Practice*. The third module emphasizes the discussion of different technologies, which can enhance student learning. It also gives teachers the opportunity to create rubrics based on their practice.
4 *Developing a Multimedia Presentation*. Shows how the creation of multimedia presentations can be incorporated into constructivist learning.
5 *Technology Seminars*. During this session teachers review software applications they studied in the previous modules and try to improve their technology skills.
6 *Creating Databases*. This module is helps participants understand the role of the teacher as a facilitator while students collaboratively solve a problem using databases.
7 *Using Web-based Resources*. Teachers publish their web pages and practice how to use and integrate Internet resources for instructional purposes.
8 *Managing Growth*. Participants are engaged as learners in a problem solving activity. The problem is "how to plan for population changes in their community's future. They use *Geographic Information Systems* (GIS) software in this activity.
9 *Connections*. This is a continuation of the previous module. Participants learn about the multiple effects of population growth using a variety of multidisciplinary resources.
10 *Sharing Lessons*. Each participant develops and shares a lesson based on their practice in this workshop.

Each ALT module was designed around commonly available resources and the software most often found in classroom settings. The booklet begins with an *Overview* section that explains the purpose, lists participant outcomes (goals), describes the content, notes the constructivist principles used, and describes the instructional strategies.

The *Module Organizer* section provides information like the time needed, the participant prerequisites, room preparation, facilitator preparation and follow-up activities.

The *Activity Sequence* section of the module provides detailed directions for each activity in the module. The final section, *Facilitator Materials and Participant Handouts,* includes things like overhead masters and handouts that can be duplicated and distributed to participants.

In terms of our overall assessment of the modules, we think the content is good, quite good. Many of the activities are thoughtful, interesting, and likely to help teachers work through the difficult process of rethinking what it means to teach and learn. Take the content and many of the activities. On the other hand, if you ignore, adapt on the fly, and remain flexible about the instructions for running the workshops, the result will likely be more constructivist. In fact, involving the participants in determining some of the goals and objectives of the workshops seems almost essential.

ALT Supplemental Materials

The ALT package includes a number of supplemental materials including videos, newsletters, and booklets.

The Videos. The eight videos included in ALT exemplify student-centered environments enhanced by technology. The schools are all in the southwestern part of the United States and represent a range of culturally diverse and poor school districts. The streaming video versions of videos are available at http://www.southcentralrtec.org/alt/files/videos.htm.

Two videos use clips from several schools to illustrate general concepts: *Engaged Discoverers: Kids Constructing Knowledge with Technology* and *Classrooms Under Construction: Integrating Student Centered Learning with Technology*. Another video was developed specifically to support one of the modules in the portfolio, *Managing Growth*. The other five videos are classroom episodes that show different uses of technology in different grade levels.

The technical quality of the videos is quite good. The videotapes, in particular, illustrate the quality that can be achieved when an agency invests time, resources, and professional expertise in the creation of instructional videos. The quality of the streaming video versions is, predictably, not as high, but again they are of very high quality compared to other streaming video on the web today. The content is also excellent. These videos could be used in a variety of settings, including methods courses for preservice teachers. They are precisely the type of video that we need more in teacher education.

Printed Materials. The ALT package also includes copies of a newsletter named *Tap into Learning* (available at http://www.southcentralrtec.org/products-5.html) which provides examples of each principle for classroom practice with the compatible software. Each of the six issues focuses on one of the six principles of constructivism and discusses its' application in the classroom. These newsletters also describe several cases that illustrate what a teacher has done in a particular classroom. The newsletters are well written and illustrated, and are on target in terms of the type of information both preservice and inservice teachers need to know.

There is also a booklet, *Connecting Student Learning and Technology,*
(available at http://www.southcentralrtec.org/products-5.html) that presents general information about student-centered environments and how they can be supported by technology. This booklet may serve as an introductory resource for teachers and teacher educators. However, if you need to explore more comprehensive and extended information about the topic, you need the search for other resources.

A second printed publication is a 270 page book, *Planning into Practice: A Practical Guide for Implementing and Integrating Instructional Technology* (downloadable version is available at http://www.seirtec.org/P2P.html). The main purpose of this book is to provide how-to-do-it information for those in charge of technology planning for their schools, districts or states. The main emphasis is, however, at the school level. This is a very useful book for technology coordinators, particularly those new to the position, and for administrators responsible for supporting technology initiatives. The chapters on curricular integration may be helpful to classroom teachers, but both the tone and the topic of the booklet will be less appealing to teachers.

A third printed resource is a 35 page booklet, Constructing Knowledge with Technology: A Review of Literature. This booklet (available at http://www.southcentralrtec.org/products-5.html) is a thoughtful summary of the professional practice and research literature on technology in relation to constructivist learning theory and its implications for the classrooms. The report starts with the discussion of major concepts in constructivist theory (six principles), then the implications of those concepts for the K-12 classrooms. The booklet also deals with barriers and problems, and approaches to creating technology-supported constructivist learning environments. It is well written

and very useful. It would be appropriate for undergraduate teacher education reading assignments as well as inservice workshops.

The SEDL Technology Assistance Program Web Site
While this web site is not devoted solely to supporting ALT, that is one of its goals. The web site (http://www.sedl.org) is a service of the Southwestern Educational Development Laboratory (SEDL), which is the parent of SCRTEC. It offers online resources for K-12 teachers and teacher educators. It also includes a searchable database for Internet resources as well as a discipline-based database about instructional materials. It is also possible to suggest resources to SEDL team that should be added to the databases. Overall, it is a useful web site that should be of interest to many teacher educators.

In Summary
That the team of professionals at SCRTEC undertook the task of creating ALT is admirable in itself. While we feel it has minor flaws - our only criticism has to do with the instructional approach the authors took to the workshops, it is the best produced, most thoughtfully developed instructional packages for teacher educators. The videos and the newsletters are particular strengths as are several of the printed books and booklets. The 16 modules are quite good and could be used as a foundation for either preservice or in-service teacher education.

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