

**Tutored Video Instruction:
A Distance Education Methodology that Improves Training Results**

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Abstract

Many popular distance education methods are expensive, inflexible, and have the undesirable side-effect of inhibiting student interaction. Tutored Video Instruction (TVI) represents a different approach to distance education based on small group, collaborative learning. Research has shown that TVI can improve learning compared to live instruction. This paper describes how TVI differs from distance education models based on a classroom learning model. It presents research findings on TVI, describes potential benefits to training organizations, and suggests guidelines for when TVI is an appropriate distance education strategy.

Distance Education

In the current era of global workforces and constrained training resources, distance education has become a critical tool in many training organizations. Distance education can save travel costs and leverage unique subject matter expertise. It can also increase the speed with which critical training is delivered, creating a competitive advantage in the marketplace.

But distance education has its downside as well. While the term "distance education" can refer to any training method in which the instructor is not in the same room with the students, it has come to refer primarily to the use of satellite broadcasts or videoconferencing technology to allow remote students to participate in a live class.

These forms of distance education require expensive equipment and may incur high ongoing telecommunication costs. Remote students must be available at the time the class is given, which can be especially troublesome if there are time zone differences.

Communicating via audio/video equipment can make it more difficult for participants to understand each other, particularly if there are students for which the course language is not their native language. Often, remote students report feeling "detached" from the main class. Studies suggest that interaction between the remote students and the instructor is minimal and often frustrating to students.

Despite the difficulties, most research has found that there is not a statistically significant difference between the performance of remote

students and local students. A few studies have reported that the remote students do not perform quite as well. The less interaction there is in the live course, the more likely the performance of the remote students will match that of the local students. Therefore, the more interactivity and student participation a course requires, the less suitable it is for these distance education methods.

Student-Centered Learning

The fact that common distance education methods inhibit interaction puts these methods at odds with the trend toward more effective, student-centered learning methods. The limitations of the technology tend to push instructional techniques back toward the outdated “information transfer” model of learning, where instructors are assumed to have all of the knowledge and students are thought of as empty buckets, waiting to have the knowledge poured in.

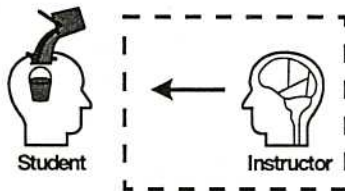


Figure 1: Information Transfer Model of Learning Emphasizing Content

In the information transfer learning paradigm, the focus is on the *content* of the instruction. The relevant questions are: “How knowledgeable is the instructor?” and “How well is the message delivered?” The role of the students in the learning process is largely ignored.

The use of limited interactive technologies simply moves the “talking head” instructor from the in-class podium to a television or computer screen.

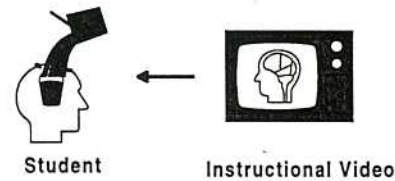


Figure 2: Technology as a Substitute for an Instructor

Tutored Video Instruction

Tutored Video Instruction (TVI) was developed in the early 1970s at Stanford University to overcome the instructional disadvantages of remote classroom distance education and of classroom instruction in general.

In TVI, remote students do not watch the course as it is happening. Instead, the course is recorded on videotape. A trained tutor shows the videotapes to a small group of four to twelve students. Tutor and students pause the tape to ask questions, replay sections, discuss topics, and perform hands-on activities.

Because the remote students are not bound by the time constraints and pacing of the original class, they are free to discuss the course material in a much more thorough way than the classroom students. Students actually customize the course by deciding when to pause the tape, when to start and end discussions and which parts of the tape to replay.

The tutor’s role is that of a facilitator—creating a learning-friendly small-group environment, encouraging student interaction and matching the pace of the course to the needs of the group. The tutor is not a subject matter expert or surrogate instructor. Because the course content is on the tape, the tutor only needs a basic familiarity with the subject. If the group encounters a content question that they are not able to resolve, the tutor has access to the instructor as an intellectual support resource.

The videotape used for a TVI course is often an unedited record of the course as it was presented live. The interaction among students in the small group largely offsets any glitches in the live course as well as the

boredom students might otherwise feel when watching an unpolished talking head video. On the other hand, if resources allow, the video production values can be increased by using multiple cameras, student microphones, editing, or even inserting video segments produced outside the classroom.

TVI provides a student-centered learning environment that goes beyond the “information transfer” model of learning. It is based on a learning model in which students construct their own understanding of the subject matter with help from the instructor and the tutor. Instead of emphasizing *content* as the key instructional variable, it emphasizes *process*—creating an environment which supports active learning.

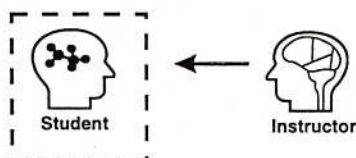


Figure 3: Knowledge Construction Model of Learning Emphasizing Process

The learning benefits of small group interaction are well known both to educational researchers and practitioners. Collaborative learning techniques have found their way into a broad spectrum of education and training situations. Even in an environment like law school, where competition is keen among individuals, students recognize the inherent advantages of collaborative learning and form their own interactive study groups.

TVI Research

While many distance education methods have a neutral or negative effect on learning, research at Stanford has shown that the TVI process can actually improve learning compared to live instruction.

In the initial Stanford TVI study, Hewlett-Packard engineers completed regular Stanford Master’s Degree-level courses at their work sites instead of on campus. Because these engineers were participating in a special Honor’s Cooperative program, they did not have to meet Stanford’s

normal admission requirements and in most cases did not have the academic credentials to gain admittance to the regular Stanford Engineering program.

The graph below shows the results of the experiment. The engineers who used Stanford’s regular distance education method—satellite broadcasts combined with a “talk-back” link for communicating with the instructor—did not perform as well as the on-campus students. A few students watched the videos by themselves. These students did not perform as well as the satellite broadcast students. However, the engineers who took the course via TVI outperformed the on-campus students by a significant margin, despite the academic credential gap.

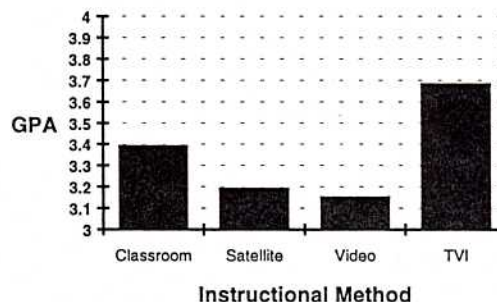


Figure 4: Comparison of instructional methods for Stanford engineering students

Not only did the TVI students perform better, but the collaborative small group experience fostered increased skills in communication and problem solving. As John Young, CEO of Hewlett-Packard at the time, put it:

We in industry also have experienced benefits we did not foresee from the TVI program. We had expected the dividends from the additional expertise our engineers would gain. What we had not expected were group problem-solving skills that have emerged from the program.

TVI’s success is not limited to engineers. At the other end of the educational spectrum, TVI has been shown to be effective with at-risk

teens. The graph below shows the results of another Stanford study where TVI was used to deliver a computer literacy course to the children of migrant farmworkers.

As with the original Stanford TVI study, the students in the classroom group had significantly higher academic indicators than the remote students (note the difference in pre-test scores on the graph). Nevertheless, the TVI students performed just as well as their classroom counterparts.

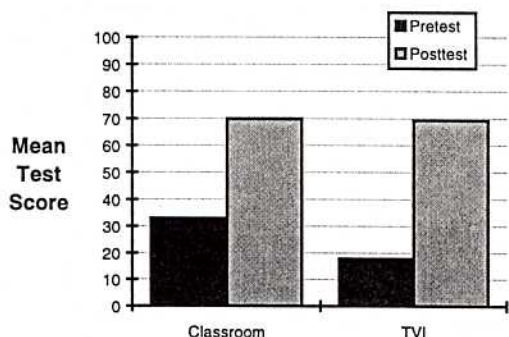


Figure 5: Comparison of classroom and TVI in a Computer Literacy course for at-risk high school students

Research across many different course topics and many different populations have yielded similar results. TVI has been used successfully for topics as diverse as poetry for college undergraduates, science inservice training for middle school teachers, and alcohol rehabilitation for Alaska natives.

Benefits of TVI

In addition to the learning benefits, TVI has a number of attributes which make it attractive for many training situations.

Scheduling Flexibility. TVI can be delivered on-site anywhere in the world at times convenient to participants. Course modules can be scheduled back-to-back for intensive training or spread out over time.

Low cost. TVI courses are cost-effective because they do not require special equipment and the subject matter expert does not need to be present each time the course is taught. TVI

courses are also reusable resources—they can be offered as many times as required with no additional cost.

Power of video. Because it is based on video, TVI provides a palette of effective training techniques that might not otherwise be available. While a video of a classroom lecture can be very effective with TVI, video can also be used to do more than just convey information. Techniques like focus groups, vignettes, and behavior modeling can reach students' emotions as well as their intellect, creating a connection with students that can help them build a bridge between learning the material and applying it.

Effectiveness with students who have special needs. TVI is particularly beneficial for students with special needs. This includes students who might be uncomfortable or under-perform in a classroom environment and students for whom the course language is not their native language. Anyone who would benefit from personalized tutoring would see a similar benefit from the peer coaching that goes on in a TVI session.

High student satisfaction. Surveys of TVI course participants show that most prefer TVI courses to classroom courses. The opportunity to interact with peers in an informal setting provides additional rewards beyond the knowledge gained.

When to Use TVI

Despite its flexibility, TVI is obviously not the right tool for all training situations. Implementing a TVI program calls for strong leadership and coordination skills. The logistics of creating videos, organizing training for small groups, finding and training tutors, etc. can be daunting. To decide whether TVI is an appropriate methodology for a given course, consider the audience, the potential tutors, and the course content.

For example, the relative value of TVI is increased in cases where

- mastering the course material is crucial for the intended audience

- the subject matter is conceptually complex or has a steep learning curve
- a portion of the audience might not perform well in a classroom environment because of learning or language difficulties
- the audience is geographically dispersed.

On the other hand, TVI might not be the best methodology in a situation where

- it is extremely difficult to create small learning groups
- there are no suitable tutors available
- the course requires that students have access to equipment or hands-on tools that can't be provided or simulated in a distance education scenario

The *TVI Course Suitability Worksheet* included at the end of this paper can help assess how suitable a particular course is for the TVI methodology.

Conclusion

The trends that are driving training institutions toward distance education are not likely to abate. At the same time, these organizations increasingly recognize the need to create more effective training programs through the use of active, student-centered learning techniques. Unfortunately, these two trends often collide as common distance education methods tend to inhibit students from interacting with the instructor and with each other.

The success of Tutored Video Instruction points to a new approach to distance education. Rather than simulate a classroom environment with an instructor making a one-way presentation to a large group of students, the new approach builds on more effective learning models that encourage student participation. TVI and other distance education methods based on techniques like small group, collaborative learning can help training organizations gain the advantages of distance education while at the same time increasing training effectiveness.

About the Authors

Dr. Jim Gibbons, Dean of Engineering at Stanford University and founder of SERA Learning Technologies, is the inventor of the Tutored Video Instruction method. Dr. Gibbons has over 20 years of experience as a researcher and practitioner in distance education. The distance education programs created under his direction by the Stanford School of Engineering have been used by many of Silicon Valley's premier high-tech companies.

Rob Pannoni is co-founder and Vice President of SERA Learning Technologies, where he has designed, implemented, and evaluated distance learning programs for high-tech corporations including Sun Microsystems, Cisco Systems, and Raychem. He has also developed successful TVI programs for at-risk juveniles and for inservice training of classroom teachers. Before co-founding SERA, he directed Tutored Video Instruction research at Stanford University.

Jay M. Orlin is the Director of Instructional Design at SERA Learning Technologies where he consults on instructional design with SERA's clients and manages the design portion of SERA TVI projects. He is the author of *Training to Win: Strategies for Today's Industrial Challenges* and has managed training for Intel Corporation, Northern Telecom and Tandem Computers and provides consulting for many corporate clients.