

## Teaching Teamwork Online\*

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### Introduction

Teamwork is a crucial skill in many professions. It is challenging to teach teamwork skills well face-to-face, and team bonding is often emphasized over the development of specific teamwork skills. In an online course, while there are opportunities to introduce many concepts, it is particularly difficult to practice skills since it necessitates coordination and collaboration between remotely located people. However, in many situations an online course is the only venue possible due to time and geographic constraints.

We describe a program aimed at providing distributed mission training for teams performing complex, highly interdependent tasks, whether co-located or distributed. These tasks require overlapping expertise and shared knowledge, flexibility, and the capability for rapid organization and deployment to respond quickly to a changing situation. The objective of our program is to provide training in *teamwork* skills such as communication, coordination, monitoring, and leadership. The underlying assumption is that the team members are already skilled in their own technical or professional area of expertise. Examples of teams for which this training would be appropriate include special purpose (e.g., crisis response) teams within command and control organizations and operations centers, special operations teams, and emergency medical teams.

### The T-TRANE Program

To address the need for distributed teamwork training, we developed *Teamwork Training and Remote Assessment in a Networked Environment (T-TRANE)*, a web-enabled, scenario-based teamwork skills training program comprised of: (1) information about and examples of teamwork skills; (2) scenario-based training exercises that provide practice in teamwork skills; (3) guidelines for team-conducted exercise debriefings that do not require the presence of a training instructor; and (4) a leader's manual that helps team leaders to conduct web-based training sessions. As shown in Figure 1, T-TRANE uses a blend of web-enabled asynchronous and synchronous collaborative tools that provide capabilities including shared artifacts, audio and text communication, discussion and chat groups, polling, whiteboards, and archiving.

T-TRANE is comprised of the materials and structures for a *self-contained set of scenario-based training sessions*, each of which is comprised of three components: (1) a structured pre-brief that will explain the training goals for that session and set forth the initial parameters for a web-based problem-solving scenario; (2) a threaded scenario that provides an initial problem for the team to work through and includes a set of events that refine, complicate, or accelerate the tempo of the teamwork processes; and (3) the structure and resource materials for a post briefing that will use the threaded events as a framework that enables the team members to analyze their teamwork and problem-solving process and derive lessons learned and goals for improvement *without the need for a real-time training instructor in the loop*.

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| 14. ABSTRACT<br><b>We report on the development of an innovative program aimed at providing online teamwork training for distributed professionals performing complex, highly interdependent tasks. Examples of teams for which this training would be appropriate include special purpose (e.g., crisis response) teams within command control organizations and operations centers, special operations teams, and medical teams. To maximize learning and flexibility, the program couples synchronous and asynchronous approaches to online learning, uses video judiciously to illustrate teamwork in a specific domain, and uses team members as session leaders.</b>   |                                    |   |  |   |                                 |
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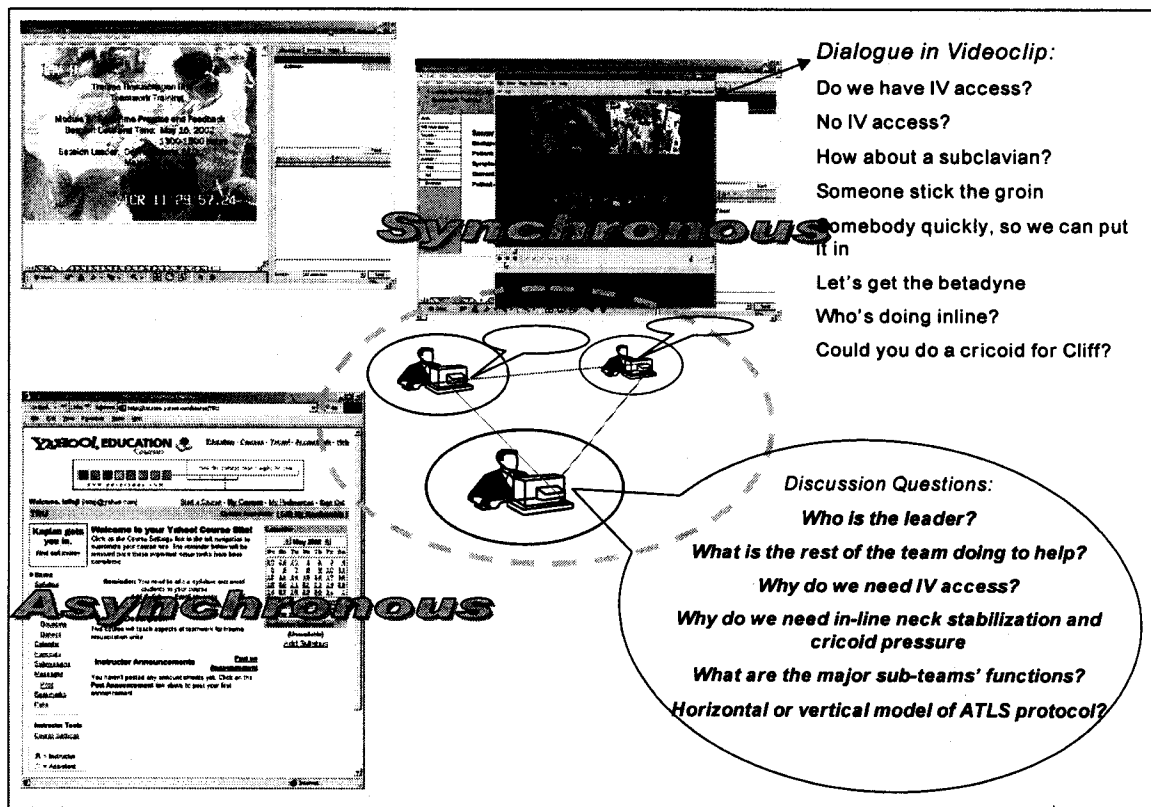


Figure 1. The T-TRANE Vision for Collaborative, Distributed Training

A major challenge in this project has been to *effectively employ web-enabled collaborative tools* so that distributed teams can train as effectively as co-located teams, and in ways that compensate for advantages that may accrue to co-located teams that are training and/or working in face-to-face environments. By using a *blend* of synchronous and asynchronous technologies, T-TRANE enables teamwork skills training that takes advantage of the sense of community created by synchronous training, and at the same time affords the scheduling flexibility provided by asynchronous training. In addition, the synchronous sessions reinforce the asynchronous sessions as well as motivating participation. In the synchronous sessions, the leader explains a problem situation that will be portrayed using video, which all the team members will view on their computers. The team then completes a exercise, which involves role playing, responding to the problem that was posed, or assessing the workload distribution. After the practice exercise is completed, the team engages in a debriefing, moderated by the team leader, guided by T-TRANE-supplied leader notes. In asynchronous sessions, team members log onto a collaborative website, where they read a description of a problem situation they must resolve. They then view a scenario on video and respond to questions. Using T-TRANE materials that were provided ahead of time, the team leader integrates and comments on team members' responses and posts feedback to the website. The team members view the integrated responses and the team leader's feedback.

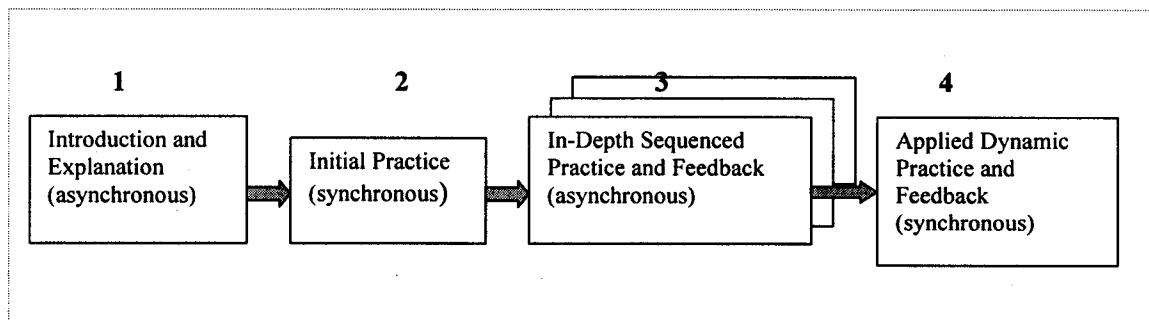
The *effective* use of video to provide the problem scenarios is a cornerstone of our training program concept. Video as a data source to examine work practices has been used in several domains to examine performance of tasks (Mackenzie et al, 1994) and as a training tool (Townsend et al, 1993). When judiciously used, video can be a valuable tool in training. Care, however, needs to be taken in the use of video that it is not "video for the sake of video" and that the use is not gratuitous. Although video is used heavily for training, many uses of video do not significantly add to training effectiveness. This is especially true of the all-too-common talking

head videos. In these, if the audio and video are out of sync or if there are transmission delays, the viewer may be more annoyed than benefited by the visual information. Even when the quality is high, a high-quality still photograph may easily replace the visual information in the video. But some instances of video are advantageous, such as when the video offers a perspective otherwise unobtainable by the remote viewer or when the interactions of people are captured on video. The use of video can also make the experience of the course more engaging.

### **T-TRANE for Emergency Medical Teams**

A hospital emergency room is an example of an environment in which effective teamwork is critical. In the initial phase of this project, working with Dr. Colin Mackenzie, Dr. Yan Xiao, and other members of the Level One Trauma Anesthesia Simulation (LOTAS) Group at the University of Maryland Shock Trauma Center (STC), we produced a demonstration of T-TRANE that focuses on training in Advanced Trauma Lifesaving Skills (ATLS) protocols and in training on how to work together effectively as a team, including teamwork skills such as coordination, monitoring, and leadership. The program is oriented for residents and fellows who, at this stage of their education, have extensive training in medical knowledge and skills, but not in the teamwork skills needed to perform their roles in teams that work in uncertain, stressful, and time-critical situations that occur in emergency medicine. The program is designed to teach teamwork skills online to residents and fellows prior to their rotation in the Trauma Resuscitation Unit (TRU) at the STC.

Figure 2 provides a high level view of the model for the teamwork training program we developed for TRU fellows and residents. The training program will require approximately eight to 10 hours and can be completed within a two week time period. The training is comprised of four modules, and alternates between asynchronous and synchronous modules. Each of the synchronous modules will require between 1 and 1.5 hours and will be scheduled at a fixed time acceptable to all the trainees in the group. The asynchronous modules can be accomplished by trainees as their individual schedules permit, but within a fixed window of time.



**Figure 2. High-level View of Teamwork Training Model**

Module 1 introduces and motivates the program, describes the course structure, and explains and exemplifies teamwork skills. Module 2 further motivates participation in the program by providing an opportunity for the trainees to interact to practice teamwork skills. Module 3 is comprised of a series of sequenced components that provide an opportunity for trainees to apply and practice teamwork skills and to receive feedback from the leader and other team members. To keep the trainees 'in sync' as they work through the components of the module, they are required to work on each component during a specified time period. The last module (4) provides an opportunity for trainees to practice teamwork skills in a dynamic environment and a forum for discussing the application of the concepts and skills learned in the training program to the emergency medical environment.

Members of the LOTAS Group have been researching team coordination in emergency medical care in the TRU for a number of years. As part of their research they have collected a large set of video recordings of emergency medical teams working in the admitting area of a trauma center, where initial resuscitation and assessment of emergency-admittance patients takes place. We are using selected videotapes from this library to exemplify correct and incorrect applications of teamwork skills and as the scenarios for the practice component of the training program. This is an extraordinary archive made possible by having the TRU outfitted with an array of video cameras that can be controlled remotely from a central control room. Video cameras can capture the overall view of area in which the team is working and a close-up view of the area around the patient where the team is focused. In addition, patient vital signs data are obtained from patient monitors and overlaid on the video images in order to facilitate review of the videotapes. Additional viewpoints can also be derived from cameras worn by members of the team. The footage is time-stamped and various camera angles can be synchronized to present a simultaneous view for example in a composite quad view. The video clips are a rich source of material for illustrating aspects of teamwork skills and for targeted performance review and awareness exercises. The use of video enables setting up of scenarios that are realistic and detailed. We use video as stimulus material to facilitate a discourse on teamwork among participants.

### **Other Applications**

In the next phase of this program, working with the Theater Medical Support Branch at Brooks AFB, we plan to expand the T-TRANE capabilities to include modules that are specific to trauma care in a field setting, where teams must work with more limited equipment under less than ideal environmental conditions. This phase of the project will involve the development of videos that capture aspects of emergency medical care in remote settings.

The concepts and approaches developed for T-TRANE, including the underlying team training principles, the effective use of multiple e-learning technologies to support the training, and the methods developed for structuring the training and for supporting collaborative learning at a distance without a trained instructor, will be directly applicable to the development of training programs in other domains in which flexible, quickly reconfigured, and rapidly deployed teams of specialists must learn to work together effectively in high-stakes, time-critical environments.

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