THE RATE TOOL: MULTIMEDIA OBSERVATION AND ANALYSIS OF TEAMS
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We have developed a digital audiovisual recording and analysis system for studying team behavior. The system uses four computers to collect up to four video and eight audio signals. A separate software package is used to synchronize, view, analyze and score the audio/video streams.

INTRODUCTION

Our research group has been focusing on patient safety interventions in the operating room. Specifically, the goal is to evaluate the effectiveness of various interventions (e.g., the use of a checklist and the use of a preoperative briefing) on the communication patterns and technical performance of operating room personnel. It is critical to measure the communication and coordination of a fairly large team (up to eight people at a time) in a surgical operating room.

TEAM EVALUATION METHODS

Evaluating coordinated team activities often requires independent observation of multiple (potentially distributed) individuals. One common technique used for team performance evaluation is to have trained observers rate the team member’s performance. This can be time consuming and difficult to perform. With no “integrated trace” of actual activities, scoring cannot be re-evaluated nor can events be recalled for debriefing purposes.

THE RATE SYSTEM

We have developed a hardware/software system, called Remote Analysis of Team Environments (RATE), to digitally record, score, annotate and analyze performance for a team of up to eight people. The system is designed to be mobile, allowing the researchers to collect data from distributed or co-located team members (and the artifacts they are using).

Four high-end PC computers with video capture cards are used, each capturing one video feed and two audio feeds. The computers are used to process, store, and broadcast the data while any PC connected to the local area network can view all of the data in a synchronized fashion using the RATE software.

The software for the RATE system is written in Microsoft Visual Basic for the Windows platform. The first function is to watch the team remotely using streaming real-time audio and video. The second function is for performance scoring and case review. The software allows the researchers to annotate or transcribe segments of video, to count verbal utterances and to code episodes with automatic time stamping.

One of the immediate advantages of using digital signals in RATE involves the capacity to skip from segment to segment in a fraction of time it takes to navigate analogue video. Any time-stamped event can be “double clicked” and all the audio/video data will play from that point (within a few seconds). Another advantage is that the audio and video streams can be isolated from each other for easier analysis.

DISCUSSION

We are now using RATE as a data collection and analysis system for a randomized, controlled trial of the use of a checklist on the improved technical and communication performance of surgery teams performing laparoscopic cholecystectomy (gall bladder removal), which allow us to record and score cases in real time.

The RATE tool will also be evaluated in the near future for its potential utility as (surgical) team debriefing and training tool, creating a possibility of training surgical “situational awareness” and improved team communication and coordination strategies.

Although we are currently using the data collection system to observe and record up to eight people working as a co-located team, the four data collection servers could be distributed if team members were distributed.

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