

AWARD NUMBER: W81XWH-11-2-0171

TITLE: "Virtual Civilian Aeromedical Evacuation Sustainment Training (V-CAEST)"

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REPORT DATE: August 2015

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE August 2015		2. REPORT TYPE Final		3. DATES COVERED 1 Sep 2011 – 31 May 2015	
4. TITLE AND SUBTITLE Virtual Civilian Aeromedical Evacuation Sustainment Training (V-CAEST)				5a. CONTRACT NUMBER W81XWH-11-2-0171	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR (S) <ul style="list-style-type: none">Xianguen Hu (current PI), Robert Koch (previous PI)Co-PI: Scotty Craig, Marian LevySenior Researchers: Keith Shubeck, Usef Faghihi E-Mail: xhu@memphis.edu (Xianguen Hu)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME (S) AND ADDRESS (ES) University of Memphis Memphis, TN 38152-3230				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM (S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER (S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <p>The Virtual Civilian Aeromedical Evacuation Sustainment Training (V-CAEST) project has a central goal to improve communication between civilian medical practitioners (i.e., first responders, EMTs, etc.) and the military during disaster situations. V-CAEST focuses on disaster situations that span multiple jurisdictions and require aeromedical evacuation. The University of Memphis, in conjunction with Arizona State University, gathered the content of an existing live-action training program (CAEST) and leveraged existing effective educational technologies (i.e., AutoTutor Lite, a web-based intelligent tutoring system equipped with natural language processing) to develop a new virtual learning environment. Specifically, the University of Memphis worked with CliniSpace to develop a virtual world enabled with AutoTutor Lite, to model the live-action training program CAEST. The V-CAEST project sought to develop a virtual learning environment that is more cost-effective and wide-reaching than the live-action training alternative, but as effective in producing learning gains. The final evaluation of the program compared the pre-test and post-test learning gains of both the live-action training program and the virtual learning environment. The results indicate that the V-CAEST virtual learning environment is as effective at producing significant learning gains as the live-action training program.</p>					
15. SUBJECT TERMS Virtual World Simulation, Triage, Intelligent Tutoring Systems, Aeromedical Evacuation.					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON	
				USAMRMC	

a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified	Unclassified	299	19b. TELEPHONE NUMBER (include area code)
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Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

Table of Contents

	<u>Page</u>
1. Introduction.....	5
2. Keywords.....	5
3. Overall Project Summary.....	6
4. Key Research Accomplishments.....	26
5. Conclusion.....	27
6. Publications, Abstracts, and Presentations.....	28
7. Reportable Outcomes.....	29
8. References.....	30
9. Appendices.....	32

Introduction

The Virtual Civilian Aeromedical Evacuation Sustainment Training (V-CAEST) project has a central goal to improve communication between civilian medical practitioners (i.e., first responders, EMTs, etc.) and the military during disaster situations. V-CAEST focuses on disaster situations that span multiple jurisdictions and require aeromedical evacuation. The University of Memphis, in conjunction with Arizona State University, gathered the content of an existing live-action training program (CAEST) and leveraged existing effective educational technologies (i.e., AutoTutor Lite, a web-based intelligent tutoring system equipped with natural language processing) to develop a new virtual learning environment. Specifically, the University of Memphis worked with CliniSpace to develop a virtual world enabled with AutoTutor Lite, to model the live-action training program CAEST. The V-CAEST project sought to develop a virtual learning environment that is more cost-effective and wide-reaching than the live-action training alternative, but as effective in producing learning gains. The final evaluation of the program compared the pre-test and post-test learning gains of both the live-action training program and the virtual learning environment. The results indicate that the V-CAEST virtual learning environment is as effective at producing significant learning gains as the live-action training program.

Keywords: Intelligent Tutoring Systems, Virtual Worlds, SALT Triage Training, Aeromedical Evacuation Training

The V-CAEST project sought to address the following research objectives:

Research Objective 1: Develop user friendly virtual learning tutoring environment to deliver military-relevant aeromedical evacuation training to civilian personnel.

Research questions to be answered:

- *To what degree is the V-CAEST virtual intelligent tutoring considered engaging and easy to use among various segments of the target group (i.e. different job classifications, levels of technological sophistication, etc.)?*
- *Which content delivery format(s) (written, video, audio, etc.) are considered most engaging and effective among the various groups within the target population (i.e. nurses vs. EMTs) for each category of training topic (i.e. triage, patient preparation, communication protocols, etc.)?*

Research Objective 2: Determine the efficacy of the V-CAEST virtual intelligent tutoring environment.

Research question to be answered:

- *To what degree does V-CAEST virtual intelligent tutoring environment produce desired learning outcomes among the various groups within the target population (i.e. nurses vs. EMTs) for each category of training topic (i.e. triage, patient preparation, communication protocols, etc.)?*

Research Objective 3: Determine the relative training efficacy of the V-CAEST virtual intelligent tutoring environment as compared to the live, CAEST training.

Research questions to be answered:

- *How do learning outcomes achieved by the V-CAEST virtual intelligent tutoring environment compare to learning outcomes achieved by the live CAEST training program?*
- *To what degree do participants feel more or less prepared to interface with military personnel in the event of a catastrophe requiring aeromedical evacuation after participating in the virtual versus the live training program?*

Phase 1

Phase 1 of the V-CAEST project, as described in our initial statement of work, involved mapping content from the existing CAEST training program to a virtual learning environment. On August 9, 2011, the current PI, Dr. Robert Koch, and the Co-PIs Dr. Xiangen Hu and Dr. Scotty Craig met with the Project Leadership Team of the CAEST project to review the previously developed live-training curriculum of CAEST. The goal of the meeting was to determine the common and discrete learning objectives and assessment tools associated with the live-action training program. Graduate students involved with the development and organization of content also attended the meeting in an effort to make initial contact with the subject matter experts associated with the CAEST training program. Through the contacts made during this initial meeting, useful content materials were procured (e.g., annotated PowerPoint slides, Sort, Assess, Lifesaving Interventions, Treatment and/or Transport (SALT) triage descriptions, training packages provided to CAEST participants, etc.), and planning was made for the

University of Memphis V-CAEST team to attend and observe a CAEST evaluation session. At the time of the meeting, the CAEST program was being finalized. The evaluation of this program was set for late March. The University of Memphis V-CAEST team was invited to observe a CAEST evaluation session on March 27, 2012. Details of the observed CAEST evaluation will be described below in the discussion of *Task 2.1*.

Task 1.1 Select virtual 3D platform

Working concurrently with the V-CAEST content team, in September 2011, the V-CAEST technical team set out to determine which 3D virtual world platform would be most appropriate for the V-CAEST program. As described in the initial V-CAEST project narrative, numerous commercial off-the-shelf virtual world software platforms are available, each with their own advantages and disadvantages (see Figure 1 below for a list of these platforms and their features). Dr. Hu narrowed down the list of potential virtual world platforms to two: DI-Guy and Unity. Dr. Hu met with both the Unity simulation software group and the DI-Guy company and ultimately determined that the Unity software was less expensive, but maintained the same high quality as the DI-Guy software. Later, Dr. Hu met with a variety of simulation companies (CliniSpace, Vcom3d, Morphologica) that worked with the Unity platform, and determined that the award winning CliniSpace company (<http://www.clinispace.com/>) would be able to develop the best virtual world that met the needs of the V-CAEST project. This decision was made after sending each company a preliminary story-board of the V-CAEST content in order to receive an estimation of the costs required to create a simulation of the content.

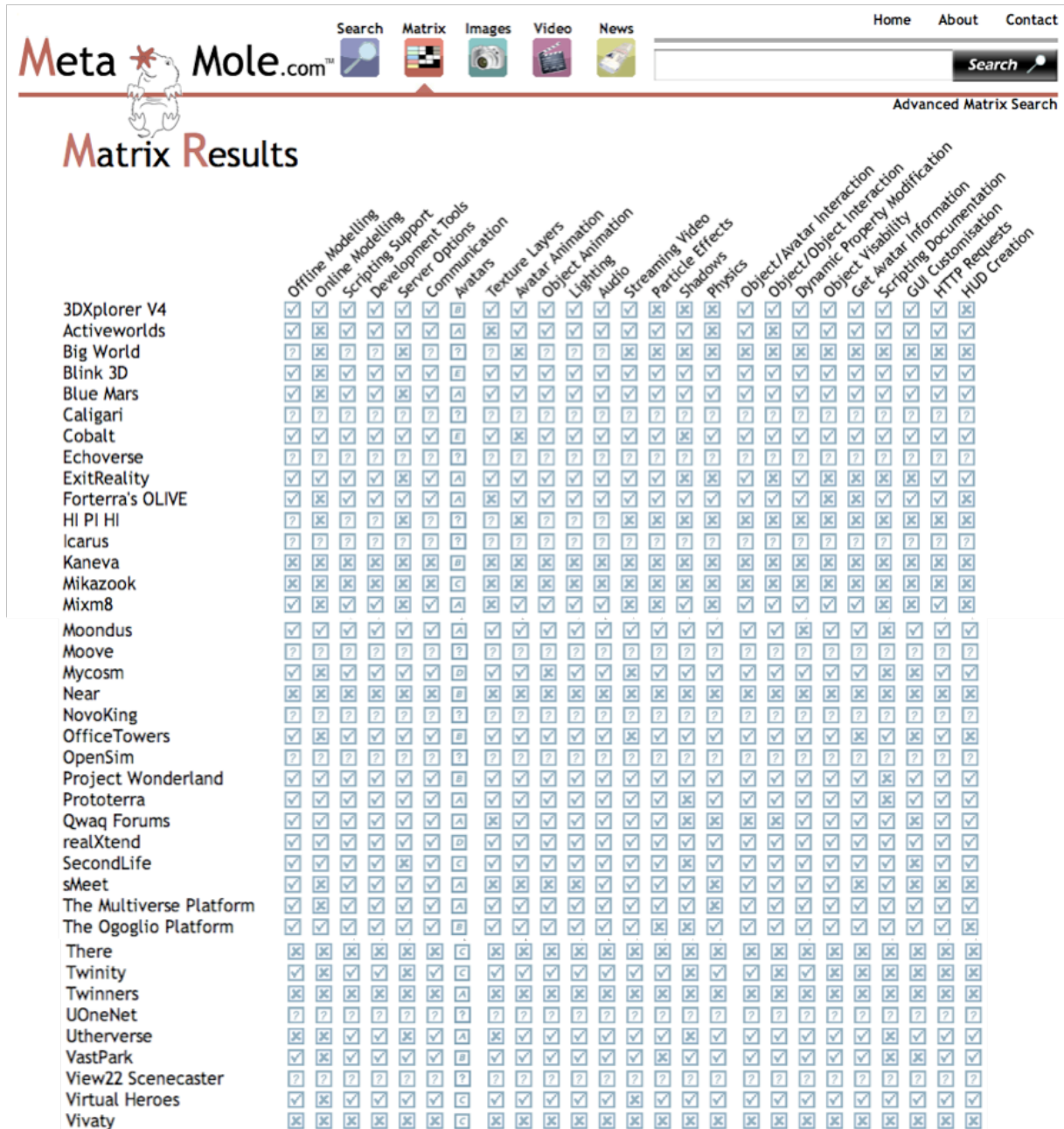


Figure 1: selected 3D virtual world platform and associated features from: <http://www.meta-mole.com/>.

Task 1.2 Gather domain specific curricular content and build semantic spaces

AutoTutor Lite (ATL), the intelligent tutoring system implemented within the V-CAEST learning environment has two important components: 1) the back end semantic engine that drives the natural language processing (NLP) component used to evaluate student input in real time, and 2) the speech engine and animated avatar. The semantic engine utilizes latent semantic analysis (LSA; Landauer & Dumais, 1997) to create a similarity matrix of terms contained in a corpus. The corpora used to train a semantic space using LSA tend to be domain-general in an effort to be applicable in a variety of educational

settings. However, domain-general semantic spaces often face issues when dealing with highly technical or specific content. The V-CAEST content consists of many esoteric and domain-specific terms that are not included in documents used to generate a domain general semantic space like the commonly used TASA space (Touchstone Applied Science Associates; Zeno, Ivens, Millard, & Duvvuri, 1995).

By utilizing a methodology to develop domain-specific semantic spaces (Cai, Graesser, Burkett, Li, Morgan, Shaffer, 2011), a medical and military domain-specific semantic space was developed. First, key domain-specific terms were collected from a subject matter expert in the aeromedical area. These terms were then used to guide a Wikipedia crawler algorithm specifically designed to develop a corpus to train a semantic space. Wikipedia articles were first included if they contained a key term in the title. These terms were added to a “seed corpus”. The seed corpus was then compared to a randomly generated, domain-general, “reference corpus”, in order to compute term “keyness”. Term keyness describes how essential a given term is for a specific domain. After computing term keyness, a new list of key terms was developed. This new list of key terms includes terms met the following criteria: 1) the term rarely occurs in the domain-general reference corpus, and 2) the term frequently occurs in the seed corpus. The new key terms list was then used to guide another wiki-crawl, where articles were included if they contained key terms in either the title or body. These new articles were then included in the updated seed corpus. A cut-off check is performed after the key terms list is updated. The cut-off check compares the new key terms to the old key terms, and if the keyness correlations are near one, the wiki-crawler stops, and no new articles are included in the corpus. Figure 2 provides a visual description of the algorithm.

Preliminary analysis of the domain-specific V-CAEST semantic space yielded poor results. A word relation survey (see Appendix A) was provided to a group of medical professionals. The survey tasked each participant to judge how similar a set of three words were to each other. The average human-similarity scores were then compared to the similarity coefficients provided by the LSA of the domain-specific corpus. No significant correlation was found between the human association responses and the LSA similarity coefficients. It should be noted, however, that when the survey was being conducted, many of the participants expressed a great deal of confusion towards their task, which may have resulted in a disproportionate amount of extreme scores (i.e., 1 or 6). A new methodology for assessing human rated similarity scores for a set of terms is currently in development. The new methodology seeks to move away from individual term-level comparisons and instead focus on the comparison of three different sentences. Additionally, during beta testing of the AutoTutor Lite modules, the domain-specific semantic space struggled to accurately assess user input that included a high percentage of domain-general terms. Ultimately, it was determined that a domain-general corpus with manually appended domain-specific terms, should be used for AutoTutor Lite assessments. Specifically, these were terms and acronyms that were included in the seed terms list provided by our subject matter experts (SMEs), and terms that regularly occurred in our SME-approved content, but were not included in the list of terms in the domain-general semantic space. This allowed the NLP component of ATL to recognize domain-specific terms included in both the target answers for assessment questions in AutoTutor Lite, and student input.

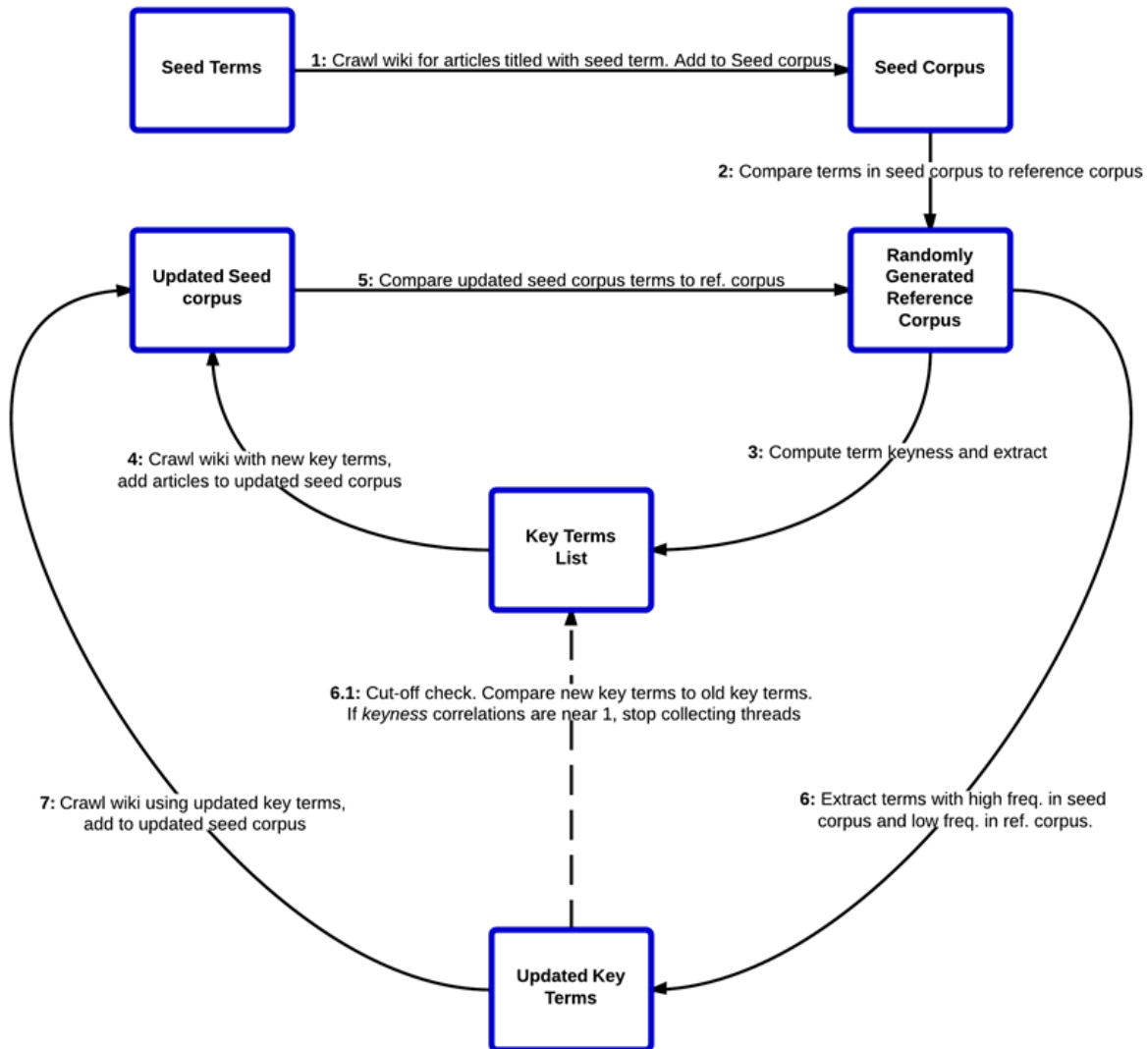


Figure 2. Visual representation of the “seeding method” for generating a domain specific corpus.

Phase 2

Phase 2 of the V-CAEST project, as described in our initial statement of work, dealt with the development of training modules that were based on the CAEST program and feedback from our various subject matter experts. The development of these modules address Research Objective 1, that is, the development of a user friendly virtual intelligent tutoring environment in order to deliver military-relevant aeromedical evacuation training to civilian personnel.

Task 2.1 *Build beta scenarios for virtual environment*

V-CAEST Victim Scenarios, Content, and Content Implementation

To take full advantage of the virtual 3D platform, it is essential to both mimic the CAEST program as closely as possible, but to also provide a training environment that live-training scenarios would find difficult or impossible to provide. For the V-CAEST 3D environment, after consultation with our subject matter experts and after observing the CAEST training in action, we decided to develop a virtual world that represented a busy city block that had recently been struck by a major earthquake (Figure 3). CAEST trainees were split into smaller groups, where each group had about six members. The smaller groups allowed for collaborative problem solving, the potential for constructive discussions, and peer feedback. Similarly, up to six users can be situated in a single V-CAEST instance. Users can communicate with one another via text by using the chat-box feature, or by voice by taking advantage of the in-game voice application.



Figure 3. A screenshot of the V-CAEST interface, illustrating the damaged, chaotic environment. Users are situated in a virtual city block that has recently been struck by an earthquake.

V-CAEST Content

The CAEST program covered four topics in detail: 1) the incident command system and the presence of military resources, 2) the aeromedical evacuation system and rotor-wing transport, 3) the aeromedical evacuation system and fixed-wing transport, and 4) SALT triage. After consultation with an expert in the aeromedical evacuation domain, it was determined that civilian medical practitioners are likely already familiar with rotor-wing evacuation, and that our resources would be better spent focusing on fixed-wing transport, the aeromedical evacuation liaison team (AELT), and the mobile aeromedical staging facility (MASF). The content covered in the V-CAEST environment therefore covered the following three topics in detail: 1) the incident command system and the presence of military resources, 2) AELT/MASF and patient readiness for fixed-wing transport, and 3) SALT triage.

The ICS content covered the following subtopics:

- Introduction to ICS, the Stafford Act, and the National Response Framework
- Overview of the ICS
- Incident Commander: Recognizing your IC and his/her responsibilities
- Command Staff and General Staff
- Common ICS misconceptions

The AELT/MASF content covered the following subtopics:

- AELT/MASF and Patient Readiness for Air Transport Introduction
- MASF configuration
- AELT details and responsibilities
- Fixed-Wing cabin conditions to consider
- Relative contraindications to flight
- Three different AELT “conversations” with hospital personnel

The SALT triage content covered the following subtopics:

- Introduction to SALT
- “SORT” -- The sorting step of SALT triage
- SALT: Assessment and life-saving interventions
- Executing tags for treatment and/or transport
- Common misconceptions associated with triage
- Eleven (11) different conditional modules -- corrective feedback for specific patient scenarios

V-CAEST Content Implementation

The content of each of the above three topics were implemented into AutoTutor Lite. AutoTutor Lite takes advantage of a triologue/quadrilogue-based dialogue system, a tutoring environment shown to be effective (Graesser, Britt, Millis, Wallace, Halpern, Cai, Kopp, Forsyth, 2010). A tutoring triologue typically consists of a tutor agent, a peer student agent, and a human student. The presence of a peer agent allows for an expectation-misconception-tailored tutoring environment, where the peer agent presents a misconception and the tutor agent allows the human student to correct the misconception. In a quadrilogue tutoring environment (trialogue plus an additional peer agent), the peer agents can either both present misconceptions, or, depending on their “expertise” can alternate from presenting the misconceptions to correcting them. In this setting, the human student will learn vicariously during an information delivery stage of a tutoring module, but will be prompted to provide elaborative self-explanations during an assessment stage of the tutoring module. Much of the content delivered in AutoTutor Lite had a tutor agent, two student agents (one firefighter, one nurse) and one human student. See Figure 4 for an example of AutoTutor Lite within the V-CAEST environment.

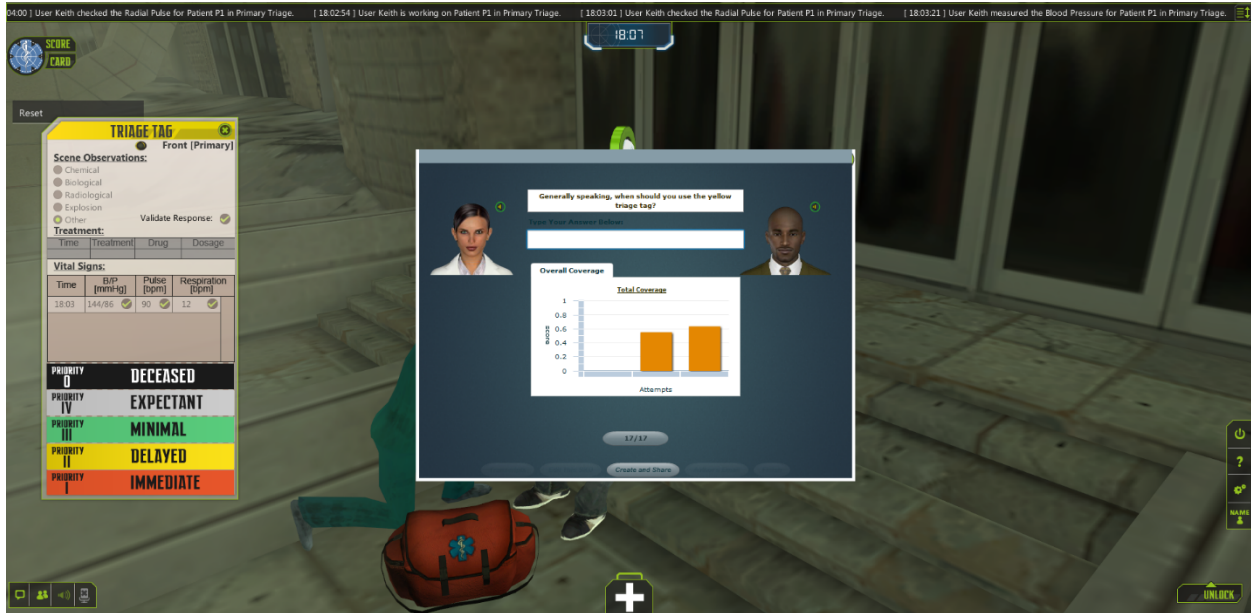


Figure 4. A screenshot of the V-CAEST interface. The user is interacting with AutoTutor Lite after choosing the incorrect triage category for this victim. The assessment type shown in the screenshot is a “self-reflection”.

Each topic was delivered in AutoTutor Lite in a set of “Sharable Knowledge Objects” or SKOs. AutoTutor Lite uses the SKO framework to deliver content in the form of brief tutoring interactions. Each SKO consists of two main components, information delivery and assessment. The information delivery component can have up to three different agents interacting with each other and discussing the relevant content. After the information delivery portion of the SKO is complete, users are then briefly assessed before moving on to the next SKO. Users can be assessed in a variety of ways in AutoTutor Lite. Multiple-choice with enhanced feedback, matching, fill-in-the-blank are each assessment types that are best used to assess shallow-level content. Self-reflection and Essay assessments are the two AutoTutor Lite assessment types that are used to assess whether or not students have a deeper understanding of the content. The self-reflection assessment type typically requires the user to answer questions that ask the participant to describe a concept in his or her own words. Answers to self-reflection questions are typically a sentence or two long. The essay assessment type involves the tutor asking a more general question that requires the user to provide up to two or three paragraphs to fully answer the question.

Within the V-CAEST environment, users are acting as civilian medical personnel who are tasked with performing SALT triage. Users are aware that military resources are available, and are told to make informed triage decisions with this information in mind. Upon entering the environment, users will see the incident commander and will be asked to click on each hotspot above the incident commander’s head (Figure 5). Each hotspot corresponds with one of the three topics (i.e., ICS, AELT/MASF, and SALT triage) that has been implemented in AutoTutor Lite.



Figure 5. A screenshot of the V-CAEST interface. The user is instructed to interact with the incident commander by clicking on each of the hotspots. Clicking on a hotspot will prompt an AutoTutor Lite interaction.

After users work their way through the content, they are instructed to begin triaging the victims scattered throughout the environment. If a user makes a mistake during the triage process (e.g., selecting the incorrect triage category, selecting the incorrect priority, inserting incorrect vital information on the triage tag, etc.), this will prompt an AutoTutor Lite interaction specific to the mistake they made. For example, if a user selected the yellow triage category for a victim who should receive a red triage category, an AutoTutor Lite interaction will begin. This interaction provides a brief review of both the yellow and red triage categories followed up with a short assessment that briefly quizzes the user on the information they just reviewed.

V-CAEST Victim Scenarios

Within the V-CAEST interface, there are a total of six victims who can be interacted with. Each victim can have up to three victim “scenarios”. The authoring tool (Figure 6) within the V-CAEST interface allows authors to determine a victim’s correct priority category, scene observation category, radial pulse, capillary refill time, respiratory rate, mental status, blood pressure, correct triage category, and whether or not the victim requires life-saving intervention, and what type of intervention would be required. Additionally, authors within the V-CAEST interface can edit the victim’s information, that is, any additional information about the victim that may not be readily apparent, which would be provided to V-CAEST users.



Figure 6. A screenshot of the V-CAEST authoring tool for victim 1.

Each victim scenario (i.e., vital information, correct triage category, etc.) was authored by an expert in triage and paramedic training, as well as a former EMT. Our subject matter experts provided two victim scenarios for each victim in the V-CAEST interface, for a total of twelve realistic victim scenarios. These twelve victim scenarios allow users to have exposure to victims that fit within each of the priority categories and each of the triage categories in SALT triage. It should be noted that once a victim has gone through both initial triage and secondary triage, V-CAEST users are to determine how the victim should be transported. After making the final transport decision, the victim will “reload” back into the V-CAEST interface, with a new victim scenario.

Task 2.2 Conduct iterative usability and reliability testing on beta modules

A formal and exhaustive usability test was prepared for, but unfortunately the project ran into several IRB issues which were exacerbated by a government shutdown and time constraints. All of the IRBs were adjusted (U of M, WSU, and ASU) to remove the screen-capture and video recordings of our usability participants and final evaluation participants in Feb 2014. An updated IRB approval was sent to the HRPO in the same month. Usability testing and final evaluation was pushed back, pending the HRPO approval. While awaiting the HRPO approval, our project’s first no-cost extension timed out in June 2014. In July 2014, we received notice that HRPO approval cannot be awarded for rewards that are not currently funded, further delaying the usability testing. Mid-August, 2014 we received notice that our NCE was accepted. Our final evaluation date was then set for December 4 - 7, 2014 at ASU. At this point, all available funds and resources were allocated to the final evaluation in Phoenix, AZ.

An informal usability test was performed on the V-CAEST interface in the associated labs for both the U of M and ASU teams. Stress testing was performed on each of the ten V-CAEST instances. Six users were loaded into a single instance at a time, and were asked to access the same embedded AutoTutor Lite modules at the same time. Each user was asked to work their way through several AutoTutor Lite interactions, as well as fully triage each victim in the interface. No interface performance issues were noticed. However, a significant text-to-speech delay was noticed with AutoTutor Lite interactions when multiple users were accessing the same module. This issue was addressed and fixed by the U of M team prior to the final V-CAEST evaluation.

In addition to the stress-testing of the V-CAEST interface, our subject matter expert, John Clouse (Wright State University), was asked to review 1) the AutoTutor Lite interactions and scripts, 2) the victim scenarios within the interface, and 3) the PowerPoint slides that were to be used during the didactic training portion of the final evaluation. Each of his concerns were addressed, and he gave final approval of the content prior to the final evaluation. The AutoTutor Lite interaction scripts were also viewed and approved by the same subject matter expert who provided our victim scenarios, Dr. Jeffrey Thomas, at ASU.

Phase 3

Phase 3 of the V-CAEST project, as described in our initial statement of work, dealt with efficacy testing of our fully developed V-CAEST interface. Specifically, the efficacy testing in this phase addresses Research Objectives 2 (determine the efficacy of the V-CAEST virtual intelligent tutoring environment) and 3 (determine the relative training efficacy of the V-CAEST virtual intelligent tutoring environment as compared to the live, CAEST training).

Task 3.1 Conduct efficacy testing

Participants

To determine the efficacy of the V-CAEST interface to produce targeted learning gains, and to compare the efficacy of the virtual training program to the gold-standard of a live-action training program, an experiment was conducted in Phoenix, AZ. Recruitment of our target population (e.g., civilian medical personnel, first responders, etc.) began in early November, 2014. Participants were recruited via e-mail and posted fliers at the ASU campus, local fire stations, and hospitals. See Appendix B for a copy of the recruitment fliers used. Participants received \$150 and continuing education credits for their participation. Our participants included 36 civilian medical personnel from the Phoenix, AZ metro area. The professions of our participants included EMT's (4), paramedics (3), firefighters (4), RNs (7), respiratory therapists (6), and other medical professions. Our participants averaged seven years of experience in their prospective professions, and about one third of the participants have previously received mass casualty training.

Materials

Two 26 item multiple-choice tests were counterbalanced as pre-test and post-test for presentation to each participant. The items on these tests covered ICS, SALT triage, and the AELT/MASF. Additionally, a demographics survey was administered that contained questions concerning the age, occupation, and years of experience of the participants. Additionally, the demographics survey contained questions concerning the participants' familiarity and frequency of usage with computers and video games. In addition to the 26 item multiple choice pre and post-tests, a nine item pre and post multiple-choice triage test was administered. For this test, participants were presented with a victim scenario and were asked to do their best in determining the correct SALT triage category for that victim, as well as provide an explanation for their decision. Finally, a six item attitude survey was administered after each participant completed their training and post-tests. This survey consisted of 6 Likert-scale items that assessed the participants' attitudes towards the training they received.

Experimental Conditions

CAEST Environment (Live-Action Training)

Twenty participants were randomly assigned to the live-action, CAEST training condition. Participants in this condition were escorted to the gymnasium located at the ASU Polytechnic campus. The instructor-led environment was set-up in a large gymnasium building including a mock military plane and Mobile Aeromedical Staging Facility (MASF) located just outside the gymnasium. Volunteers were moulaged into mock victims and mannequins were used in substitute of live victims for some situations. Hospital beds, IV poles, medical pumps and several other medical items were used as props to set the scenes. Four instructors were assigned to individual stations. The stations were SALT triage, patient readiness for air evacuation, military communication protocols, and patient transfer. Instructors gave a detailed overview of the content for their assigned station as small groups of participants spent between 15 and 20 minutes at each station. Hands-on interaction consisted of participants triaging patients (live volunteers & mannequins) using SALT standards, packaging the patients for transfer, and moving them to either to the MASF or loading them directly into a mock military plane.

V-CAEST Environment (Virtual Training Condition)

Sixteen participants were randomly assigned to the V-CAEST virtual training condition. A virtual environment of a mass casualty disaster situation was created using the Unity platform covering the same base content as CAEST. Virtual humans are used to provide direct SALT triage practice and to model interactions. Participants select a virtual human to represent themselves and manipulate during interactions with victims, other participants, and the incident commander. The incident commander is the first virtual human participants encounter in the environment and participants are instructed to obtain instructions from the incident commander. There are six victims in various locations within the environment that have different degrees of injuries. Each participant has a medical bag representation within the environment which allows them to simulate obtaining vital signs. There is an interactive triage

tag for each victim that participants enter victim information, vital signs, and select the victims triage category.

The V-CAEST environment incorporates an existing intelligent tutoring system called AutoTutor LITE (Learning & Instruction for Training Environments) (Hu et al, 2014). AutoTutor LITE (ATL) acts as a facilitator providing guidance and feedback during the learners' interaction in the virtual world. V-CAEST features natural language processing enabled by a Domain Specific Semantic Processing Portal (DSSPP). The DSSPP creates a domain-specific semantic space by taking in a corpus of military and civilian emergency literature.

ATL guides user through the V-CAEST environment utilizing Latent Semantic Analysis (LSA) to communicate with learners and deliver content. Self-reflection assessments in ATL are used within the V-CAEST environment with the use of prompts, hints, and deep learning questions to bolster learning. Just-in-time feedback is provided throughout the learners' interaction in the V-CAEST environment.

The V-CAEST virtual training condition had participants interact with the V-CAEST interface described above for up to three hours. Participants in the virtual condition were asked to find the nearest empty computer station in a computer lab. Each computer station had a desktop computer, a monitor, a mouse and keyboard, and a headset. In an effort to encourage in-world communication via the chat-box messaging system, participants who were seated next to each other found themselves in separate virtual world instances. In this condition, participants received 20 minutes of instructions on how to use and navigate the virtual world and how to interact with victims. After participants viewed the 20 minute instructions video, they were instructed to begin interacting with the virtual world, which contained instructions for how to proceed. Participants in this condition were able to ask the experimenter questions concerning technical issues, but the experimenter was unable to answer any questions concerning the content being taught.

Procedure

Participants were asked to arrive at the ASU Polytechnic by 9:00 am. Participants were directed to a large classroom equipped with a projector and screen. Participants received an informed consent, were asked to review it and sign it if they agreed to the terms. Participants were asked to fill out a demographics survey. Upon completion of the demographics survey, participants were given 45 minutes to complete the nine-item triage pre-test, and the 26-item multiple-choice pre-test. After the 45 minutes were up, the materials were collected by the experimenter and the participants were given a brief ten minute break. After the break, participants were asked to watch a 1hr 15min video lecture. The video lecture consisted of a narrated slideshow that covered the three major content topics: ICS, SALT triage, and AELT/MASF. When the video lecture was complete, participants were escorted to the cafeteria lounge on campus and were provided with lunch. Participants were given 1 hr. and 30 min for their lunch break. After lunch, participants were escorted to their simulation training locations. Participants in the virtual training condition were escorted to a computer lab on campus. Participants in the live-action training condition were escorted to the gymnasium in which the live simulation was set up. Participants in both conditions were trained for up to three hours. When their training ended, participants were given a brief break and were then escorted back to the original lecture hall, where they were given 45 minutes to

complete the 9-item triage post-test, and the 26-item multiple-choice post-test. After participants completed the post-tests they were given the six item Likert-scale attitude survey. They were then asked to provide information necessary to receive their \$150 payment and CE credit.

Results and discussion

Pre-test measures

Two independent samples t-tests were performed on pre-test scores of the multiple choice pre-test and the triage application test. These tests yielded no differences between the two experimental conditions. For the multiple choice test, the virtual training condition ($M = 11.938$, $SD = 4.17$) scored at the same levels as the live-action training condition ($M = 12.500$, $SD = 2.06$); $t(34) = -0.529$, $p = 0.60$. For the triage application test, the virtual training condition ($M = 6.188$, $SD = 1.22$) scored at the same levels as the live-action training condition ($M = 6.000$, $SD = 1.52$); $t(34) = 0.400$, $p = 0.44$. This indicates randomization was successful in producing statically equivalent groups based on beginning knowledge.

Knowledge change

Results of the immediate learning multiple choice tests were analyzed with a 2 (Virtual Training, Live-Action Training) by 2 (pre-test, post-test) repeated measures ANOVA. There was a significant main effect for immediate learning evidenced by $F(1, 34) = 40.63$, $p = 0.00$, with $\eta^2 = 0.544$. However, there was not a significant main effect for condition, $F(1, 34) = 0.02$, $p = 0.89$, with $\eta^2 = 0.001$, nor a significant interaction between condition and immediate learning, $F(1, 34) = 0.90$, $p = 0.35$, with $\eta^2 = 0.026$; see Table 3 for means and standard deviations. This indicates that there was no significant difference of immediate learning on the multiple choice test.

Table 1

Tests of Within-Subjects Effects (Multiple Choice Test)

	df	Mean Square	F	Sig.	Partial Eta Squared
Test	1	0.227	40.23	0.000	0.544
Test * Condition	1	0.005	0.901	0.349	0.026
Error (Test)	34	0.006			

Note. $\alpha = .05$

Table 1. Results of tests of within-subjects effects on immediate learning multiple choice test.

A 2 (Virtual Training, Live-Action Training) by 2 (pre-test, post-test) repeated measures ANOVA analysis of the participants application transfer tests results showed a significant main effect for application transfer, $F(1, 34) = 11.63$, $p = 0.00$, with $\eta^2 = 0.255$. There was not a significant main effect for condition, $F(1, 34) = 0.44$, $p = 0.51$, $\eta^2 = 0.013$, nor was there a significant interaction between condition and application transfer $F(1, 34) = 2.30$, $p = 0.14$, with $\eta^2 = 0.063$; see Table 1 for means and standard deviations.

Table 2
Tests of Within-Subjects Effects (Application Test)

	df	Mean Square	F	Sig.	Partial Eta Squared
Test	1	14.40	11.629	0.002	0.255
Test * Condition	1	2.844	2.297	0.139	0.063
Error (Test)	34	1.238			

Note. $\alpha = .05$

Table 2. Results of tests of within-subjects effects on application test.

Table 3
Means and Standard Deviations of Multiple Choice Tests

Variable	<u>Immediate Learning</u>					
	<u>Pre-Test</u>			<u>Post-Test</u>		
	n	M	SD	n	M	SD
V-CAEST	16	11.94	4.17	16	15.31	3.40
CAEST	20	12.50	2.07	20	15.00	2.49
Column totals	36	12.25	3.14	36	15.14	2.89

Variable	<u>Application Transfer</u>					
	<u>Pre-Test</u>			<u>Post-Test</u>		
	n	M	SD	n	M	SD
V-CAEST	16	6.19	1.22	16	6.69	1.14
CAEST	20	6.00	1.52	20	7.30	0.98
Column totals	36	6.08	1.38	36	7.03	1.08

Note. $N = 36$; $\alpha = .05$

Learning Gains and Condition effects discussion

Question 1 of Research Objective 3 (*How do learning outcomes achieved by the V-CAEST virtual intelligent tutoring environment compare to learning outcomes achieved by the live CAEST training program?*) was addressed with the above analysis. Participants in both conditions significantly improved from pre to post-test. No significant difference on learning gains between the two conditions was observed. We consider this result very promising. Although live-action training is considered the gold

standard in training methodologies, it is both highly expensive and logistically challenging. Additionally, live-action training can only reach a limited audience. Our virtual training environment enhanced with an ITS is highly scalable and can reach a global audience. Our results suggest that virtual training via ITS enhanced virtual worlds can be an effective and more economically viable solution for mass-casualty training.

Post-Training Survey Results

In order to assess participant attitudes towards their received training, a five item Likert-scale survey was conducted. Table 4 details the questions asked on the survey, and the possible scores for each question.

Table 4
Post-Training Attitude Survey Questions

-
1. Do you feel a sense of efficacy/adequacy/self-confidence regarding the simulation?
 2. Did you like the simulation and the questions? That is, were they thought provoking?
 3. Overall, are your thoughts generally positive regarding your participation in the simulation today?
 4. Has the training you received (lecture, training video, computer assisted instructions, role-playing) prepared you for implementing the skills taught from the simulation?
 5. Was today's drill/simulation useful for your being prepared to respond in a case of this type of emergency?
 6. Did you feel comfortable in your role in today's simulation?

Not at all 1	Somewhat 2	Moderately 3	Very Much 4	Extremely 5
-----------------	---------------	-----------------	----------------	----------------

Table 4. Questions asked on the post-training attitudes survey.

A Mann-Whitney U test was run to determine if there were any differences in each survey item between participants in the live-action training condition and the virtual training condition. Distributions for the scores of each item between conditions were not similar, as assessed by visual inspection. A significant difference between conditions was observed for each item on the survey. See Table 5 for mean ranks for each condition on each survey item. Table 5 provides test statistics for each item. See Appendix C for a set of bar charts that visualize the percentages of response types across conditions for each survey item.

Table 5
Mann-Whitney Test: Mean Rank Per Item and Condition

Condition		N	Mean Rank	Sum of Ranks
PSQ1	Virtual	16	11.31	181.00
	Live-Action	19	23.63	449.00
	Total	35		
PSQ2	Virtual	16	11.16	178.50
	Live-Action	19	23.76	451.50
	Total	35		
PSQ3	Virtual	16	10.00	160.00
	Live-Action	19	24.74	470.00
	Total	35		
PSQ4	Virtual	16	11.78	188.50
	Live-Action	19	23.24	441.50
	Total	35		
PSQ5	Virtual	16	11.69	187.00
	Live-Action	19	23.32	443.00
	Total	35		
PSQ6	Virtual	16	11.16	178.50
	Live-Action	19	23.76	451.50
	Total	35		

Table 5. Mann-Whitney Test, Mean ranks for each condition on each survey item

Table 6

Mann-Whitney U-Test Statistics for Post-Training Attitude Survey

Mann-Whitney U-Test Statistics ^a						
	PSQ1	PSQ2	PSQ3	PSQ4	PSQ5	PSQ6
Mann-Whitney U	45.000	42.500	24.000	52.500	51.000	42.500
Wilcoxon W	181.000	178.500	160.000	188.500	187.000	178.500
Z	-3.794	-3.802	-4.451	-3.490	-3.499	-3.727
Asymp. Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000

Note. a. Grouping Variable: Condition; $\alpha = .05$

Table 6. Test Statistics for Mann-Whitney U test.

For item one on the survey, “Did you feel a sense of efficacy/ adequacy/ self-confidence regarding the simulation?”, participants in the live-action training condition provided scores (mean rank = 23.63) statistically significantly higher than those in the virtual training condition (mean rank = 11.31), $U = 45.00$, $z = -3.794$, $p < 0.001$. This indicates that participants in the live-action training condition felt as though their live-action training was effective and adequate (94.73% marked “moderately” or higher). Comparatively, participants who received virtual training felt as though their training was not effective, where 56.25% of participants responded with either “somewhat” or “not at all”.

A similar trend was observed for item two (Did you like the simulation and the questions? That is, were they thought provoking?). Participants in the live-action training condition provided scores (mean rank = 23.76) statistically significantly higher than those in the virtual training condition (mean rank = 11.31), $U = 42.50$, $z = -3.802$, $p < 0.001$. This indicates that participants in the live-training condition preferred their live-action training more than participants in the virtual training condition preferred their virtual training. Similar trends were also observed for items 3, 4, and 5 ($U = 24.00$, $z = -4.451$, $p < 0.001$; $U = 52.50$, $z = -3.490$, $p < 0.001$; $U = 51.00$, $z = -3.499$, $p < 0.001$; respectively). Each of these items dealt with participants’ confidence in the training they received. Here, the general trend appears to be that participants have more confidence in live-action training than they do in virtual training.

Post-Training Survey Discussion

Research Objective 1, question 1 (*To what degree is the V-CAEST virtual intelligent tutoring considered engaging and easy to use among various segments of the target group (i.e. different job classifications, levels of technological sophistication, etc.)?*) was partially addressed in the above

analysis. Participants in the live-action training condition had much more confidence in their training than participants in the virtual training condition. This result is not surprising and is in line with the CAEST survey results of over 673 medical professionals (see below).

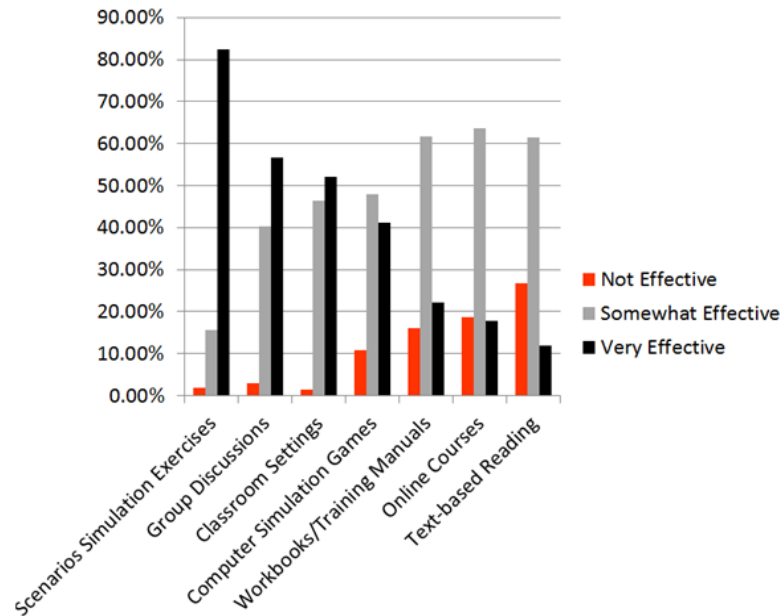


Figure 7. Results of CAEST Survey

Over 80% of respondents felt that “Scenarios: Simulation Exercises” were “very effective”. Less than 4% of respondents felt that “Scenarios: Simulation Exercises” were “not effective”, but more than 10% of respondents felt that “Computer Simulation Games” were not effective, and only 40% of respondents felt that “Computer Simulation Games” can be “very effective”. A similar trend was observed for online courses. There appears to be a low buy-in for virtual simulation-based training among many medical professionals. However, as the results of our learning gains analysis above indicates, learners’ preference in learning environment and their perceived effectiveness of the learning environment does not appear to impact their learning. That is, although learners in the live-action training condition had much more confidence in their learning environment than learners in the virtual training condition, there was no significant difference in learning gains from pre to post-test. This finding is similar to previous research, which has shown that learner’s preference and computer attitudes do not impact their learning outcomes (Steele, Palensky, Lynch, Lacy, and Duffy, 2002).

General Discussion

Lessons Learned

The V-CAEST project was met with many challenges, each of which provided valuable lessons learned. Our collaboration with non-academic groups (i.e., CliniSpace, Medical Education Research Institute of Memphis, and PARAGON) helped to equip the V-CAEST team with knowledge and experience in collaborating with medical communities outside of academia. Our collaboration with

CliniSpace has taught us the importance of a wide-ranging technical knowledge. Being able to communicate effectively with a team who has experience in developing virtual worlds, but limited to no experience in dealing with intelligent tutoring systems proved to be invaluable, and ultimately resulted in a polished, effective, and unique learning environment. Interacting with the PARAGON group provided several insights in the professional medical training community that will prove useful in future endeavors in developing medical training technologies. Specifically, the PARAGON group, while highly professional, exhibited similar attitudes towards virtual training environments as our participants in the final evaluation. This resulted in, understandably, a low buy-in and interest in improving virtual training environments. For content development, several interviews were conducted with experts from PARAGON and experts outside of the professional training community. Some conflicting information was collected from our SMEs. This conflicting information was not necessarily fact-based or systems oriented, but rather the amount of emphasis that needs to be placed on specific topics. Future content development teams would benefit from interviewing SMEs who have minimal or no roles in the final evaluation. The nature of our final evaluation pit virtual training and live-action training against each other; while this resulted in a group of highly motivated live-action training experts, it also created an unnecessarily competitive environment during the content development phase.

Another key lesson learned from the V-CAEST project was the difficulty in acquiring and juggling multiple IRB protocols across three universities. Each IRB had different standards that must be met. Specifically, the recording of participants in both conditions via video camera and screen recording software required full IRB reviews, which would have required several weeks of back and forth between the IRB and the V-CAEST team, which we often could not afford. Eventually the recording pieces of the protocols were removed. The IRB hold-ups and other time-delay issues resulted in time-constraint issues with Wright State University, and ultimately resulted in us not being able to conduct an additional evaluation. Future endeavors in comparing the efficacy of virtual training and live-action training should take into consideration the inevitable IRB-related time delays.

Finally, a critical lesson for those interested in developing technologies for medical training: there is currently a good amount of hesitation from those in the medical community towards using virtual training technologies. This last lesson echoes the difficult lessons learned from previous projects members of the V-CAEST team have encountered with implementing and testing technology in classroom environments. Teachers and instructors are hesitant to adapt new technologies in their classrooms for several reasons. First, teachers and instructors feel like the amount of time it takes to learn the new technology would not provide results that outweigh the time cost. Secondly, teachers and instructors feel as if they are in direct competition with these new technologies. Many teachers and instructors worry these technologies will end up replacing them, and are understandably resistant to expediting that process. The professional medical community also appear to be hesitant in adopting new learning technologies for similar reasons. Additionally, the knowledge and skills being taught by these new learning technologies are certainly more sensitive to error than those taught in the classroom. Inadequate training in the medical community can result in lives being lost. Future researchers should keep these attitudes in mind when interacting with the professional medical community.

KEY RESEARCH ACCOMPLISHMENTS:

- Developed training content for SALT triage, AELT/MASF, and ICS training, integrated content into existing, effective web-based intelligent tutoring system (AutoTutor Lite)
- Developed an ITS-enhanced virtual learning environment
- Conducted efficacy testing of both live-action training and virtual learning environment in randomized experiment. Participants in both conditions found to have significant learning gains from pre to post-test.
- No significant difference between conditions observed. The interaction between Test and Condition was not significant $F(1,34) = 0.901, p = 0.349, \eta p^2 = 0.026$, indicating there was no significant difference on learning between the live-action training condition and the virtual training condition.
- Participants in live-action training condition had more confidence in their training environment, appeared to have strongly preferred their training environment more than participants in virtual training condition. Attitudes towards learning environment did not appear to have impacted amount of learning.

CONCLUSION:

Live training and simulation exercises are widely considered to be the most effective training available. These training environments have several critical drawbacks: they are costly (time, travel, and facilities), only a few locations around the nation have full simulation training environments, and they require domain knowledge experts to be present during the training. Disaster situations that span multiple jurisdictions often require the use of military resources. During these situations, civilian medical personnel must interface with the military. Therefore it is important to devise an alternate training delivery method that can reach as many people as possible in a cost-effective manner. The goal of V-CAEST was to develop a cost-effective learning environment by leveraging proven learning technologies (i.e., AutoTutor Lite) to make training widely available via an internet-based virtual learning environment. V-CAEST enhanced a virtual world simulation with an intelligent tutoring system that acted as a facilitator in the interface and guided the user throughout his or her training.

We hypothesized that the V-CAEST interface would achieve learning outcomes comparable to the live, simulation-based training. A pre-test-post-test experimental design was conducted to test our hypothesis. 36 civilian medical personnel were recruited and were randomly assigned to either a virtual training condition or a live-action training condition. Results indicate that both groups significantly improved their learning from pre-test to post-test, but there is no significant difference in learning gains between the two conditions. This promising result warrants further investigation. Additionally, a common theme was observed via post-assessment survey results: civilian medical personnel largely prefer live-action training to virtual training, and those who received virtual training did not feel confident in their learning environment. Regardless, participants in both conditions significantly improved their learning from pre-test to post-test.

Future research should attempt to see which features in the virtual learning environment lend to its success. Comparative studies can help by teasing apart some central features of the learning environment (e.g., V-CAEST virtual world with no ITS vs. V-CAEST virtual world with ITS). Additionally, the V-CAEST learning environment provides a unique testing space for collaborative problem solving studies. Determining the optimal group size and composition within the virtual world would help to inform future researchers interested in developing collaborative virtual training environments.

PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS:

Impact

Throughout the span of the V-CAEST project, several V-CAEST-related publications, conference presentations, and tutorials helped to: 1) raise awareness of the need for mass-casualty training for civilian medical personnel during disaster scenarios with military resources present, 2) build connections with medical research institutes and personnel, and 3) improve the V-CAEST platform through valuable feedback from both domain experts and experts in the technical community.

An abstract was submitted and accepted at the *25th International Florida Artificial Intelligence Research Society (FLAIRS) Conference*, titled “Incorporating natural language tutoring into a virtual world for emergency response training”. This presentation was later published in the conference’s proceedings (Shubeck, Craig, Hu, Faghihi, Levy, & Koch, 2012). A book chapter with a section dedicated to describing the V-CAEST natural language processing component was accepted in the book *“Foundations of Augmented Cognition. Advancing Performance and Decision-Making through Adaptive Systems”*. The V-CAEST section helped to illustrate the need for domain specific semantic spaces, particularly within the medical training domain (Hu, Nye, Gao, Huang, Xie, & Shubeck, 2014).

During the development of the V-CAEST learning environment, several V-CAEST related conference presentations allowed us to receive critical feedback from experts within the ITS community that eventually helped us to fine-tune our learning environment. Our presentation at the *43rd Annual Meeting of the Society for Computers in Psychology (SCiP)* titled, “V-CAEST: Training facilitated by an ITS embedded in a Virtual World” received a good deal of interest and useful feedback (Shubeck, Germany-Shubeck, Craig, Dev, Hu, Koch, Heinrichs, Liao, & Cai, 2013) from the ITS community. A tutorial titled “Integrating Intelligent Tutoring Systems (ITS) in Virtual World (VW) Training/Learning” was presented at the annual Medical Meets Virtual Reality (NextMed MMVR) conference in 2014 (Dev, Shubeck, Germany-Shubeck, Hu, 2014). This conference’s community consists of leading experts in the virtual world community and those specifically interested in using virtual worlds for medical training. Finally, a tutorial was accepted and presented at the *2014 Interservice/Industry Training, Simulation and Education Conference (IITSEC)* titled, “Augmenting Virtual Worlds with Intelligent Tutors” (Dev, Hu, 2014). These two tutorials particularly helped us make connections with a professor at Johns Hopkins University, where an additional evaluation of V-CAEST is currently being conducted.

REPORTABLE OUTCOMES:

Publications/Book Chapters/Conference Proceedings:

Shubeck, K. T., Craig, S. D., Hu, X., Faghihi, U. Levy, M., & Koch, R. (2012). Incorporating natural language tutoring into a virtual world for emergency response training. In P. M. McCarthy & G. M. Youngblood (Eds.), *Proceedings of the 25th International Florida Artificial Intelligence Research Society (FLAIRS) Conference* (p. 573). Menlo Park, CA: The AAAI Press.

Hu, X., Nye, B.D., Gao, C., Huang, X., Xie, J., & Shubeck, K. T. (2014). Semantic Representation Analysis: A general framework for individualized, domain-specific and context sensitive semantic processing. In D.D., Schmorow & C.M. Fidopiastis (Eds.), *Foundations of Augmented Cognition. Advancing Performance and Decision-Making through Adaptive Systems* (pp. 35 - 46). Switzerland: Springer International Publishing.

Andrews, D. H. & Craig, S. D. (Eds.). (in press). Readings in Training and Simulation (Vol. 2): Research articles from 2000 to 2014. Santa Monica, CA: Human Factors and Ergonomics Society.

Foronda, C.L., Shubeck, K. T., Swoboda, S.M., Hudson, K.W., Budhathoki, C., Sullivan, N., Hu, X. (2015). Feasibility testing of a virtual simulation to teach concepts of disaster management. Manuscript submitted for publication.

Conference Presentations & Tutorials:43rd Annual Meeting of the Society for Computers in Psychology (SCiP)

Shubeck, K.T., Germany-Shubeck, M., Craig, S.D., Dev, P., Hu, X., Koch, R., Heinrichs, W.L., Liao, Y., Cai, Z. (2013, November). *V-CAEST: Training facilitated by an ITS embedded in a Virtual World*. Poster presented at the annual meeting of the Society for Computers in Psychology, Toronto, ON.

Annual NextMed / Medicine Meets Virtual Reality (MMVR) Conference (2014)

Dev, P., Shubeck, K.T., Germany-Shubeck, M., Hu, X., (2014, February). *Integrating Intelligent Tutoring Systems (ITS) in Virtual World (VW) Training/Learning*. Tutorial presented at the annual Medical Meets Virtual Reality (NextMed MMVR) conference, Manhattan Beach, CA.

44th Annual Meeting of the Society for Computers in Psychology (SCiP)

Hu, X., Nye, B.D., Shubeck, K.T., *Shareable Knowledge Objects as Portable Intelligent Tutoring Systems Modules: Integrating Computerized Natural Language with STEM Topics* (2014, November). Symposium presentation at the 44th annual meeting of the Society for Computers in Psychology, Long Beach, CA.

2014 Annual Meeting of the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC)

Dev, P., Hu, X., *Augmenting Virtual Worlds with Intelligent Tutors* (2014, December). Tutorial presentation at the 2014 Annual Meeting of the Interservice/Industry Training, Simulation and Education Conference, Orlando, FL.

Graduate Student Supported: Keith Shubeck, enrolled in Experiment Psychology PhD program at the University of Memphis. Pedro Gutierrez, Applied Psychology Masters of Science program at Arizona State University.

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Table of Contents (Appendices)

	<u>Page</u>
Appendix: A (Word Relation Survey)	32
Appendix: B (ASU Recruitment Flyer)	35
Appendix: C (Participant Responses Post Training Survey).....	36
Appendix: D (Patient Scenarios for Virtual World).....	39
Appendix: E (SALT SKOs).....	47
Appendix: F (ICS SKOs).....	49
Appendix: G (AELT/MASF SKOs).....	50
Appendix: H (CliniSpace Mass Casualty Author Manual).....	51
Appendix: I (CliniSpace Mass Casualty User Manual).....	71
Appendix: J (FLAIRS Poster Abstract).....	109
Appendix: K (FLAIRS Poster).....	115
Appendix: L (User Interface for Triage Patient Proposal).....	116
Appendix: M (Functional Specification Document).....	119
Appendix: N (Game Design Document Proposal).....	137
Appendix: O (Semantic Representation Analysis: HCII Paper).....	181
Appendix: P (Integrating ITS into a Virtual World: NextMed MMVR)....	193
Appendix: Q (V-CAEST SCiP Poster).....	262
Appendix: R (Selected YouTube Movies for V-CAEST).....	263
Appendix: S (Sample XML Script for selected SKO).....	264

APPENDIX: A

World Relation Survey

Instructions: Please write a score from 1 - 6 between each word. This score should reflect how closely related the two words you're comparing are. A score of 1 would indicate that the two words are not related at all, whereas a score of 6 would indicate that the two words are very closely related.

Example:

WordA 6 WordB 1 WordC 4 WordA
 Here, WordA is extremely related to WordB, WordB is not related at all to WordC, and WordC is somewhat related to WordA.

facilitative	documentation	updates	facilitative
cadre	responder	derailed	cadre
resilient	workplace	monitoring	resilient
asphyxiation	tribal	flammable	asphyxiation
coordinated	stat	intentionally	coordinated
overpressure	sunscreen	disrupting	overpressure
nonflammable	unimpeded	coordinate	nonflammable
participants	cribbing	workplaces	participants
capabilities	convene	documenting	capabilities
articulates	priorities	consortium	articulates
compliant	implementation	hazardous	compliant
reassigned	briefings	online	reassigned
paramedics	alerting	proactive	paramedics
database	dispatching	monitoring	database
demobilization	competencies	hazards	demobilization
compendium	mitigate	certification	compendium
foxholes	fujita	extinguishers	foxholes
workforce	jurisdictional	dispatch	workforce
lacerations	decontaminated	acronym	lacerations
simulations	disseminating	authentication	simulations
intentionally	manageable	sunscreen	intentionally
staffing	dispatchers	timely	staffing
exam	backhoe	scenarios	exam
infrastructure	interface	tsunami	infrastructure
commander	telecommunication	disrupting	commander
certification	imminently	visual	certification
demobilization	hazardous	flotation	demobilization
seamless	acronym	foundational	seamless
workforce	disseminates	cache	workforce
terrorist	preparedness	unsolicited	terrorist

extinguish	agreements	extinguishing	extinguish
backup	delegating	suppression	backup
workforce	workplace	professionalism	workforce
transportable	compliant	standardization	transportable
hypothermia	workplaces	emergency	hypothermia
validate	tactical	cribbing	validate
qualification	tabletop	avalanches	qualification
extinguisher	oversees	perimeter	extinguisher
entities	documentation	defibrillator	entities
injects	ensures	ensure	injects
demobilize	evaluator	backhoe	demobilize
catastrophic	workplaces	jurisdictional	catastrophic
suppression	dispatching	tactically	suppression
synchronizing	staffing	equipping	synchronizing
procurement	briefings	fortifying	procurement
impregnated	simulation	detering	impregnated
deploys	pandemic	frostbite	deploys
evacuees	supervisory	evacuation	evacuees
instructors	initiatives	incidents	instructors
usability	hypoallergenic	credentials	usability
deactivate	velcro	telecommunication	deactivate
followup	wildfire	flammable	followup
database	recordkeeping	dispatching	database
management	inundate	cadre	management
floodwaters	derailment	katrina	floodwaters
protocols	inoperable	manmade	protocols
convergence	tomography	video	convergence
compiles	inventoried	reimburse	compiles
coordinated	responder	wildfire	coordinated
reimburse	collaboration	activation	reimburse
aviators	hypothermia	terminology	aviators
extinguisher	coursework	managing	extinguisher
sterno	delegated	hazards	sterno
video	mitigation	annex	video
extinguish	strategies	manageable	extinguish
categorizing	portability	immunizations	categorizing
response	delegated	katrina	response
notification	oversees	subcomponent	notification
exam	floodplain	disrupting	exam
contaminants	post-test	multipoint	contaminants
methodologies	nonflammable	unincorporated	methodologies
preventative	potable	sponsoring	preventative
competitively	directive	transcript	competitively
extinguisher	initiatives	suppression	extinguisher

foxholes
tiered
swat
specifics
annex
documenting
bandaging
polyurethane
reimbursement
acronym
integrating
butyl
scenarios
omni
manmade
tsunamis

deployed
telecommunication
articulates
mobilization
omni
bandaging
instructor
sponsoring
contaminants
janitorial
collaborative
columbine
commander
extinguishing
scenarios
categorizing

omni
flotation
landslides
unincorporated
organizational
multipoint
institutionalizing
dispatch
acronym
impacted
visuals
functionality
collaborative
unincorporated
exiting
donning

foxholes
tiered
swat
specifics
annex
documenting
bandaging
polyurethane
reimbursement
acronym
integrating
butyl
scenarios
omni
manmade
tsunamis

APPENDIX: B



Are you a Medical Professional?

EMT, Paramedic, Firefighter, MA, Nurse, Physician

Want to Earn \$150 & CE Credit?

How?

By volunteering to participate in Virtual
Civilian Aeromedical Evacuation Sustainment
Training (VCAEST)

Saturday December 6th
ASU Polytechnic Campus
7001 E. Williams Field Road, Mesa, AZ 85212
9am to 4:30pm - Lunch will be provided

For more information & to sign up for the event visit
www.tinyurl.com/vcaest

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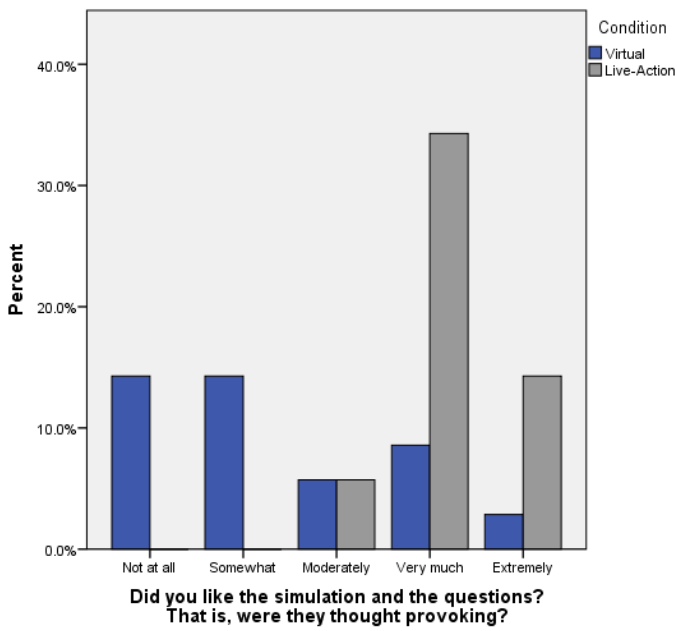
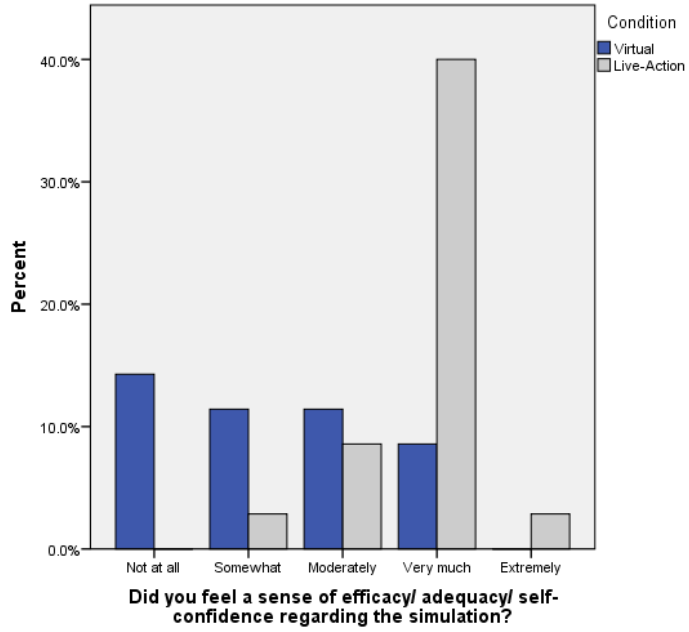
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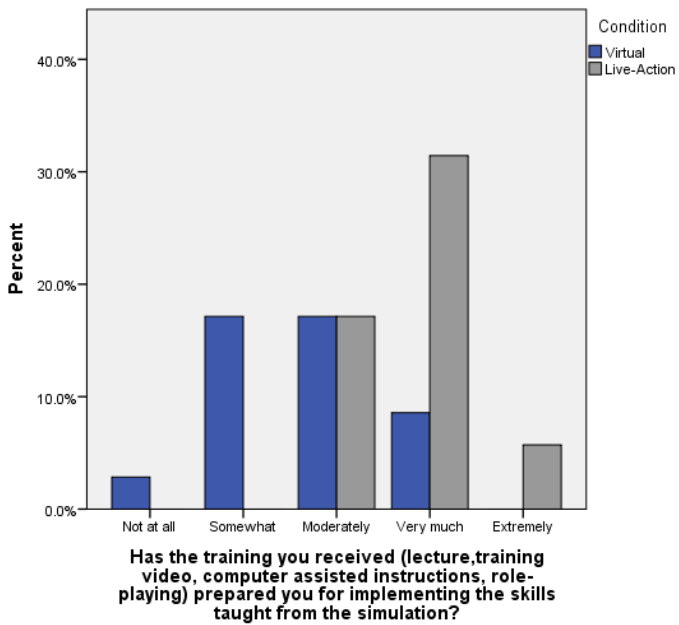
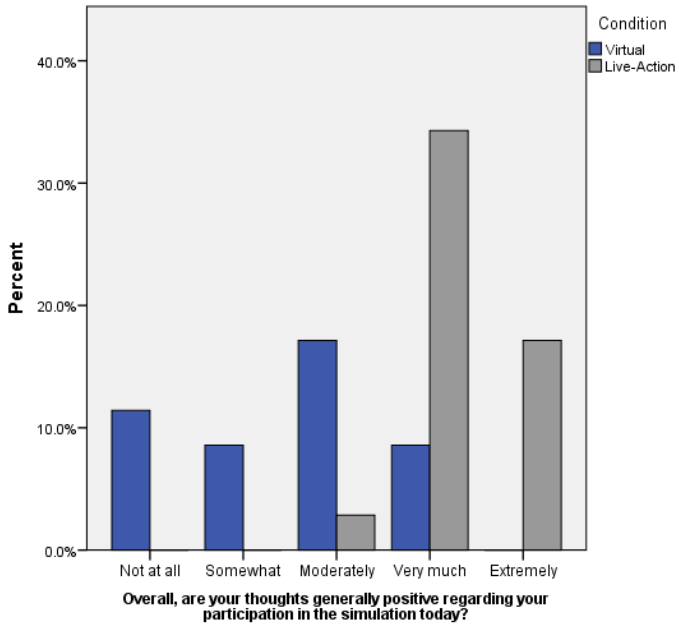
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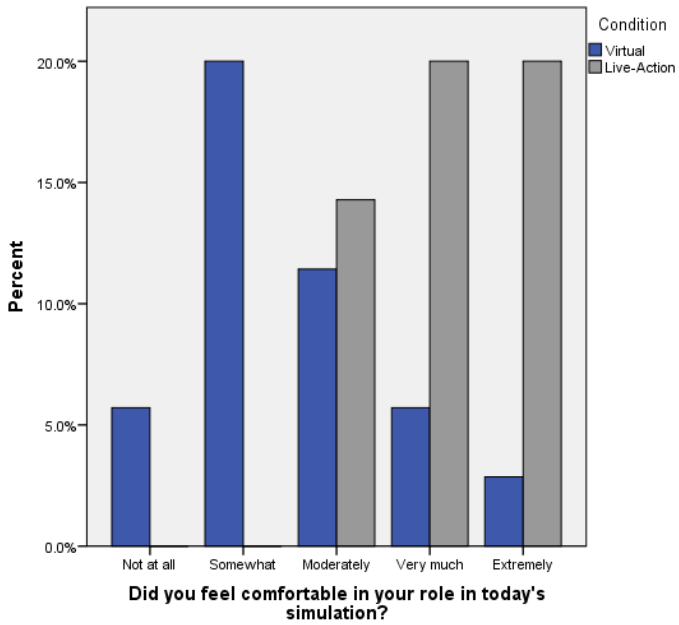
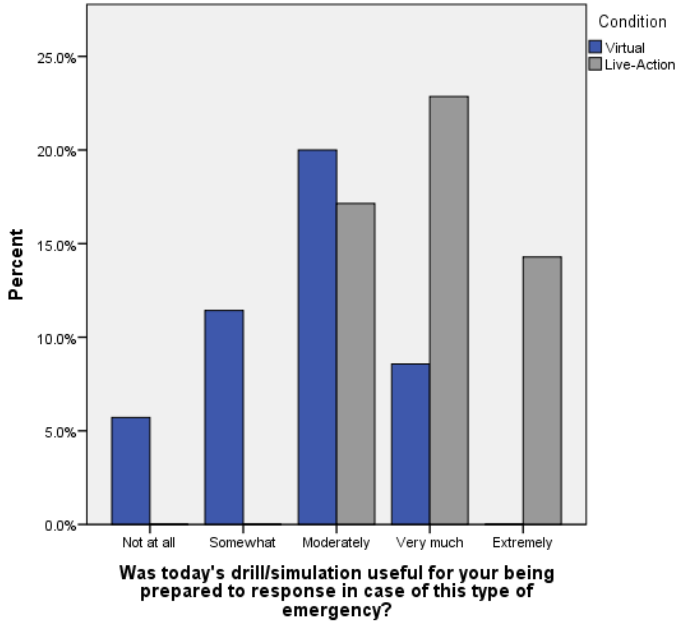
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APPENDIX: C

Participant Responses on Post-Training Survey







APPENDIX: D

Patient scenarios used in virtual world

Primary Triage	Patient 1 Case 1	Patient 1 Case 2
SALT Priority	Priority 2	1
Pulse Rate	90	120
Pulse Feature	Strong	Present
Respiration Rate	12	20
Respiration Feature	Regular	Rapid & Shallow
A&O General Description	Seems confused and distracted	Responds to verbal, looks at you when you speak
Can you hear me?	Yes	No answer
Where are you right now?	Near my work	No answer
Do you know what day it is?	Monday...I think	No answer
Can you tell me what happened?	I think...it was an earthquake	No answer
What is your name?	Marcus	No answer
Correct Triage Tag	Yellow	Red
Intervention Needed?	Oxygen	Oxygen
Blood Pressure	144/86	166/96
Patient Information	Patient is holding his head, appears to be in pain. He also seems to be confused and distracted. He appears to have been struck by falling building debris.	Patient is holding his head and appears to be disoriented and in pain. He looks at you when he speaks but provides no answers to your questions. He appears to have been struck by falling building debris.
Secondary Triage		
Pulse Rate	90	140
Pulse Feature	Strong	
Respiration Rate	12	15 with BVM assistance
Respiration feature	on 15L Oxygen via non-rebreather	
Correct Triage Tag	Yellow	Red
Blood Pressure	144/86	166/96
Contraindications to Air Transport	No contraindications for Air Transport	Possible Air Transport conflict - Craniotomy Surgery
Mental Status Change?	No change in mental status	Improving, answers questions more quickly
Priority	2	1
Scene Obs	Other	Other

Primary Triage	Patient 2 Case 1	Patient 2 Case 2
SALT Priority	1	1
Pulse Rate	0	20
Pulse Feature	Absent	
Respiration Rate	0	8
Respiration Feature	0	Agonal
A&O General Description	Does not respond to pain	Responds to pain
Can you hear me?	No response	No response
Where are you right now?	No response	No response
Do you know what day it is?	No response	No response
Can you tell me what happened?	No response	No response
What is your name?	No response	No response
Correct Triage Tag	Black	Gray
Intervention Needed?	Open Airway	Open Airway
Blood Pressure	0/0	60/0
Patient Information	Patient is not moving or responding to pain. Patient appears to have been near an explosion.	Patient responds to pain. Patient breathing appears to be agonal. Patient appears to have been near an explosion.
Secondary Triage		
Pulse Rate	0	10
Pulse Feature	Absent	pulse rate declining
Respiration Rate	0	unable to breath without support
Respiration feature	0	unable to breath without support
Correct Triage Tag	Black	Black
Blood Pressure	0/0	60/0
Contraindications to Air Transport	N/A	N/A
Mental Status change?	N/A	N/A
Priority	1	1
Scene Obs	Explosion	Explosion

Primary Triage	Patient 2 Case 1	Patient 2 Case 2
SALT Priority	1	1
Pulse Rate	0	20
Pulse Feature	Absent	
Respiration Rate	0	8
Respiration Feature	0	Agonal
A&O General Description	Does not respond to pain	Responds to pain
Can you hear me?	No response	No response
Where are you right now?	No response	No response
Do you know what day it is?	No response	No response
Can you tell me what happened?	No response	No response
What is your name?	No response	No response
Correct Triage Tag	Black	Gray
Intervention Needed?	Open Airway	Open Airway
Blood Pressure	0/0	60/0
Patient Information	Patient is not moving or responding to pain. Patient appears to have been near an explosion.	Patient responds to pain. Patient breathing appears to be agonal. Patient appears to have been near an explosion.
Secondary Triage		
Pulse Rate	0	10
Pulse Feature	Absent	pulse rate declining
Respiration Rate	0	unable to breath without support
Respiration feature	0	unable to breath without support
Correct Triage Tag	Black	Black
Blood Pressure	0/0	60/0
Contraindications to Air Transport	N/A	N/A
Mental Status change?	N/A	N/A
Priority	1	1
Scene Obs	Explosion	Explosion

Primary Triage	Patient 3 Case 1	Patient 3 Case 2
SALT Priority	2	1
Pulse Rate	180	50
Pulse Feature	Thready	irregular
Respiration Rate	18	10
Respiration Feature	Shallow	irregular
A&O General Description	Answers, yelling in pain	Answers only to name, no questions answered coherently
Can you hear me?	Yes	Yes
Where are you right now?	answers correct	incoherent answer
Do you know what day it is?	I'm not sure	incoherent answer
Can you tell me what happened?	I don't know what happened	incoherent answer
What is your name?	Mike...Mullins	Mike....Mullins
Correct Triage Tag	Red	Red
Intervention Needed?	Oxygen, Traction Splint	Oxygen
Blood Pressure	100/80	240/110
Patient Information	Patient is yelling in pain. He appears to be disoriented and very distracted by his pain. Patient may have fallen down stairs while evacuating building.	Patient appears to have sustained serious head injury, possible femur fracture. Holding his leg, mumbling. Patient may have fallen down stairs while evacuating building.
Secondary Triage		
Pulse Rate	210	0
Pulse Feature		irregular
Respiration Rate	15	0
Respiration feature	on 15L oxygen via non-rebreather	w/ BVM 100% oxygen assistance
Correct Triage Tag	Red	Black
Blood Pressure	100/80	240/110
Contraindications to Air Transport	needs external fixation device secured, needs cast placed after transport	
Mental Status change?	Loses consciousness	Loses consciousness
Priority	2	1
Scene Obs	Other	Other

Primary Triage	Patient 4 Case 1	Patient 4 Case 2
SALT Priority	1	1
Pulse Rate	0	30
Pulse Feature	Absent	
Respiration Rate	0	6
Respiration Feature	Absent	agonal
A&O General Description	Does not respond to pain	Responds to pain
Can you hear me?	no response	no response
Where are you right now?	no response	no response
Do you know what day it is?	no response	no response
Can you tell me what happened?	no response	no response
What is your name?	no response	no response
Correct Triage Tag	Black	Gray
Intervention Needed?	open airway	open airway
Blood Pressure	0/0	60/0
Patient Information	Patient is unconscious and does not respond to pain. Appears patient was near an explosion	Patient is unconscious, responds to pain. Appears patient was near an explosion
Secondary Triage		
Pulse Rate	0	0
Pulse Feature	Absent	
Respiration Rate	0	0
Respiration feature	Absent	
Correct Triage Tag	Black	Black
Contraindications to Air Transport	N/A	N/A
Blood Pressure	0/0	60/0
Mental Status change?	N/A	N/A
Priority	1	1
Scene Obs	Explosion	Explosion

Primary Triage	Patient 5 Case 1	Patient 5 Case 2
SALT Priority	3	2
Pulse Rate	100	190
Pulse Feature	Present	Thready
Respiration Rate	14	20
Respiration Feature	Normal	
A&O General Description	Answers everything correctly	Answers, but confused
Can you hear me?	Yes	Yes
Where are you right now?	Near my office	I'm...not really sure
Do you know what day it is?	Monday	Monday
Can you tell me what happened?	I think there must have been an earthquake	I'm not sure
What is your name?	David Su	David Su
Correct Triage Tag	Green	Red
Intervention Needed?	None	Oxygen, shoulder aligned
Blood Pressure	140/90	156/98
Patient Information	Patient is clutching his shoulder and appears to be in pain. Patient responds appropriately to all mental status questions. Patient appears to have fallen on shoulder while running.	Patient is clutching shoulder. Pulse is not present in affected arm. Patient appears to have fallen on shoulder while running.
Secondary Triage		
Pulse Rate	120	120
Pulse Feature		
Respiration Rate	18	15
Respiration feature	put on oxygen via non-rebreather	15L oxygen via non-rebreather
Correct Triage Tag	Yellow	Yellow
Contraindications to Air Transport	None	No contraindications after surgery
Blood Pressure	140/90	156/98
Mental Status change?	Remains stable	Mental Status improves
Priority	3	2
Scene Obs	Other	Other

Primary Triage	Patient 6 Case 1	Patient 6 Case 2
SALT Priority	2	2
Pulse Rate	100	100
Pulse Feature	LT foot pulse present	LT foot pulse absent
Respiration Rate	16	16
Respiration Feature	Shallow	shallow
A&O General Description	answers, moaning in pain	answers, moaning in pain
Can you hear me?	Yes	Yes
Where are you right now?	Near a grocery store	Near a grocery store
Do you know what day it is?	Monday	Monday
Can you tell me what happened?	There was an earthquake, a piece of debris hit me	There was an earthquake, a piece of debris hit me
What is your name?	Roger Weaver	Roger Weaver
Correct Triage Tag	Yellow	Red
Intervention Needed?	Oxygen	Oxygen, hip alignment
Blood Pressure	140/96	150/100
Patient Information	Possible left hip fracture. Pulse is present in left foot. Patient answers questions but is in significant pain. Appears to have been struck by large building debris.	Possible left hip fracture. Pulse is present in left foot. Patient answers questions but is in significant pain. Appears to have been struck by large building debris.
Secondary Triage		
Pulse Rate	120	120
Pulse Feature		no pulse in LT foot
Respiration Rate	14	18
Respiration feature	on 15L oxygen via non-rebreather	on 15L oxygen via non-rebreather
Correct Triage Tag	Yellow	Red
Contraindications to Air Transport	None. Hip external fixation device secured for transport	Air transport concern due to blood loss in surgery; amputation of lower LT leg
Blood Pressure	140/96	150/100
Mental Status change?	No mental status change	Mental Status deteriorates
Priority	2	2
Scene Obs	Other	Other

APPENDIX: E

SALT: Shareable Knowledge Objects (SKOs) used in Virtual World (AutoTutor Lite Modules)

SKO Title	Assessment Type	Agents Used	URL to View SKO
SKO #1 SALT INTRO	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=d7d7cb89-34e1-4e35-b2a9-6bddb08e2e7f&xAPI=1&RL=0&pv=1
SKO #2 SORT	Multiple choice	3	http://sko.skoonline.org/player.html?guid=f2c52ea7-8fcd-4444-9926-c17e7b6ef8ca&xAPI=1&RL=0&pv=1
SKO #3--Assessment and Life Saving Interventions	Information Delivery	3	http://sko.skoonline.org/player.html?guid=313d61ec-71cf-4634-a9f9-6e61ecc787d4&xAPI=1&RL=0&pv=1
SKO #4--Executing Tags for Treatment and/or Transport	Tutoring	3	http://sko.skoonline.org/player.html?guid=2fb4ee92-4ca4-4dca-abc6-9ddd11ca3901&xAPI=1&RL=0&pv=1
<i>CONDITIONAL REVIEW MODULES</i>			
Patient 1.1 (Explanation of Yellow)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=ac628d26-680c-44d2-b0f4-d19c5670d27e&xAPI=1&RL=0&pv=1
Patient 1.2 (Explanation of Yellow)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=5a562abc-0c21-465f-a7fedd5627399076&xAPI=1&RL=0&pv=1
Patient 2.1 (Explanation of Black)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=d5512762-b39f-42f3-a8da-4344eb9f7a46&xAPI=1&RL=0&pv=1
Patient 2.2 (Explanation of Gray)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=8884fa1c-dd9f-4726-a444-27e6870508dc&xAPI=1&RL=0&pv=1
Patient 3.1 (Explanation of Red)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=b1e3984b-ff7b-444a-b139-eec812c9d94e&xAPI=1&RL=0&pv=1
Patient 3.2 (Explanation of Red)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=1452480a-a156-4d65-b9c5-8cbb7ea28459&xAPI=1&RL=0&pv=1
Patient 4.1 (Explanation of Black versus Gray)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=def23406-7bec-43e5-ad93-1fd540cec058&xAPI=1&RL=0&pv=1
Patient 4.2 (Explanation of Black versus Gray)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=fc62cad4-a793-49fa-aa03-c4c0d6e1da33&xAPI=1&RL=0&pv=1

Patient 5.1 (Explanation of Green)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=5bf3f222-e729-45f9-bbf4-589f9af0133d&xAPI=1&RL=0&pv=1
Patient 5.2 (Explanation of Red)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=cead4a70-d780-4c92-83fa-070b7520a9d5&xAPI=1&RL=0&pv=1
Patient 6.1 (Explanation of Yellow)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=003a13a2-6f31-4a88-ad76-19e1dcc8f3bf&xAPI=1&RL=0&pv=1
Patient 6.2 (Explanation of Yellow vs. Red)	Self-Reflection	2	http://sko.skoonline.org/player.html?guid=540da8d2-4dd9-4e02-b9f8-291c040f153e&xAPI=1&RL=0&pv=1
Incorrect Priority Selection (SORT Review)	Information Delivery	2	http://sko.skoonline.org/player.html?guid=e2a0ee4d-2eae-4a66-9640-188c88e73c9d&xAPI=1&RL=0&pv=1

APPENDIX: F

ICS: Shareable Knowledge Objects (SKOs) used in Virtual World (AutoTutor Lite Modules)

SKO Title	Assessment Type	Agents Used	URL to View SKO
ICS #1 ICS INTRO: NRF, STAFFORD ACT	Information Delivery	3	http://sko.skoonline.org/player.html?guid=2b27a904-8d67-428f-b875-994013fa91f7&xAPI=1&RL=0&pv=1
ICS #1 ICS INTRO: NRF, STAFFORD ACT Part 2	Tutoring	3	http://sko.skoonline.org/player.html?guid=8e69f0bc-91df-4ca1-805e-acc11d3f0046&xAPI=1&RL=0&pv=1
ICS #2 ICS OVERVIEW	Information Delivery	3	http://sko.skoonline.org/player.html?guid=5215a912-b342-44c7-82d7-950012aa0666&xAPI=1&RL=0&pv=1
ICS #3 Incident Commander Overview	Information Delivery	3	http://sko.skoonline.org/player.html?GAE=skodev2012&guid=2bfbc29a-536f-408c-99c2-89abb3438de4&xAPI=1&RL=0&pv=1
ICS #4 Command Staff and General Staff Overview-1	Information Delivery	3	http://sko.skoonline.org/player.html?guid=26f9bf0d-3e11-430b-91b3-ce0e8a3bf5e7&xAPI=1&RL=0&pv=1
ICS #4 Command Staff and General Staff Overview-2	Information Delivery	3	http://sko.skoonline.org/player.html?GAE=skodev2012&guid=d8ebe9d0-d819-4ca5-b5aa-73212fb75e46&xAPI=1&RL=0&pv=1
ICS #5 Common ICS Misconceptions	Information Delivery	3	http://sko.skoonline.org/player.html?guid=874dd644-d855-47cc-8556-a9051db2d939&GAE=skodev2012&xAPI=1&RL=0&pv=1

APPENDIX: G

AELT/MASF: SKOs used in Virtual World (AutoTutor Lite Modules)

SKO Title	Assessment Type	Agents Used	URL to View SKO
AELT/MASF #1: AELT / MASF / Patient Readiness for Air Transport Introduction	Self- Reflection	3	http://sko.skoonline.org/player.html?guid=7e264e73-cc43-47be-825a-4684e45f71fb&xAPI=1&RL=0&pv=1
AELT/MASF #1: AELT / MASF / Patient Readiness for Air Transport [TUTORING]	Tutoring (Essay)	1	http://sko.skoonline.org/player.html?guid=6edd4c48-1659-43b0-a8d5-809f7d39915d&xAPI=1&RL=0&pv=1
AELT/MASF #2: MASF	Self- Reflection	3	http://sko.skoonline.org/player.html?guid=f9810517-d975-4552-ae7a-10808ec8dc1d&xAPI=1&RL=0&pv=1
AELT/MASF #3: AELT	Self- Reflection	3	http://sko.skoonline.org/player.html?guid=18e38ca4-f95c-4384-b22a-f50c79f39752&xAPI=1&RL=0&pv=1
AELT/MASF #4: Cabin Conditions Part 1 (Conditions 1 - 3)	Information Delivery	3	http://sko.skoonline.org/player.html?guid=d817c789-e179-46ce-9294-67fa9ea72127&xAPI=1&RL=0&pv=1
AELT/MASF #4: Cabin Conditions Part 2 (4 - 7)	Information Delivery	3	http://sko.skoonline.org/player.html?guid=df5f1d74-feaa-4fd0-8002-61313e74fa02&xAPI=1&RL=0&pv=1
AELT/MASF #4: Cabin Conditions Part 3 (8 - 10)	Information Delivery	3	http://sko.skoonline.org/player.html?guid=b452566f-39c2-4b68-82d2-68855168a570&xAPI=1&RL=0&pv=1
AELT Conversation with Hospital #1	Information Delivery	3	http://sko.skoonline.org/player.html?guid=6e02146d-63df-4789-a9d9-7f48bea2273f&xAPI=1&RL=0&pv=1
AELT Conversation with Hospital #2	Information Delivery	3	http://sko.skoonline.org/player.html?guid=191daffe-b542-4c6b-b701-f971d1763a93&xAPI=1&RL=0&pv=1
AELT/MASF Relative Contraindication to Air Transport via Fixed- Wing	Information Delivery	3	http://sko.skoonline.org/player.html?guid=175e3728-035b-40cd-a796-13486cb1c5ba&xAPI=1&RL=0&pv=1
OUTRO VIDEO - SUMMARIZATION - VIDEO	Information Delivery	3	http://sko.skoonline.org/player.html?RL=1&guid=7b9267d4-15e4-4438-ac89-adf02848675f&xAPI=1&RL=0&pv=1



CLINISPACE MASS CASUALTY

AUTHOR MANUAL

Contents

Contents.....	2
1. Overview	3
2. Unlocking 'Author Mode'	4
3. Accessing Patient Authoring	4
4. Patient Authoring - Tabs	4
1. Patient Introduction.....	5
a. Patient name.....	5
b. Patient Info.....	5
2. Setup Case Cycle	5
a. Add/Delete case cycles	6
b. Save case cycles	6
c. Active case cycle	6
3. Author Shareable Knowledge Object (SKO).....	6
a. Hotspot ID	6
b. SKO URL.....	6
c. Preview SKO	6
d. Edit SKO.....	7
e. Trigger	7
f. SAVE	7
4. Primary Triage Tab	7
a. Hotspot ID	8
b. Protocol Order	8
c. Selection/Value/Quality.....	9
d. Author SKO.....	9
5. Secondary Triage Tab.....	10
5. Patient Authoring - Features.....	11
1. Copy Primary Triage Cases to Secondary Triage Cases.....	11
2. Copy Secondary Triage Cases to Primary Triage Cases.....	12
3. Copy Case Data	14
4. Copy Case SKO	16
6. SAVE Authored Data and return to Game Mode:.....	19

1. Overview

CliniSpace™ Mass Casualty-Disaster Management training system is a full 3D, browser-based environment. CS Mass Casualty module trains medical personnel on the live action triage (SALT) Protocol and Civilian Aeromedical Evacuation Sustainment Training (CAEST). The module helps practice streamlined communication protocols between civilians, medical personnel and the military.

The author mode in CliniSpace Mass Casualty – Disaster Management environment enables the trainer to setup/customize patient information to generate multiple cases and hence scenarios, expanding the scope of learner assessment in the SALT protocol.

2. Unlocking 'Author Mode'

In order to unlock the author mode during game play,


1. Log into the CliniSpace™ Mass Casualty-Disaster Management environment with your Google ID.
2. On the bottom right of the screen click on 'Unlock'. Enter the code and click on Proceed. An information message will appear informing user that the authoring feature is unlocked.



3. You will now access the environment as an author. All the hotspots on the patient will be inactive except Patient Introduction, which opens the authoring module.

3. Accessing Patient Authoring



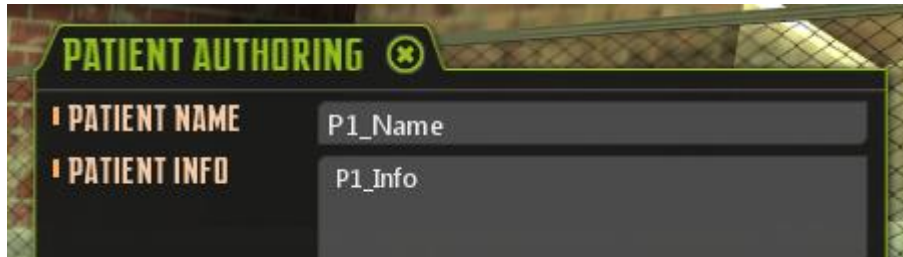
1. After unlocking the Author feature, click on the green ball  for 'Patient Introduction' on the patient's head. This will open the Patient Authoring menu.

4. Patient Authoring - Tabs

This section describes the tabs and menu items of the Patient Authoring.

1. Patient Introduction

The top most section of the Authoring contains information that is displayed when the user clicks on the patient introduction hotspot on the patient. This section includes two options:



- Patient name is a non-editable field. Each patient has a unique name assigned to them which is displayed in this section.
- Patient Info is an editable text field. Any information relating to patient information can be entered in this text box. To enter information, click on the text box.

2. Setup Case Cycle

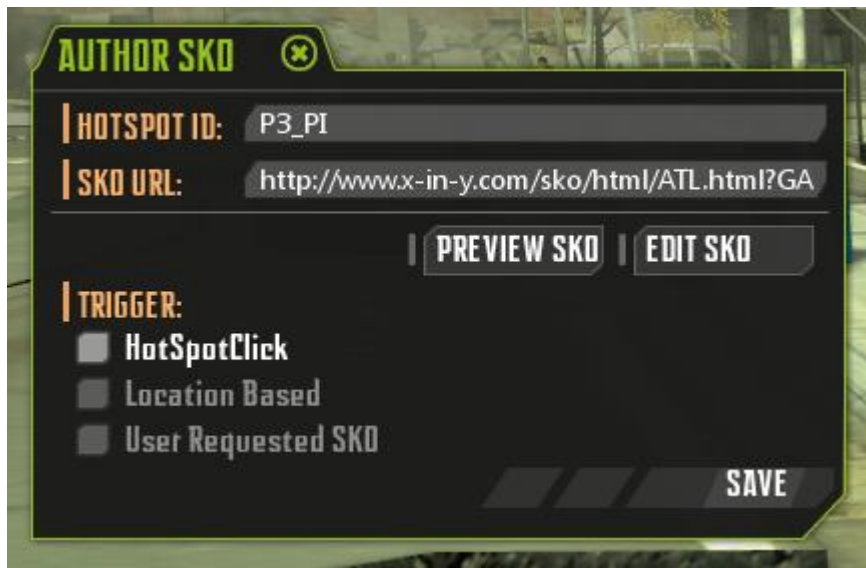
The Setup Case Cycle option contains a list of the various combinations of cases that form the active cycle of a patient. One case from primary and one from secondary creates one complete patient cycle.



- a. Add/Delete case cycles: The author can select and save various combinations of primary and secondary cases. In order to do this,
 - i. Select from the 3 available primary and secondary cases in the drop down menu
 - ii. Click on 'Add'. Your selected combination will be visible in the list.
 - iii. If you wish to remove any combination from the list click on the cross button on the right side of the combination.
 - b. Save case cycles:
 - i. Once you have added all the combinations, click on 'Save'. This will save your list. When the patient is put in primary triage, system will randomly select a cycle from the configured cycles and assign the values associated with the case to the patient in the respective triage state.
 - c. Active case cycle:
 - i. At any time during game play if you wish to check the active case cycle, unlock author mode > Open Patient Authoring > Open Setup Case Cycle > in the list, the combination highlighted in green will be the active case cycle for the particular patient.
3. Author Shareable Knowledge Object (SKO)
- The Author Shareable Knowledge Object (SKO) button on Patient Authoring opens the authoring window for SKO relating to the Patient Introduction.



- a. Hotspot ID is a pre-assigned ID for the particular hotspot that the SKO is being authored for. This is an un-editable field.
- b. SKO URL for the concerned SKO is to be entered in this area.
- c. Preview SKO: SKOs can be previewed using this button. Clicking this button opens the SKO in a separate frame.



- d. Edit SKO: SKOs can be edited using this button. Clicking this button opens the SKO in a separate frame.
- e. Trigger: The trigger for launching a SKO during game play can be determined by checking the options under this section. SKOs are triggered by default when a user enters incorrect values or performs an incorrect action. SKOs can also be made to trigger when a user clicks on a hotspot by checking the 'Hotspot Click' option. Location Based trigger and User Requested SKO trigger are disabled in the current system.
- f. SAVE: Click on 'Save' to save all the SKO related information.

4. Primary Triage Tab

Primary Triage tab contains authorable case data displayed during game play when the patient is in primary triage area. Three cases can be authored in the primary triage tab, these are represented by the 3 'Case' tabs – Case1, Case2 and Case3. All three case tabs are identical in their options and menu items. Nine active tabs (that correspond to 9 different hotspots/actions on the patient) are available under each Case under the Primary Triage tab. These are:

- a. Priority
- b. Scene Obs.
- c. Radial Pulse
- d. Capillary Refill
- e. Respiration
- f. Mental Status
- g. BP
- h. Correct Triage

i. Life Saving Int.



Each active tab has 3 or 4 sections, as described below:

a. Hotspot ID

This is an uneditable and pre-populated field. A unique hotspot ID is assigned to each hotspot. This menu item is available on each active tab. Information in this section is not displayed to the user at any point during game play.

b. Protocol Order

Protocol Order is a drop down menu. The correct protocol order for a particular action can be assigned using this menu. Score for 'Protocol Order' is awarded to the user only if the user performs all the actions in the same order as set by the author. Protocol order can only be set for Priority, Radial Pulse, Capillary Refill, Respiration, Mental Status, BP and Life Saving Interventions (LSI).

c. Selection/Value/Quality

- i. Tabs – Priority, Scene Obs, Mental Status and Correct Triage tabs have multiple options available from which only one option can be selected as the correct response. To mark the correct selection, click on the radio button next to the option.
- ii. Tabs – Radial Pulse, Capillary Refill, Respiration and BP have two text boxes available for entering the Value (numeric entry only) and Quality (Text & numeric value). Click on the text box to enter information in the corresponding text boxes. This data is displayed to the user when he performs the specific action during game play.
- iii. The LSI tab has three options available, of which multiple options can be checked as the correct actions for the user. To check an option, click on the checkbox next to it. User will be awarded score for correct LSI only if he performs all the interventions selected by the author.

d. Author SKO

All the tabs have the 'Author SKO' button. This button is used to enter, preview or edit individual SKOs. Author SKO has been described in more details [here](#).

5. Secondary Triage Tab

The Secondary Triage Tab is similar to the Primary Triage tab described [here](#). Three cases can be authored in Secondary Triage via tabs Case1, Case2 and Case3.

The screenshot shows the 'PATIENT AUTHORIZING' interface. At the top, there are fields for 'PATIENT NAME' (P1_Name) and 'PATIENT INFO' (P1_Info). Below these are buttons for 'SETUP CASE CYCLE' and 'AUTHOR SKD'. The interface is split into two main sections: 'PRIMARY TRIAGE' and 'SECONDARY TRIAGE'. The 'SECONDARY TRIAGE' section is active and contains a 'COPY' button. Below this are three tabs: 'CASE 1', 'CASE 2', and 'CASE 3'. A 'Copy Case 1' button is followed by a 'Data' dropdown menu, a 'To' label, a 'Case 2' dropdown menu, and another 'COPY' button. The 'TRANSPORT' tab is selected, showing a 'HOTSPOT ID' field with the value 'P1_S1_CO_TRANSPRT'. Below this are four radio button options: 'To Hospital Via Ambulance' (selected), 'To Hospital Via Helicopter', 'To Hospital Via Fixed Wing Aircraft', and 'No Transport Required'. At the bottom right, there are 'AUTHOR SKD' and 'SAVE' buttons.

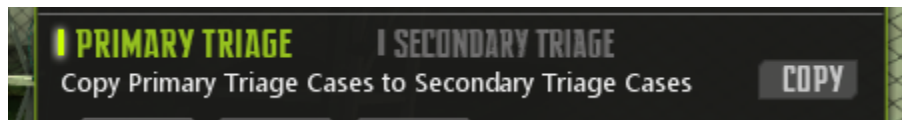
- Actions like Priority selection and Scene Observation that were available in primary triage are restricted in Secondary Triage. Corresponding tabs for these actions are inactive in the Secondary Triage tab.
- An extra action, 'Transport', is available in secondary triage, information for which can be authored from the 'Transport' tab. The transport tab currently has only one active selection 'To Hospital Via Ambulance'.
- All the other tabs are as described [here](#).

5. Patient Authoring - Features

This section describes the features and capability of the patient authoring.

1. Copy Primary Triage Cases to Secondary Triage Cases

All the information (data + SKO) updated in the Primary Triage tab of Case 1, Case2 and Case 3 can be copied to respective cases in the Secondary Triage tab. To copy primary triage cases to secondary triage cases, select the 'Primary Triage' tab and then click on the 'Copy' button next to 'Copy Primary Triage Cases to Secondary Triage Cases'.



Please note that

- a. Priority, Scene Obs and Transport tab information does not copy between Primary and Secondary tabs.
- b. 'Protocol Order' information for any of the active tabs does not copy between Primary and Secondary tabs.
- c. 'Hotspot ID' information does not copy between Primary and Secondary tabs.

The table below highlights information that is copied when copying Primary Triage Cases to Secondary Triage Cases.

Triage Tab Selection:	Primary		
Case tab Selection:	ANY (Case1 OR Case2 OR Case3)		
Click on:	'Copy' Primary Triage Cases to Secondary Triage Cases		
Information copies From/To:	Primary Triage Case1 TO Secondary Triage Case1	Primary Triage Case2 TO Secondary Triage Case2	Primary Triage Case3 TO Secondary Triage Case3

TAB	INFORMATION	COPIES
Priority	Hotspot ID	x
	Protocol Order	x
	Selection	x
	SKO	x
Scene Obs.	Hotspot ID	x
	Selection	x
	SKO	x
Radial Pulse	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√
Capillary Refill	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√
Respiration	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√

TAB	INFORMATION	COPIES
Mental Status	Hotspot ID	x
	Protocol Order	x
	Selection+Q&A	√
	SKO	√
BP	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√
Correct Triage	Hotspot ID	x
	Selection	√
	SKO	√
Life Saving Int.	Hotspot ID	x
	Selections	√
	SKO	√
Transport	x	x

2. Copy Secondary Triage Cases to Primary Triage Cases

All the information (data + SKO) updated in the Secondary Triage tab of Case 1, Case2 and Case 3 can be copied to respective cases in the Primary Triage tab. To copy secondary triage cases to primary triage cases, select the 'Secondary Triage' tab and then click on the 'Copy' button.



Please note that

- d. Priority, Scene Obs and Transport tab information does not copy between Primary and Secondary tabs.
- e. 'Protocol Order' information for any of the active tabs does not copy between Primary and Secondary tabs.
- f. 'Hotspot ID' information does not copy between Primary and Secondary tabs.

The table below highlights information that is copied when copying Secondary Triage Cases to Primary Triage Cases.

Triage Tab Selection:	Secondary		
Case tab Selection:	ANY (Case1 OR Case2 OR Case3)		
Click on:	Copy' Secondary Triage Cases to Primary Triage Cases		
Information copies from/to:	Secondary Triage Case1 TO Primary Triage Case1	Secondary Triage Case2 TO Primary Triage Case2	Secondary Triage Case3 TO Primary Triage Case3

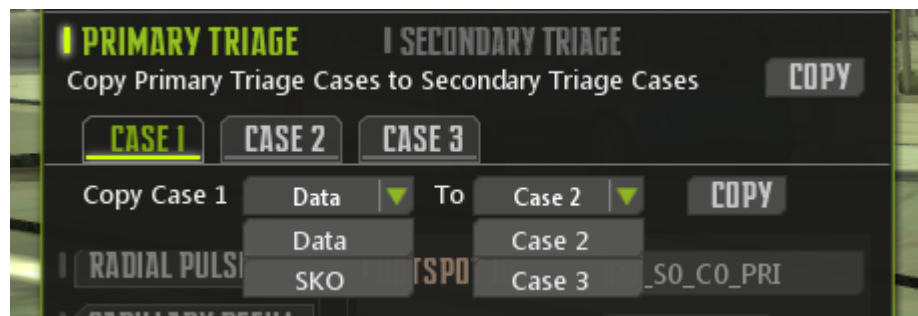
TAB	INFORMATION	COPIES
Priority	x	x
Scene Obs.	x	x
Radial Pulse	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√
Capillary Refill	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
Respiration	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
	SKO	√
Mental Status	Hotspot ID	x
	Protocol Order	x
	Selection+Q&A	√
	SKO	√

TAB	INFORMATION	COPIES
BP	Hotspot ID	x
	Protocol Order	x
	Value+Quality	√
Correct Triage	SKO	√
	Hotspot ID	x
	Selection	√
Life Saving Int.	SKO	√
	Hotspot ID	x
	Selections	√
Transport	SKO	√
	Hotspot ID	x
	Selection	x
	SKO	x

3. Copy Case Data

All the data updated in a Case can be copied to any other Case in the same tab i.e. from Case 1 of primary triage tab to Case 2 or Case 3 of primary triage tab and vice versa. Similarly, from Case 1 of Secondary Triage tab to Case 2 or Case 3 of Secondary Triage tab and so on.

To copy Case Data, under the Case tab (where data needs to be copied from), select 'Data' from the first drop down menu and the Case number (of where the data needs to be copied to) from the second drop down menu and click on 'Copy'.



Please note that

- Copy Data function is the same for both Primary and Secondary Triage tabs.
- When you select 'Data' from the drop down menu, only the data in the tab will get copied to the selected Case tab, no SKO information will be copied.
- Protocol order gets copied between cases.
- No Hotspot ID information gets copied between cases

The table below highlights information that is copied when copying 'Data' between Cases under Primary/Secondary Triage tab.

Triage Tab Selection:	Primary Triage
Case tab Selection:	Case 1
Click on:	Copy' Case1 'Data' to 'Case2'
Information copies from/to:	Primary Triage Case 1 tab to Primary Triage Case 2

TAB	INFORMATION	COPIES
Priority	Hotspot ID	x
	Protocol Order	√
	Selection	√
	SKO	x
Scene Obs.	Hotspot ID	x
	Selection	√
	SKO	x
Radial Pulse	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Capillary Refill	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Respiration	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x

TAB	INFORMATION	COPIES
Mental Status	Hotspot ID	x
	Protocol Order	√
	Selection+Q&A	√
	SKO	x
BP	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Correct Triage	Hotspot ID	x
	Selection	√
	SKO	x
Life Saving Int.	Hotspot ID	x
	Selections	√
	SKO	x
Transport	x	x

Triage Tab Selection:	Secondary Triage
Case tab Selection:	Case 1
Click on:	Copy' Case1Data to 'Case2'
Information copies from/to:	Secondary Triage Case 1 tab to Secondary Triage Case 2

TAB	INFORMATION	COPIES
Priority	x	x
Scene Obs.	x	x
Radial Pulse	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Capillary Refill	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Respiration	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Mental Status	Hotspot ID	x
	Protocol Order	√
	Selection+Q&A	√
	SKO	x

TAB	INFORMATION	COPIES
BP	Hotspot ID	x
	Protocol Order	√
	Value+Quality	√
	SKO	x
Correct Triage	Hotspot ID	x
	Selection	√
	SKO	x
Life Saving Int.	Hotspot ID	x
	Selections	√
	SKO	x
Transport	Hotspot ID	x
	Selection	√
	SKO	x

4. Copy Case SKO

All the SKO information updated in a Case can be copied to any other Case in the same tab i.e. from Case 1 of primary triage tab to Case 2 or Case 3 of primary triage tab and vice versa. Similarly, from Case 1 of Secondary Triage tab to Case 2 or Case 3 of Secondary Triage tab and so on.

To copy Case SKO information, under the Case tab (where data needs to be copied from), select 'SKO' from the first drop down menu and the Case number (of where the data needs to be copied to) from the second drop down menu and click on 'Copy'.

Please note that

- a. Copy SKO function is the same for both Primary and Secondary Triage tabs.
- b. When you select 'SKO' from the drop down menu, only the SKO information in the tab will get copied to the selected Case tab, no Data will be copied.
- c. Protocol order gets copied between cases.
- d. No Hotspot ID information gets copied between cases

The table below highlights information that is copied when copying 'SKO' information between Cases under Primary/Secondary Triage tab.

Triage Tab Selection:	Primary Triage
Case tab Selection:	Case 1
Click on:	Copy' Case1 'SKO' to 'Case2'
Information copies from/to:	Primary Triage Case 1 tab to Primary Triage Case 2

TAB	INFORMATION	COPIES
Priority	Hotspot ID	x
	Protocol Order	x
	Selection	x
	SKO	√
Scene Obs.	Hotspot ID	x
	Selection	x
	SKO	√
Radial Pulse	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Capillary Refill	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Respiration	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√

TAB	INFORMATION	COPIES
Mental Status	Hotspot ID	x
	Protocol Order	x
	Selection+Q&A	x
	SKO	√
BP	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Correct Triage	Hotspot ID	x
	Selection	x
	SKO	√
Life Saving Int.	Hotspot ID	x
	Selections	x
	SKO	√
Transport	x	x

Triage Tab Selection:	Secondary Triage
Case tab Selection:	Case 1
Click on:	Copy' Case1 'SKO' to 'Case2'
Information copies from/to:	Secondary Triage Case 1 tab to Secondary Triage Case 2

TAB	INFORMATION	COPIES
Priority	x	x
Scene Obs.	x	x
Radial Pulse	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Capillary Refill	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Respiration	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Mental Status	Hotspot ID	x
	Protocol Order	x
	Selection+Q&A	x
	SKO	√

TAB	INFORMATION	COPIES
BP	Hotspot ID	x
	Protocol Order	x
	Value+Quality	x
	SKO	√
Correct Triage	Hotspot ID	x
	Selection	x
	SKO	√
Life Saving Int.	Hotspot ID	x
	Selections	x
	SKO	√
Transport	Hotspot ID	x
	Selection	x
	SKO	√

6. SAVE Authored Data and return to Game Mode:

1. Once all the authored information is finalised, click on 'Save' at the bottom of the Patient Authoring.
2. Click on 'Lock' to return to Game Mode. An information message will be displayed informing the user that the authoring feature is locked.





CLINISPACE MASS CASUALTY

USER MANUAL

Contents

Overview: Scenario & Objectives.....	5
Learning Objectives.....	5
Launching CliniSpace Mass Casualty.....	6
▪ Logging In:.....	6
▪ Character Selection:.....	8
User Interface	8
▪ Score Card:.....	9
1. Attempt No:.....	9
2. Protocol Order:.....	9
3. LSI:	9
4. Priority:.....	9
▪ World Clock:.....	10

▪ Action Ticker:	10
▪ Action Log:	10
▪ Settings & Help:	11
1. Logout:.....	11
2. Help:	12
3. Settings:.....	12
4. User Name:.....	12
▪ Unlock Authoring:	13
▪ Communication Panel:.....	13
1. Text Chat:	13
2. Contacts:.....	14
3. Voice Chat:	15
4. Microphone:.....	15
Primary Triage: Interactive Objects	16
▪ Incident Commander:	16
▪ Hotspots:.....	16
▪ Auto Tutor LITE (ATL):	17
Primary Triage: Patients.....	17
▪ Focus On Patient:	18
▪ Assign Priority:	19
▪ Interactive Hotspots:	19
1. Patient Introduction:.....	19
2. Mental Status:	20
3. Radial Pulse:	22
4. Capillary Refill:.....	22
Primary Triage: Triage Tag	23
1. Scene Observations:.....	24
2. Treatment:.....	24
3. Vital Signs:	25
4. Triage Tags:.....	26
Primary Triage: EMS Bag.....	27
1. Stethoscope:.....	28

2. BP Cuff:	29
3. Chest Decompression:.....	30
4. Bandages:	31
5. Open Airway:.....	32
6. Auto-Injector Antidote:	32
Secondary Triage: Interactive Objects	33
▪ Secondary Triage Introduction:	33
Secondary Triage: Patients	34
▪ Stretcher Cam:	34
▪ Interactive Hotspots:	35
Secondary Triage: Triage Tag	36
Secondary Triage: EMS Bag.....	37

Overview: Scenario & Objectives

CliniSpace and the Institute for Intelligent Systems and the School of Nursing, University of Memphis, present a Mass Casualty-Disaster Management training system embedded in a virtual world. It Includes live action triage (SALT) training simulation program and Civilian Aero medical Evacuation Sustainment Training (CAEST). The training system incorporates an existing intelligent tutoring system called AutoTutor LITE.

Learning Objectives

The Mass Casualty scenario is designed to focus on the following goals and objectives of training:

- Train medical personnel on the S.A.L.T Triage Protocol.
- Learn and Practice streamlined communication protocols between civilians, medical personnel and the military.
- A review of the incident command system with special considerations when interacting with military resources.

Launching CliniSpace Mass Casualty

The CliniSpace Mass Casualty environment can be launched by clicking on this link-

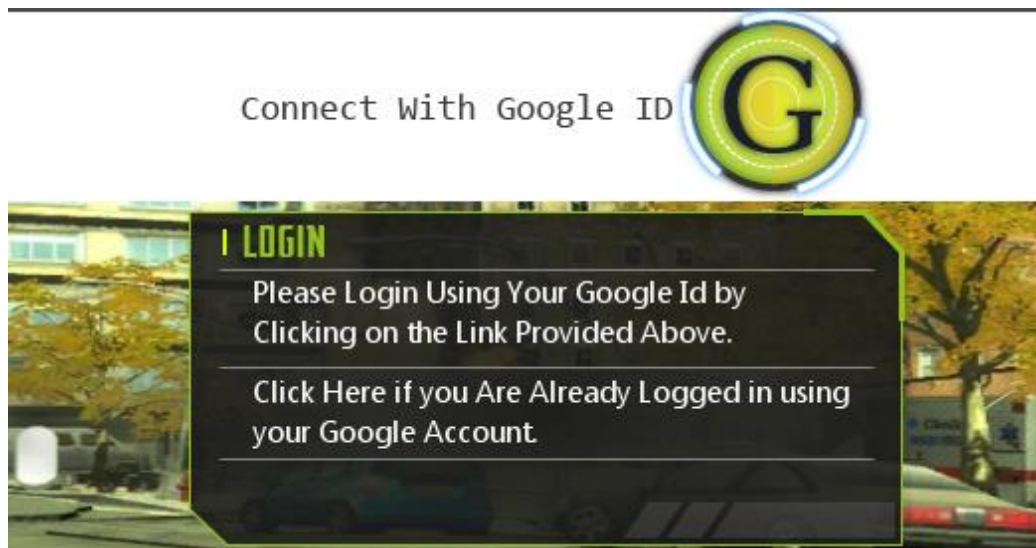
<http://vps01.metamersive.co.in/MemphisPhase2/Environment>

The minimum recommended system requirements to run CliniSpace Mass Casualty are-

Component	Recommended
Operating System	Windows XP, Windows Vista, Windows 7, Windows 8, Mac OS X 10.5 + with Intel CPU only
Browser	Firefox 4+, IE 8+, Chrome 10+, Safari 5+
System Resolution	1024 x 768

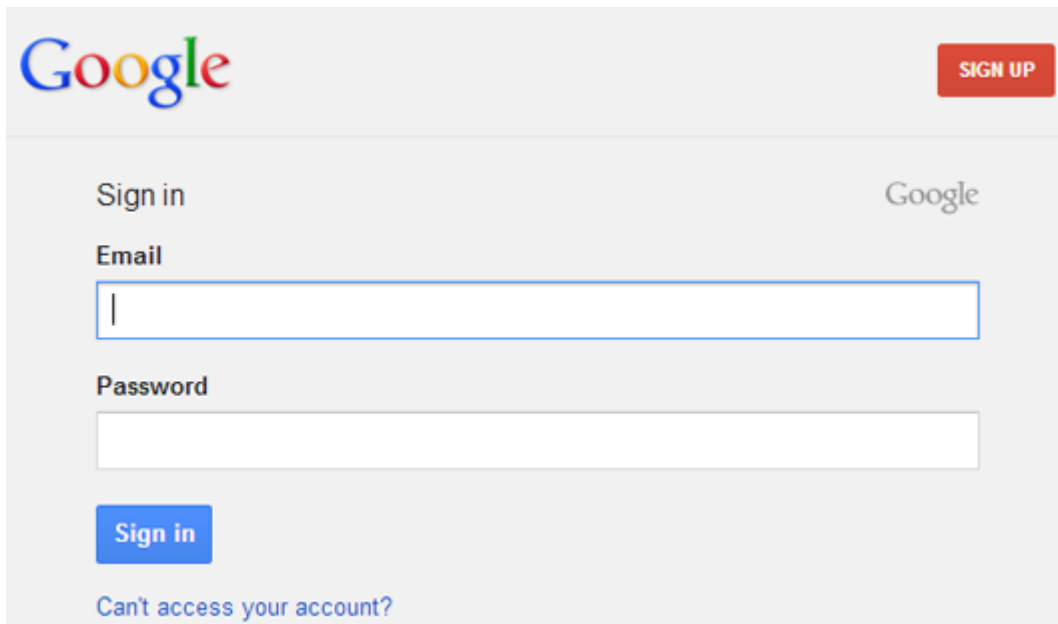
Please note that this application can be best experienced with the help of a microphone and speakers.

- **Logging In:**



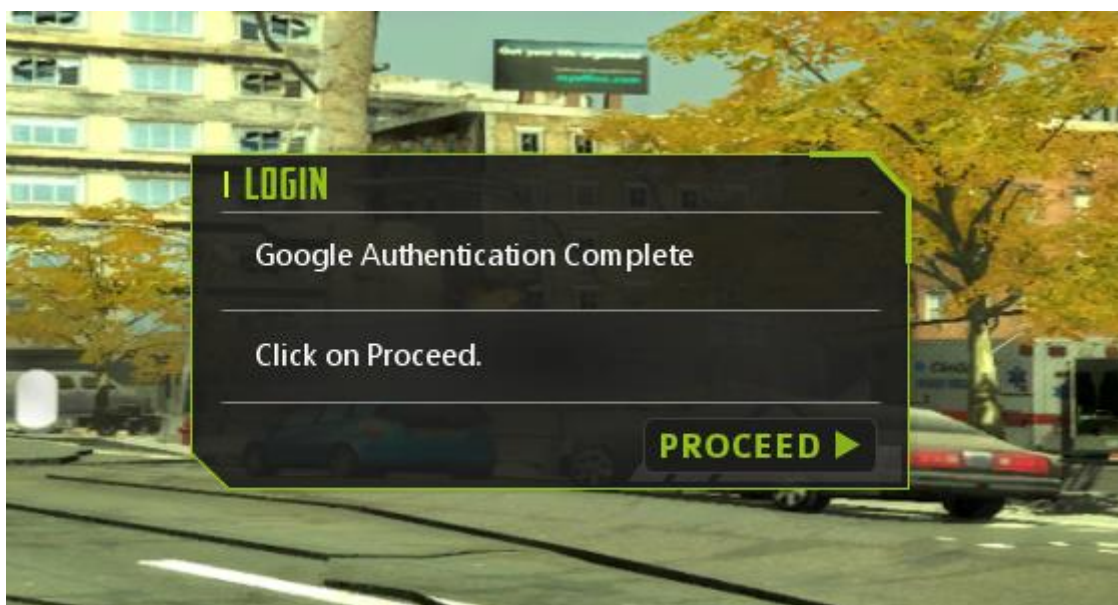
You have to use your **Google Id** to log in to CliniSpace Mass Casualty.

- Click on the **Circular Icon** at the top.
- A Google login page will open.
- Enter your credentials in the username and password fields.
- However, if you are already logged in to your Google account, you can click on the second option in the login panel.



The image shows the Google sign-in interface. At the top left is the Google logo, and at the top right is a red button labeled "SIGN UP". Below the logo, the text "Sign in" is on the left and "Google" is on the right. There are two input fields: "Email" and "Password". Below the password field is a blue button labeled "Sign in". At the bottom left, there is a link that says "Can't access your account?".

The login panel will notify you after the Google authentication is completed. Click on **Proceed** to continue.



- **Character Selection:**

After you have logged in, you will be taken to the character selection screen. You can select from any one of the six characters. Enter a display name and click on proceed.



User Interface



- **Score Card:**

The Score card presents a detailed breakdown of the categories & the points that you scored for that particular category. The scoring system depends on the actions that you did or did not perform in the CliniSpace Mass Casualty environment.

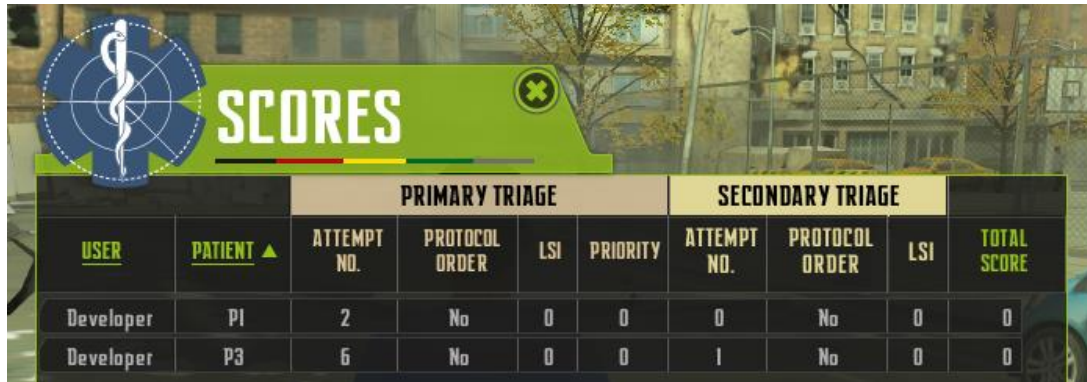
		PRIMARY TRIAGE				SECONDARY TRIAGE			TOTAL SCORE
USER	PATIENT ▲	ATTEMPT NO.	PROTOCOL ORDER	LSI	PRIORITY	ATTEMPT NO.	PROTOCOL ORDER	LSI	
Developer	P1	2	No	0	0	0	No	0	0
Developer	P3	6	No	0	0	1	No	0	0

The categories in the Score Card for both Primary and Secondary Triage are:

1. **Attempt No:** Attempt number denotes the number of attempts it took you to correctly Triage the patient.
2. **Protocol Order:** This shows whether the correct protocol order for SALT Triage was followed or not.
3. **LSI:** LSI stands for Life Saving Interventions and shows if the correct lifesaving intervention(s) was performed. This score can either be zero (0) or one (1) - zero meaning that you did not perform the correct intervention(s) and one meaning that the correct intervention(s) was performed.
4. **Priority:** This denotes whether you assigned the correct Priority state to the patient. This score can either be zero (0) or one (1) - zero meaning that you did not assign the correct priority state and one meaning that the correct priority state was assigned. Please note that Priority is only applicable for Primary Triage and is not present in Secondary Triage.

To reorder the entries in the score card in either ascending or descending order, with respect to User or Patient, follow these steps-

- Click on either **User** or **Patient** to reorder the entries.
- An arrow next to the User or Patient will denote if the entries are arranged in ascending or descending order.



		PRIMARY TRIAGE				SECONDARY TRIAGE			TOTAL SCORE
USER	PATIENT ▲	ATTEMPT NO.	PROTOCOL ORDER	LSI	PRIORITY	ATTEMPT NO.	PROTOCOL ORDER	LSI	
Developer	P1	2	No	0	0	0	No	0	0
Developer	P3	6	No	0	0	1	No	0	0

The **Total Score** is calculated by adding the scores that you earned in LSI, Priority and Protocol Order. Attempt Number does not contribute to the Total Score.

- **World Clock:**

The world clock shows the current time in the environment.



- **Action Ticker:**

The action ticker is located at the top of the screen and provides a constant feed of the actions performed by you.

- **Action Log:**

You can click on the button at the top right corner of the action ticker to display the action log. The action log shows all actions performed during the current session. Click on that same button to hide the action log.



- **Settings & Help:**

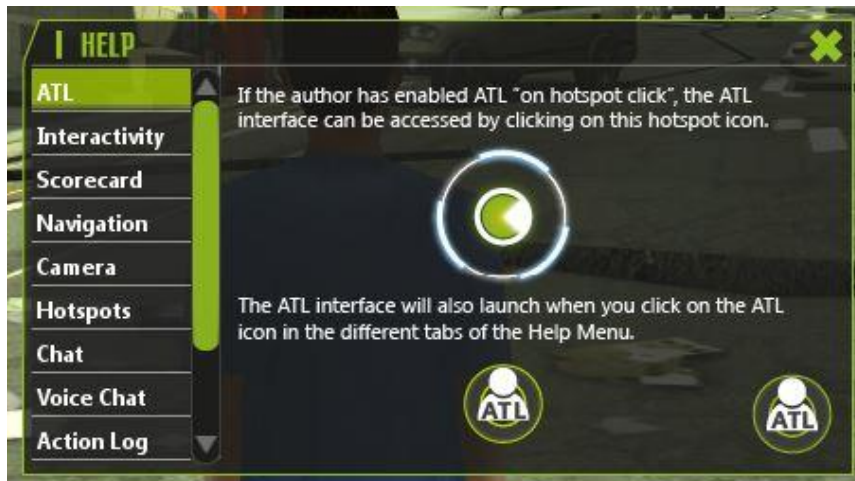
The options in the settings & help panel are:



1. **Logout:** This will log you out of the currently running session. A confirmation message appears when you click on log out. You can click on **Yes** to end your session or click on **No** to stay logged in.



2. **Help:** Click on help to view relevant information on using CliniSpace Mass Casualty.



3. **Settings:** The settings menu has various options that you can change. The display and quality settings affect the graphical quality of the environment and the user interface.



4. **User Name:** This option lets you display or hide the user name that is visible on top of a learner's head.



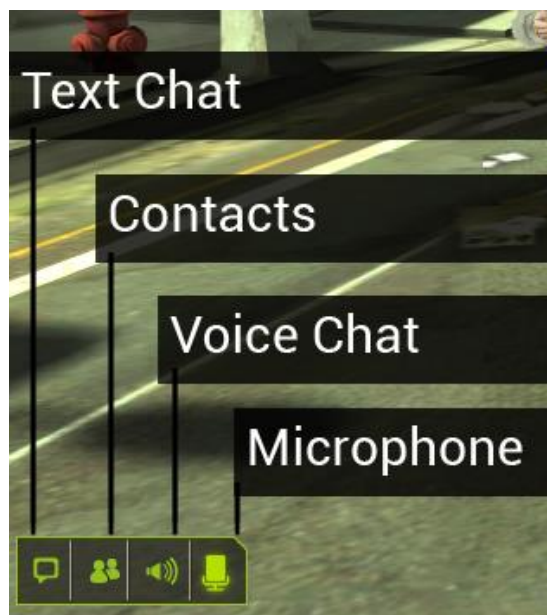
- **Unlock Authoring:**

Click on the unlock button at the bottom right corner of the screen to bring up the unlock panel. Enter your unlock code and click on proceed to unlock the authoring features. Click on cancel to close the unlock panel and continue as a learner. A detailed guide to using the authoring features is described in the Authoring Manual.

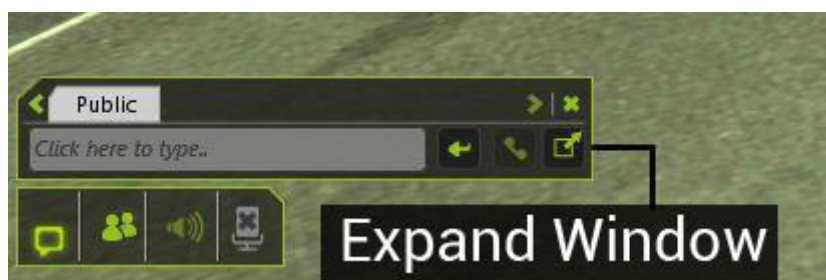


- **Communication Panel:**

The communication panel allows users in the environment to communicate with each other via text and voice chat. The options available are:



1. **Text Chat:** Clicking on the text chat button opens a minimised text input window. In order to view messages being sent to you, click on the **expand button** at the extreme right of the text input panel.

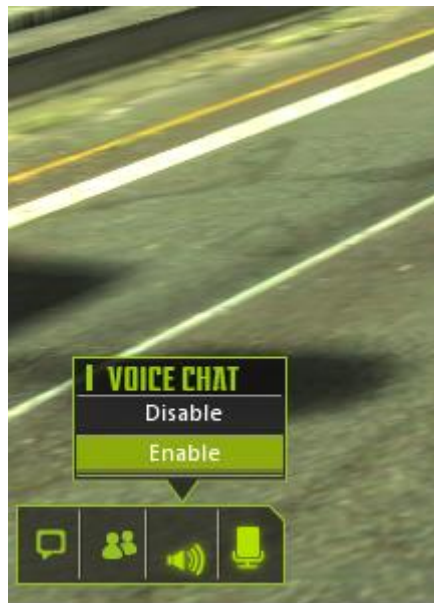




- 2. Contacts:** Clicking the contacts button opens up a list of users currently logged in to the environment. Clicking on a user opens a tab on the chat window to communicate with that user.



3. **Voice Chat:** Click on this button to enable or disable the Voice Chat feature.



4. **Microphone:** Click on the Microphone button to mute or un-mute it.



Primary Triage: Interactive Objects

- **Incident Commander:**

The Incident Commander is a non-playable character who provides information relevant to the scenario. There are two hotspots over the incident commander that you can click to open a SKO window. (More on SKO & ATL [here](#))



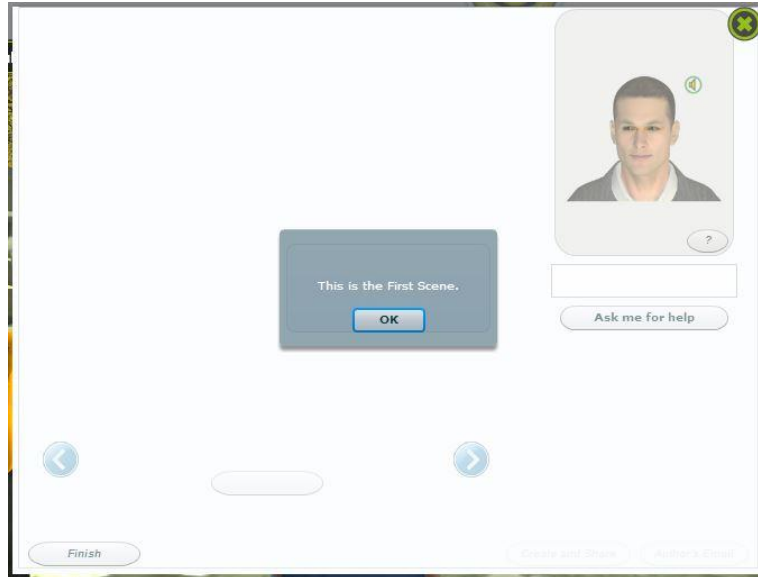
- **Hotspots:**

The image below shows what the interactive hotspots in the environment look like. If the author has enabled triggering of SKO on hotspot click, a SKO window will open up with relevant information every time you click on a hotspot.



- **Auto Tutor LITE (ATL):**

The Mass Casualty training system incorporates an existing intelligent tutoring system called Auto Tutor LITE. It contains a Shareable Knowledge Object (SKO) that opens up on either hotspot click or when learner performs an incorrect action. The SKO educates the user on correct procedures and practices via dialog based verbal interactions and feedback.



Primary Triage: Patients

There are multiple patients in the environment requiring different levels of assistance. Approach a patient to interact with him/ her.



- **Focus On Patient:**

Click on this button to get a better view of the patient. Focusing on a patient will allow you to interact with the different hotspots that are otherwise unavailable. You can also access your EMS bag in this view. To go back to the normal view, click on the reset button.



- **Assign Priority:**

Click on the Green hotspot to assign a priority to the patient, there are three options that you can select from. Select an option and click on save to assign that priority.



- **Interactive Hotspots:**

The hotspots on a patient allow you to check his vitals and assess his mental state. Place your mouse cursor on a hotspot to know what it's for. Please note that some Hotspots are hidden until you focus on the patient.

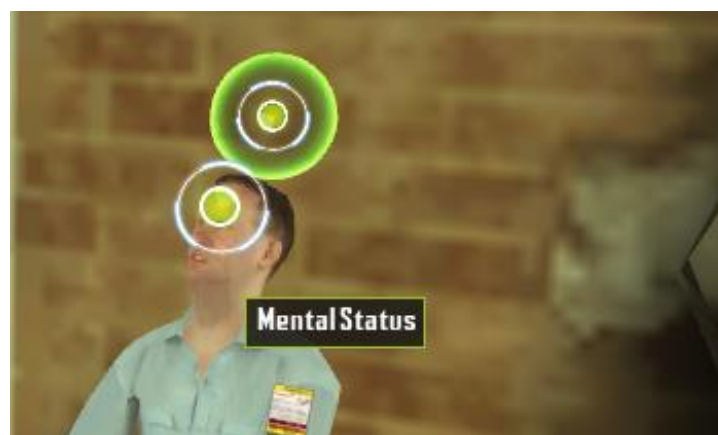


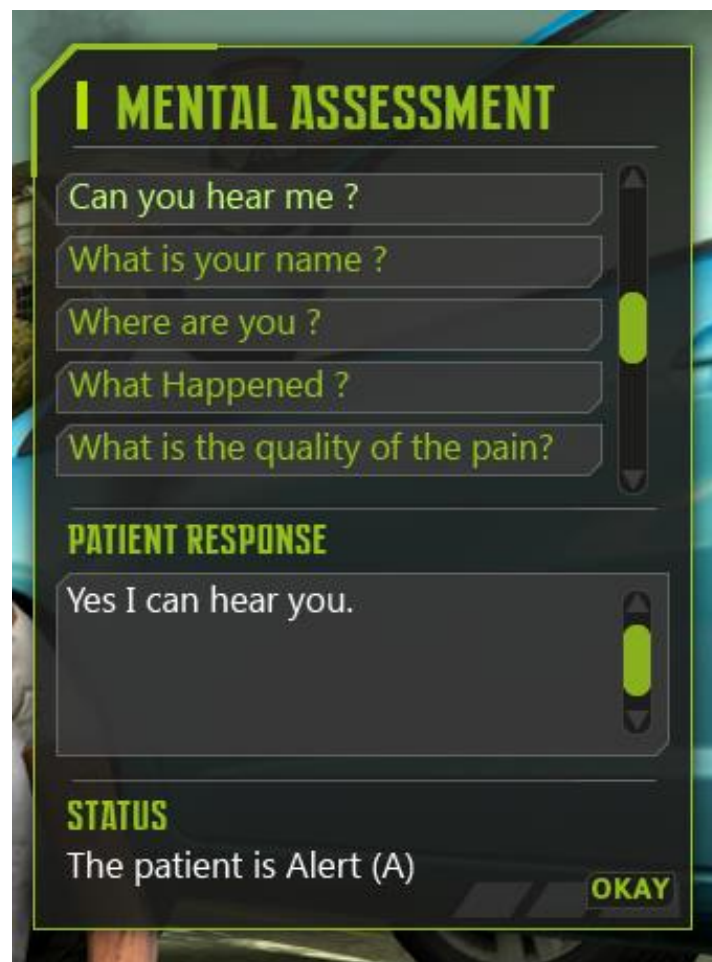
The different hotspots are:

1. **Patient Introduction:** This hotspot is present at the top of a patient's head and provides a brief introduction of the patient.



- 2. Mental Status:** When you click on this hotspot, the patient's mental status is displayed via either a visual feedback, if patient is unconscious or via a dialogue panel if the patient is conscious. Select the questions you want to ask and you will receive a response from the patient. The patient's mental status will be shown at the bottom of the window.





- 3. Radial Pulse:** Click on this hotspot to view the radial pulse of the patient. You will receive a text and visual feedback.



- 4. Capillary Refill:** Click on this option once to bring up the capillary refill screen. Then click on the centre of the pink circle to check the capillary refill time. You will receive a text and visual feedback.



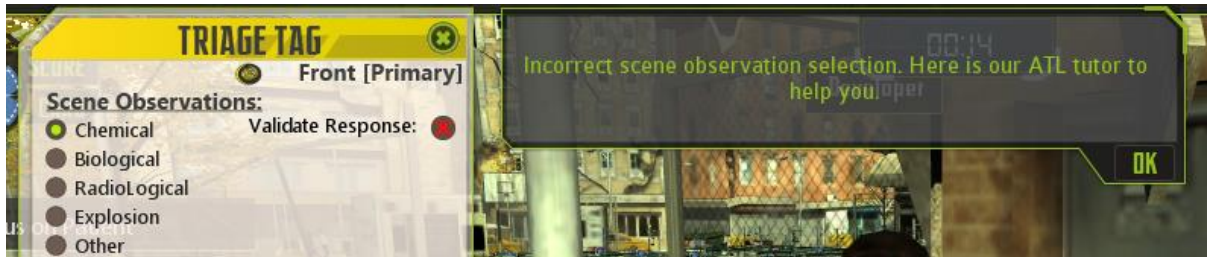
Primary Triage: Triage Tag

Click on the Triage Tag on the patient's body to triage the patient. The Triage Tag's user interface will open.



The options in the Triage Tag are:

- 1. Scene Observations:** There are five different options under scene observations. Once you select an option, click on the **Validate Response** button to confirm that you have selected the correct option. There can be two different outcomes depending on your response-
 - If your response is incorrect, a text feedback will let you know that you have made a mistake and a SKO window will pop up with relevant information on the subject.



- If your response is correct, the options will be locked and you cannot select any other option from the list.

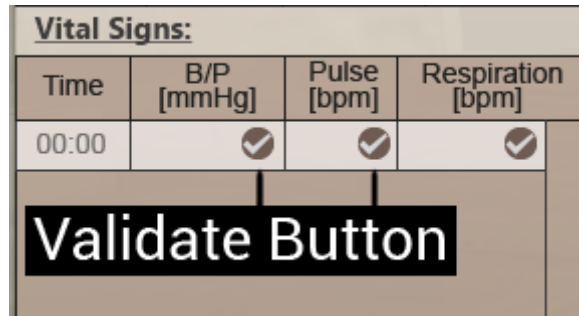


- 2. Treatment:** The Treatment option is unavailable in the current Mass Casualty environment. It appears as a greyed out section and is non-interactive.

Treatment:			
Time	Treatment	Drug	Dosage

3. Vital Signs: This section allows you to enter values for the Vital Signs of the patient.

- After you have entered the values, you must click on the **validate button** to confirm that you have entered the correct values.



- Note that the time entry gets auto validated. You must enter the time that the [world clock](#) is displaying at that instant, in the correct format.
- There can be two different outcomes depending on your input-
 - If your input is incorrect, a text feedback will let you know that you have made a mistake and a SKO window will pop up with relevant information on the subject. A new section will also be available for you to enter your values again.



- If your input is correct, the vital signs section will be locked and you cannot enter any values again.

Vital Signs:			
Time	B/P [mmHg]	Pulse [bpm]	Respiration [bpm]
01:55	24	25	26
02:00	87/141	63	42

4. **Triage Tags:** There are 5 Triage Tags ordered on the basis of their priority. There are two steps to apply a triage tag-

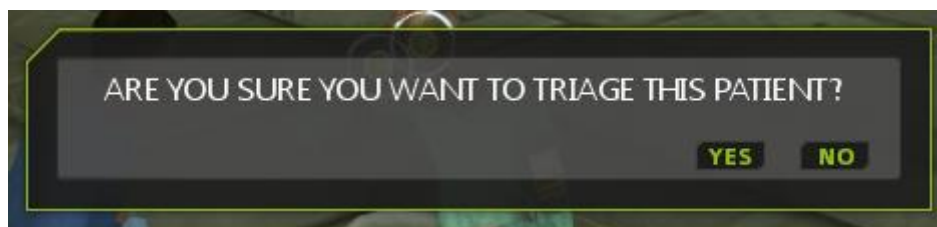
- Place your mouse on the Triage Tag you want to apply.
- Click and drag the tag towards the right, imitating a pull.



- If you select the incorrect tag, a text feedback will let you know that you have made a mistake and a SKO window will pop up with relevant information on the subject.



- A confirmation message appears when you select the correct tag. Click on **Yes** to confirm your selection.



Please note that you cannot apply a Triage Tag if you haven't validated your response for Scene Observations & Vital Signs. A text feedback will notify you to validate your response if you haven't already done so.

Primary Triage: EMS Bag

The EMS bag appears when you focus on a patient. Click on the plus sign at the centre of the screen to display the contents of the EMS bag. The hotspots on the patient's body will change, indicating that you can use the contents in your EMS bag.



Place your mouse cursor on an object to know what it is.



To use an object from your EMS bag, click and drag the object to the relevant hotspot on the patient's body. The different supplies in your EMS bag are, from left to right:

1. Stethoscope:

Use the Stethoscope to check the patient's Respiration. You will receive a text and visual feedback.



2. BP Cuff:

Use the BP Cuff to check the patient's Blood Pressure. You will receive a text and visual feedback. A BP Cuff will also appear on the patient's arm.



3. Chest Decompression:

Use the Chest Decompression Needle to perform Chest Decompression on the patient. You will receive a visual feedback.



4. Bandages:

Click and drag the bandage to the hotspot where you want to apply it. The bandage will appear on that area. Please note that not all patients may require a bandage.



5. Open Airway:

Use this option to open the airway of the patient. You will see your avatar performing the operation. Please note that not all patients may require an open airway operation.



6. Auto-Injector Antidote:

The Auto-Injector Antidote is not available for use in the current Mass Casualty scenario.



Secondary Triage: Interactive Objects

▪ **Secondary Triage Introduction:**

The basketball court is the area for Secondary Triage. Click on the yellow Triage Board to open a SKO window with relevant information.



The Secondary Triage area is divided into six colour coded regions:

1. Black
2. Grey
3. Green
4. Yellow
5. Red

Based on the colour of the Triage Tag that you applied, patients from Primary Triage area are moved to the corresponding colour coded region in the Secondary Triage Area.

Secondary Triage: Patients

Based on the colour of the Triage Tag that you applied, patients from Primary Triage area are moved to the corresponding colour coded region in the Secondary Triage Area. They will be laid down on one of the stretchers. You will also have access to your EMS bag when you focus on the patient using the stretcher camera.



▪ **Stretcher Cam:**

The Stretcher Camera is a rotating 3d camera object on the side of each stretcher. This camera object serves the same function as [focus on patient](#) (present in the primary triage area). Click on this camera object to focus on the patient and click again to go back to regular view.



- **Interactive Hotspots:**

The hotspots on a patient allow you to check his vitals and assess his mental state. The Hotspots are same as the ones in Primary Triage and have already been described in detail [here](#).

There is one additional hotspot in Secondary Triage that allows you to transport the patient.

- This Hotspot is only visible after you have triaged the patient within secondary triage. It will appear on the feet of the patient.
- Click on the Hotspot to open a menu with options to transport the patient.
- In the current Mass Casualty scenario, you can only select the first option.
- The Patient will no longer appear on the Stretcher after you have transported him/ her.



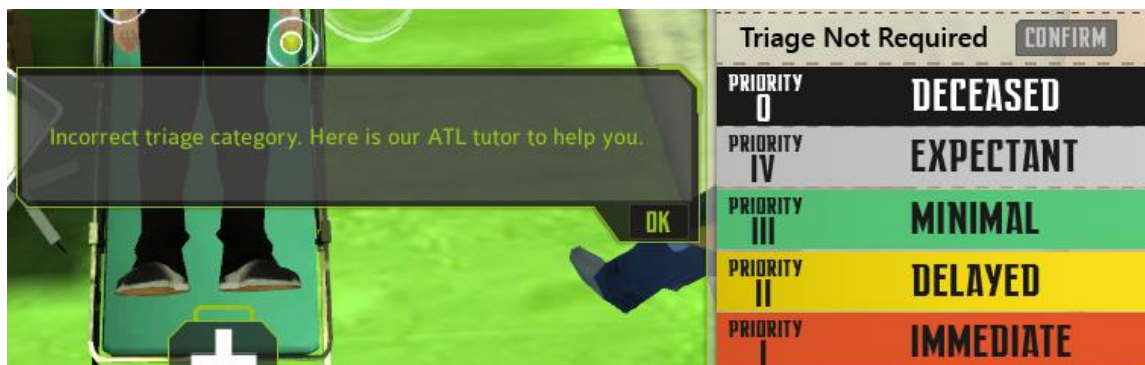
Secondary Triage: Triage Tag

Click on the Triage Tag on the patient's body to triage the patient. The Triage Tag's user interface will open.

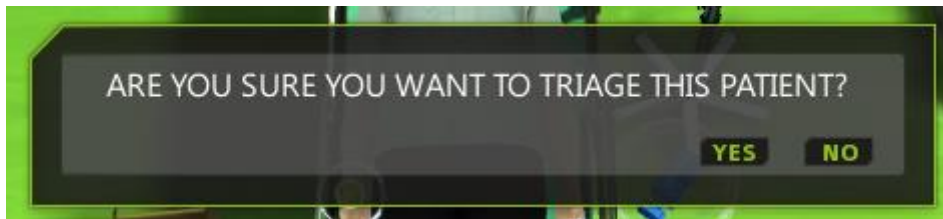
- In Secondary Triage, you can see the [Primary Triage Tag](#) for reference.
- However, you cannot edit any entries in the Primary Triage Tag.



- If you select the incorrect tag, a text feedback will let you know that you have made a mistake and a SKO window will pop up with relevant information on the subject.
- Please note that not all patients may require Triage in the Secondary Triage area, in which case you can select the **Triage not required** option.



- A confirmation message appears when you select the correct tag. Click on **Yes** to confirm your selection.



Secondary Triage: EMS Bag

The EMS bag appears when you focus on a patient. Click on the plus sign at the centre of the screen to display the contents of the EMS bag. The hotspots on the patient's body will change, indicating that you can use the contents in your EMS bag. The supplies in your EMS bag have been described in greater detail [here](#).





Poster Abstracts

In the Silver Anniversary year of FLAIRS, in an effort to promote discussion of emerging ideas and work in order to encourage and help guide researchers, especially new researchers, the program committee added the poster abstract submission category. This allows researchers to present a full poster in the conference poster session and receive that critical, work-shaping feedback that helps guide good work into great work. Abstracts of those posters appear here, which we hope to see fully developed into future FLAIRS papers.

FLAIRS Poster Abstracts

Nik Naila Binti Abdullah, Samuel Mendes, Eisa Alanazi, Bandar Mohammed, Malek Mouhoub, Samira Sadaoui, Crystal Batts, C. J. Taylor, Elva Jones, Rebecca Caldwell, Chutima Boonthum-Denecke, Hasani Burns, Samantha Allen, Chutima Boonthum-Denecke, Kyle R. Cheney, Scotty D. Craig, Xiangen Hu, Vahid Jalali, David Leake, Fazel Keshtkar, David Hatfield, Jin Wang, Zhiqiang Cai, Arthur Graesser, Katherine Lang, James Allen, Ingyu Lee, Joe Teng, Niels Pinkwart, Barbara Hammer, Keith Shubeck, Scotty. D. Craig, Xiangen Hu, Usef Faghihi, Marian Levy, Robert Koch, Warren Stanton, Kyle Thompson, Licia Moses, Chutima Boonthum-Denecke, Quan Tang, Jin Wang, Haiying Li, Xiangen Hu, Bulent Tastan, David Chang, Gita Sukthankar, Curley Williams, Cheryl Swanie, Chutima Boonthum-Denecke, Yanbo Xu, Jack Mostow

Activity States Framework for Studying Context and Communication Process in Web-Mediated Collaboration Setting

*Nik Naila Binti Abdullah (MIMOS Berhad)
and Samuel Mendes (University of Montpellier II)*

In our work, we want to understand how context influences communication process during Web-mediated collaboration. Thus we have explored these notions - conceptualization, and contextualization from situated cognition, and psychic reflection from activity theory into a framework of analysis called the Activity States Framework (ASF). In this paper we introduce ASF and our understanding of the notions from the modeling of ASF. The main idea of ASF is based on the notion of conceptualization - ‘What I am Doing Now’ of a person acting in a setting. Based on this idea, we study the relation between contextualization and psychic reflection. Contextualization is described as the product of an “active state”, whereby past experiences are compared to information situated to context. Psychic reflection is the transformation between an object (an objective) and a subject (person) in the subject’s pursue of a goal mediated by artifacts. From this relation, we hypothesize that a subject’s actions, and object will influence how the subject communicates influenced by the ‘level of engagement’ (activity states) in his pursue of his object. In ASF, object is defined as conception and subject as reference to conception. We have used the hypothesis to implement the ASF – analyzing 300 lines of collaborative chat dialogs. We have found that the notion of object de-

notes the near-start of when a transformation is about to take place in a subject at that moment. Meanwhile the notion of subject is the relationship to the object - the product of within-and transformation.

Online Shopping Under Qualitative and Quantitative Preferences

*Eisa Alanazi, Bandar Mohammed, Malek Mouhoub,
Samira Sadaoui (University of Regina)*

Many internet shoppers find it challenging to select the appropriate features when purchasing a new product online. For instance, there are many specifications they may wish to choose from when purchasing a desktop computer, camera, laptop, etc. Indeed, the majority of online corporations do not offer clients the capability of selecting their choices and preferences when purchasing a new product. In other words, several shopping web sites constrain the clients’ ability to between a number of options and do not necessarily offer alternatives which meet their expectations, or needs. This can be frustrating and upsetting for clients as it gives them the impression their preferences are not being taken into consideration.

In this paper, we propose a new shopping system that enables customers to express what they want when buying a product online. More precisely, the users are given the ability to provide their requirements and desires in a friendly and interactive way. The system will then provide a list of suggestions meeting the users’ requirements and maximizing their desires. Requirements and desires are managed in a unique model, respectively as a set of hard constraints and preferences where these latter can be quantitative (numerical) or qualitative (ordinal). The branch and

bound method is then applied in order to provide the users with a list of best outcomes.

iRobot Create Navigation with Mapping Interpretation Explored Through Smart Camera Networks

Crystal Batts (Winston-Salem University), C. J. Taylor (University of Pennsylvania), Elva Jones (Winston-Salem University), Rebecca Caldwell (Winston-Salem University), and Chutima Boonthum-Denecke (Hampton University)

This poster describes our approach of tackling the most common problem when dealing with robotics, localization, the ability for a robot to know its current position relative to its environment and any of its previous positions. The idea is to create a system that would be used to automatically localize both the cameras and the robot relative to any characterized reference points. This project is built off of past work that used optical signaling techniques to localize a set of smart camera modules. The iRobot Create's odometry will be used to measure precise positions of the robot in relation to the positions of the smart camera network. The smart camera modules have the ability to localize itself and send back their positions relative to one another. Once their positions and distances from one another are known it is easier to find the position of the robot relative to the positions of the smart camera modules.

Blackout: Guidance for Household Emergencies

Hasani Burns, Samantha Allen, Chutima Boonthum-Denecke (Hampton University)

The robot, nicknamed "Blackout," was created in order to be an emergency robot with the goal of assisting one in any number of household emergencies. Though limited in resources, we have produced a robot with the ability of providing assistance in small, but vital ways to a young child home alone, a senior citizen, or even one with a disability. Our presentation will focus on, why Blackout can be essential to our society, how far we've gotten in the time we've had, and where we possibly plan to take this robot in the future, including further implementations, and necessary augmentations to make "Blackout" greater.

Lessons Learned from a Three Year After-School Program Using ALEKS to Teach Sixth Graders Mathematics

Kyle R. Cheney, Scotty D. Craig, Xiangen Hu (University of Memphis)

This project incorporated a web-based artificially intelligent program (ALEKS) into an after-school tutoring pro-

gram on mathematics. The program was open to sixth grade students in a rural west Tennessee school district. Students were randomly assigned to, one of two conditions (teacher- led and ALEKS) to assess the effectiveness of the program. The sessions were two hours, twice a week, and divided into 20 minutes segments so that the students received three twenty minute instructional sessions separated by two 20 minute breaks during which snacks were provided (the first twenty minute break) and games were played (the second twenty minute break). There were 10 minutes allowed before and after the program for set-up and dismissal. In the ALEKS condition, students interact with the program, which assigns problems appropriate for their current knowledge space by using Knowledge Space Theory. In the teacher led condition, the teachers used a scaffolded approach to teaching, slowly decreasing their involvement throughout the session. As with all new after-school programs, maintaining retention of students enrolled in the program, encouraging teacher and administrative involvement, increasing community awareness, and implementing effective recruitment practices were all threats to the viability of this program. Over the course of this three-year project, we have been able to successfully tackle these threats by creating a structured incentive program and fostering a strong relationship among the teachers, administration, and community.

Increasing Response Flexibility in Conversational Case-Based Reasoning

Vahid Jalali, David Leake (Indiana University)

Conversational case-based reasoning (CCBR) is an interactive form of case-based reasoning in which the system presents users with questions whose answers incrementally guide case retrieval. CCBR systems often ask about atomic features. However, in some domains, users may wish to provide multiple pieces of information in response to a single question. For example, in a cell phone recommendation domain, rather than the system successively asking if the user wants a phone supporting IM, MMS, and SMS, it might be more efficient for a user to simply provide a list. However, existing question selection methods are not designed for handling questions with composite answers. This poster presents a method for handling composite responses in CCBR dialogs, with the goal of retrieving the desired case(s) with a short sequence of questions. It handles composite features by increasing the level of abstraction at which each question is asked and selecting questions by a new adaptation of information gain for composite features. It compares results for three scenarios: (1) Atomic Selection, in which the user only selects a single component for a (possibly multi-component) feature at each step, (2) Decomposed, in which multi-component fea-

tures of a domain are decomposed into atomic features, which the user can provide through a series of questions, and (3) Composite Selection, in which the user can select multiple components for a feature in one step, and our question selection method for composite features is applied to question selection. Experiments showed that composite selection achieved 54%, and 15% improvements over the decomposed approach, and 24% and 17% improvements over the atomic approach in our test domains.

The Components of the Intelligent Virtual Mentoring and Assessment in Computer Education Games for e-Learning

Fazel Keshtkar (University of Memphis), David Hatfield (University of Wisconsin), Jin Wang (University of Memphis), Zhiqiang Cai (University of Memphis), Arthur Graesser, (University of Memphis)

AutoSuggester is an intelligent module that decides when AutoMentor generates a message in the Mentor View window and the content of what to say. As technical point of view, AutoSuggester works as a plug-in with the main application in AutoMentor system in the Land Science Game. The aim of AutoSuggester is to help human mentor to monitor players in chat rooms, and gives suggestions if necessary. AS decides when AutoMentor generates a message and decides what to say. AutoSuggester can be categorized in the following modules, that it watches over: (a) the multiple threads of conversation among the players and mentor in the group (i.e., sequences of categorized speech acts), (b) the actions and decisions of players and mentor in the interaction history, (c) the game phase and current state of relevant parameters specified in the frameboard, and (d) the status of the epistemic network analysis (ENA). When particular features, data patterns, or state parameters accrue in this information blackboard, then AutoSuggester generates a message in Suggestion List, by selecting the appropriate message from a categorized set of alternative messages. We designed and developed a computational architectures and add complexity as needed.

In this poster we demonstrate the Autosuggester Architecture Diagram, Goals, the current status of the AutoSuggester, Modules that have been developed and implemented so far, technical constraints, such as the speed of computation, and the future work and direction toward AutoSuggester design and implementation.

AID: An Intelligent Dialogue System for Interviews

Katherine Lang, James Allen (University of Rochester)

Most programs used to collect data via interviews, e.g. a program to collect local food usage information for food

aid/relief programs, which are available to the public and not off-the-shelf tend to utilize ridged state-based systems with predefined responses for information collection. However, these systems lack the flexibility that is necessary for interviews containing open-ended questions such as “Why do you prefer one market over the others?” that cannot be simply separated into a finite number of categories or exact phrases. The Artificially Intelligent Interview Dialogue (AID) system is a guidance system that will assist interviewers not familiar with the reasoning behind the interview in successfully collecting consistent and accurate information in the field. AID's dialogue manager utilizes a finite-state automaton and extends the framework for better flexibility. These extensions include logical form matching to interpret utterances provided by the robust parser and the incorporation mixed-initiative dialogue. Semantic parsing adds flexibility to the system including the use of semantic rules, which the dialogue manager can use to cover a broad selection of answers. Interestingly, our state-based dialogue control is far more flexible than McTear's classification predicts. Moreover, our variant of the TRIPS parser can handle partial parses and extra information, unlike McTear's state-based NLDSs. Finally, AID strives for a conversational feel to put less pressure on the user to know exactly what he/she should say to collect the interview data, including the familiar AIM chat window as the GUI so the user can interact with the program more naturally.

Risk Oriented Intrusion Detection Classifier

Ingyu Lee, Joe Teng (Troy University)

With the popularity of the Internet, network security is becoming increasingly important. Many studies have been done in Intrusion Detection Systems (IDS) using data mining and machine learning technologies. However, traditional studies have been focused on correctly predicting intrusions without considering the frequency and impact of attacks. In reality, some attacks are more frequent and cause more damage to systems than others. Therefore, a classifier in an Intrusion Detection System should better detect some attacks which are not frequent but are more serious than others, which are more frequent but less harmful. In this paper, we explore a risk oriented intrusion detection classifier that considers frequency and impact.

Towards Learning Feedback in Intelligent Tutoring Systems by Clustering Spaces of Student Solutions

Niels Pinkwart (Clausthal University of Technology), Barbara Hammer (University of Bielefeld)

Since about 1990, intelligent tutoring systems (ITS) have

been getting more and more popular. Designing an ITS usually requires precise models of the underlying domain as well as of how a human tutor would respond to student mistakes. As such, the applicability of ITSs is typically restricted to well-defined domains where such formalization is possible and large scale applications where development costs do not play a significant role. For ill-defined domains, human tutors still by far outperform the performance of ITSs, or the latter are not applicable at all. This poster proposes a novel ITS approach which extends the applicability of ITS systems to ill-defined domains by means of machine learning techniques which can autonomously infer structures and feedback options from given data (e.g., student solutions). The proposed approach uses prototype-based methods and recent developments for general non-vectorial data structures, extended in a way that they allow to simultaneously structure solution spaces, learn metrics for structures, align student solutions with clusters of other solutions, and infer appropriate feedback based thereon. The adaptation mechanisms are designed to work in fully unsupervised scenarios or settings with only partial feedback to take into account the requirements for ITSs in ill-defined domains where an automated assessment of student solutions is rarely possible. A first validation of the approach was conducted using a dataset from the domain of programming. The results show that clusters of structurally similar solutions could be detected, and that an automated provision of student feedback based on this clustering seems feasible.

Incorporating Natural Language Tutoring Into a Virtual World for Emergency Response Training

Keith Shubeck, Scotty. D. Craig, Xiangen Hu, Usef Faghihi, Marian Levy, Robert Koch (University of Memphis)

Virtual Civilian Aeromedical Evacuation Sustainment Training (V-CAEST), is a Department of Defense funded project that aims to improve communication between civilian and military personnel during emergency situations. The V-CAEST team at the University of Memphis is developing a robust training system embedded in a virtual world. The V-CAEST system is based on the live action training simulation program, Civilian Aeromedical Evacuation Sustainment (CAEST), and will serve as a virtual implementation of the live action training simulations. V-CAEST incorporates an existing intelligent tutoring system called AutoTutor LITE (Learning in Interactive Training Environments). AutoTutor LITE, a variation of AutoTutor, is a product developed by University of Memphis researchers. Within V-CAEST, AutoTutor LITE acts as a facilitator providing guidance and feedback during the learners' interaction in the virtual world. In order to automati-

cally evaluate student responses, V-CAEST features natural language processing enabled by a Domain Specific Semantic Processing Portal (DSSPP). The DSSPP creates a domain-specific semantic space by taking in a corpus of military and civilian emergency literature. In this poster, we will report the application of AutoTutor LITE and DSSPP in V-CAEST.

Swagbot: Audio and Visual Telepresence Using ROS-Bridge, GStreamer and TokBox

Warren Stanton, Kyle Thompson, Licia Moses, Chutima Boonthum-Denecke (Hampton University)

This poster describes the "Swagbot," a virtual waiting service. The Swagbot consists of the iRobot Create, a sturdy platform for holding a drink, and a laptop with built-in camera. The robot is operated by a waiter/waitress from a remote location. The customer interfaces with the Swagbot using the teleconference system or the web. For the teleconference system, the waiter/waitress and customer can interact with each other using sound and video in real-time. The customer can order drinks via a web-interface, that is, no direct communication between waiter/waitress and customer. This project will provide high-end services with low-end maintenance, and it will also allow business owners to reduce the number of waiters/waitresses needed to host a party, which will ultimately decrease cost.

An Exploratory Study on the Relationship between Situation Changes and Word Uses

Quan Tang, Jin Wang, Haiying Li, Xiangen Hu (University of Memphis)

Word use relevant to linguistic and psychological features may vary along with the financial situation of a company. This study explores the relationship between linguistic and psychological word use in workplace email and the timeline related to the financial situation of Enron Corporation, an American energy, commodities, and services company. This paper adopted as the dataset 97 thousand emails from Enron's employees before the company collapsed. The 2007 English LIWC program was processed to generate 64 linguistic and psychological word categories. Then, a Principal Component Analysis was performed to extract the major components from the 64 words categories to seek fewer potential representative psychological features. Three principle components were extracted, among which the first component explained about 70% of the variance. This component represented the synthetic and diverse psychological processes, including cognitive, affective, biological, and social processes, and spatial and time relativity. The second component mainly consisted of biological

category, swear words and religious words. The last component just contained the negatively loaded category “you”. Thereafter, the emails were partitioned into four groups based on the timeline of three important events. Results indicated that linguistic and psychological word use have a close relation with ups and downs of the financial state of the company, and all three components show relatively similar patterns. This indicates the psychological word categories processed by LIWC are related to the company’s financial situation, and it is possible to track or predict the important financial variations through the word uses in the employee’s email communication.

Learning Motion Prediction Models for Opponent Interception

*Bulent Tastan, David Chang, Gita Sukthankar
(University of Central Florida)*

One important aspect of creating intelligent physically-embodied agents for first-person shooter games and simulations is adversarial motion planning: identifying how to move to counter possible actions made by the adversary. When the opponent’s movements are hidden from view, it is useful to incorporate motion prediction into planning to account for the opponent’s movements in occluded regions of the map. In this research, we examine the problem of opponent interception, in which the goal of the agent is to apprehend the opponent in the shortest amount of time. Here, we present an algorithm for motion planning that couples planning and prediction to intercept an enemy on a partially-occluded map. Opponent motion prediction is performed using a particle filter to track current and future candidate hypotheses of the opponent’s location. Yet human players can exhibit considerable variability in their movement preferences and do not uniformly prefer the same routes. To model this variability, we use inverse reinforcement learning to learn a player-specific motion model from sets of example traces. From these examples of a player’s policy preferences, we learn a feature-based reward model for different areas on the map which are used to calculate transition probabilities for the motion model. Since the learned model is feature-based, it can generalize to areas that the player has not yet visited. Our preliminary results indicate that the learned motion model has a higher tracking accuracy and yields better interception outcomes than simpler motion models and prediction methods.

No Child Left Behind

Curley Williams and Cheryl Swanier (Fort Valley State University), Chutima Boonthum-Denecke (Hampton University)

The goal of this project was to develop a user interface which allows children with physical limitations, such as cerebral palsy, to interact with an iPad. Unfortunately,

many of the existing applications like Proloquo2go and Accessible Messaging were developed based on a touching-based procedure. This proposed interface is centered on the ideas of comfort, style, and the development of the “Swipe” motion which allows these children to be more active with today’s technology. This process involved a lot of studying of the Arduino board and a lot of coding as well. Many items were found to make the interface more comfortable for children to use. Ultimately, the development of this device could help children worldwide with cerebral palsy or other physical limitations develop physically as well as mentally.

Extending a Dynamic Bayes Net Toolkit to Trace Multiple Subskills

Yanbo Xu and Jack Mostow (Carnegie Mellon University)

Dynamic Bayesian Nets (DBNs) provide a powerful representation to (1) model the relationships between students’ evolving knowledge and behavior in a Tutoring System, and (2) infer changes in a student’s hidden knowledge from the student’s observed sequential steps. In 2006, Chang, Beck, Mostow, and Corbett introduced a Matlab tool called BNT-SM, which inputs a concise specification of a DBN and uses the Bayes Net Toolbox (BNT) to generate Matlab code to train and test the DBN. The input DBN specification, expressed in XML, is a fraction of the size of the generated output, thereby sparing researchers considerable coding. However, the DBNs represented by BNT-SM did not model steps that involve multiple subskills. To overcome this limitation, LR-DBN uses logistic regression in DBNs to trace multiple subskills. As reported at EDM2011 by Xu and Mostow, LR-DBN fits student performance data significantly better than previous methods, with only half as many prediction errors on unseen data. Therefore, we have extended BNT-SM to make LR-DBN available to researchers in easy-to-use form (<http://www.cs.cmu.edu/~listen/BNT-SM>). Compared to implementing a LR-DBN model directly in BNT, implementing it in BNT-SM now requires substantially less user effort and code. For example, the simplest LR-DBN model uses logistic regression in Knowledge Tracing. Implementing it directly in BNT required 86 lines of code. In contrast, implementing it in BNT-SM needs only half as many lines of XML to specify its structure and parameters.

Incorporating Natural Language Tutoring into a Virtual World for Emergency Response Training

Keith T. Shubeck, Scotty D. Craig, Xiangen Hu, Usef Faghihi, Marian Levy, & Robert Koch
University of Memphis

Problem

- During disaster situations, first responders experience difficulty when communicating with military personnel
- Civilian first responders experience difficulty utilizing military resources (e.g., Aeromedical transport) during catastrophe situations like Hurricane Katrina



Image: Military Personnel assisting civilian evacuation in Louisiana

CAEST (Civilian Aeromedical Evacuation Sustainment Training)

- Live training program aimed to ensure effective interface between civilian and military operations during disasters requiring aeromedical evacuation
- Prepares civilian nursing, allied health, public health, and emergency responders
- Addresses differences between civilian and military systems, specifically: Communications, Medical triage, and Patient evac and transfer protocols



Image: Nurses and First Responders work together to evacuate a medical manikin during a CAEST training session

VCAEST (Virtual Civilian Aeromedical Evacuation Sustainment Training)

- VCAEST is based on the CAEST training but embedded within a virtual world (CliniSpace™)
- Incorporates AutoTutor LITE (ATL) which will act as a facilitator and provide guidance and feedback to learner
- ATL also features Natural Language Conversational Feedback, Point & Query, Artificial Intelligence Markup Language, Learner's Characteristics Curves
- Goal to make widely available, cost-effective, updatable, internet-based virtual ITS



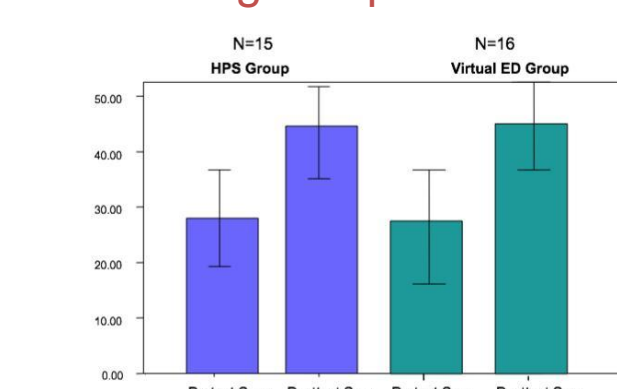
Image: Top left CliniSpace™ triage example, Top Right CliniSpace™ ER, Bottom Left Interior of C-17 Aeromedical, Bottom Right CliniSpace™ Helicopter Example

DSSPP (Domain Specific Semantic Processing Portal)

- Provides a general framework of semantic space:
- Measure semantic differences
 - Concepts in difference semantic spaces
 - Semantic spaces generated from different set of parameters
 - Enables Semantic Processing Portal
 - Computers collect corpus, evaluate semantic spaces without human experts
 - Semantic Spaces can be highly individual
 - Anybody (any virtual human) may have its own "world knowledge"
 - Created a DSSPP for VCAEST by taking in a corpus of military and civilian emergency literature.

Real World vs Virtual World training

Learning is equivalent for trauma teams!



Youngblood, P., Harter, P. M., Srivastava, S., Moffett, S., Heinrichs, W. L., & Dev, P. (2008). Design, development, and evaluation of an online virtual emergency department for training trauma teams. *Simulation Healthcare*, 3(3), 146-153.

- Can virtual training be improve?
 - Observational training
 - Case-based reasoning
 - Point & query interaction points with natural language tutoring.

AutoTutor LITE (Learning in Interactive Training Environments)



- Web-based intelligent tutoring system that utilizes a semantic engine to evaluate student input
- Uses natural language and AIML to respond to user
- Uses DSSPP to rate user responses within specific preselected domains

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Acknowledgements

This project was funded by the United States Department of Defense & USAMRAA.



We would also like to thank our virtual world development partners, CliniSpace. <http://www.clinispace.com>



User Interface for Triage Patient

Parvati Dev, Wm LeRoy Heinrichs

Sep 10, 2012

Data from tables 1-12 in Finalized Module #3:

Respiration	<30 per min; >30 per min; Nonexistent; 30 and shallow; gurgling sounds; rapid and shallow; 10; 40; 18	
Capillary Refill	<2 seconds; >2 seconds; sluggish; >10 seconds; normal	
Radial Pulse	Present; Nonexistent; weak and thready; rapid thready; not palpable secondary to burns; (not mentioned, but "bounding" is also a common description)	
Mental Status	Unconscious; Follows commands; moaning, opens eyes; cannot be assessed; opens eyes, no direct eye contact	

Indicate Hotspots with some kind of highlight or flashing circle. I actually like the little star highlights in:

<http://www.marriott.com/springhill-suites/travel.mi#/floorplans/king>

Hotspots (for GUI, not SKO):

- Hand (for pulse) – with tooltip indicating that a radial pulse can be taken. Both hands can have highlights. Even if no pulse is available, the highlight should be present. If one arm is injured, it is possible that the user can compare the pulse on the two arms.
- Chest (for respiration)
- Hand nail (for Capillary Refill) – This forces us to have two activities on the hand, adding another click to the interface. If we can have one highlight on the wrist (pulse) and one on the fingertips (cap refill), then we do not need the two-step interface for selecting the function.
- Ear (pain check in mental status) – allow pinching the ear.

Pulse:

The pulse is taken by taking the wrist in the user's palm and placing two fingers on the radial (thumb-side) pulse. Since this is on a computer and not the iPad, we cannot "feel" the pulse. We want an alternate perception that feels similar. We propose the following

A red circle that expands and contracts with a timing similar to a felt pulse. The expansion is faster than the contraction. The rate corresponds to the pulse rate. A strong pulse has a larger, brighter circle. A weak pulse shows very little expansion. A thready pulse wavers as it expands, and does not expand much. A bounding pulse expands and contracts very fast.

The red circle sits in the middle of a round clock face. The clock (or stop watch) has only a second hand that sweeps around the clock face in 60 seconds. (An alternative could be a digital clock. We think the cognitive load is higher if the user must count the pulses while tracking the digital numbers.) (Another alternative could be a true stop watch where the user presses the clock face to start the sweep or the count-up. Another press stops the sweep or the count-up.)

A nicety may be placing the clock and red dot on a background of a hand. This may be a bit too much visual information for the user.

Respiration:

For breathing, we want to represent the rise and fall of the chest. So we propose a vertical bar that rises and falls in time with the breathing. (Note, no stethoscope seems to be used here, so we cannot provide the sound of breathing.)

The bar is blue. It rises from a baseline.

The bar could be positioned on the chest.

Capillary refill:

Capillary refill can be tested on many parts of the body. For this situation, we will show it by pressing on the fingernail. Show a fingernail pressing on a fingernail. (Try it yourself.) The nail turns white, then the red returns. We will show it a little schematically – a white circle that shrinks, surrounded by pinkish-red. The nail is a "mask" (Photoshop term) over the white circle.

For clarity, we will use only a few timings for the pink-red flush to develop.

- 1 second – normal, or <2 seconds
- 3 seconds – corresponds to >2 seconds
- 10 seconds
- 15 seconds – corresponds to >10 seconds

Mental Status:

This expert appears to use the AVPU method used by first responders.

<http://en.wikipedia.org/wiki/AVPU>

also <http://www.nursingtimes.net/nursing-practice/clinical-zones/neurology/neurological-assessment-1-assessing-level-of-consciousness/1703021.article>

- Assess the level of consciousness using the AVPU scale; if fully awake and talking to you, they are A (alert). If they respond but appear confused, try to establish whether this is a new or a long-standing problem; causes of recent onset confusion include neurological pathology and hypoxia.
- If the patient is not fully awake, check if they respond to your voice, for example by opening their eyes, speaking or moving; if they do, they are V (responds to voice).
- If the patient does not respond to voice, administer a painful stimulus such as a trapezium squeeze (*use ear squeeze instead*) and check for a response (eye opening, verbal such as moaning, or movement); if there is a response, they are P (responds to pain). Those who do not respond are U (unresponsive).

A - Alert

Patient's eyes are open and s/he is looking around. May be moaning or verbalizing. May make guarding movements towards pain site.

We suggest using the dialog notepad that was used for BattleCare for dialog interaction.

Questions:

- Can you hear me?
- What is your name?
- Where are you?

These test for Alertness and Confusion. (An Alert patient could also be Confused.)

V - Voice

Response to question could be verbal, or just eyes opening, or a moan. But it indicates ability to respond. Again use the notepad for dialog.

P - Pain

This is not about where the pain is. It is being able to respond to pain. The Hotspot on the ear allows pressing on the ear to show an animation of squeezing the ear. Patient moans, opens eyes, or, if alert, will push hand away. Note, the learner should not apply pain if they have established that the patient is Alert and responds to Voice.

U - Unconscious

If the patient does not respond to any of the above, they are Unconscious.

Functional Specification Document (FSD)

Virtual Training Solution for: Mass Casualty Module – Triage according to SALT

Date: September 26, 2012

Document Version: 1.0

Document ID: CS/12-13/C-06/FSD_01

Submitted By



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To

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Table of Contents

EXECUTIVE SUMMARY.....	3
Definitions & Acronyms.....	3
OVERALL SYSTEM STRUCTURE:	5
MODULES OVERVIEW:	9
Login System:	9
Character Selection:	9
Communications Module:.....	10
Animation/ Gesture System:.....	10
User Interface module	11
Analytics module	13
Hotspot Module	13
Server Features	14
Application Technical Features	14
Technical Specifications for application to run	15
Deployment Details.....	16
Testing Strategy.....	17
APPENDIX I: ADMINISTRATIVE AND SUPPORT CONTACTS.....	18

Executive Summary

The Institute for Intelligent Systems and the School of Nursing of the University of Memphis are keen on exploring the use of CliniSpace, a Virtual Healthcare Training & Simulation platform, in conjunction with their own AutoTutor Lite intelligent tutoring technology.

The objective is to use a scalable, online platform that delivers engaging content, intelligent tutoring and game play for learning and training, focusing on the training of Nurses in preparation for a mass casualty.

Definitions & Acronyms

Definitions & Acronyms	
Term	Meaning
CS	CliniSpace
IIL	Innovation in Learning, Inc.
IIS	Institute for Intelligent Systems
UM	The University of Memphis
DHS	Department of Homeland Security, UM's sponsor
Unity	Unity 3D
SALT	<u>S</u> ort, <u>A</u> ssess, <u>L</u> ife-saving interventions, <u>T</u> reatment or <u>T</u> ransport
3D	Three - Dimensional
ATL	AutoTutor Lite

The solution being developed for UM is for training of nurses on the evacuation process during an emergency, such as an earthquake, and communication with emergency personnel.

The system is subdivided in to following general components. These components will be further subdivided in to modules.

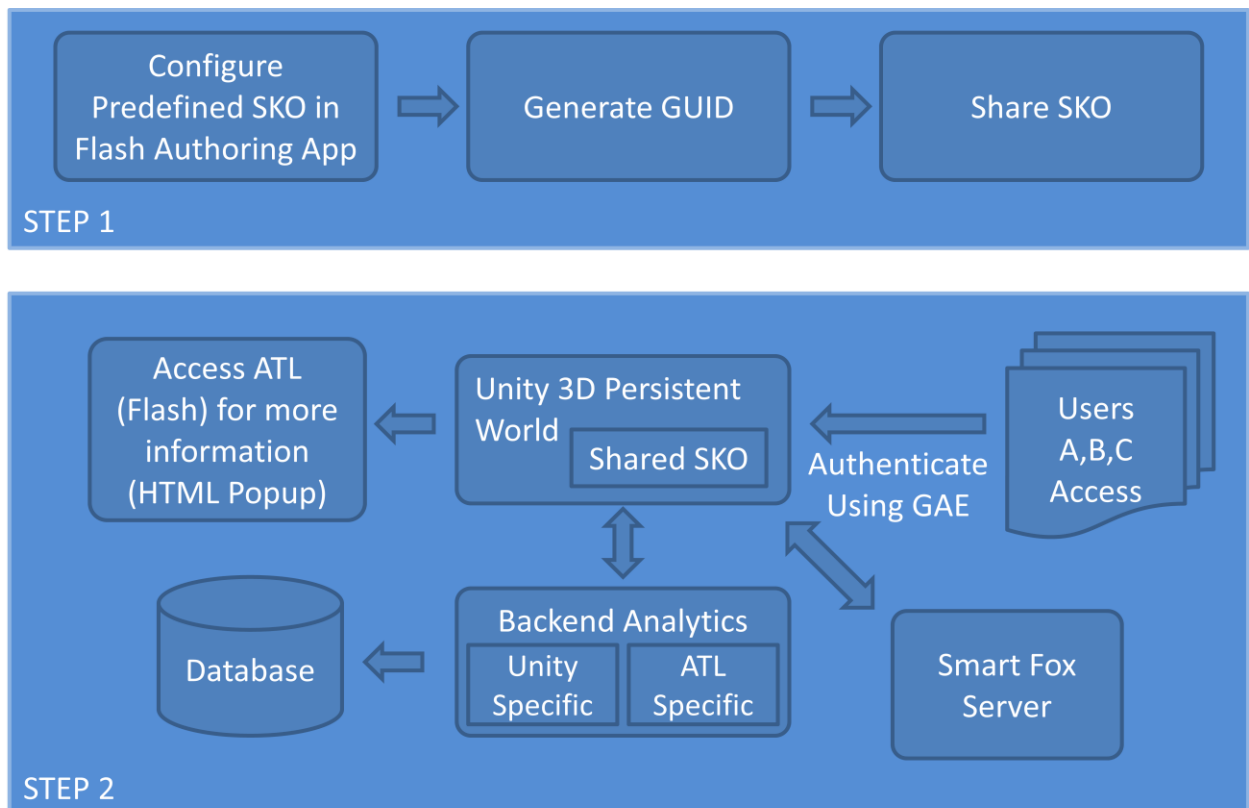
- Client (front end)
 - Login System (integration with GAE)
 - User Interface (including ATL)
 - Animation
 - Gameplay
 - Sound
 - VFX
 - Server-Interaction component
 - Voice
- Server (back end)
 - Gameplay
 - Database-Interaction Component
 - Client-Interaction component
- Database
 - Database-Schema

Overall System Structure:

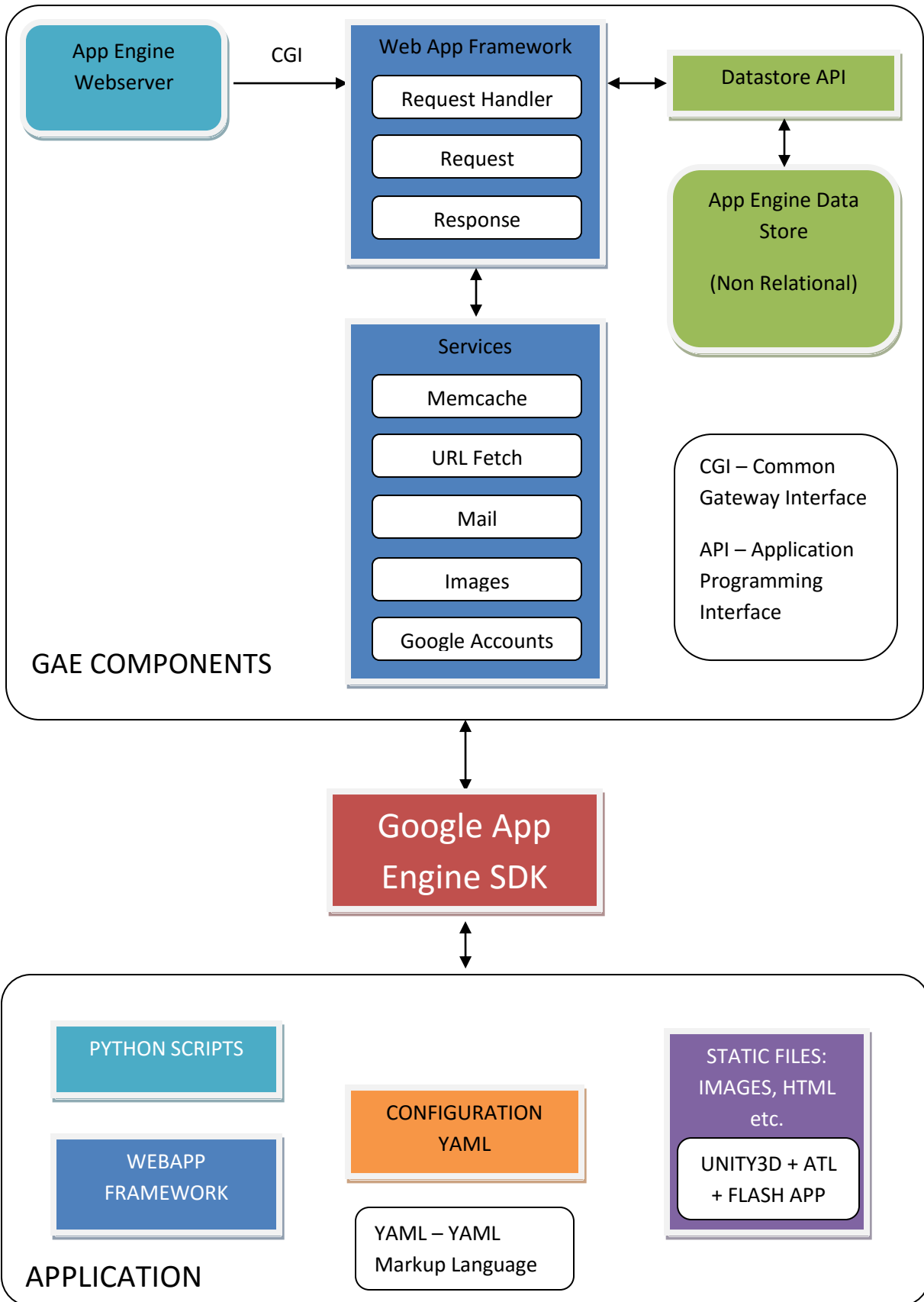
The various components of the application are as follows:

- Google App Engine (GAE) and its components
- Unity, ATL and SFS and their interactions
- Flash Authoring App

OVERALL SYSTEM FLOW AND INTERACTION

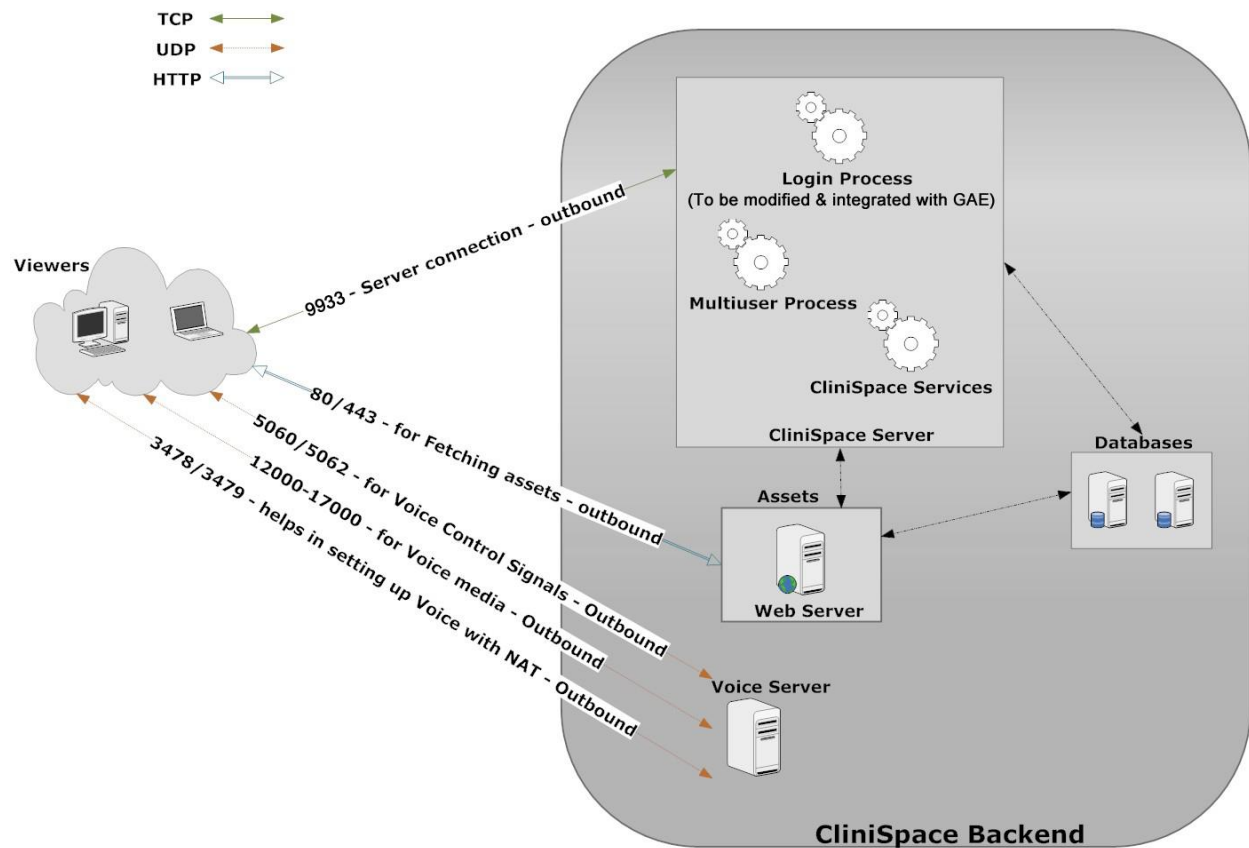


GOOGLE APP ENGINE AND ITS COMPONENTS:



UNITY, SFS AND ITS INTERFACE (EXISTING CLINISPACE SYSTEM):

CliniSpace Network Architecture



The CliniSpace experience is provided by interacting services including:

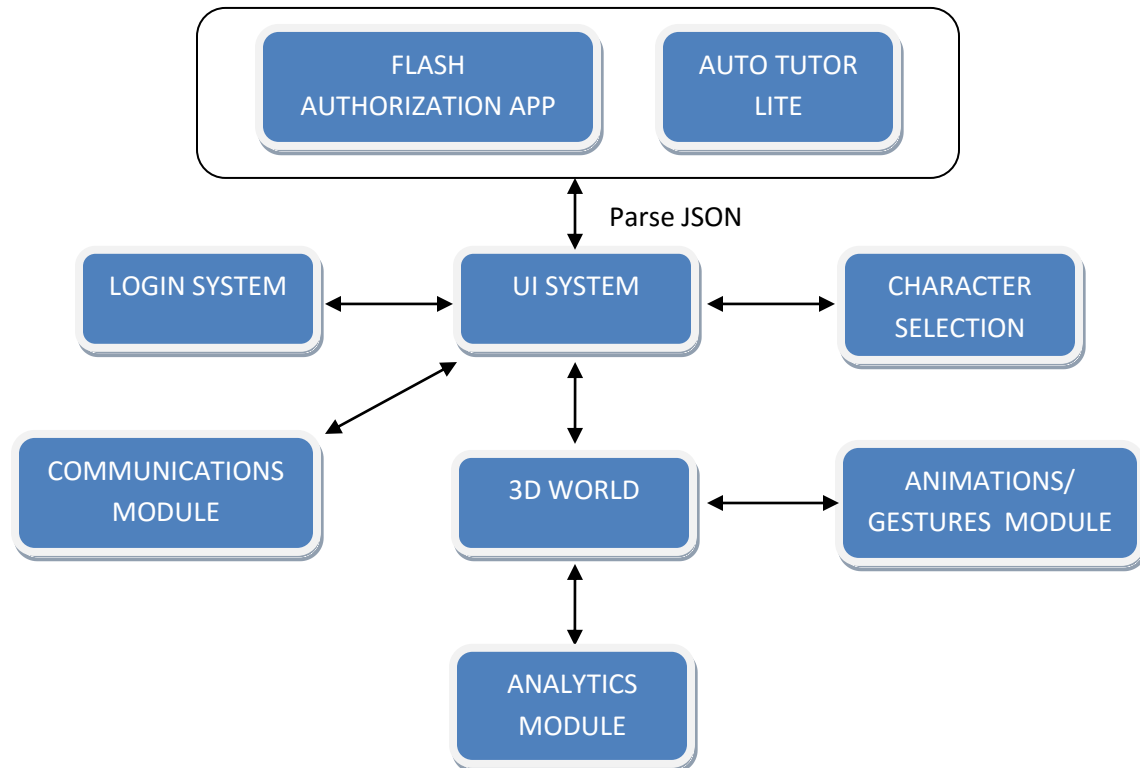
- Dynamically downloaded persistent virtual spaces
- A multi-user server that tracks all user actions and transmits them to all users
- A database that records user actions, session setup information and performance assessments
- A web server that provides backend services for session setup and invitations, for analytics and for learner assessments
- A voice server for VoIP conversation between all users in a room.

The user logs in and is authenticated by the Multi-User Server. They select a character and role, and enter the virtual world, like in this case, an area in a city affected by an earthquake. They move through different spaces by navigating or teleporting. (The available spaces are configured for custom solutions.) The Multi-User Server tracks their actions and serves up behaviors and animations based on the user's selections. These include text chat, animations and state changes of computer-controlled characters (also known as non-player characters) such as the virtual patients. The Voice server allows players to interact through verbal conversation. All actions are tracked and stored in a database for real-time or subsequent recall and analysis.

Interactive objects in CliniSpace environments are objects with distributed intelligence. Each object has its own capabilities, and its inputs and outputs interface with other objects, or with the virtual patient. Each object has a visualization based on its state, which may change, and a user interface menu.

Modules Overview:

An overview of how modules interact with each other:



Login System:

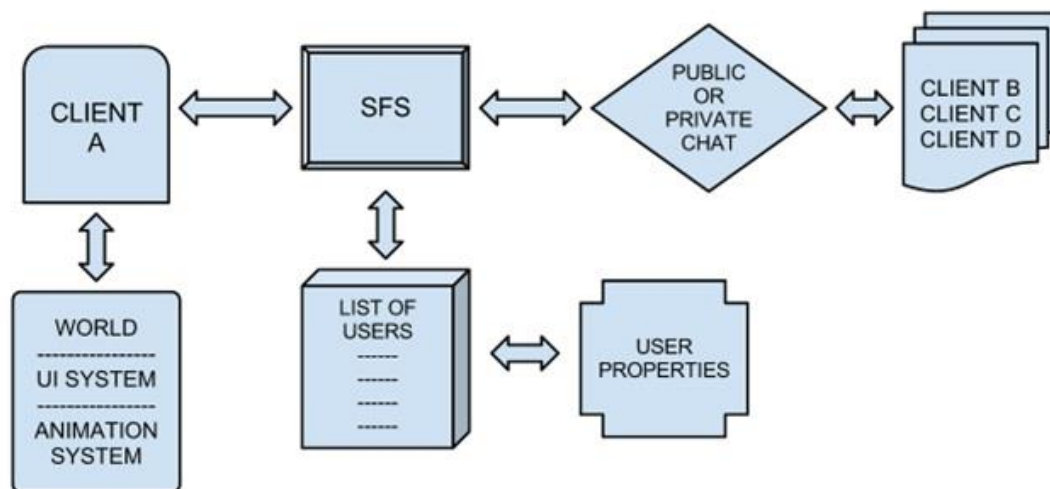
- The user credentials are validated using the values for username and password through the Google App Engine, on success of which, the user is allowed to proceed to character selection.
- Any other user data such as the Display name (is different to the username), Role Description etc is retrieved at this stage and stored with the Player Manager (a sub-module inside the application that handles all the information regarding the concerned player) as an entry for this user.

Character Selection:

- The client sends the ID of the character selected by the player to the game server.
- The game server validates the ID and retrieves the download URL for the character and sends it back to the client.
- The client adds this URL to its download list in order to start the download.

Communications Module:

- Public Chat
 - The client sends the public chat request along with the chat message to the server.
 - The server sends this message to all the users who are currently present in the room.
- Private Chat
 - The client sends the public chat request along with the chat message and the id of the user for whom the message is meant for to the server.
 - The server just forwards the message to the correct user based on the id.
- Contact List
 - The contact list (list of users currently in the room) is maintained on the server side itself.



Animation/ Gesture System:

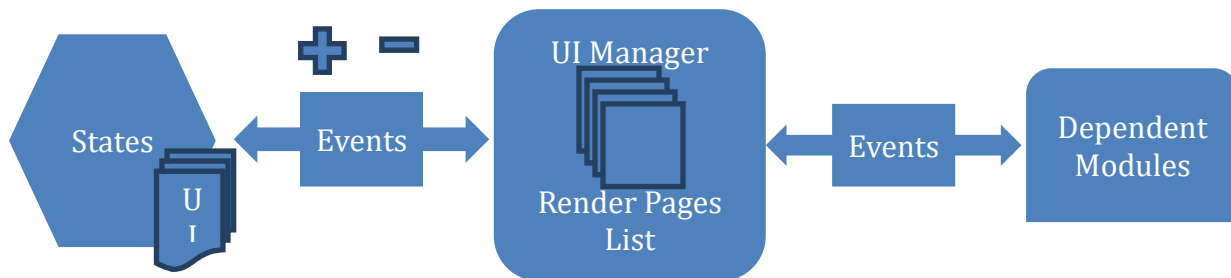
- Movement
 - When movement input is provided by the user the player avatar is translated in the input direction with a constant speed. Also Animation Manager is responsible for playing the corresponding animation.
 - Movement packets are sent from the client to the server only when the move input is provided by the user, the packet consists of the direction and position values of the player avatar.
 - The server is responsible to send these packets to the rest of the connected clients so that movement is synched throughout the system for that user.

- **Gesture**

- The player will be able perform gesture only in idle state if the gesture is performed while the player is in movement state the movement animation is overridden by the gesture animation.
- If the player is already performing a gesture then he/she cannot perform another gesture before the current animation is finished.
 - This is enforced by the server by allowing the client to perform gesture only if he is not performing any gesture currently.

User Interface module

This module is responsible for all the User Interface that is seen on the app. The module is triggered through the events and the current game state. Every game state has one or multiple UI control pages.



Every game state calls the UI Manager to add and remove pages from the UI Render List. The UI Manager exposes the interface to do the same and also handles event call backs from the pages back to the respective owner game states. The Manager maintains the UI Control Page render list which is the list of pages which are currently being rendered on the screen. Some of the various components of the UI in Clinispace to be extended to the application are:

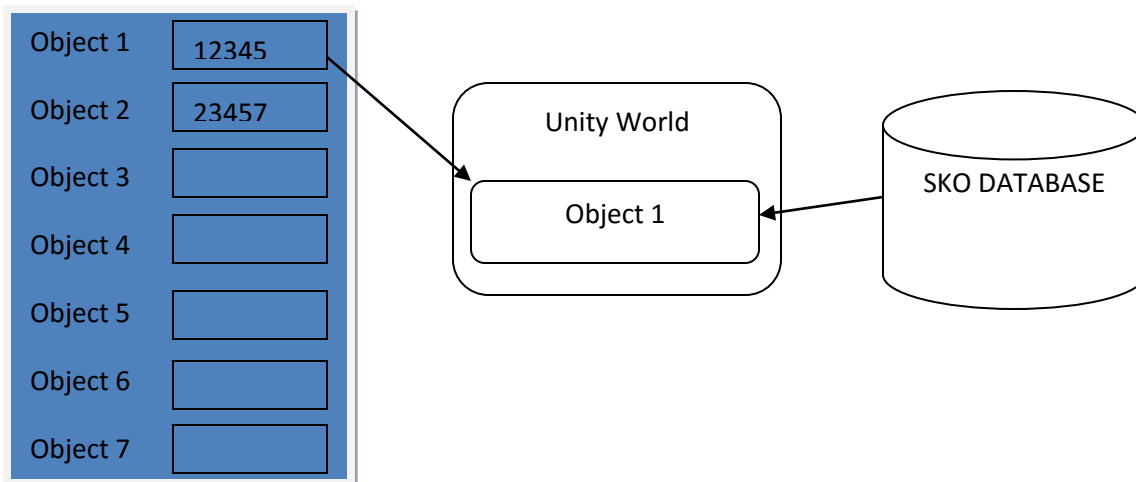
- **Communications Panel**

- Chat window Button - On click opens/closes the chat window, the chat window.
- Chat Window – Always has the default public tab, message can be typed in the text panel. The message is sent to the server on pressing enter or clicking on the send button. The message is also displayed in the chat panel of the window. Once the number of messages exceeds the panel height, vertical scroll bar appears on the panel.
- Contact List Button – On click shows the list of all connected users, User can select the other user he wishes to initiate a private text chat with. Each selected user appears as a separate tab in the chat window.

- Settings Panel
 - Display Settings –
 - Full Screen checkbox – enables/disables full screen mode.
 - Screen Resolution Drop Down List – desired screen resolution can be selected from the given list.
 - Hide User interface Checkbox – shows/hides the user interface
 - Quality Settings –
 - Anti Aliasing Drop Down List – Anti aliasing sampling rate can be selected from the list to enable anti aliasing. Anti aliasing is disabled by default.
 - Anisotropic filter checkbox – enables/disables anisotropic filtering.
 - Volume Settings –
 - Volume slider – used to set the volume level in world.
 - Mute check box – enables/disables environment sounds.
 - Help Panel –
 - Displays information about different user controls available in the world.
 - Log Out Button –
 - On Click displays a confirmation window to the user for logging out. Once the user selects ‘yes’ he is logged out of the world.

- Misc
 - Display Name Button – shows/hides the display name of the user present on the player’s avatars head.
 - Teleport Button – On click displays a list of areas (if any) that the user can teleport to. The user can select an area he wishes to teleport to from the list.

- Associating GUIDs with Objects
 - The list of interactive objects in the environment is known at the Client.
 - Thus, the main user/facilitator of the application will need to assign the GUID of the SKO to the respective interactive object.



Analytics module

- Date and the current system time to be stored with each entry.
- All user actions in Memphis will be tracked and logged in a SQL database.
- It is time-stamped, user-stamped, and indicates the action taken.
- Data from the database will be processed in real time or after the session.
- The assessment depends on certain parameters that are listed below:
 - Learner can be assigned a score based on the following performance criteria (each of these criteria will be tracked against the user):
 - Assignment of the correct Triage Tag at each stage (Primary & Secondary)
 - Correct order of steps involved in assessment prior to each Triage stage
 - Type of questions posed to the ATL Tutor (assessment at ATL's end)
 - Completion of Triage stage within an ideal/target time
 - The final score can be based either on a weighted average of the above parameters or the learner can be scored on each of these parameters individually.

Hotspot Module

- The world co-ordinates from the object of interest are taken, and these coordinates are converted to screen co-ordinates from the point of view of the Camera.
- The corresponding UI is relative to this new position.
- The bounding box for the UI effect is calculated and repositioned if the position and size of the UI element falls out of the screen.
- Using simple interpolation algorithms various UI elements like buttons, labels etc. area animated.



Server Features

- Event/Request Handling
 - Everything in the world is synchronized by sending events/requests to the servers which are to be processed by the server.
 - In order for a server module to be able to process an event/request it needs to be derived from the Clinispace module.
- World Synchronization
 - World Sync includes syncing of all the interactive objects in the world e.g. presenter.
 - World sync is handled using a packet named 'sao'. The packet consists of the current state of all objects in the world.
 - Whenever a new player enters the world he first receives the 'sao' to sync with.
- Player Synchronization
 - Player synchronization process involves synchronizing all the player movements/gestures across the world so that none of the players appear out of sync.
 - Player sync is handled by the packet 'tran', this packet consists of float values that represent the players' position and rotation.
 - The 'tran' packet is only sent when that player is moving /gesturing in the environment.
- Database Communication
 - Database communication is handled using the Smartfox DBManager.
 - Accessing information from the database will always be done within a try – catch block.

Application Technical Features

- Anti-Aliasing: Anti aliasing is supported from 2x to up to 16x multi sampling rate.
- Resolutions Supported: The resolutions are picked up from the system the application is running on.

Technical Specifications for application to run

- Hardware
 - Minimum System Requirements for users :
 - OS: Windows XP, Vista, 7 or Mac OS X
 - CPU: 1.8 GHz +
 - RAM: 512 MB
 - Video: Video Card with 64 MB Memory (Intel Integrated Graphics on 965 chipsets and above do not require any separate video cards)
 - Recommended System Requirements:
 - OS: Windows XP, Vista, 7 or Mac OS X
 - CPU: 2.4 GHz +
 - RAM: 1 GB+
 - Video: Video Card with 128 MB Memory and above

- Networking (Port requirement)
 - One TCP Port – Configurable (default:9339)
 - Port 80 – HTTP
 - Port 443 – HTTPS
 - Ports for voice
 - Ports 12000 – 17000 – UDP – for voice media (RTP/RTCP)
 - Port 80 and 443 – for Web Server (HTTP/HTTPS)
 - Ports 5060 and 5062 – UDP – for voice control signals (SIP)
 - Ports 3478 and 3479 – UDP – to aid in setting up voice with NAT (STUN)

Deployment Details

- Unity Application Web Deployment
 - Standard unity web player build to be deployed through the Google App Engine. The build will not include any player or level asset files as these will be downloaded according to user selection.
 - The Index.html file will have code to check for installing the dependencies (Vivox, Unity etc.).
- Server Application Deployment
 - Appropriate zone files will be copied in the zones folder of SmartFox.
 - The Zone file will have the entry for the database to connect to using the proper JDBC connection interface.
 - The Zone and Room extension jar and property files will be copied in the extensions folder of SmartFox.

Testing Strategy

A comprehensive Testing strategy would be developed in collaboration with University of Memphis.

Testing involves the following:

- Unit Testing – Testing each individual system out individually, to the extent possible, without any integration
- Integration Testing (Offsite) – Testing performed after integrating all systems of the solution. Performed internally by IG.
- Live Testing – Testing performed after hosting the final solution. Performed both by IG & UM. This falls under the User Acceptance Testing (UAT).

Appendix I: Administrative and Support Contacts

In case of any queries/communication regarding this document, please contact:

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Name: Parvati Dev

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U.S.A

Tel: 650-208-8142

Module – Triage according to SALT

Document: Game Design Document (GDD)

Date: Sept 26, 2012

Version: 1.0

Document Revision History

Revision List			
Ver No	Date	Author	Description

Reference Resources

Documents:

- ▶ CS/12-13/C-06/Pr-2

Links:

- ▶ <http://www.skoonline.org>
- ▶ <https://sites.google.com/site/vcaestmodules/entrypage/home/finalized-modules/finalized-module-3>

Index

- ▶ Executive Summary
- ▶ Definitions & Acronyms
- ▶ Application Overview
- ▶ Environment
- ▶ Characters
- ▶ Application Flow & Features
 - Use Case & Features – Learner
 - ATL – Learner Interaction
 - Success Parameters
 - Use Case & Features - Facilitator
- ▶ Additional Technical Notes

Executive Summary

- ▶ The Institute for Intelligent Systems and the School of Nursing of the University of Memphis are keen on exploring the use of CliniSpace, a Virtual Healthcare Training & Simulation platform, in conjunction with their own AutoTutor Lite intelligent tutoring technology.
- ▶ The objective is to use a scalable, online platform that delivers engaging content, intelligent tutoring and game play for learning and training, focusing on the training of Nurses in preparation for a mass casualty.

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3D	Three - Dimensional
ATL	AutoTutor Lite

Application Overview

CliniSpace is a virtual environment-centered platform upon which healthcare education and training solutions can be developed. The solution developed for UM will be for training of nurses on the evacuation process during an emergency, such as an earthquake, and communication with emergency personnel. We list below the solutions being provided:

- ❑ **CliniSpace® Triage**
- ❑ **CliniSpace® Hotspot Middleware for AutoTutor Lite Integration**

Application Overview

❑ CliniSpace® Triage:

- ▶ This is a multi-patient scenario, in the grounds outside the hospital, with a performance goal of performing the correct triage category, the appropriate intervention (if any).
- ▶ The solution will be built by expanding on CliniSpace's award-winning CliniSpace and BattleCare applications. Learners will interact with each patient, evaluating and tagging each patient, and preparing a list of issues for consideration during transportation. Incorrect assessment or management of a patient, location sensitivity and/or mandatory triggers will trigger AutoTutor Lite response, and the learner will be guided through the reasoning and decision-making for that case.
- ▶ UM, and their sponsor, DHS, will receive an engaging, highly interactive learning experience for one or multiple learners interacting with virtual patients set in a 3D environment. UM will have the ability to author tutoring content, for teaching and remediation, based on performance criteria that they will be able to set themselves.

Application Overview

- **CliniSpace® Hotspot Middleware for AutoTutor Lite Integration:**
 - ▶ This is middleware that allows tutoring content to be linked to author-selected objects, characters, menu items, or events. Once such a link is created, the object, character, etc. acts as a “hotspot”. User selection of the hotspot or, in the case of an event, user encounter of that event, will trigger the tutoring dialog linked to that hotspot. The “hotspot” authoring tool will be used by UM or other authors to create tutoring content for display and use within the CliniSpace environment.
 - ▶ For the current scope selected hotspots will be created by IIL for implementation of tutoring content. In later projects, a generalized hotspot middleware technology will be designed and implemented.
 - ▶ Using the Hotspot Middleware and Authoring Tool, UM faculty will be able easily to create training and tutoring content for the scenarios that will be developed for evacuation training.

Environment

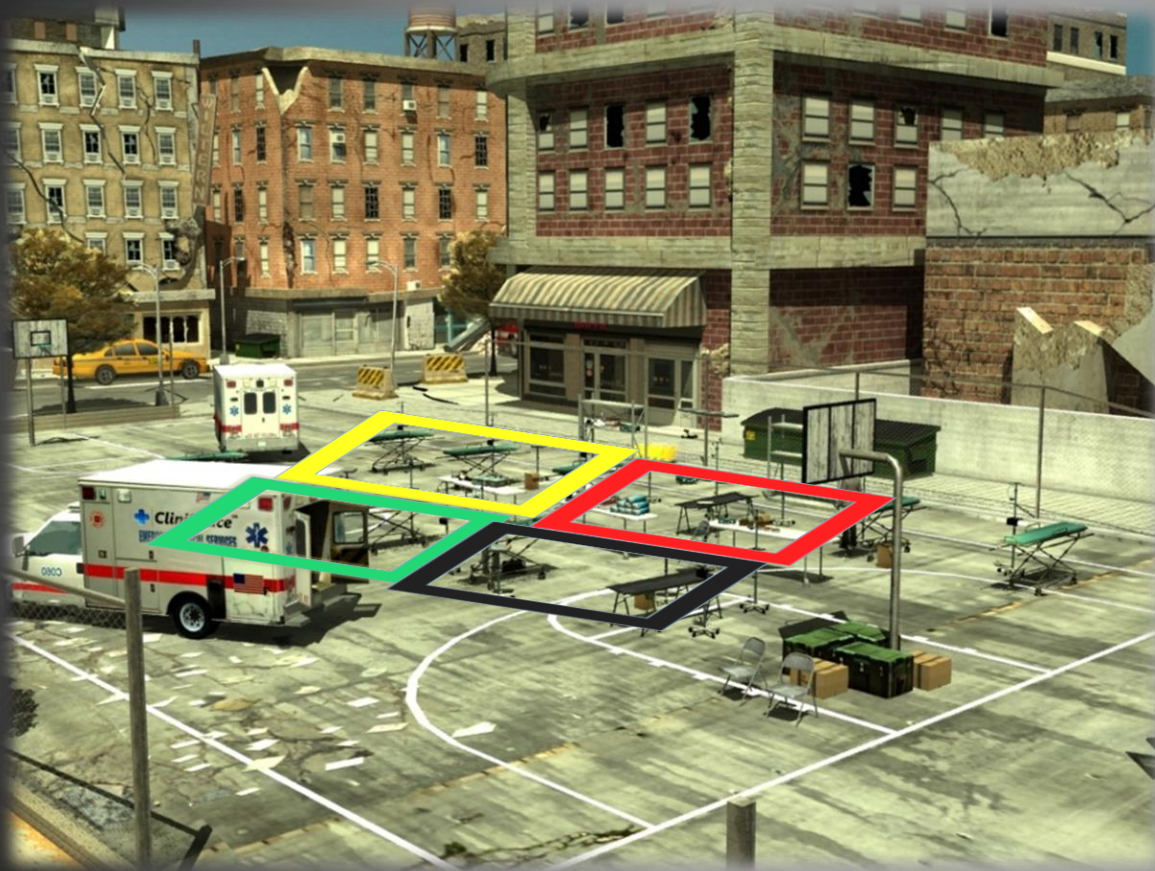
- »» □ Primary Triage Area– Earthquake-hit Urban/Sub-urban Street
- Secondary Triage Area – Staging Area – Basketball Court

Primary Triage Area



- ▶ Interactive patients/victims will be lying around on the street at various locations
- ▶ A marker will highlight the interactive patients/victims for identification by the learner

Secondary Triage/Staging Area



- ▶ Once the primary triage has been undertaken by the learners on the victims, they will be automatically transported to this staging area.
- ▶ The staging area will also include triage colour coding on the ground to segregate patients based on the primary triage tagging.

Characters

- »» Patients/Victims
- Learner Characters
- Non-Playing Characters

Patients/Victims - 9



Note: 4 more patients are currently being developed

Learners - 6



Non-Playing Characters (Extras) - EMT



Non-Playing Characters (Extras)



Non-Playing Characters (Extras)



Application Flow

- »» Use Case & Features– Learner
- Use Case & Features– Facilitator

Use Case & Features

Learner

Use Case Overview (Learner)

Learner logs in using Gmail Username and Password

Learner spawns in Primary Triage Area

Learner identifies a victim highlighted by a marker

Learner assesses the victim according to SALT-defined parameters – Respiration, Capillary Refill, Radial Pulse and Mental Status

Learner undertakes primary triage of victim and tags him/her using the colour codes – Black, Grey, Red, Yellow, Green (the non-relevant tags are removed from the patient)

Victim is automatically transported to the Secondary Triage/Staging Area and placed according to the triage colour codes

Further medical intervention is undertaken using IV Stands, Oxygen cylinders and patient is re-assessed (Secondary triage) for transportation to hospital/next staging area via ambulances

Primary Triage – Step 1 – ID of Hotspots

The following hotspot will be available on each victim for the assessment:

- ▶ Hand (for pulse) – with tooltip indicating that a radial pulse can be taken. Both hands can have highlights. Even if no pulse is available, the highlight should be present. If one arm is injured, it is possible that the user can compare the pulse on the two arms.
- ▶ Chest (for respiration)
- ▶ Hand nail (for Capillary Refill) – This forces us to have two activities on the hand, adding another click to the interface. If we can have one highlight on the wrist (pulse) and one on the fingertips (cap refill), then we do not need the two-step interface for selecting the function.
- ▶ Ear (pain check in mental status) – allow pinching the ear.

Note: Besides the patient hotspots, there will be other pre-determined hotspots within the 3D environment that will be integrated with ATL.

Primary Triage – Hotspots – Image Reference

SGT RODRIGUEZ: "WHAT DO YOU WANT TO DO NEXT? CONTINUE EXAMINING HIM – OR ASK HIM SOME QUESTIONS?"



Primary Triage – Step 2 - Assessment

Assessment of the Victim based on the following parameters:

Respiration	<30 per min; >30 per min; Nonexistent; 30 and shallow; gurgling sounds; rapid and shallow; 10; 40; 18
Capillary Refill	<2 seconds; >2 seconds; sluggish; >10 seconds; normal
Radial Pulse	Present; Nonexistent; weak and thready; rapid thready; not palpable secondary to burns; (not mentioned, but “bounding” is also a common description)
Mental Status	Unconscious; Follows commands; moaning, opens eyes; cannot be assessed; opens eyes, no direct eye contact

Primary Triage – Graphical User Interface

- Image Reference *(not the final design)*



-  Response/walk check
-  Breathing check
-  Open airway
-  Respiration rate check
-  Pulse rate check
-  Capillary refill rate check
-  Priority - to tag the casualty
-  Exit examination mode

Primary Triage – Step 2 –User Interface

Features & Interaction

❑ Pulse:

- ▶ The pulse is taken by taking the wrist in the user's palm and placing two fingers on the radial (thumb-side) pulse. Since this is on a computer and not the iPad, we cannot "feel" the pulse. We want an alternate perception that feels similar. We propose the following
- ▶ A red circle that expands and contracts with a timing similar to a felt pulse. The expansion is faster than the contraction. The rate corresponds to the pulse rate. A strong pulse has a larger, brighter circle. A weak pulse shows very little expansion. A thready pulse wavers as it expands, and does not expand much. A bounding pulse expands and contracts very fast.
- ▶ The red circle sits in the middle of a round clock face. The clock (or stop watch) has only a second hand that sweeps around the clock face in 60 seconds. (An alternative could be a digital clock. We think the cognitive load is higher if the user must count the pulses while tracking the digital numbers.) (Another alternative could be a true stop watch where the user presses the clock face to start the sweep or the count-up. Another press stops the sweep or the count-up.)
- ▶ A nicety may be placing the clock and red dot on a background of a hand. This may be a bit too much visual information for the user.

❑ Respiration:

- ▶ For breathing, we want to represent the rise and fall of the chest. So we propose a vertical bar that rises and falls in time with the breathing. (Note, no stethoscope seems to be used here, so we cannot provide the sound of breathing.)
- ▶ The bar is blue. It rises from a baseline.
- ▶ The bar could be positioned on the chest.

Primary Triage – Step 2 –User Interface

Features & Interaction

❑ Capillary refill:

- ▶ Capillary refill can be tested on many parts of the body. For this situation, we will show it by pressing on the fingernail. Show a fingernail pressing on a fingernail. (Try it yourself.) The nail turns white, then the red returns. We will show it a little schematically – a white circle that shrinks, surrounded by pinkish-red. The nail is a “mask” (Photoshop term) over the white circle.
- ▶ For clarity, we will use only a few timings for the pink-red flush to develop.
- ▶ 1 second – normal, or <2 seconds
- ▶ 3 seconds – corresponds to >2 seconds
- ▶ 10 seconds
- ▶ 15 seconds – corresponds to >10 seconds

❑ Mental Status:

- ▶ Assess the level of consciousness using the AVPU scale; if fully awake and talking to you, they are A (alert). If they respond but appear confused, try to establish whether this is a new or a long-standing problem; causes of recent onset confusion include neurological pathology and hypoxia.
- ▶ If the patient is not fully awake, check if they respond to your voice, for example by opening their eyes, speaking or moving; if they do, they are V (responds to voice).
- ▶ If the patient does not respond to voice, administer a painful stimulus such as a trapezium squeeze (*use ear squeeze instead*) and check for a response (eye opening, verbal such as moaning, or movement); if there is a response, they are P (responds to pain). Those who do not respond are U (unresponsive).

Primary Triage – Step 2 –User Interface Features & Interaction

A – Alert:

- ▶ Patient's eyes are open and s/he is looking around. May be moaning or verbalizing. May make guarding movements towards pain site.
- ▶ We suggest using the dialog notepad that was used for BattleCare for dialog interaction.
- ▶ Questions:
 - ▶ Can you hear me?
 - ▶ What is your name?
 - ▶ Where are you?
- ▶ These test for Alertness and Confusion. (An Alert patient could also be Confused.)

V – Voice:

- ▶ Response to question could be verbal, or just eyes opening, or a moan. But it indicates ability to respond. Again use the notepad for dialog.

P – Pain:

- ▶ This is not about where the pain is. It is being able to respond to pain. The Hotspot on the ear allows pressing on the ear to show an animation of squeezing the ear. Patient moans, opens eyes, or, if alert, will push hand away. Note, the learner should not apply pain if they have established that the patient is Alert and responds to Voice.

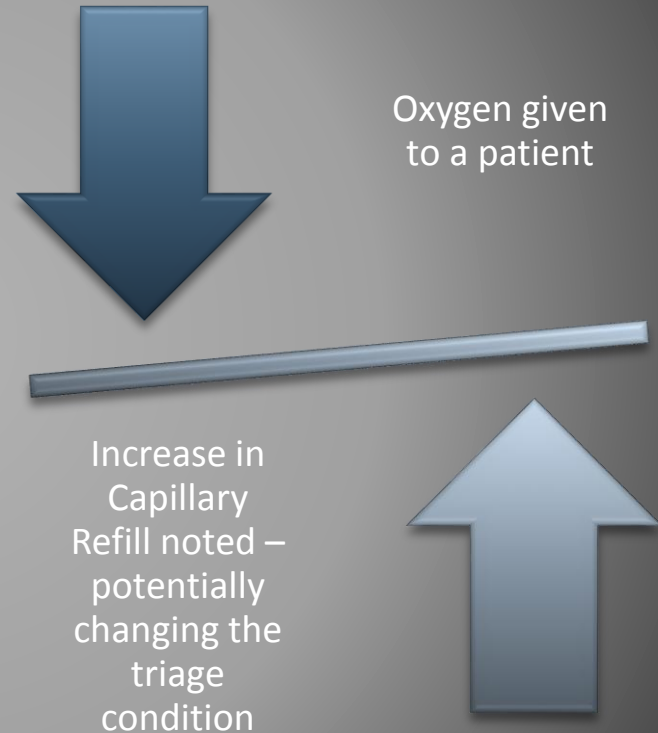
U – Unconscious:

- ▶ If the patient does not respond to any of the above, they are Unconscious.

Secondary Triage – Step 1 – Medical Intervention

- ▶ The learner will have the ability to perform medical intervention on the patient using the following interactive objects:
 - IV Stand
 - Oxygen Cylinders
 - Dressings
- ▶ These interactive objects will have pre-determined menu options
- ▶ The impact of any of the medical intervention on the victim will be hardcoded into the environment using a minimalistic set of physiology rules by co-relating the victim parameter (pulse etc.) with the impact of oxygen, saline etc.

Example:



Secondary Triage – Step 2 – Re-assessment of Patient

- ▶ The learner will need to re-assess the patient according to the required parameters and re-tag them.
- ▶ Following options will be provided to the learners to proceed:
 - Transport patient to hospital via ambulance
- ▶ The learner will be judged on the correct triage assessment at the secondary stage as well as the decision to transport the patient based on their condition
- ▶ The patient transport decision will be logged but will not be depicted within the 3D environment under the current scope

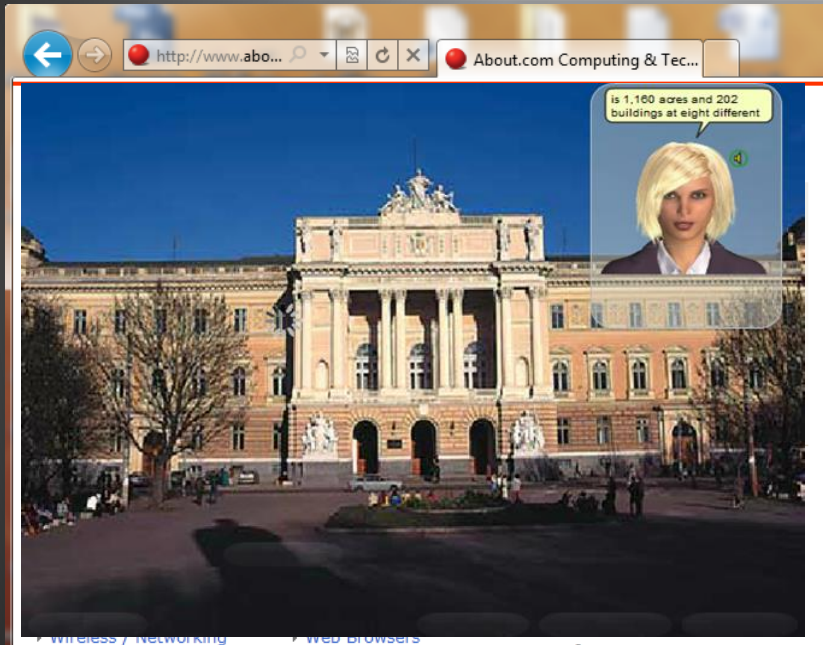
ATL – Learner Interaction

ATL – Learner Interaction

- ▶ Following types of situations can trigger the ATL-Learner interaction in the environment:
 1. Pre-determined events that will trigger mandatory interaction with ATL including incorrect assessment/management of the patient can trigger an interaction with ATL
 2. Location sensitivity – If a learner approaches a certain radius or area in the 3D environment, interaction with ATL will be triggered.
 3. Learner requested interaction with ATL
- ▶ All of the above triggers need to be pre-determined and listed by UM and the types of trigger-interactions should be unique in the environment.
- ▶ The facilitator will have the ability to hyperlink each of the above with an SKO

ATL – Learner Interaction – User Interface

- ▶ The current Flash-based ATL interface will launch as a browser pop-up over the 3D environment for the learner



Success Parameters

Success Parameters

-(Suggested parameters below- Needs validation from Triage expert)

- Learner can be assigned a score based on the following performance criteria (each of these criteria will be tracked against the user):
 - ❑ Assignment of the correct Triage Tag at each stage (Primary & Secondary)
 - ❑ Correct order of steps involved in assessment prior to each Triage stage
 - ❑ Completion of Triage stage within an ideal/target time
- The final score can be based either on a weighted average of the above parameters or the learner can be scored on each of these parameters individually.
- All of these parameters will be tracked against the user and stored in a database.

Success Parameters - Reference

Sieve Results

Single Mobility Sieve

Casualty Breakdown

	Tag	Steps
Casualty 1		
Casualty 2		
Casualty 3		
Totals	100%	66%

Detailed Breakdown



Age:	33
Walking:	No
Breathing:	Yes
Respiratory Rate:	32 per minute
Pulse Rate:	130 per minute
Cap Refill Rate:	<= 2 Secs

Correct Procedure	Your Procedure
--------------------------	-----------------------

	Response Check
	Open Airway
	Resp Check
	Cap. Refill
	Pulse Check
	Tag

 	X 2
----------	-----------------

Priority: P1 Target time: 33 Secs

Use Case & Features

Facilitator/Trainer

Facilitator/Trainer Unlock Code

- Since the 3D environment is persistent and shared by all users (learners and facilitators), the authoring will have to be undertaken by the facilitator on the live, real-time environment.
- A unique unlock code/key will be provided for the facilitators. UM will be responsible for sharing the key with designated facilitators
- This code/key will unlock the authoring features for a facilitator on the environment interface (this is how a facilitator will be distinguished from a learner by the system)
- Once the author edits the parameters and applies, the state of the patient will be updated for all users in the 3D environment until it's altered again by a facilitator



Facilitator/Trainer Authoring Features

- ▶ Ability to author the victim parameters – Respiration, Capillary Refill, Pulse and Mental Status
- ▶ Ability to reset the state of a patient from Secondary triage to Primary triage
- ▶ Ability to link a pre-determined 3D asset and/or location with an SKO hyperlink (*Please note that the authoring of the SKO itself will be undertaken using the existing UM Flash-based system. The GUID that will be generated will be the SKO link that can be attached in-world*)

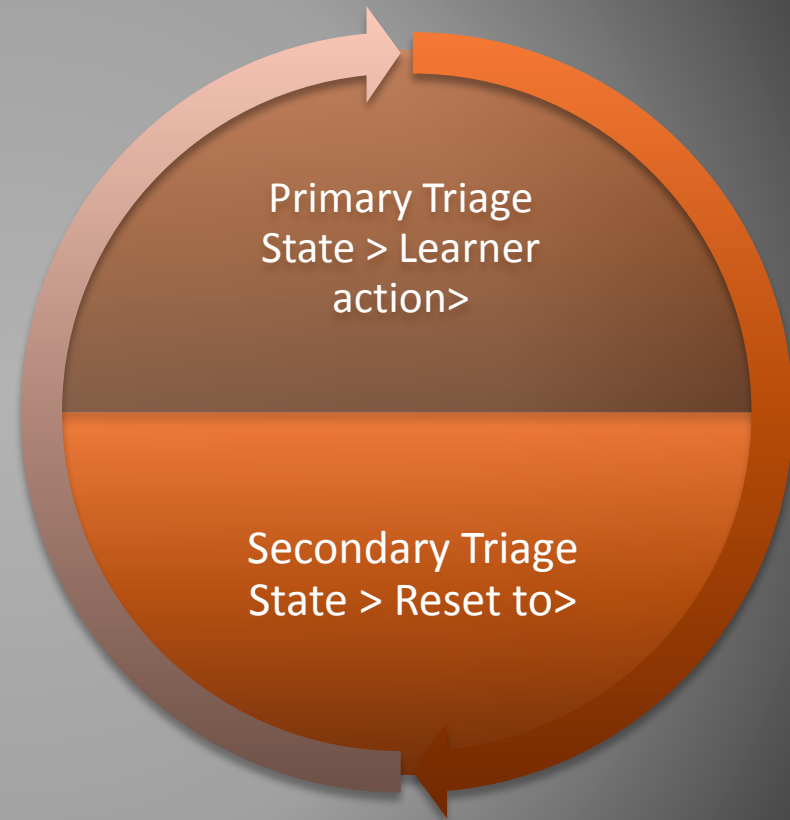
Authoring of Patient/Victim Parameters

- ▶ The Facilitator will have the added GUI capability to edit/author the following parameters for each patient:

Respiration	<30 per min; >30 per min; Nonexistent; 30 and shallow; gurgling sounds; rapid and shallow; 10; 40; 18
Capillary Refill	<2 seconds; >2 seconds; sluggish; >10 seconds; normal
Radial Pulse	Present; Nonexistent; weak and thready; rapid thready; not palpable secondary to burns; (not mentioned, but “bounding” is also a common description)
Mental Status	Unconscious; Follows commands; moaning, opens eyes; cannot be assessed; opens eyes, no direct eye contact

Authoring of Patient/Victim State

- ▶ Once a patient has undergone Primary triage and moved into the Secondary triage state, the facilitator will have the ability to click on the victim and reset the state to Primary triage, so that learners can re-do/re-experience the triage scenario.
- ▶ Once a patient has undergone Secondary triage and a decision has been made regarding transportation, the patient will be automatically reset to Primary triage for the scenario to be available again for other learners.



Authoring of the ATL SKO- Options

- ▶ A list of pre-determined – 3D assets, locations and events will be programmed to be authorable within the 3D environment.
- ▶ The facilitator will be able to select these pre-determined entities and link an ATL-enabled SKO hyperlink to the same.
- ▶ This hyperlink when triggered for the learner will come up in a browser pop-up.



Additional Technical Notes



Editor/Development Tools

- ▶ Unity 3D: Unity 3D is a technology for video game development and for architectural visualizations. It works on a large number of consoles as well as embedded inside browsers to deliver high quality 3D animations in the browser. Unity is a feature rich, fully integrated development engine for the creation of interactive 3D content. It provides complete, out-of-the-box functionality to assemble high-quality, high-performing content and publish to multiple platforms
- ▶
- ▶ 3DS Max: Autodesk 3ds Max is 3D modeling, animation, and rendering software for games, film, and television development.

Semantic Representation Analysis: A General Framework for Individualized, Domain-Specific and Context-Sensitive Semantic Processing

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Abstract. Language agnostic methods for semantic extraction, encoding, and applications are an increasingly active research area in computational linguistics. This paper introduces an analytic framework for vector-based semantic representation called semantic representation analysis (SRA). The rationale for this framework is considered, as well as some successes and future challenges that must be addressed. A cloud-based implementation of SRA as a domain-specific semantic processing portal has been developed. Applications of SRA in three different areas are discussed: analysis of online text streams, analysis of the impression formation over time, and a virtual learning environment called V-CAEST that is enhanced by a conversation-based intelligent tutoring system. These use-cases show the flexibility of this approach across domains, applications, and languages.

Keywords: Semantic analysis, language agnostic, domain vocabulary, intelligent tutoring systems.

1 Theoretical Basis: Semantic Representation Analysis

As the internet becomes pervasive worldwide, languages other than English will be increasingly common. Chinese, Spanish, French, German, Korean, and many other languages already have significant footholds in the internet, which are likely to grow, since users prefer sites in their native language. Social networks, which account for a large percentage of web traffic, already tend to be almost entirely in native languages. Semantic analysis can be an extremely useful tool, but the emerging internet presents significant challenges for traditional methods. Text corpora exist across many languages, many domains, and many contexts, such as different time periods or applications. This diversity of text corpora has made language-agnostic methods for semantic extraction, encoding, and applications an active research area in contemporary computational linguistics.

SRA provides a general framework for conceptualizing and applying existing semantic extraction/encoding methods, such as Latent Semantic Analysis (LSA) [1], Hyperspace Analogue to Language (HAL) [2], and bound encoding of the aggregate language environment (BEAGLE) [3]. The two key elements of SRA are the vector-representation of the semantics of language entities (words, idioms, phrases, sentences, paragraphs, documents, etc.) and the numerical relations between language entities (such as similarity, relatedness, or semantic overlap). The basic requirements for SRA are that the representations must be language-agnostic and computationally feasible. Hu, Cai, Graesser, and Ventura [4] outlined SRA based on the following assumptions:

Hierarchical Representation: Different levels of a language entity may have their semantics represented differently.

Algebraic Representation: The semantics of any level of language entities must be capable of being represented numerically or algebraically.

Computational Aggregation: The semantics of a higher-level language entity are computed as a function of semantics for its lower-level language entities. Also, at the lowest level of language entities, a numerical semantic comparison measure must exist between any two items (e.g., words).

These three assumptions are the foundation of a general framework underlying most existing semantic extraction/encoding methods. The hierarchical assumption and the algebraic representative assumption work together to ensure that the language entities can be computed mathematically. This final assumption emphasizes the idea that comparisons occurring at the most basic level should be inputs for higher levels (e.g., the similarity of paragraphs should consider the similarity between their constituent sentences). These assumptions come from considering semantic regularities. First, the five basic language entities are hierarchical: words, phrases, sentences, paragraphs, and documents are each constituted by more basic entities. Second, numerical and algebraic representations for each language entity have been created in recent decades. Semantic extraction/encoding methods (e.g., LSA & BEAGLE) have been used to numerically represent all five levels of language entities, through the creation of semantic spaces. Third, in these semantic spaces, a larger language entity (e.g., document) can be represented by aggregating the semantic relationships of smaller entities (e.g., cosine similarity of words in LSA).

An important concept that is derived from the SRA framework is the Induced Semantic Structure (ISS). ISS focuses on numeric relations between language entities while intentionally de-emphasizing the encoding details (the vector-representation) for the semantic spaces. ISS considers a target word and an ordered list of its top nearest neighbors in a semantic space [4]. At the lowest levels (typically words), one intuitive measure for the semantic similarity can be the unordered overlap between their nearest neighbors. By computing the information from the top nearest neighbors, ISS captures the similarity of the target words, which can be aggregated to calculate the semantic similarity of the higher-level language entities.

The words of J.R Firth [5] best capture the concept of nearest neighbors: “You shall know a word by the company it keeps” (p. 11). This view has been accepted as

an important hypothesis in the field of vector-based semantic analysis: A word's nearest neighbors represent the meaning of the target word. Prior studies have applied nearest neighbors to compare semantics. Andrews, Vigliocco, and Vinson [6] randomly chose words in several spaces and compared their top several nearest neighbors. In this study, different neighbors for the same target word indicated different meanings for the word in the two semantic spaces. The overlap between nearest neighbors has also been used to identify words whose meanings vary across domains [7].

SRA used with ISS is capable of comparing a variety of semantic spaces. These semantic spaces may differ in their encoding methods (such as LSA, HAL), corpora (e.g., Wikipedia, TASA), or parameters (e.g., the number of dimensions in the vector representation). Semantic spaces can be compared to any semantic representations with nearest neighbors, even those not generated algorithmically. A particularly notable semantic representation of this type is the set of free association norms manually collected by humans [8], which is often used as a "gold standard" for semantic meaning.

An evaluation between five Touchstone Applied Science Associates (TASA) spaces [9] was recently conducted and showed that measuring semantic spaces with SRA captured underlying patterns from the corpora effectively [10]. The TASA corpus consists of proper English written text, including textbooks from first grade to the first year of college, with each of the five TASA spaces being additive (e.g., the 6-th grade space includes grades 1-6). The additive property of the spaces imposes natural similarity relationships between spaces. Specifically, two spaces with the largest proportion of document overlap should have the highest semantic similarity. Three distinct space comparison measures based on ISS each successfully captured this similarity pattern [10].

Furthermore, SRA combined with ISS provides an efficient way to create a domain-specific semantic processing portal that is capable of computing semantic relevance to customized domains. Such a capability makes it possible to "decompose" the semantics of any language entity on a list of domains, similar to the way spectrum-analysis does in physics. In the next sections, we will present the Domain-Specific Semantic Processing Portal (DSSPP) web service (about.dsspp.com) that implements this functionality and a tutoring system based on Sharable Knowledge Objects (SKO; www.skoonline.org) that consumes the DSSPP web service. Applications of DSSPP are presented, including analysis of online text streams, analysis of the impression formation over time, and a virtual learning environment called V-CAEST that is enhanced by a conversation-based intelligent tutoring system.

2 The Domain-Specific Semantic Processing Portal

A proof of concept implementation of SRA has been implemented. This implementation is called the Domain-Specific Semantic Processing Portal (DSSPP). DSSPP is a web-service implemented in a cloud computing platform (Google App Engine and Amazon Elastic Compute Cloud). DSSPP provides web services to 1) compute

nearest neighbors for available semantic spaces, 2) compute semantic relations (e.g., similarity) between any two pieces of English texts within or between two semantic spaces, and can also 3) perform a semantic “spectrum analysis” (e.g., relevance to different domains), and 4) calculate learner’s characteristics curves (LCC) for student statements in a tutoring system. These functionalities can be used for a number of applications, and will be described in the context of the applications where they have been used, to help ground the discussion.

2.1 Real-Time Analysis of Topic Evolution in Online Text Streams

SRA has been used to analyze topic evolution in online text streams. This application collected a series of corpora from online text streams such as tweets or online blogs. Each corpus is a slice of the continuous stream of tweets or entries, which will be referred to as the smallest independent corpus (SIC). These SIC are indexed by their occurrence (e.g., time, location). For each SIC, a small semantic space is created and an ISS is extracted for a limited lexicon (i.e., a specific topic of interest). The relationships between the terms for the selected lexicon are analyzed as the function of their indexes (e.g., time) and relevance to a domain.

This technique is useful for studying online social networks, which are influential in contemporary society. Online social networks continuously generate text streams over time, which carry a high volume of information and change quickly. Online text streams have been used to explore public opinion, such as sentiment towards political candidates [11], and customer attitude toward commercial products [12]. Researchers often analyze public opinion in text streams by studying topic evolution [13,14,15, 16]. In this earlier research, a topic is defined as a term or a group of terms and their relations to their referent topics. Therefore, topic evolution is defined as the change in relationships between a topic and its referent topics as a function of internet time [17]. For example, if the topic is education, it semantically relates to teachers, schools, students, knowledge, and other topics which are the referent topics of education. Thus, the topic evolution of education would be the change of semantic relationships between education and its associated topics over a time interval of interest.

Based on the definition of topic evolution in prior work, two issues exist. First, it is not domain specific. Each topic is composed of various referent topics, which may be connected to different domains. Accordingly, the change of semantic relations between a specific topic and its referent topics reflects the change of semantic relations between it and all of its related domains. Kleinberg [18] noted that domain knowledge can be used to interpret the temporal patterns in topic evolution. However, previous studies seldom conduct domain-specific topic evolution [19]. Second, most existing semantic methods do not track topic evolution using online algorithms. Instead, they employ retrospective analysis to consider topic evolution. When new texts arise, a retrospective approach adds the new texts to the old ones to update the parameters of a model in order to generate the new trend of topic. This approach can incur resource-intensive computation that is hard to perform in real-time. To address these issues, a new method based on DSSPP was applied to generate topic evolution as a function of domains in real time [17].

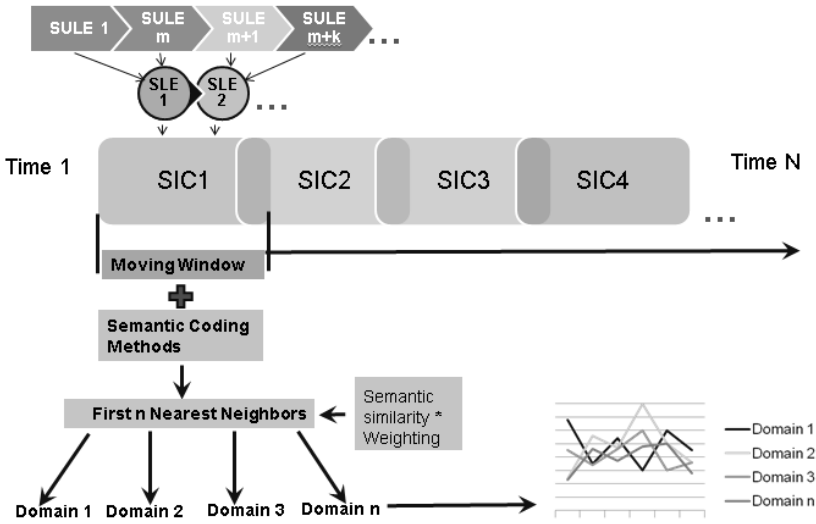


Fig. 1. The process for tracking topic evolution using DSSPP [17]

In this approach, online text streams are decomposed into three levels: 1) the Smallest Unit of Language Entity (SULE), which is usually a word or some special combination of words; 2) the Smallest Language Environment (SLE), which are constituted by SULE (such as a tweet); and 3) the Smallest Independent Corpus (SIC), which is the highest level and composed by SLE. The moving window, which is a time frame sliding on the timeline, generates temporal SICs. Therefore, online text streams are processed as a sequence of time-ordered SICs. In each SIC, semantic analysis is applied to generate nearest neighbors for the topic. According to their semantic similarity to the topic, the top N neighbors represent the semantic associations for the current SIC. Then, these top N neighbors are analyzed based on topic-related domains, where each domain contains a selected set of words and their semantic relationships. This method computes the topic’s relevance to each domain based on the number of overlapping top N nearest neighbors between the SIC’s semantic space and that domain’s semantic space. If desired, the neighbors’ importance to the topic can also be considered, by taking the order of the nearest neighbors into account. After calculating the relevance to the domains, the moving window slides to create a new SIC and the topic relevance to each domain is continuously calculated. This produces a time series for the relevance of each SIC to each domain, which is the topic evolution with respect to each domain. Figure 1 displays the process for this method for tracking topic evolution in real time.

This new method was applied to a topic on a serious car accident. The data came from Sina Weibo, which is China’s equivalent to Twitter. As such, Chinese semantic spaces were generated and analyzed using DSSPP. In this application, a moving window generated three sizes of SICs in order to test the effect of window size on the method’s performance. These sizes were 5000 documents, 7000 documents, and 9000 documents per SIC window. Latent semantic analysis was employed to generate

nearest neighbors for the topic. The top 1000 neighbors were used to analyze the topic's meaning in each SIC. The topic's relevance was computed with respect to four domains: politics, social events, economics, and entertainment.

The goal of this application was to test the effectiveness of the new method and examine the influence of SIC size on the method's performance. Preliminary results using this method indicated that the topic's relevance to the social domain was significantly higher than other domains. This follows what was anticipated, since the car accident generated significant debate over social issues, but was not particularly tied to economics or entertainment. There was, however, some political debate over the role of the police. As shown in Figure 2, the results were stable across the different SIC window sizes. Future work is planned to compare the topic evolution patterns against human ratings for this corpus, to help validate this method.

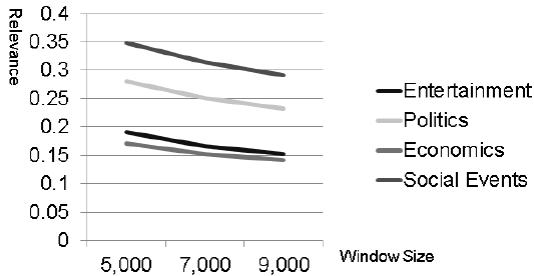


Fig. 2. Topic relevance to domains across SIC sizes [17]

2.2 Semantic Analysis to Track Impression Formation

A second application of SRA is the “semantic decomposition” capability. Within SRA, any piece of texts can be semantically “decomposed” based on a customizable set of domains or broken down based on the sentiment expressed (e.g., negativity versus positivity as domains). A case study of impression formation on the internet shows the capabilities of this approach. In social psychology, impression formation is the process that integrates separate pieces of information about a person into a holistic and global impression of that person. In online social networks, news stories about famous men or women are constantly being published. After publishing a story, individuals in certain areas of the world (e.g., China) send off Bulletin Board System (BBS) texts about these stories. The news is connected with the BBS text content. So then, BBS texts carry important semantic information about an individual concept.

To examine this phenomenon, a story was analyzed as an event associated with a sample of BBS texts from different subjects. A three step process collected semantic data on impression formation with respect to an individual news story and its subsequent BBS texts. First, the topic was selected. For this case study, we chose a famous

Chinese internet model. The number of BBS texts for each story ranged from 630 to 25400. This subject was chosen for two reasons:

1. All the news on this model is largely on the same topic. Though there are differences in the level of focus, all stories focus on the same class of events (stimuli);
2. A corpus of stories and data on the model could be collected starting from the beginning of the model’s celebrity status until the present day.

Second, using semantic analysis, keywords for each text were classified into three categories of sentiment: positive, negative, and neutral. As the stories and BBS texts were in Chinese, this analysis was performed using semantic analysis based on Chinese semantic spaces. Third, the ratio of negative keywords was calculated for each BBS text to form a time series. Each news story was considered as a psychological event or stimuli, forming one time point in the time series.

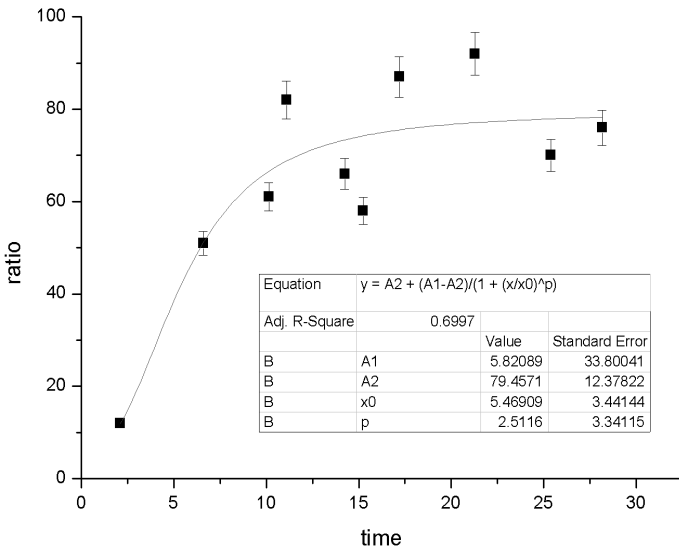


Fig. 3. The time series for impression formation

Figure 3 shows the time series of stories on the given celebrity model over time. Each data point is one story. The ratio shown is the average proportion of negative sentiment over the large sample of BBS texts for each story. In this case, sentiment was initially positive, progressed to neutral fairly quickly, after which it became increasingly negative. A logistic regression was fit to this data, which had a moderate fit. The rising behavior shows the changes that occur during the formation of the groups’ impression of the model, which appears to stabilize around fairly negative opinion. Further exploration is looking into the rates for impression formation to stabilize for different types of topics, in order to see if certain topics tend to stabilize more quickly (or not at all).

2.3 Learner's Characteristic Curves (LCC) to Drive Tutoring Dialog

Finally, the semantic processing web service provided by DSSPP can be used by Sharable Knowledge Object (SKO) modules, an implementation of AutoTutor [20]. AutoTutor is an intelligent tutoring system (ITS) framework developed at the University of Memphis over the last 17 years. SKO uses two functions of DSSPP. Semantic similarity is computed to evaluate overlap between a student's natural language input and expected ideal answers for questions. Across multiple student inputs, learner's characteristic curves (LCC) are calculated to track the novelty and relevance of student's free recall of learned content in a self-elaboration style interaction. These LCC curves are used to determine the appropriate feedback to present to the student.

An AutoTutor module typically consists of two or more animated agents, where one agent represents a tutor. The tutor agent guides the learner through various domain concepts by applying a conversational framework based on constructivist theories of learning [21] and the behavior of expert human tutors [22]. Empirical evaluations have shown that AutoTutor provides an effective learning environment, with learners using AutoTutor averaging about 0.8σ higher learning gains over control conditions such as reading static text [23]. Recently, AutoTutor has moved towards modularity by adopting a Sharable Knowledge Object (SKO) framework. A SKO uses natural language processing and dialog engines hosted on a cloud server. Distributing static content and media on cloud servers allows AutoTutor to be broken down into its key components [24].

AutoTutor Lite takes advantage of this modular, cloud-hosted, SKO framework by providing a web-based tutoring system which uses some, but not all, of the components of AutoTutor. AutoTutor Lite includes the AutoTutor-style interface and conversational framework, incorporating animated agents and natural language [25]. AutoTutor Lite also contains a simplified authoring tool which allows subject matter experts or instructors to create effective learning modules with minimal computer skills. A typical AutoTutor Lite module contains several "slides" dedicated to information delivery and each can contain various media (images, video clips, sound clips, etc). The information delivery section is typically followed by some form of knowledge assessment. AutoTutor Lite allows authors to choose from several assessment types, including fill-in-the-blank, matching, multiple choice, self-reflection and tutoring. The fill-in-the-blank, matching and multiple choice types are best at assessing shallow knowledge and recall, while self-reflection and tutoring assessment types are designed to assess and reinforce qualitative or conceptual knowledge.

AutoTutor Lite assesses student responses in real time by using a lightweight language analyzer based on DSSPP. This analyzer creates a simple micro-model of student knowledge referred to as the Learner's Characteristic Curves (LCC). Student responses are evaluated and compared to an ideal answer (expectation) through the use of semantic analysis provided by a DSSPP. Authors can select between corpora from several domains (science, mathematics, computers and internet, health, etc.), which interpret input using different semantic relationships and domain-specific terms.

The LCC builds curves which describe a student's knowledge on a given topic, based on two metrics: relevance and novelty. Relevance (R) is calculated as the semantic similarity of student input to the ideal answer. Novelty (N) is calculated as the semantic similarity between the student's current input with their history of prior statements. From these, four curves are generated based on the sequence of student responses: Relevant+New ($N \cdot R$), Irrelevant+New ($N \cdot (1-R)$), Relevant+Old ($(1-N) \cdot R$), and Irrelevant+Old ($(1-N) \cdot (1-R)$). A total coverage score is also calculated, which evaluates the total combined relevance of student statements. When developing AutoTutor Lite modules, authors create specific feedback triggers using these LCC curves. For example, if a student consistently provides irrelevant-old information, the authors can create a trigger that prompts the tutor agent to guide the learner back to the issue at hand, or to suggest a review of the content. These triggers consist of rule-sets contingent on the current and prior values of LCC curves (e.g., if Relevant+New < 0.1 , provide a hint).

An ongoing project called V-CAEST (Virtual Civilian Aeromedical Evacuation Sustainment Training) takes advantage of the SKO framework with AutoTutor Lite and its LCC student model. The central goal of V-CAEST is to improve communication between civilian medical practitioners and military personnel during disaster situations (e.g., Hurricane Katrina). To accomplish this goal, a virtual world has been developed using the Unity 3D game engine. AutoTutor Lite is embedded within this virtual world, and helps guide and tutor users in the game world.

To more accurately evaluate user input in the V-CAEST interface, a domain specific semantic space was developed. Both the medical and military fields involve a great deal of domain-specific vocabulary. Most semantic engines are trained on general corpora, such as TASA [26], because these corpora generalize to common English use-cases. However, a semantic engine trained on a general corpus is unsuitable for V-CAEST, which needs to determine the semantic similarity of responses within a specialized domain. Despite the large size of TASA and other spaces, many esoteric medical and military terms and acronyms are not even included in general corpora. To solve this issue, a guided web crawler iteratively collected domain-specific corpus of articles from a source (e.g., a wiki) around a starting set of domain-specific seed terms provided by subject matter experts.

A screenshot of this interface is shown in Figure 4. In V-CAEST, users are situated in a city block recently struck by a large earthquake. They are required to locate and triage several victims. As a user triages victims, they receive just-in-time feedback from AutoTutor Lite. For example, if a user selects an incorrect triage category, an AutoTutor Lite SKO is triggered and helps explain the mistake that was made. This shows how V-CAEST combines four key technologies into a virtual world: a domain specific processing portal, shareable knowledge objects, web-based intelligent tutoring systems, and a lightweight student model (LCC).



Fig. 4. The V-CAEST 3D world with an AutoTutor Lite SKO tutoring dialog active

3 Conclusions and Future Directions

As shown in these examples, the Semantic Representation Analysis and the Domain-Specific Semantic Processing Portal (DSSPP) have a variety of useful applications for research and educational applications. In particular, it is important to note the breadth of the language that this approach can accommodate: the examples described here cover general English (TASA corpora), informal Chinese (Weibo, BBS), and constrained military-medical English terminology. English and Chinese can both be handled using this approach, with the difference being that Chinese requires a parser that segments characters into words (as word boundaries are less clear than English). In future work, we hope to apply DSSPP to additional languages and domains.

Significant work remains for exploring the current directions described in this paper as well. The V-CAEST project is about to begin two phases of evaluation: expert evaluation of the military-medical semantic space using a triad task (i.e., selecting which of two sentences are more similar to an exemplar sentence) and evaluation of learning outcomes for subjects using the V-CAEST environment. These should provide insight into how learners speak and learn in virtual worlds. Further study of online feeds and streams is also continuing, focusing on how a topic's relevance to different domains evolves over time. In particular, relationships between domains may prove an interesting area of study. If language about certain topics goes through certain discrete phases of focus (e.g., it initially focuses on social events, then shifts toward politics), these patterns could be important for anticipating and understanding discourse transitions in online environments. Future work will also focus on validating the computed levels of domain-relevance against human judgments made for samples of texts.

Acknowledgements. Our thanks to the Office of Naval Research STEM ITS Grand Challenge, the Institute of Education Sciences, and the US Army, whose grants have supported this fundamental research. All statements are the responsibility of the authors alone.

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Integrating an Intelligent Tutoring System into a Virtual World

Parvati Dev, Wm LeRoy Heinrichs,
CliniSpace

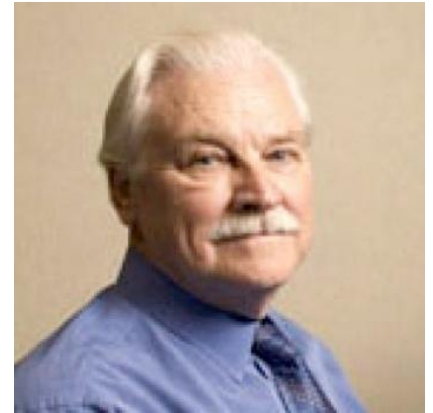
Keith Shubeck , Xiangen Hu,
University of Memphis





Parvati Dev

Introductions



LeRoy Heinrichs



Xiangen Hu

Speakers and Participants



Keith Shubeck



Overview

1. **Complex multi-person triage in a mass casualty – Preview of the problem**
2. **Virtualized mass casualty simulation - VCAEST**
3. **Immersive virtual simulations – *discussion***
4. **Review of Intelligent Tutoring Systems**
5. **Demonstration of an ITS in VCAEST**
6. **Creating the guidance content in an online tutor**
7. **Evaluation study - *plans***
8. **Summary and discussion**



CAEST

**Civilian Aeromedical Evacuation
Sustainment Training**

Civilian Aeromedical Evacuation





Goals of CAEST

- Provide **effective training** to medical professionals on SALT Triage
- **Improve communication** between medical professionals and military during disaster situations



Mass Casualty and SALT Triage – Background



Mass Casualty

- **Casualties**
- **Usually in a single incident (hurricane, aircraft accident, etc)**
- **Large number of casualties**
- **Exceed local logistic and emergency medical resources**



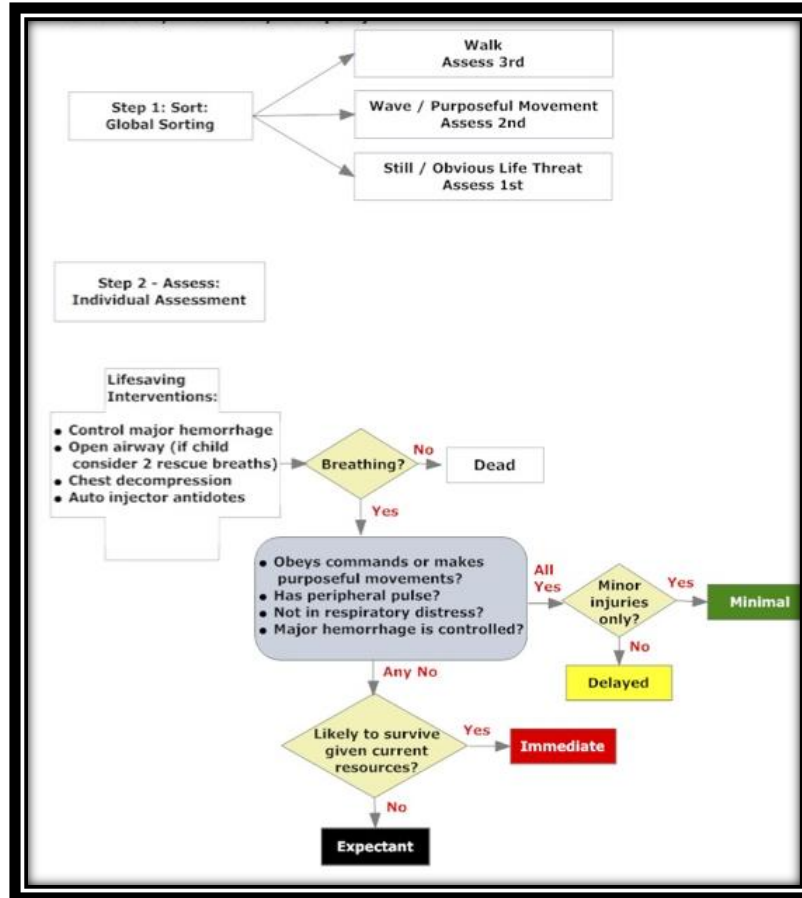
Triage – Video



Video from National Preparedness Network: http://youtu.be/1mVX8Ggj_3E



SALT Triage – Background



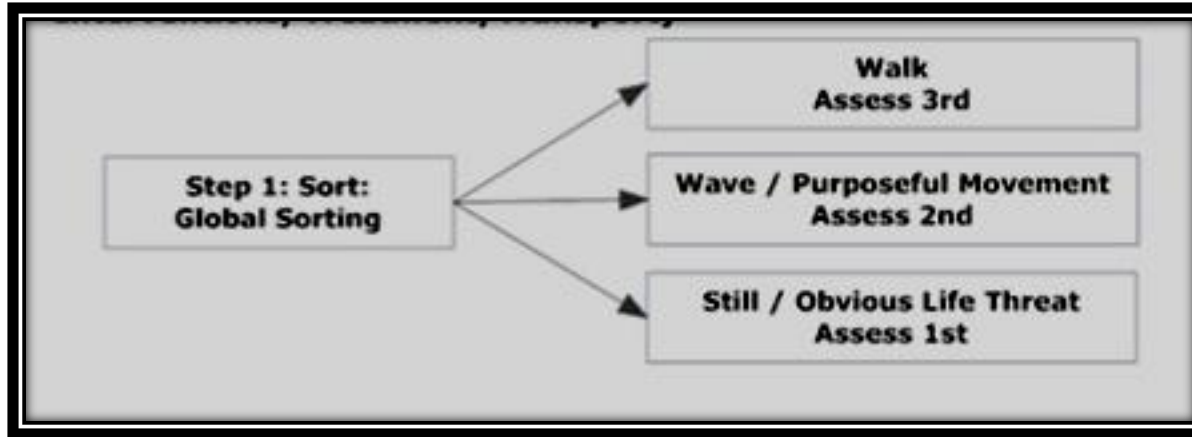
SALT

- **S**ort
- **A**ssess
- **L**ife-saving interventions
- **T**reat / **T**ransport

Most **accepted** of many diverse triage algorithms (e.g. S.T.A.R.T.)



SALT Triage – Background

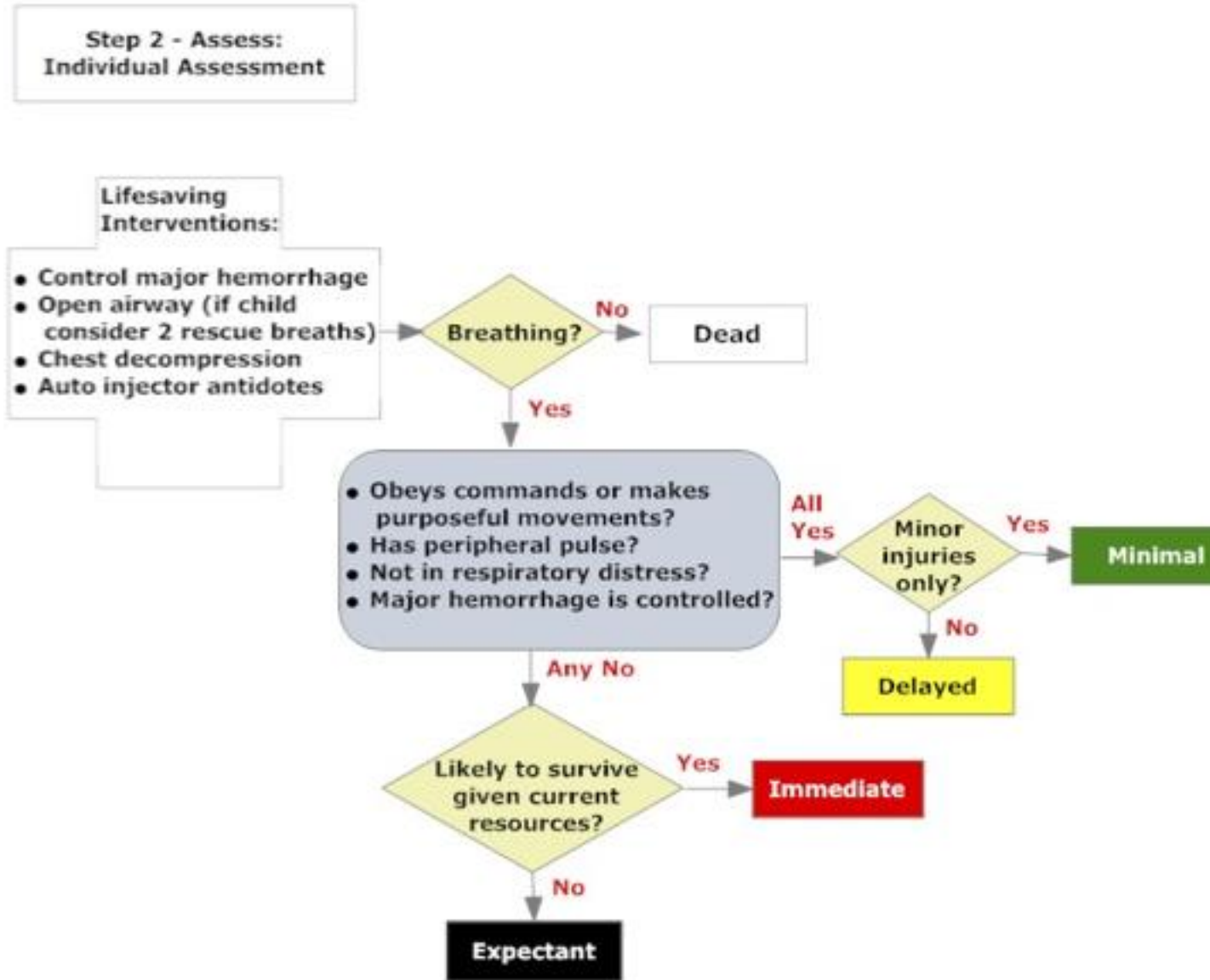


SALT

- **Sort**
- **Assess**
- **Life-saving interventions**
- **Treat / Transport**



SALT Triage – Background



SALT

- SORT
- Assess
- Life-saving interventions
- Treat / Transport



SALT Triage – Background



SALT

- Sort
- Assess
- Life-saving interventions
- Treat / Transport



CAEST

What worked – what did not

Why was it started?

- Communication challenges during recent mass casualty disasters between civilian medical responders and military

How was it implemented?

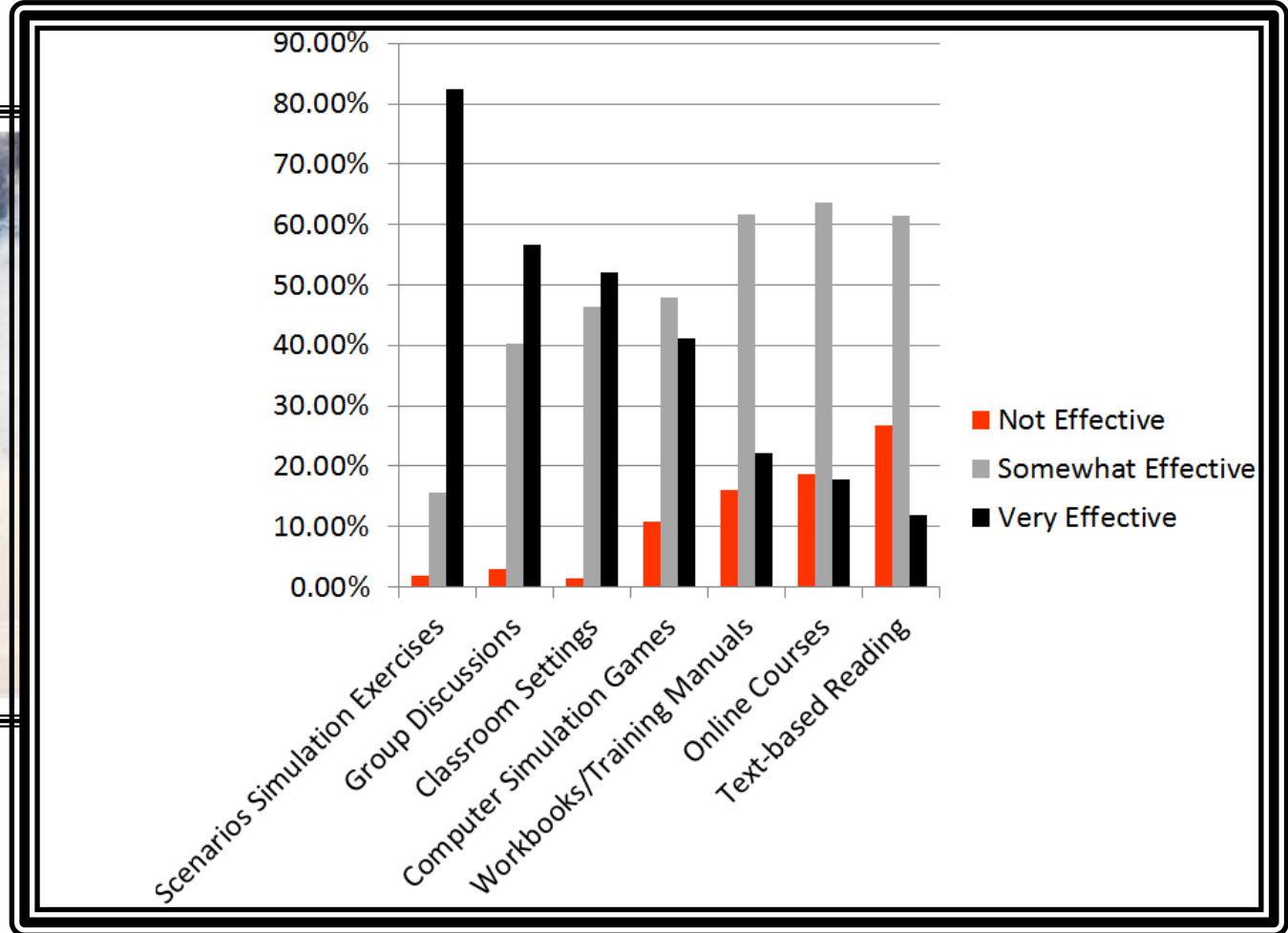
- Didactic learning in classroom setting and live-action training scenarios

What worked, what didn't work?

- Live action training scenarios helped to ground content taught
- Logistically challenging, expensive

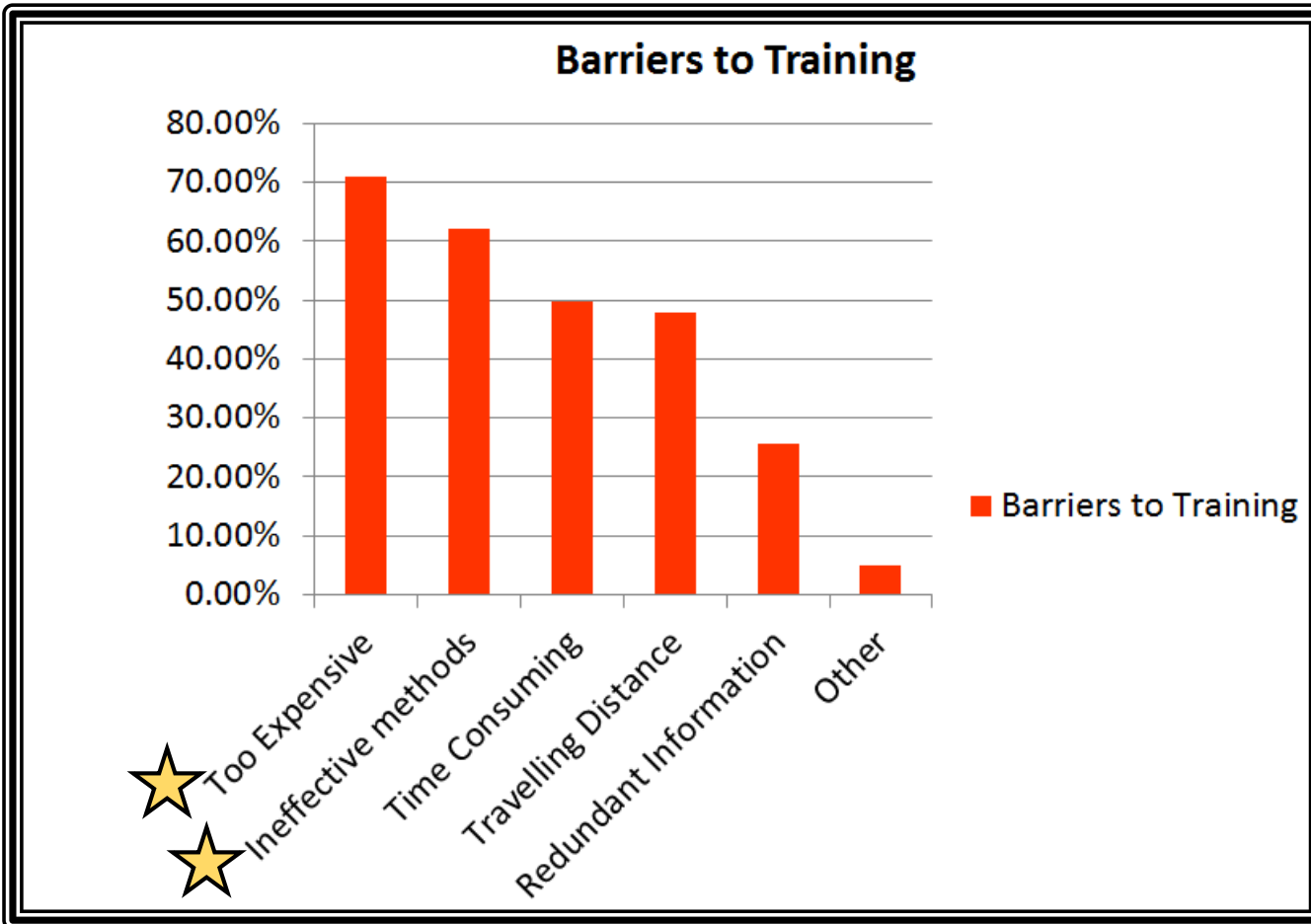


Perceived effectiveness of training



Perceived effectiveness of training

Live training is often...



- Too expensive
- Time consuming
- Inattentive to individual learning needs
- Costly to travel to and from



Additional Goals of CAEST Training

How can the differences in goals, roles, and expectations be bridged?

How will differences in jargon, equipment and standard operating procedures affect patient care?



VCAEST

**Virtual Civilian Aeromedical Evacuation
Sustainment Training**

Goal of VCAEST project

Live simulations are highly effective but very expensive...

- We need an **effective, low cost alternative** to live simulation training for healthcare personnel who interface with military operations in a catastrophe requiring aeromedical evacuation

Achieve this through ...

- Integrating a Web-based virtual 3D environment with an Web-based intelligent tutoring system
- **Low cost**, easily updateable, internet-based
- Leverage **proven learning technologies**
- Make training **widely available**
- *Marry realistic virtual environments with robust learning technologies*



What we built



- **Multi-patient scenario**
- **Grounds outside the hospital,**
- **Performance goal**
 - performing the correct triage category
 - the appropriate intervention
 - selecting the appropriate mode of evacuation, air or ground



Virtual World Screenshots (Without ITS)

Damaged Chaotic Environment



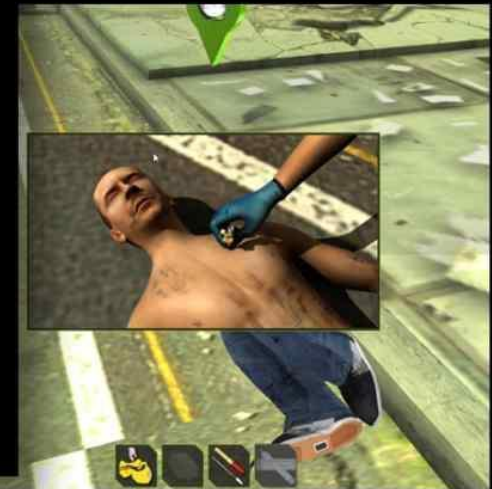
Virtual World Screenshots (Without ITS)

Multiple Patients



Virtual World Screenshots (Without ITS)

Provide Life Saving Interventions



Virtual World Screenshots (Without ITS)

Assessing Patient Vitals

Respiratory

Capillary Refill

Heart Rate

Mental Health

TRIAGE TAG

CONTAMINATION: No Yes

Respirations Yes No

Perfusion +2 SEC -2 SEC

Mental Status Can Do Can't Do

Oriented Disoriented Unconscious

Time	Pulse	B/P	Respiration

Time	Drug Solution	Dosage

PRIORITY 0 EXPECTANT

PRIORITY I IMMEDIATE

PRIORITY II DELAYED

PRIORITY III MINDR

PRIORITY IV INVOLVED

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Virtual World Screenshots (Without ITS)

Assess Patient Vitals: Respiratory Rate



Virtual World Screenshots (Without ITS)

Assess Patient Vitals: Capillary Refill Time



Optimized by www.ImageOptimizer.net



Virtual World Screenshots (Without ITS)

Assess Patient Vitals: Heart Rate



Virtual World Screenshots (Without ITS)

Assess Patient Vitals: Mental Status



Optimized by www.ImageOptimizer.net



Virtual World Screenshots (Without ITS)

Interact with Triage Tag to Triage Patient





Open Discussion



Intelligent Tutoring Systems

**Learning Theory, Efficacy of Tutoring, and
Computerized Learning Environments**

The importance of tutoring...

With normal group instruction or training, individuals will vary in terms of prior knowledge.

- **One-on-one human tutoring**
 - **Beneficial but depends on skill level of the tutor**
 - **Learning may be tailored to the individual's skill level**
 - **Expensive**
- **Virtual agents comparable to human tutors**
- **Virtual agents can simulate learning gains comparable to one-on-one human tutoring**
 - **importance of pedagogical strategies**



Learning Theory Behind ITS

- **Constructivist approach**
 - Learning seen as an active and social process
 - Learners responsible for knowledge construction
 - Expressing
 - Explaining
 - Question asking
- **Learning environments should...**
 - Stimulate knowledge
 - Model explanations
 - Foster self-explanations
 - Provide feedback for correction of misconceptions



Pedagogical Learning Strategies

Pedagogical Strategies used by Expert Human Tutors

- Hints
- Prompts
- Bridging Inferences
- Self-explanations
- Question Asking
 - Type of question determines the level of complexity in the answer given
 - Graesser & Person (1994) Question Asking taxonomy
 - Shallow, intermediate, and deep questions for various types of learning



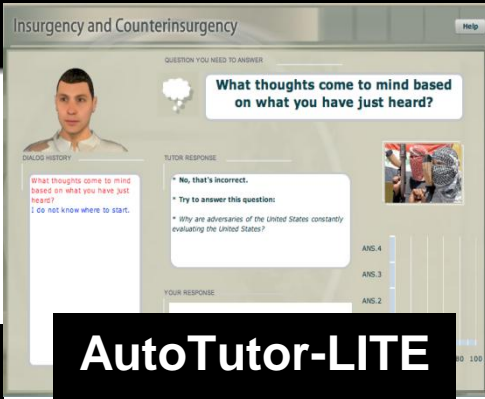
Advantages of 1:1 Tutoring

- **Just-in-time Feedback**
 - Student misconceptions quickly dealt with
- **Tutors prompt students to elaborate**
 - Student self-explanations shown to provide large learning gains compared to various controls (Chi et al., 1989)
- **ITSs can model expert 1:1 tutoring conversational framework**
 - Provides hints, prompts, feedback to encourage elaborative self-explanations from students.





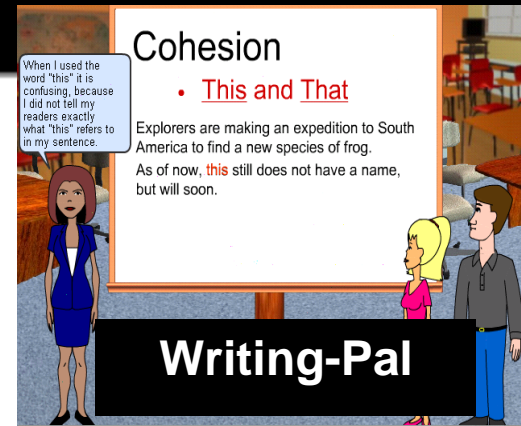
AutoTutor



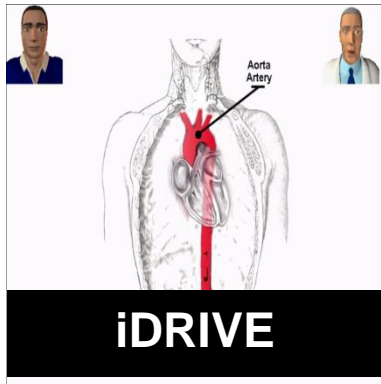
AutoTutor-LITE



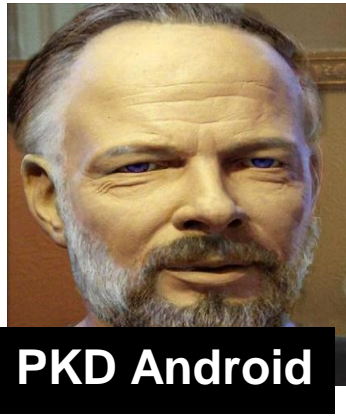
iSTART



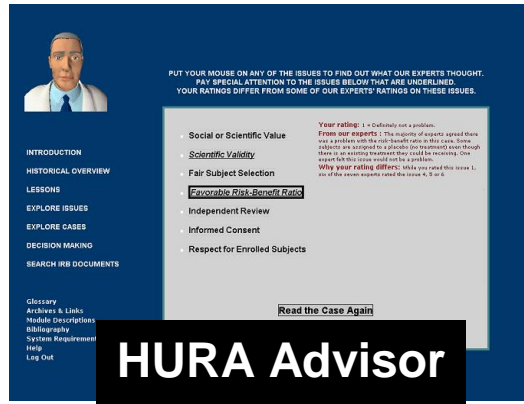
Writing-Pal



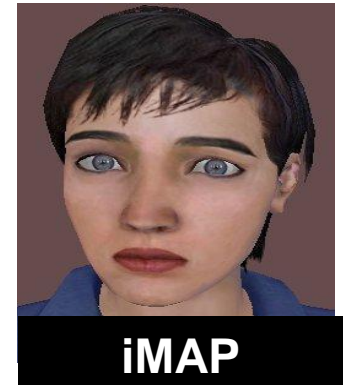
iDRIVE



PKD Android



HURA Advisor



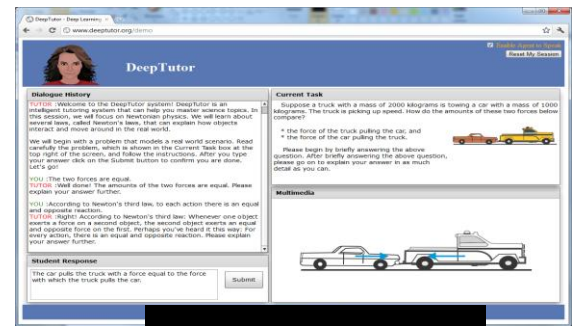
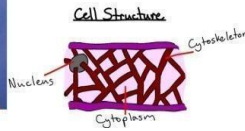
iMAP



Meta-Tutor



Guru



DeepTutor



LEARNING GAINS

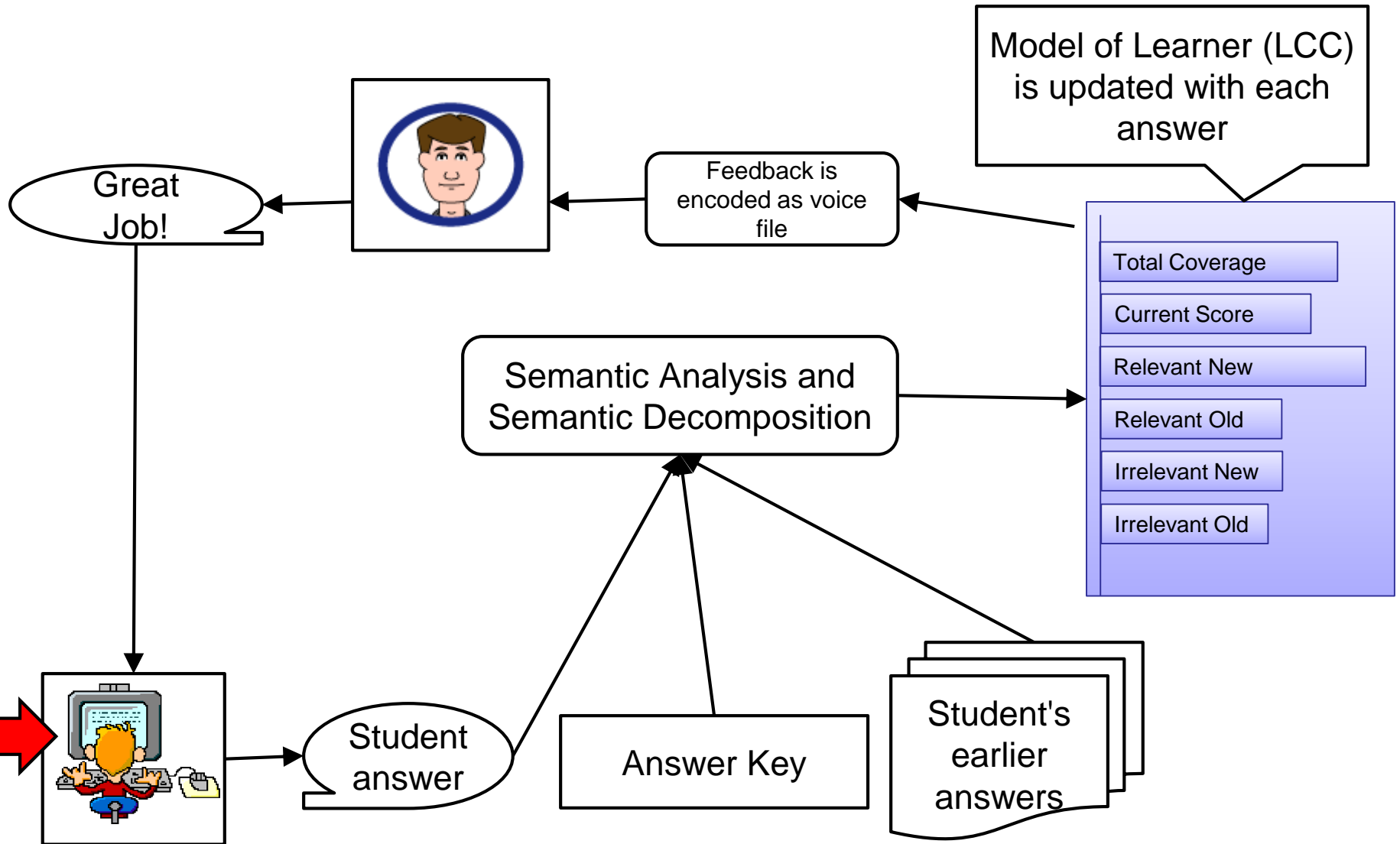
Effect Sizes	Learning Environment
.42	Unskilled Human Tutors (Cohen, Kulik, & Kulik, 1982)
.80	AutoTutor (20 experiments) (Graesser and colleagues)
1.00	Intelligent Tutoring Systems PACT (Anderson, Corbett, Alevan, Koedinger) Andes, Atlas (VanLehn) Diagnoser (Hunt, Minstrell) Sherlock (Lesgold)
2.0	Expert Human Tutors (Bloom, 1984)



Under the hood of Intelligent Tutoring Systems

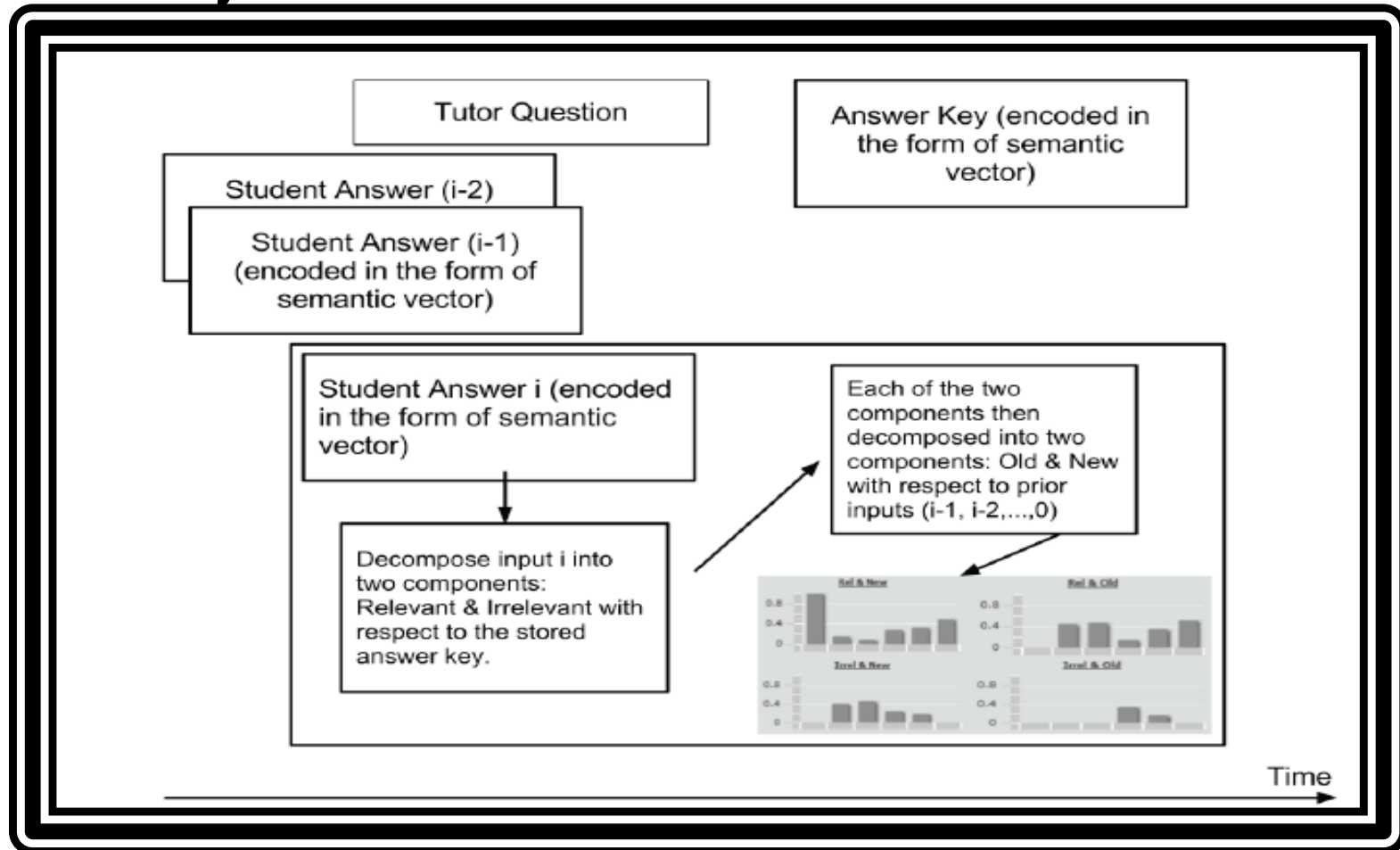
**Semantic Spaces, Natural Language Processing,
Sharable Knowledge Objects (SKOs), Student
Model**

Overview of Flow in Intelligent Tutoring System



LCC in Tutoring (Updating the Learner Model)

Each answer is analyzed with respect to: *prior answers & stored answer key*



LCC in Tutoring

Contraindications

Type Your Answer Below

Acute blood loss is a contraindication. A broken arm is a contraindication to air transport.

O... Cu... Re... Ir... Ir... R...

Total Coverage

Attempts	Score
1	0.5
2	0.75
3	0.75

SCORE

Attempts

4 / 12

Finish Edit This SKO Author's Email

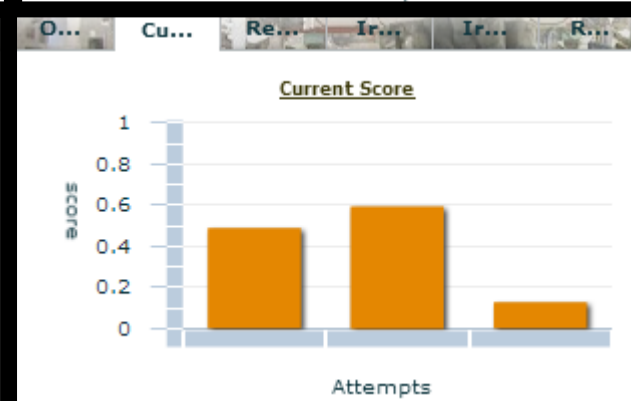
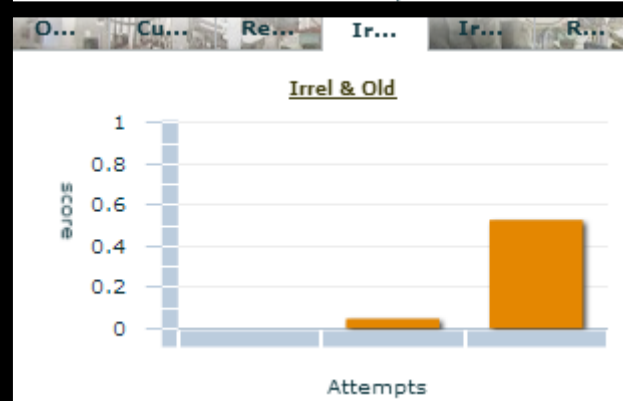
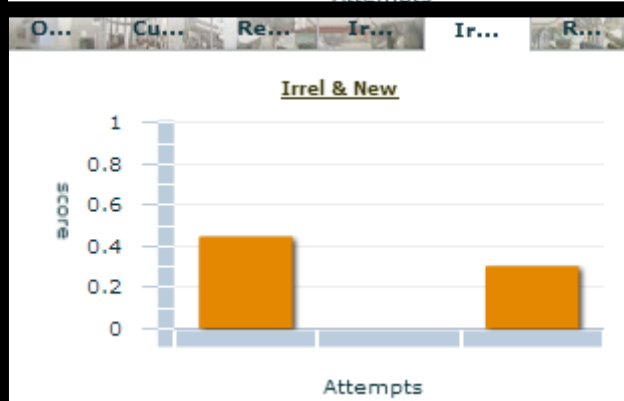
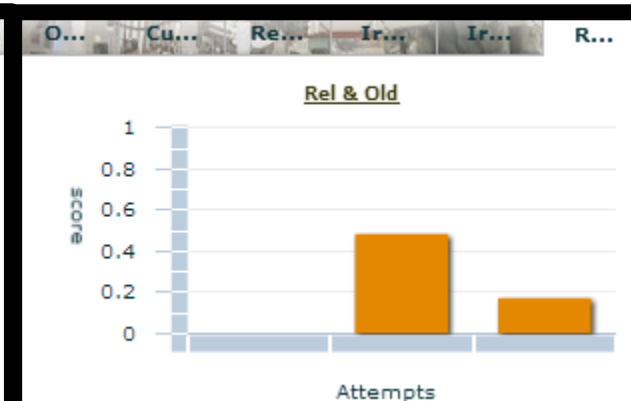
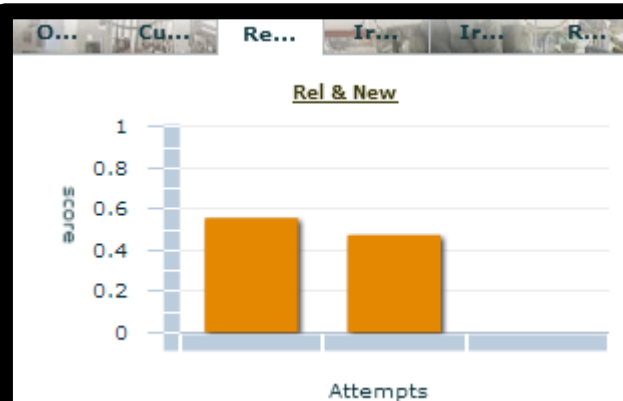
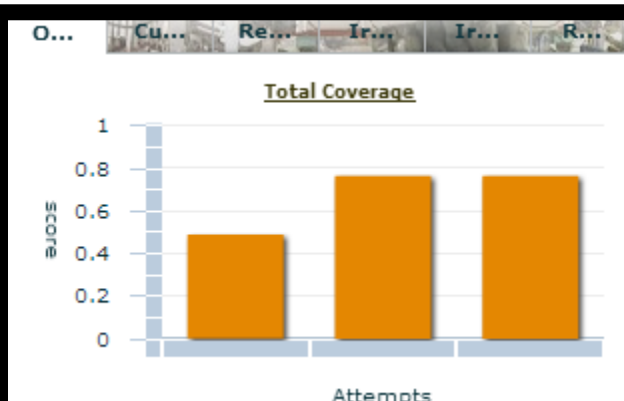


LCC in Tutoring

Contraindications

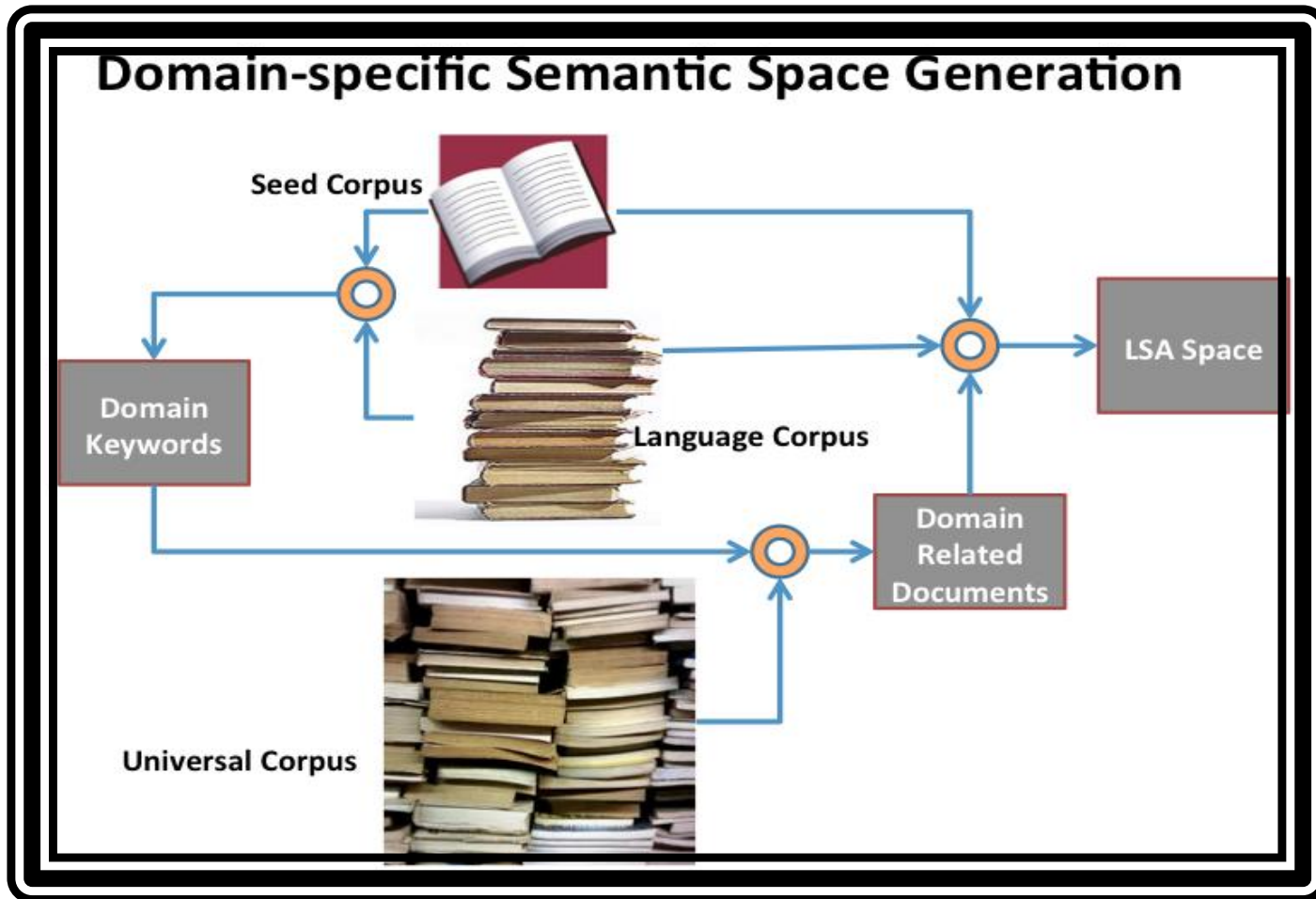
Type Your Answer Below

Acute blood loss is a contraindication. A broken arm is a contraindication to air transport.



Domain specific semantic space

- Robust language processing of student answer **requires** a Domain specific semantic space



A Theory of Semantic Spaces

- Hu et al. (2005)
 - Basic assumption of languages
 - Concept of "layers": words, phrases, sentences, paragraphs, documents
 - Formal framework
 - Language neutral
 - Computational (vector-based)
 - Implementable
- Hu et al. (2005)
 - Essence of semantic space: Semantic similarity between items can be computed (numerically).
- "semantic of any item (words, phrases, etc) in a given language is embedded within its **relations** with other items"



Accessing ITSs in a Virtual World

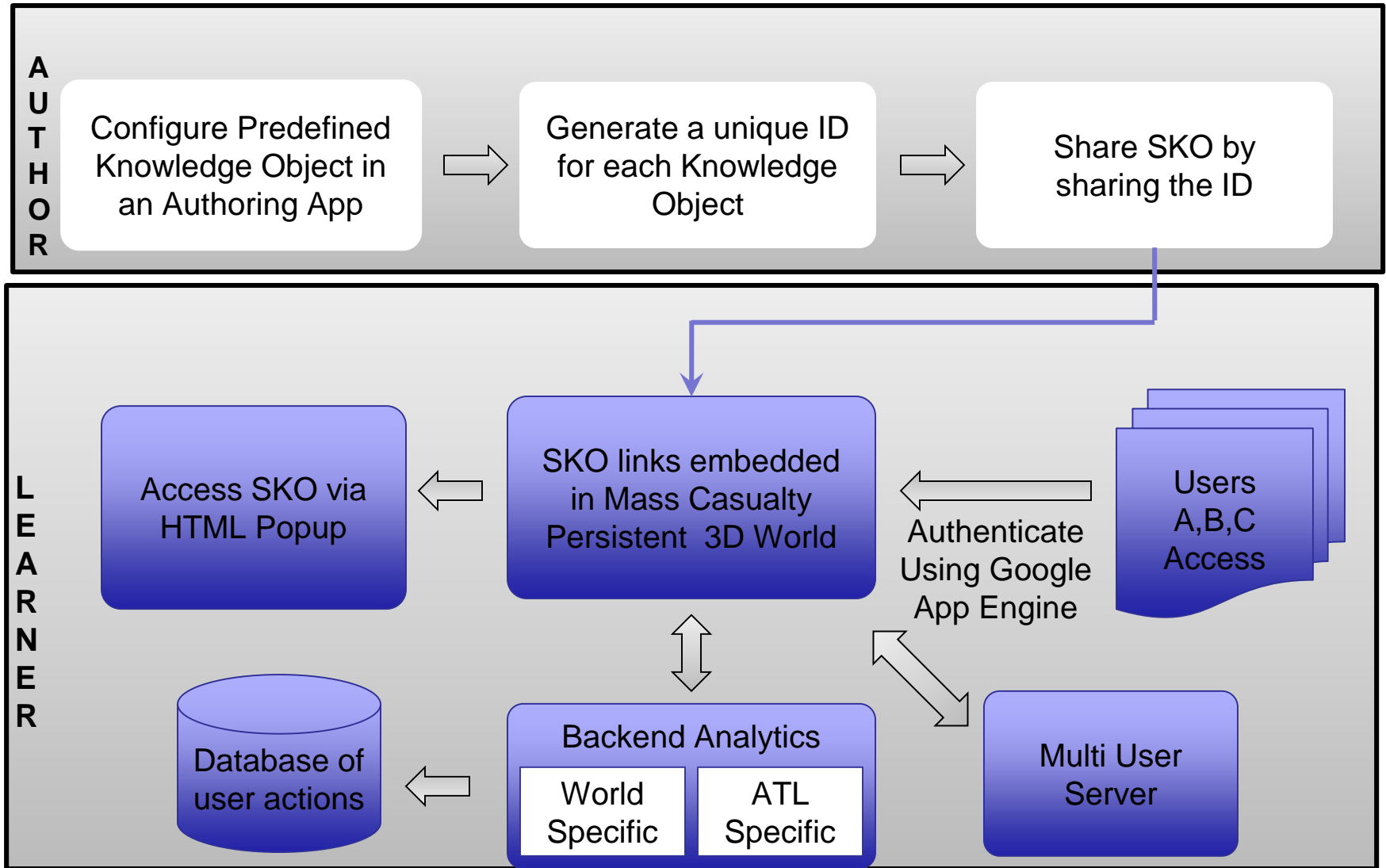
Sharable Knowledge Objects (SKOs)

Shareable Knowledge Objects (SKOs)

- **A unit of knowledge (Knowledge Object)**
 - **implemented using an ITS**
- **implemented Knowledge Objects**
 - **as a Web service**
 - **allowing them to be shared with other Web applications – thus Sharable Knowledge Objects**
- **The 3D Virtual Environment accesses these SKOs and displays them in-world**



Use Case – Author and Learner



Shareable Knowledge Objects (SKOs)

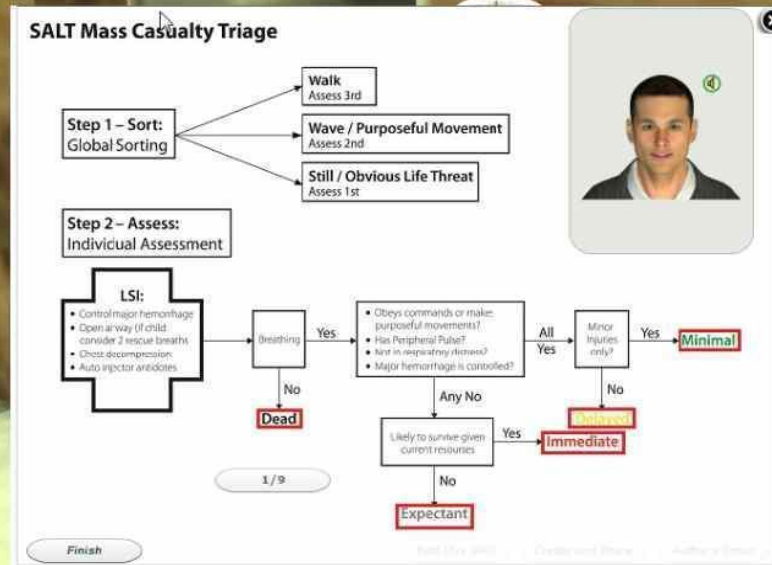
- **SKOs are portable to new learning environments.**
- **SKOs are fortified by improved semantic processing algorithms to evaluate student's natural language input.**
 - **Individualized domain-specific semantic processing**
 - **Learner's Characteristics Curves (LCC) as student's model that evaluates how new and relevant the student input is**
- **Incorporates Artificial Intelligence Markup Language (AIML) in addition to AutoTutor Dialog Advancer network (DAN) to handle Tutor-Student interaction**
 - **Adaptive and flexible dialog that mimics human tutoring**



SKO links embedded within VW



Information presented by SKO



Assessment in SKO

For this category: Patients previously labeled red with injuries incompatible with life given the currently available resources. This category is only needed if there are not enough resources available to handle demand. ___1___. The category reserved for patients who have minor injuries that are self-limited and if not treated can tolerate a delay in care without increasing their risk of mortality. These patients should be triaged as minimal. ___2___. Patients with more than minor injuries but are able to sustain a delay in transportation. Must be re-evaluated because they are at risk of decompensating ___3___. Patients who: Do not obey commands, have carotid pulse but no peripheral pulse, experiencing respiratory distress, have uncontrolled major hemorrhage. ___4___. Patients who are not breathing even after lifesaving interventions

1.

2.

3.

4.

5.

[Review Learning Objectives](#)

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Guidance by Tutor in SKO

QUESTION TO ANSWER:

Based on what you just learned, what are the three patient categories that are used during Step 1 of executing SALT?

TUTOR INPUT/RESPONSE

Nice job!
Priority 1 patients are patients who cannot move or can barely move when given a voice command and or has an obvious life threat.
You should be looking for whether or not patients are able to respond to your voice commands whether or not patients are able to walk or move and whether or not the patient has

YOUR RESPONSE

DIALOG HISTORY:

Priority one patients are patients who cannot give a purposeful movement and cannot walk. They have a serious life threat.

Current Progress on this Question: 43%

63%. 36%. 1%. 68%

Submit

Finish

Nice job! Priority 1 patients are patients who cannot

Avatar of a man



Guidance by Tutor in SKO - 2

QUESTION TO ANSWER:
Based on what you just learned, what are the three patient categories that are used during Step 1 of executing SALT?

TUTOR INPUT/ RESPONSE:
respond to your voice commands whether or not patients are able to walk or move and whether or not the patient has a serious life threat.
Answer this question for me:
Explain how patients in the priority 2 category should respond to voice commands.

YOUR RESPONSE:

DIALOG HISTORY:
Priority one patients are patients who cannot give a purposeful movement and cannot walk. They have a serious life threat.

Current Progress on this Question: 43%
63% 36% 1% 68%

Submit

Finish

or not the patient has a serious life threat. Answer

Return to previous question

1. Exit this SKO 2. Cross and Store 3. Allbert's Email



Guidance by Tutor in SKO - 3

QUESTION TO ANSWER:
Based on what you just learned, what are the three patient categories that are used during Step 1 of executing SALT?

TUTOR INPUT/RESPONSE:
Great!
Bringing everything together,
Priority 2 patients are patients who are able to wave or give a purposeful movement but are unable to walk
Priority 3 patients are patients who are able to walk and respond to voice commands

YOUR RESPONSE:

DIALOG HISTORY:
Priority 2 patients should be able to respond to voice commands with a purposeful movement or hand wave.

Current Progress on this Question: 75%

81% 48% 100% 70%

Close

Review learned material

Great! Bringing everything together, Priority 2 patients



Tutoring Interface

This box contains the ITS's responses to the users contributions. It will provide feedback to user contributions and give hints to help complete their answer

This box contains the full conversational history with the ITS. It consists of tutor conversations in RED and user contributions in BLUE

This bar and the four percentages below it displays the user's progress on a particular expectation.

The question in this box is the overall question that the user is attempting to answer. The question is broad and here to guide the user's thoughts on the topic

An agent on the monitor displays facial expressions and some gesturing while conversing with the learner. This agent is a product of Media Semantics

This box is where users type their contributions. The conversation works best if complete contributions are entered.

The screenshot shows a tutoring interface with the following components:

- QUESTION TO ANSWER:** A text box containing the question: "Based on what you just learned, what are the three patient categories that are used during Step 1 of executing SALT?".
- TUTOR INPUT/ RESPONSE:** A scrollable text area containing the tutor's response: "Nice job! Priority 1 patients are patients who cannot move or can barely move when given a voice command and or has an obvious life threat. You should be looking for whether or not patients are able to respond to your voice commands whether or not patients are able to walk or move and whether or not the patient has".
- YOUR RESPONSE:** An empty text box for the user to type their answer.
- DIALOG HISTORY:** A scrollable list showing previous interactions. The first entry is in red: "Priority one patients are patients who cannot give a purposeful movement and cannot walk. They have a serious life threat." The second entry is in blue: "Current Progress on this Question: 43%".
- Progress Bar:** A green progress bar showing 43% completion. Below it are four buttons with percentages: 63%, 36%, 1%, and 68%.
- Submit Button:** A button to submit the user's response.
- Agent Window:** A window on the right showing a 3D agent's face and a speech bubble that says "Nice job! Priority 1 patients are patients who cannot".
- Review learned material:** A button to review previously learned content.
- Footer:** Buttons for "Finish", "Edit This SKO", "Create and Share", and "Author's Email".



Authoring within ITSs

Creating Sharable Knowledge Objects (SKOs)

Authoring SKO's: Overview (theory)

- **Components of SKO scripts**
 - **Content: Scripts guide natural language conversation between learner and SKOs**
 - **Expectation-Misconception Tailored Dialog.**
 - **Guided by established effective learning principle**



Authoring SKO's

- **Authoring effective SKOs requires the author to use pedagogical learning strategies**
 - **Expert tutoring strategies**
 - **Scaffolding**
 - **Question Asking**
 - **Modeling**
- **Two main phases for authoring SKOs**
 - **Information Delivery**
 - **Assessment Creation**



Authoring SKO's – 1. Information Delivery

- **Presenting content to the student via animated agents**
 - **Limiting seductive details**
 - **Using animated agent actions to direct student attention to important graphs/images**
 - **Scaffolding, reinforcement strategies for designing script for agent**
 - **Using Dual Code and Multimedia effects**
 - **Information should be delivered via multiple modalities**
 - **Insert brief quizzes to keep students engaged (Testing Effect)**



Information Delivery: Spoken Text for Avatar

Spoken text

The screenshot shows a software interface with a top navigation bar containing 'Script Information', 'Information Delivery' (highlighted with a red box), and 'Tutoring'. Below this are buttons for 'Delete', 'Add Scene', 'Add Reflection', '<', and '>'. A secondary bar contains 'Intro', 'Assess', 'LSI', 'Tagging', 'Dynamic (Repeat)', 'Outro', and 'Blank'. A third bar contains 'Content', 'Author Notes', and 'Configuration'. The main area is split into two panels: 'Spoken Text for Avatar' on the left and 'Display Text' on the right. Both panels have a yellow header with 'Number of words: 0'. The 'Spoken Text for Avatar' panel contains the text: `<bubble text=" />` followed by a red-bordered box containing the text: 'You have just learned how to sort patients into one of three priority categories. You will now learn how to execute the second and third steps of SALT, the assessment and life-saving interventions steps.' The 'Display Text' panel contains a red-bordered box with the text: 'You have just learned how to sort patients into one of three priority categories. You will now learn how to execute the second and third steps of SALT, the assessment and life-saving interventions steps.' At the bottom of the interface are buttons for 'Test', 'pause', a dropdown arrow, and a '+' sign.

Display text



Information Delivery: Adding Media

Script Information | Information Delivery | Tutoring

Delete Add Scene Add Reflection < >

1 2 3 Reflection1 4 5 6 Reflection3 7 8 Reflection5 Outro

Content | Author Notes | Configuration

Media Type **TextOnly** Media URL ?

Use Default

Enable Click Auto Play Show Avatar Use AIML

Background Image



Authoring SKO's – 2. Assessment

- **Several assessment types**
 - multiple choice
 - fill in the blank
 - matching
 - essay
 - self-reflection
- **Important to choose the right assessment type for the material being taught**
 - Multiple Choice, fill in the blank and matching are effective with shallow level knowledge
 - Essay, Self-reflection are effective with deep level knowledge



Doing a Reflection quiz

Script Information | Information Delivery | Tutoring

Delete | Add Scene | **Add Reflection** | < | >

1 | 2 | 3 | Reflection1 | 4 | 5 | 6 | Reflection3 | 7 | 8 | Reflection5 | Outro

Reflection Content | Configure Feedback

Reflection Question Title:

Spoken Text for Avatar	Reflection Answer (100 words or less)
Number of words: 66	Number of words: 9
<p><bubble text=" Now, let's review the content we just covered. Please do your best to recall the relative contraindications I told you about. Be sure to complete each of your responses with a period. "/></p> <p>Now, let's review the content we just covered. Please do your best to recall the relative contra-indications I told you about. Be sure to complete each of your responses with a period.</p>	<p>pneumothorax. severe anemia. sickle cell. acute blood loss. tracheostomy.</p>

Test | pause | ▾ | +



Authoring SKO's - Feedback from IT agent

Script Information | Information Delivery | Tutoring

Delete Add Scene Add Reflection < >

1 2 3 Reflection1 4 5 6 Reflection3 7 8 Reflection5 Outro

Relection Content Configure Feedback

Show: Co CS RN IN RO IO

Turn	type	Relation	[0,1]	feedback from Avatar	?
1	CS	near	0.9	Very good! Please move on to the next contraindications.	
1	CS	near	0.5	Great!	
1	CS	near	0.2	Doing well so far!	
2	IN	near	0.3	Sorry, that is not correct.	
2	CS	near	0.5	Great!	
2	CS	near	0.9	Very good! Please move on to the next contraindications.	
2	IO	near	0.5	You might be repeating something wrong!	
2	RN	less than	0.8	Great Job! You're on the right track!	
3	RN	less than	0.8	You're on the right track! Keep it up!	
3	CS	near	0.6	Doing well so far!	
3	CS	near	0.9	Very good! Please move on to the next contraindications.	

Add Rule for: RN IN RO IO CO CS Delete Rule



Authoring SKO's - Assessment Essay

The screenshot shows a software interface for authoring SKOs (Skill Knowledge Objects). At the top, there are tabs for 'Script Information', 'Information Delivery', and 'Tutoring'. Below these tabs is a toolbar with a '+' button and a 'Delete Exp' button. A row of buttons includes 'Seed Question', 'expectation1', 'expectation2', 'expectation3', 'expectation4', and 'Utility'. The 'Seed Question' button is highlighted with a red rectangle. Below the toolbar are two side-by-side panels. The left panel is titled 'Spoken Text for Avatar' and contains a yellow header bar with 'Number of words: 12' and a text area with the text 'Try to recall as many contraindications to Air Transport as you can.' The right panel is titled 'Display Text' and contains a yellow header bar with 'Number of words: 12' and a text area with the same text. Both panels have a '?' icon in the top right corner. At the bottom of the left panel, there are buttons for 'Test', 'pause', a dropdown arrow, and a '+' button.



Authoring SKO's - Assessment Essay

Script Information | Information Delivery | Tutoring

+ | Delete Exp

Seed Question | **expectation1** | expectation2 | expectation3 | expectation4 | Utility

Expectation | Hint1 | Hint2 | Hint3 | Hint4 | Ideal Answer

Summary for expectation (?)

Number of words: 17

Which contraindications to Air Transport have to do with the patient's equipment, or the equipment the patient requires?

Semantic Answer (?)

Number of words: 7

pneumothorax. tracheostomy. pacemaker. jaw immobilization. circumfrential casts.

+ | Delete Hint



Authoring SKO's - Assessment Essay

Script Information | Information Delivery | Tutoring

+ | Delete Exp

Seed Question | expectation1 | expectation2 | expectation3 | expectation4 | Utility

Expectation | **Hint1** | Hint2 | Hint3 | Hint4 | Ideal Answer

Spoken Text for Avatar (?)

Number of words: 23

Many of the contraindications to Air Transport that have to do with patient equipment have to do with the increased air pressure during flight.

Test | pause | +

Display Text (?)

Number of words: 23

Many of the contraindications to Air Transport that have to do with patient equipment have to do with the increased air pressure during flight.

+ | Delete Hint



Early Evaluation Results

**... evaluation studies will be conducted in September 2013
Selected results will be presented at this tutorial.**

References

- D'Mello, S., & Graesser, A. (2013). Design of dialog-based intelligent tutoring systems to simulate human-to-human Tutoring. In *Where Humans Meet Machines* (pp. 233-269). Springer New York.
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V-CAEST: Training Facilitated by an ITS embedded in a Virtual World

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University of Memphis¹, Arizona State University², CliniSpace³

Problem

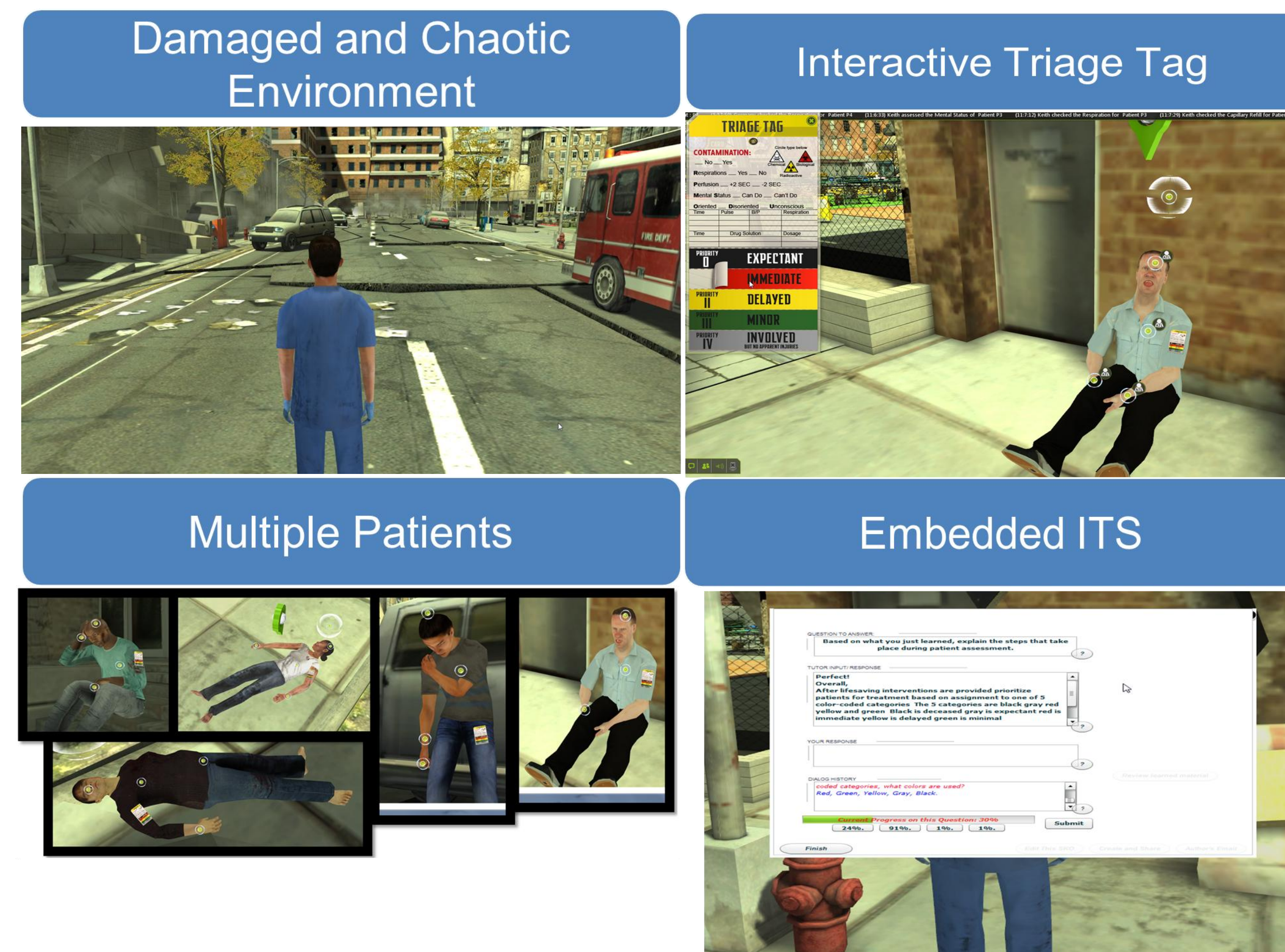
- First responders experience difficulty when communicating with military personnel
- First responders experience difficulty utilizing military resources during catastrophe situations
- Live training is expensive and time consuming

Hypothesis

- V-CAEST delivered through an intelligent tutoring environment will achieve learning outcomes comparable to live simulation-based training

V-CAEST (Virtual Civilian Aeromedical Evacuation Sustainment Training)

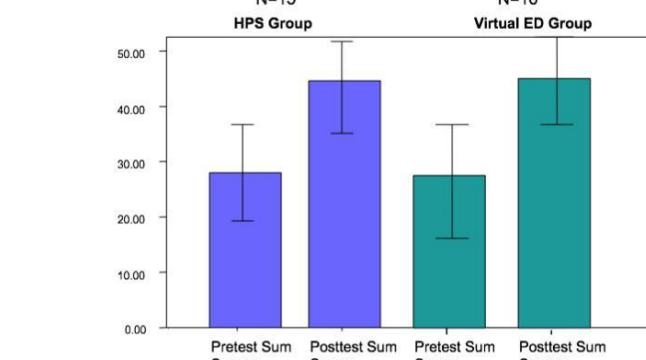
- **VCAEST** is based on CAEST training but embedded within a virtual world (CliniSpace™)
- Incorporates **AutoTutor LITE** (ATL), an **Intelligent Tutoring System** (ITS) which will act as a facilitator and provide guidance and feedback to learner
- **ATL** features Natural Language Conversational Feedback, Artificial Intelligence, Learner's Characteristics Curve (Student Model)



- ATL takes in a **domain specific semantic space** to automatically provide individualized feedback to learners in real time
- Goal: make a widely available, **cost-effective**, updatable, **internet-based** virtual ITS

Real World vs Virtual World training

- Learning is equivalent for trauma teams



Youngblood, P., Harter, P. M., Srivastava, S., Moffett, S., Heinrichs, W. L., & Dev, P. (2008). Design, development, and evaluation of an online virtual emergency department for training trauma teams. *Simulation Healthcare*, 3(3), 146-153.

- Can virtual training be improved?
 - Observational training
 - Case-based reasoning
 - Point & query interaction points with natural language tutoring.

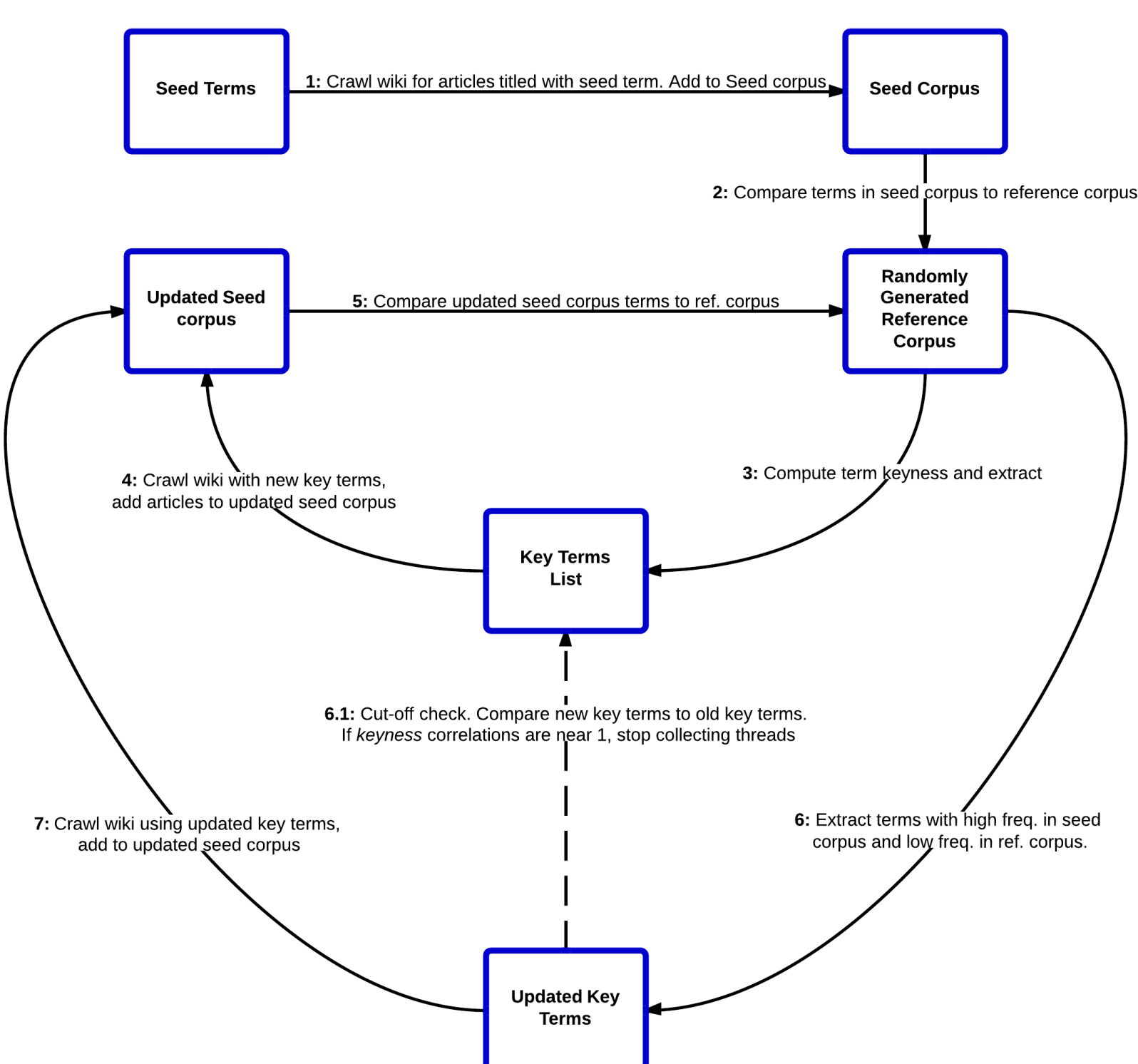
Why ITS?

Effect Sizes	Learning Environment
.42	Unskilled Human Tutors (Cohen, Kulik, & Kulik, 1982)
.80	AutoTutor (20 experiments) (Graesser et al., 2004)
1.05	Other Intelligent Tutoring Systems PACT (Anderson, Corbett, Aleven, Koedinger) Andes, Atlas (VanLehn) Diagnoser (Hunt, Minstrell) Sherlock (Lesgold)
2.0	Expert Human Tutors (Bloom, 1984)

- ITSs utilize virtual agents to simulate novice or expert tutors
- Expert human tutors viewed as gold standard of learning environments
- ITSs can adapt and implement pedagogical strategies used by expert human tutors

A Method for Training Domain Specific Semantic Spaces

Generating a Domain Specific Corpus

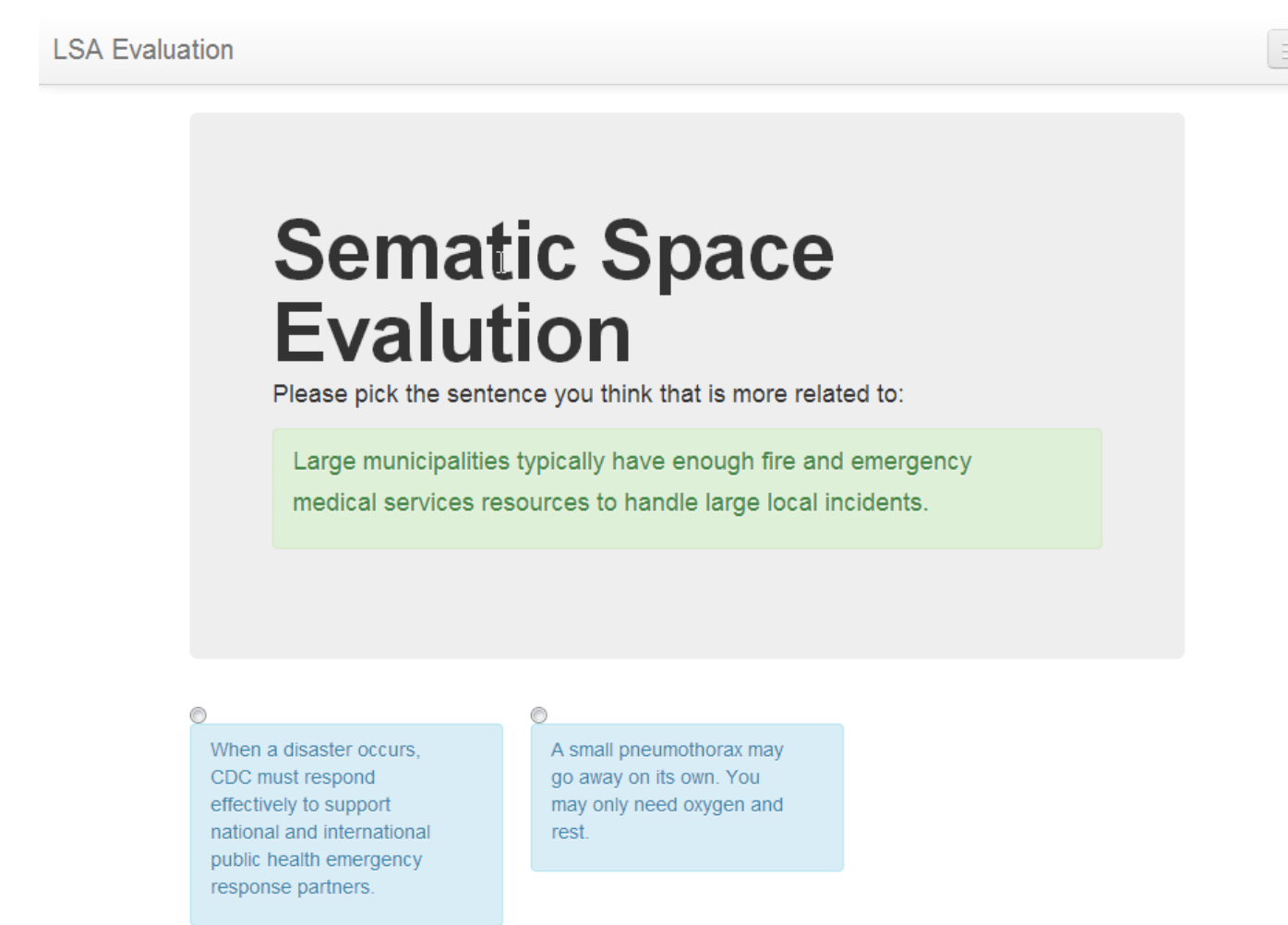


Cai, Z., Graesser, A.C., Burkett, C., Li, H., Morgan, B., Shaffer, D. (2011, November). *Generation of domain-specific LSA spaces*. Paper presented at the annual meeting of the Society for Computers in Psychology, Seattle, WA.

Latent Semantic Analysis

- Method for analyzing relationships between sets of documents and their contained terms.
- Assumption behind LSA: "the meaning of any item (words, phrases, etc) in a given language is embedded within its relations with other items"
- LSA proposes the semantic similarity between items can be numerically computed
- LSA takes in any given corpus and generates a semantic space by using a term-document matrix and singular value decomposition. Terms and document vectors can be compared through cosine similarity
- Advantages of a Domain Specific Semantic Space? The meaning of a word can vary across domains (i.e, "plane" in aviation domain vs "plane" in geometry domain)
- Hypothesis is: If we generate a domain specific semantic space, our system will analyze learner responses more accurately, where key domain specific terms are weighted more heavily

Validating the Semantic Space



- To validate the semantic space, human association norms are gathered from domain experts, or subject matter experts (SMEs)
- Present a series of "triads" (A, B, C) to SMEs and have them determine which pair within the triad is the most similar or most related
- Triad task can work on the sentence level and the word level
- If, on average, SME judgments of the same triads match what our LSA determined, then our semantic space is validated

Learner's Characteristic Curve



- **Student Model** within ATL
- Used to provide relevant and **accurate feedback** to each student response
- Using LSA, fits each **student response into one of 6 categories** (Relevant & New, Relevant & Old, Irrelevant & New, Irrelevant & Old, Total Coverage, and Total Score)

Key References

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Acknowledgements

This project was funded by the United States Department of Defense & USAMRAA.



We would also like to thank our virtual world development partners, CliniSpace. <http://www.clinispace.com>



Selected Movies (youtube) for V-CAEST

- Introduction Video: <https://www.youtube.com/watch?v=3YEEhPzFRBw>



- ATL for incorrect triage 2.5 minutes: <https://www.youtube.com/watch?v=ywMdRd9HwRQ>



- Triage in a Mass Casualty Incident: <https://www.youtube.com/watch?v=MklOaGaY3ns>



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108         <NF UID="Msg_1_1_6" playaction="Msg_1_1_6">That's not quite it.</NF>
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185 <AgentSay UID="Msg_2_15_0" playaction="Msg_2_15_0">That's not quite it. Not really.</AgentSay>
186 <DisplayText UID="" playaction="">That's not quite it. Not really.</DisplayText>
187 </NEGF>
188 <NEGF UID="" playaction="">
189 <AgentSay UID="Msg_2_16_0" playaction="Msg_2_16_0">No, that's not the right answer.</AgentSay>
190 <DisplayText UID="" playaction="">No, that's not the right answer.</DisplayText>
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195 </NEGF>
196 <NEGF UID="" playaction="">
197 <AgentSay UID="Msg_2_18_0" playaction="Msg_2_18_0">That's not completely correct.</AgentSay>
198 <DisplayText UID="" playaction="">That's not completely correct.</DisplayText>
199 </NEGF>
200 <NEGF UID="" playaction="">
201 <AgentSay UID="Msg_2_19_0" playaction="Msg_2_19_0">Well, let's try again.</AgentSay>
202 <DisplayText UID="" playaction="">Well, let's try again.</DisplayText>
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206 <DisplayText UID="" playaction="">Um, that's not completely correct.</DisplayText>
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208 <NEUF UID="" playaction="">
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211 </NEUF>
212 <NEUF UID="" playaction="">
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214 <DisplayText UID="" playaction="">All right.</DisplayText>
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216 <NEUF UID="" playaction="">
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220 <NEUF UID="" playaction="">
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222 <DisplayText UID="" playaction="">OK.</DisplayText>

223 </NEUF>
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228 <NEUF UID="" playaction="">
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250 <DisplayText UID="" playaction="">It seems to me that you have answered another question. If I understand you right, let me summarize for you.</DisplayText>
251 </TRND>
252 <TRND UID="" playaction="">
253 <AgentSay UID="Msg_2_32_0" playaction="Msg_2_32_0">Well, if I understood you right, it was a good answer, but to the wrong question. Let me summarize that for you.</AgentSay>
254 <DisplayText UID="" playaction="">Well, if I understood you right, it was a good answer, but to the wrong question. Let me summarize that for you.</DisplayText>
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256 <TRND UID="" playaction="">
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262 <DisplayText UID="" playaction="">It seems to me that you have answered another question. If I understand you right, let me summarize for you.</DisplayText>
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274 <DisplayText UID="" playaction="">It seems to me that you have answered another question. If I understand you right, let me summarize for you.</DisplayText>
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286 <DisplayText UID="" playaction="">Pulling it all together,</DisplayText>
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288 <TRNS UID="" playaction="">
289 <AgentSay UID="Msg_2_41_0" playaction="Msg_2_41_0">In summary,</AgentSay>
290 <DisplayText UID="" playaction="">In summary,</DisplayText>
291 </TRNS>
292 <TRNS UID="" playaction="">
293 <AgentSay UID="Msg_2_42_0" playaction="Msg_2_42_0">To summarize,</AgentSay>
294 <DisplayText UID="" playaction="">To summarize,</DisplayText>
295 </TRNS>
296 <TRNS UID="" playaction="">
297 <AgentSay UID="Msg_2_43_0" playaction="Msg_2_43_0">Bringing everything together,</AgentSay>
298 <DisplayText UID="" playaction="">Bringing everything together,</DisplayText>
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313 <AgentSay UID="Msg_2_47_0" playaction="Msg_2_47_0">Here are some main points to remember:</AgentSay>
314 <DisplayText UID="" playaction="">Here are some main points to remember:</DisplayText>
315 </TRNS>
316 <TRNS UID="" playaction="">
317 <AgentSay UID="Msg_2_48_0" playaction="Msg_2_48_0">Overall,</AgentSay>
318 <DisplayText UID="" playaction="">Overall,</DisplayText>
319 </TRNS>
320 <TRNH UID="" playaction="">
321 <AgentSay UID="Msg_2_49_0" playaction="Msg_2_49_0">I bet you can answer this.</AgentSay>
322 <DisplayText UID="" playaction="">I bet you can answer this.</DisplayText>
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331 </TRNH>
332 <TRNH UID="" playaction="">
333 <AgentSay UID="Msg_2_52_0" playaction="Msg_2_52_0">I think this question will help you:</AgentSay>
334 <DisplayText UID="" playaction="">I think this question will help you:</DisplayText>
335 </TRNH>
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361
362 What is the SALT tree-ahge tagging system? Please explain the overall system, its purpose, and what each of the five colors stands for.]]></AgentSpeech>
363 <IdealAnswer playaction="Msg_3_0_2" UID="Msg_3_0_2"><![CDATA[The SALT system has been developed as a singular standardized way of tagging victims to easily alert care providers of their medical and transport priority. Grey indicates the victim is expectant. Red indicates the victim is immediate because they do not obey commands or they have an altered mental status. Yellow indicates the victim is delayed. Green indicates the victim is minimal.]]></IdealAnswer>
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374
375 SALT tree-ahge tagging is a systematic method of categorizing patients for treatment and transport after the first assessment has been performed. The SALT system has been developed as a singular standardized way of tagging victims to easily alert care providers of their medical and transport priority.]]></AgentSpeech>
376 <TextDisplay playaction="" UID=""><![CDATA[SALT triage tagging is a systematic method of categorizing patients for treatment and transport after the first assessment has been performed. The SALT system has been developed as a singular standardized way of tagging victims to easily alert care providers of their medical and transport priority.]]></TextDisplay>
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498 What advantage does the SALT system provide that the use of multiple alternative tree-ahge tagging systems does not?]]></Age
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540 How does tree-ahge tagging assist care providers who may be arriving on scene after tagging?]]></AgentSpeech>
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915 ]]></AgentSpeech>
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917 If these victims decompensate, which category will they be placed in?
918 ]]></TextDisplay>
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922 ed mental state. Victims must be continually monitored, at risk of decompensating, may need to be tagged as grey or black.]]
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926 they do not obey commands or they have an altered mental status. These victims must be continually monitored because they a
927 re at great risk of decompensating beyond the current resources if transportation is delayed, meaning they may need to be ta
928 gged as grey or black.]]></AgentSpeech>
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930 or they have an altered mental status. These victims must be continually monitored because they are at great risk of decomp
931 ensating beyond the current resources if transportation is delayed, meaning they may need to be tagged as grey or black.]]><
932 /TextDisplay>
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935 ed as grey or black.]]></IdealAnswer>
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964         <IdealAnswer playaction="Msg_3_3_2_0_2" UID="Msg_3_3_2_0_2"><![CDATA[They would not respond to the command.]
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1275 <HintQuestion playaction="" UID="">
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1277 jor risk of?]]></AgentSpeech>
1278     <TextDisplay playaction="" UID=""><![CDATA[What are victims tagged as yellow at major risk of?]]></TextDisplay>
1279     <IdealAnswer playaction="Msg_3_4_2_1_2" UID="Msg_3_4_2_1_2"><![CDATA[Decompensating to the criteria of a red
1280 tag.]]></IdealAnswer>
1281 </HintQuestion>
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1297     </Semantics>
1298     <RegExp playaction="" UID="">
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1302 <TC_Mean playaction="" UID="">0.8</TC_Mean>
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1308 <RegExpCoverage playaction="" UID="">0.6</RegExpCoverage>
1309 </Threshold>
1310 </Hint>
1311 <Hint Used="False" playaction="" UID="">
1312 <HintQuestion playaction="" UID="">
1313 <AgentSpeech playaction="Msg_3_4_2_2_0_0" UID="Msg_3_4_2_2_0_0"><![CDATA[What type of injuries do victims tagged
as green have?]]></AgentSpeech>
1314 <TextDisplay playaction="" UID=""><![CDATA[What type of injuries do victims tagged as green have?]]></TextDisplay>
1315 <IdealAnswer playaction="Msg_3_4_2_2_0_2" UID="Msg_3_4_2_2_0_2"><![CDATA[They have minimal injuries that can go
untreated.]]></IdealAnswer>
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1354 <TextDisplay playaction="" UID=""><![CDATA[What level of risk for decompensation are victims tagged as green at?
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1355 <IdealAnswer playaction="Msg_3_4_2_3_0_2" UID="Msg_3_4_2_3_0_2"><![CDATA[Victims tagged as green can go without
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1356 </HintQuestion>
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1358 <Threshold playaction="" UID="">
1359 <Semantics playaction="" UID="">
1360 <RN_Mean playaction="" UID="">0.3</RN_Mean>
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1369     <TC_SD playaction="" UID="">0.1</TC_SD>
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1377     <RO_SD playaction="" UID="">0.1</RO_SD>
1378     <IN_Mean playaction="" UID="">0.3</IN_Mean>
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1397         <IdealAnswer UID="Msg_3_4_3_0_2" playaction="Msg_3_4_3_0_2"><![CDATA[Expectation Answer]]></IdealAnswer>
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1403       <AgentSpeech UID="_SKOSCRIPTS_TU_EXPECTATION4_PROMPTS_PROMPT2_PROMPTQUESTION_AGENTSPEECH"><![CDATA[]]></AgentSpe
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1413     </Prompt>
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1418         <IdealAnswer UID="Msg_3_4_3_3_0_2" playaction="Msg_3_4_3_3_0_2"><![CDATA[Expectation Answer]]></IdealAnswer>
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1426       <AgentSpeech UID="_SKOSCRIPTS_TU_EXPECTATION4_PUMPS_PUMP1_PUMPQUESTION_AGENTSPEECH"><![CDATA[]]></AgentSpeech>
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1429   </Pump>
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1431   <PumpQuestion UID="" playaction="">
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1433     <AgentSpeech UID="_SKOSCRIPTS_TU_EXPECTATION4_PUMPS_PUMP2_PUMPQUESTION_AGENTSPEECH"><![CDATA[]]></AgentSpeech>
1434     <IdealAnswer UID="Msg_3_4_4_1_0_2" playaction="Msg_3_4_4_1_0_2"><![CDATA[Expectation Answer]]></IdealAnswer>
1435   </PumpQuestion>

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1441             <IdealAnswer UID="Msg_3_4_4_2_0_2" playaction="Msg_3_4_4_2_0_2"><![CDATA[Expectation Answer]]></IdealAnswer>
1442         </PumpQuestion>
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1448             <IdealAnswer UID="Msg_3_4_4_3_0_2" playaction="Msg_3_4_4_3_0_2"><![CDATA[Expectation Answer]]></IdealAnswer>
1449         </PumpQuestion>
1450     </Pump>
1451 </PUMPS>
1452 </Expectation>
1453 </TU>
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1455     <ITEM type="scene" playaction="" UID="">
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1457         <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1458         <mattextS playaction="Msg_4_0_2" UID="Msg_4_0_2"><![CDATA[<bubble text=" During the assessment phase of the SALT Triage
1459 e system, you will record the victim's vital signs and mental status. "/>
1460 During the assessment phase of the SALT TreeAhge system, you will record the victim's vital signs and mental status. ]]></
1461 mattextS>
1462         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1463         <mattextD playaction="" UID=""><![CDATA[During the assessment phase of the SALT Triage system, you will record the vic
1464 tim's vital signs and mental status. If no life saving interventions are needed, we move to "t" which is tagging for t
1465 ransport or treatment. ]]></mattextD>
1466         <PageConfig playaction="" UID="">
1467             <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1468             <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
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1471             <MediaTypeXML playaction="" UID="">
1472             <SKOMsg playaction="" UID="">
1473             <UseAIML playaction="" UID=""><0</UseAIML>
1474             <PlayStyle playaction="" UID="">auto</PlayStyle>
1475             <EnableBigImage playaction="" UID=""><0</EnableBigImage>
1476         </PageConfig>
1477     </ITEM>
1478     <ITEM type="scene" playaction="" UID="">
1479         <TITLE playaction="" UID="">1.1</TITLE>
1480         <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1481         <mattextS playaction="Msg_4_1_2" UID="Msg_4_1_2"><![CDATA[<bubble text=" If no life saving interventions are needed, w
1482 e move to tagging for treatment or transport. "/>
1483 If no life saving interventions are needed, we move to tagging for treatment or transport.]]></mattextS>
1484         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1485         <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1486         <PageConfig playaction="" UID="">
1487             <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1488             <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
1489 "true" showTeacher="true" useTeacher="true" playaction="" UID="">
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1492             <SKOMsg playaction="" UID="">
1493             <UseAIML playaction="" UID=""><0</UseAIML>
1494             <PlayStyle playaction="" UID="">auto</PlayStyle>
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1496         </PageConfig>
1497     </ITEM>
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1501         <mattextS playaction="Msg_4_2_2" UID="Msg_4_2_2"><![CDATA[<bubble text=" The color selected denotes the order in which
1502 the victims are treated, monitored, and transported. The 5 categories are, red for immediate, yellow for delayed, green for
1503 minimal, gray for expectant, and black for dead. It is important to remember that this tagging step is dynamic like the ent
1504 ire SALT system. "/>
1505 The color selected denotes the order in which the victims are treated, monitored, and transported. The 5 categories are, red
1506 for immediate, yellow for delayed, green for minimal, gray for expectant, and black for dead. It is important to remember t
1507 hat this tagging step is dynamic like the entire SALT system. ]]></mattextS>

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1499     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1500     <mattextD playaction="" UID=""><![CDATA[The color selected denotes the order in which the victims are transported. The
1501     5 categories are, red for immediate, yellow for delayed, green for minimal, gray for expectant, and black for dead. It is i
1502     mportant to remember that this tagging step is dynamic like the entire SALT system. The SALT triage system is heavily depend
1503     ent on available resources and victim conditions are always changing. When you are labeling your patients with a SALT triage
1504     color, you should be sure to take into account available resources. Also, it is very important to reassess frequently. In
1505     this module you will learn the condition criteria for each color category for tagging.]]></mattextD>
1506     <PageConfig playaction="" UID="">
1507     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1508     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
1509     "true" showTeacher="true" useTeacher="true" playaction="" UID="">
1510     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
1511     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1512     <SKOMsg playaction="" UID="">
1513     <UseAIML playaction="" UID="">0</UseAIML>
1514     <PlayStyle playaction="" UID="">auto</PlayStyle>
1515     <EnableBigImage playaction="" UID="">0</EnableBigImage>
1516   </PageConfig>
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1519   <TITLE playaction="" UID="">Turn 2.1</TITLE>
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1522   n available resources and victim conditions are always changing. "/>
1523   The SALT TreeAhge system is heavily dependent on available resources and victim conditions are always changing.]]></mattextS
1524   >
1525   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1526   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1527   <PageConfig playaction="" UID="">
1528   <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1529   <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
1530   "true" showTeacher="true" useTeacher="true" playaction="" UID="">
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1532   <MediaTypeXML playaction="" UID="">
1533   <SKOMsg playaction="" UID="">
1534   <UseAIML playaction="" UID="">0</UseAIML>
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1537 </PageConfig>
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1539 <ITEM type="scene" playaction="" UID="">
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1543   T triage color, you should be sure to take into account available resources. Also, it is very important to reassess frequent
1544   ly. In this module you will learn the condition criteria for each color category for tagging."/>
1545   When you are labeling your victims with a SALT TreeAhge color, you should be sure to take into account available resources.
1546   Also, it is very important to reassess frequently. In this module you will learn the condition criteria for each color cate
1547   gory for tagging.]]></mattextS>
1548   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1549   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
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1551   <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1553   "true" showTeacher="true" useTeacher="true" playaction="" UID="">
1554   <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
1555   <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1556   <SKOMsg playaction="" UID="">
1557   <UseAIML playaction="" UID="">0</UseAIML>
1558   <PlayStyle playaction="" UID="">auto</PlayStyle>
1559   <EnableBigImage playaction="" UID="">0</EnableBigImage>
1560 </PageConfig>
1561 </ITEM>
1562 <ITEM type="scene" playaction="" UID="">
1563   <TITLE playaction="" UID="">Turn 3: Dead/Black</TITLE>
1564   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1565   <mattextS playaction="Msg_4_5_2" UID="Msg_4_5_2"><![CDATA[<bubble text=" Black is the triage category for victims who
1566   are not breathing even after life-saving interventions are attempted; they are considered dead. "/>
1567   Black is the TreeAhge category for victims who are not breathing even after life-saving interventions are attempted; they ar
1568   e considered dead. ]]]></mattextS>
1569   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1570   <mattextD playaction="" UID=""><![CDATA[Black is the triage category for victims who are not breathing even after life

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-saving interventions are attempted; they are considered dead. It is important to tag the dead victims so valuable time is not wasted by other responders attempting to re-assess the victim.]]></mattextD>

1558 <PageConfig playaction="" UID="">

1559 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

1560 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="true" playaction="" UID="">

1561 <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>

1562 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>

1563 <SKOMsg playaction="" UID="">

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1565 <PlayStyle playaction="" UID="">auto</PlayStyle>

1566 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

1567 </PageConfig>

1568 </ITEM>

1569 <ITEM type="scene" playaction="" UID="">

1570 <TITLE playaction="" UID="">3.1</TITLE>

1571 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

1572 <mattextS playaction="Msg_4_6_2" UID="Msg_4_6_2"><![CDATA[<bubble text=" It is important to tag the dead victims, so valuable time is not wasted by other responders attempting to re-assess the victim. "/>

1573 It is important to tag the dead victims, so valuable time is not wasted by other responders attempting to re-assess the victim.]]></mattextS>

1574 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

1575 <mattextD playaction="" UID=""><![CDATA[]]></mattextD>

1576 <PageConfig playaction="" UID="">

1577 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

1578 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="true" playaction="" UID="">

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1580 <MediaTypeXML playaction="" UID="">

1581 <SKOMsg playaction="" UID="">

1582 <UseAIML playaction="" UID=""><0</UseAIML>

1583 <PlayStyle playaction="" UID="">auto</PlayStyle>

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1585 </PageConfig>

1586 </ITEM>

1587 <ITEM type="scene" playaction="" UID="">

1588 <TITLE playaction="" UID="">Turn 4</TITLE>

1589 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

1590 <mattextS playaction="Msg_4_7_2" UID="Msg_4_7_2"><![CDATA[How are we sure that they are not unconscious and need an intervention like assisted breathing via bag-valve mask?]]></mattextS>

1591 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

1592 <mattextD playaction="" UID=""><![CDATA[How are we sure that they are not unconscious and need an intervention like CP R?]]></mattextD>

1593 <PageConfig playaction="" UID="">

1594 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

1595 <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

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1597 <MediaTypeXML playaction="" UID="">

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1599 <UseAIML playaction="" UID=""><0</UseAIML>

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1602 </PageConfig>

1603 </ITEM>

1604 <ITEM type="scene" playaction="" UID="">

1605 <TITLE playaction="" UID="">Turn 5</TITLE>

1606 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

1607 <mattextS playaction="Msg_4_8_2" UID="Msg_4_8_2"><![CDATA[An example of this would be a 2 year old child who is unresponsive, can not maintain an open airway and is not breathing even after 2 rescue breaths. We would use the black tag to indicate this victim is dead.]]></mattextS>

1608 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

1609 <mattextD playaction="" UID=""><![CDATA[An example of this would be a 2 year old child who is unresponsive, can not maintain an open airway and is not breathing even after 2 rescue breaths. We would use the black tag to indicate this person is deceased.]]></mattextD>

1610 <PageConfig playaction="" UID="">

1611 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

1612 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

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1615 <SKOMsg playaction="" UID="">

1616 <UseAIML playaction="" UID=""><0</UseAIML>

1617 <PlayStyle playaction="" UID="">auto</PlayStyle>

1618

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1619     <EnableBigImage playaction="" UID="">0</EnableBigImage>
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1625   <mattextS playaction="Msg_4_9_2" UID="Msg_4_9_2"><![CDATA[Correct!]]></mattextS>
1626   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1627   <mattextD playaction="" UID=""><![CDATA[Correct!]]></mattextD>
1628   <PageConfig playaction="" UID="">
1629     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1630     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">/
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1632     <MediaTypeXML playaction="" UID="">/
1633     <SKOMsg playaction="" UID="">/
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1639 <ITEM type="scene" playaction="" UID="">
1640   <TITLE playaction="" UID="">Turn 7: Expectant/Gray</TITLE>
1641   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1642   <mattextS playaction="Msg_4_10_2" UID="Msg_4_10_2"><![CDATA[<bubble text=" Gray is the triage category for "expectan
t" victims who, when faced with limited resources, are unlikely to survive. This category will ONLY be needed when there a
re not enough medical responders, supplies, and transportation options available to handle the number of seriously injured v
ictims. "/>
1643
1644   Gray is the TreeAhge category for "expectant" victims, who when faced with limited resources, are unlikely to survive. T
his category will ONLY be needed when there are not enough medical responders, supplies, and transportation options, availab
le to handle the number of seriously injured victims.]]></mattextS>
1645   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1646   <mattextD playaction="" UID=""><![CDATA[Gray is the triage category for "expectant" victims who, when faced with l
imited resources, are unlikely to survive. This category will ONLY be needed when there are not enough medical supplies or t
ransportation available to handle the number of seriously injured victims. Expectant victims should be re-evaluated and re-c
ategorized as appropriate when more resources become available. Expectant victim are STILL ALIVE and should be given whatev
er palliative care is available.]]></mattextD>
1647   <PageConfig playaction="" UID="">
1648     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1649     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
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1650     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
1651     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1652     <SKOMsg playaction="" UID="">/
1653     <UseAIML playaction="" UID="">0</UseAIML>
1654     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1656   </PageConfig>
1657 </ITEM>
1658 <ITEM type="scene" playaction="" UID="">
1659   <TITLE playaction="" UID="">7.1</TITLE>
1660   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1661   <mattextS playaction="Msg_4_11_2" UID="Msg_4_11_2"><![CDATA[Expectant victims should be re-evaluated and re-categorize
d as appropriate when more resources become available. Expectant victims are STILL ALIVE and should be given whatever palli
ative care is available.]]></mattextS>
1662   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1663   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1664   <PageConfig playaction="" UID="">
1665     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1666     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
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1667     <MediaURLXML playaction="" UID="">/
1668     <MediaTypeXML playaction="" UID="">/
1669     <SKOMsg playaction="" UID="">/
1670     <UseAIML playaction="" UID="">0</UseAIML>
1671     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1673   </PageConfig>
1674 </ITEM>
1675 <ITEM type="scene" playaction="" UID="">
1676   <TITLE playaction="" UID="">Turn 8</TITLE>
1677   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1678   <mattextS playaction="Msg_4_12_2" UID="Msg_4_12_2"><![CDATA[I don't really understand. These victims are still alive
. Why can't we perform life-saving interventions?]]></mattextS>

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1679     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1680     <mattextD playaction="" UID=""><![CDATA[I don't really understand. These victims are still alive. Why can't we per
form life-saving interventions?]]></mattextD>
1681     <PageConfig playaction="" UID="">
1682     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1683     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
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1685     <MediaTypeXML playaction="" UID="">
1686     <SKOMsg playaction="" UID="">
1687     <UseAIML playaction="" UID=""><0</UseAIML>
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1690     </PageConfig>
1691   </ITEM>
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1693     <TITLE playaction="" UID="">Turn 9</TITLE>
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1695     <mattextS playaction="Msg_4_13_2" UID="Msg_4_13_2"><![CDATA[It can be difficult to make this decision for tagging this
category. One time I had a victim who had multiple amputations all of which had the hemorrhaging controlled with tournique
ts. The victim was in respiratory distress with no peripheral pulses.]]></mattextS>
1696     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1697     <mattextD playaction="" UID=""><![CDATA[It can be difficult to make this decision for tagging this category. One time
I had a victim who had multiple amputations all of which had the hemorrhaging controlled with tourniquets. The victim was i
n respiratory distress with no peripheral pulses. ]]]></mattextD>
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1704     <UseAIML playaction="" UID=""><0</UseAIML>
1705     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1707     </PageConfig>
1708   </ITEM>
1709   <ITEM type="scene" playaction="" UID="">
1710     <TITLE playaction="" UID="">9.1</TITLE>
1711     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1712     <mattextS playaction="Msg_4_14_2" UID="Msg_4_14_2"><![CDATA[He was moaning but otherwise not moving. The problem was w
e were located in a remote area with an extremely long transport time, no helicopters, and only a few ground transport vehi
cles with 25 other victims already in Immediate category.]]></mattextS>
1713     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1714     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1715     <PageConfig playaction="" UID="">
1716     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1719     <MediaTypeXML playaction="" UID="">
1720     <SKOMsg playaction="" UID="">
1721     <UseAIML playaction="" UID=""><0</UseAIML>
1722     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1724     </PageConfig>
1725   </ITEM>
1726   <ITEM type="scene" playaction="" UID="">
1727     <TITLE playaction="" UID="">Turn 10</TITLE>
1728     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1729     <mattextS playaction="Msg_4_15_2" UID="Msg_4_15_2"><![CDATA[I see, so you had to tag him as expectant because there we
re just too few resources. It was a situation where you did not have enough people or adequate transportation to get him the
help he needed.]]></mattextS>
1730     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1731     <mattextD playaction="" UID=""><![CDATA[I see, so you had to tag him as expectant because there were just too few reso
urces. It was a situation where you did not have enough people or adequate transportation to get him the help he needed. I a
lways think of resources as items or tools but I can see how resources in these circumstances could be not enough health car
e staff.]]></mattextD>
1732     <PageConfig playaction="" UID="">
1733     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1734     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
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1738     <UseAIML playaction="" UID="">0</UseAIML>
1739     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1741   </PageConfig>
1742 </ITEM>
1743 <ITEM type="scene" playaction="" UID="">
1744   <TITLE playaction="" UID="">10.1</TITLE>
1745   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1746   <mattextS playaction="Msg_4_16_2" UID="Msg_4_16_2"><![CDATA[I always think of resources as items or tools, but I can s
ee how resources in these circumstances could include medical responders. ]]></mattextS>
1747   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1748   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1749   <PageConfig playaction="" UID="">
1750     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1753     <MediaTypeXML playaction="" UID="">
1754     <SKOMsg playaction="" UID="">
1755     <UseAIML playaction="" UID="">0</UseAIML>
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1758   </PageConfig>
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1761   <TITLE playaction="" UID="">Turn 11</TITLE>
1762   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1763   <mattextS playaction="Msg_4_17_2" UID="Msg_4_17_2"><![CDATA[Correct. The question you should ask yourself when tagging
an individual as expectant is "will the victim likely survive with the current available resources?" If the answer is n
o, then the expectant tag should be used.]]></mattextS>
1764   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1765   <mattextD playaction="" UID=""><![CDATA[Correct. The question you should ask yourself when tagging an individual as ex
pectant is "will the victim likely survive with the current available resources?" If the answer is no, then the expectan
t tag should be used.]]></mattextD>
1766   <PageConfig playaction="" UID="">
1767     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1771     <SKOMsg playaction="" UID="">
1772     <UseAIML playaction="" UID="">0</UseAIML>
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1777 <ITEM type="scene" playaction="" UID="">
1778   <TITLE playaction="" UID="">Turn 12: Immediate/Red</TITLE>
1779   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1780   <mattextS playaction="Msg_4_18_2" UID="Msg_4_18_2"><![CDATA[<bubble text=" Red is the triage category for victims who
do not obey commands or have an altered mental status; who have a carotid pulse but do not have peripheral pulses; who are i
n respiratory distress or have an uncontrolled major hemorrhage. "/>
1781   Red is the TreeAhge category for victims who do not obey commands or have an altered mental status; who have a carotid pulse
1782   but do not have peripheral pulses; who are in respiratory distress or have an uncontrolled major hemorrhage. ]]></mattextS>
1783   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1784   <mattextD playaction="" UID=""><![CDATA[Red is the triage category for victims who do not obey commands or have an alt
ered mental status; who have a carotid pulse but do not have peripheral pulses; who are in respiratory distress or have an u
ncontrolled major hemorrhage. If the victim is likely to survive with the resources available, they should be triaged as im
mediate and tagged the color red. Victims who are triaged as red must be continually monitored as they are at risk of decom
pensating beyond the available resources if delays in transport increase. As resources lessen, the triage tag may need to be
changed to gray or expectant.]]></mattextD>
1785   <PageConfig playaction="" UID="">
1786     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1787     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
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1788     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
1789     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1790     <SKOMsg playaction="" UID="">
1791     <UseAIML playaction="" UID="">0</UseAIML>
1792     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1794   </PageConfig>
1795 </ITEM>

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1796 <ITEM type="scene" playaction="" UID="">
1797 <TITLE playaction="" UID="">Turn 12.1</TITLE>
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resources available, they should be triaged as immediate and tagged as red. Victims who are triaged as red must be continu
ally monitored as they are at risk of decompensating beyond the available resources if delays in transport increase. "]/>
1800
1801 If the victim is likely to survive with the resources available, they should be TreeAhged as immediate and tagged as red. V
ictims who are TreeAhged as red must be continually monitored as they are at risk of decompensating beyond the available res
ources if delays in transport increase.]]></mattextS>
1802 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1803 <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1804 <PageConfig playaction="" UID="">
1805 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1809 <SKOMsg playaction="" UID="">
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1813 </PageConfig>
1814 </ITEM>
1815 <ITEM type="scene" playaction="" UID="">
1816 <TITLE playaction="" UID="">12.2</TITLE>
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d to be changed to gray or expectant. "]/>
1819
1820 As resources lessen, the TreeAhge tag may need to be changed to gray or expectant.]]></mattextS>
1821 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1822 <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1823 <PageConfig playaction="" UID="">
1824 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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1827 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1828 <SKOMsg playaction="" UID="">
1829 <UseAIML playaction="" UID="">0</UseAIML>
1830 <PlayStyle playaction="" UID="">auto</PlayStyle>
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1833 </ITEM>
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1835 <TITLE playaction="" UID="">Turn 13</TITLE>
1836 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
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n blood with no obvious visible hemorrhaging, has no pulses and is in respiratory distress is ready for tagging. Why would y
ou expect to tag this victim as expectant? "]/>
1838
1839 Let's say a female victim who is soaked in blood with no obvious visible hemorrhaging, has no pulses and, is in respirator
y distress, is ready for tagging. Why would you expect to tag this victim as expectant?]]></mattextS>
1840 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1841 <mattextD playaction="" UID=""><![CDATA[Let's say a female victim who is soaked in blood with no obvious visible hem
orrhaging, has no pulses and is in respiratory distress is ready for tagging. Why would you expect to tag this victim as imm
ediate?]]></mattextD>
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1843 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1844 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
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1846 <MediaTypeXML playaction="" UID="">
1847 <SKOMsg playaction="" UID="">
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1849 <PlayStyle playaction="" UID="">auto</PlayStyle>
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1851 </PageConfig>
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1853 <ITEM type="scene" playaction="" UID="">
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1856 <mattextS playaction="Msg_4_22_2" UID="Msg_4_22_2"><![CDATA[She isn't hemorrhaging, but she is in respiratory distre
ss and doesn't have a pulse. To me, she would need immediate and consistent assistance because she is at a risk of decomp

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nsating.]]></mattextS>
1857     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1858     <mattextD playaction="" UID=""><![CDATA[She isn't hemorrhaging, but she is in respiratory distress and doesn't hav
e a pulse. To me, she would need immediate and consistent assistance because she is at a risk of decompensating.]]></mattext
D>
1859     <PageConfig playaction="" UID="">
1860     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1861     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
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1863     <MediaTypeXML playaction="" UID=""/>
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1865     <UseAIML playaction="" UID=""><0</UseAIML>
1866     <PlayStyle playaction="" UID="">auto</PlayStyle>
1867     <EnableBigImage playaction="" UID=""><0</EnableBigImage>
1868     </PageConfig>
1869 </ITEM>
1870 <ITEM type="scene" playaction="" UID="">
1871     <TITLE playaction="" UID="">14.1</TITLE>
1872     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1873     <mattextS playaction="Msg_4_23_2" UID="Msg_4_23_2"><![CDATA[If not enough resources are available to continually provi
de this victim the assistance she needs she would be tagged as expectant. ]]></mattextS>
1874     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1875     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1876     <PageConfig playaction="" UID="">
1877     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1878     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
1879     <MediaURLXML playaction="" UID=""/>
1880     <MediaTypeXML playaction="" UID=""/>
1881     <SKOMsg playaction="" UID=""/>
1882     <UseAIML playaction="" UID=""><0</UseAIML>
1883     <PlayStyle playaction="" UID="">auto</PlayStyle>
1884     <EnableBigImage playaction="" UID=""><0</EnableBigImage>
1885     </PageConfig>
1886 </ITEM>
1887 <ITEM type="scene" playaction="" UID="">
1888     <TITLE playaction="" UID="">Turn 15</TITLE>
1889     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1890     <mattextS playaction="Msg_4_24_2" UID="Msg_4_24_2"><![CDATA[I agree with that statement. I did not hear anything about
mental status or movement though. I know that part of tagging in any category beyond black, involves knowing if the victim
is making any purposeful movements or obeying commands.]]></mattextS>
1891     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1892     <mattextD playaction="" UID=""><![CDATA[I agree with that statement. I did not hear anything about mental status or mo
vement though. I know that part of tagging in any category beyond dead involves knowing if the victim is making any purposef
ul movements or obeying commands. With no pulse, this victim wouldn't be conscious so no purposeful movement is happening.
]]></mattextD>
1893     <PageConfig playaction="" UID="">
1894     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1895     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
1896     <MediaURLXML playaction="" UID=""/>
1897     <MediaTypeXML playaction="" UID=""/>
1898     <SKOMsg playaction="" UID=""/>
1899     <UseAIML playaction="" UID=""><0</UseAIML>
1900     <PlayStyle playaction="" UID="">auto</PlayStyle>
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1902     </PageConfig>
1903 </ITEM>
1904 <ITEM type="scene" playaction="" UID="">
1905     <TITLE playaction="" UID="">15.1</TITLE>
1906     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1907     <mattextS playaction="Msg_4_25_2" UID="Msg_4_25_2"><![CDATA[With no pulse, this victim wouldn't be conscious, so no
purposeful movement is happening.]]></mattextS>
1908     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1909     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1910     <PageConfig playaction="" UID="">
1911     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1912     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
1913     <MediaURLXML playaction="" UID=""/>
1914     <MediaTypeXML playaction="" UID=""/>
1915     <SKOMsg playaction="" UID=""/>
1916     <UseAIML playaction="" UID=""><0</UseAIML>
1917     <PlayStyle playaction="" UID="">auto</PlayStyle>

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1923   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1924   <mattextS playaction="Msg_4_26_2" UID="Msg_4_26_2"><![CDATA[Correct and good point. Keep in mind that this victim is i
n the expectant category because there aren't enough resources available.]]></mattextS>
1925   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1926   <mattextD playaction="" UID=""><![CDATA[Correct and good point. Also, keep in mind that this victim may be moved to th
e expectant category if they are not enough resources available.]]></mattextD>
1927   <PageConfig playaction="" UID="">
1928     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1929     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">/>
1930     <MediaURLXML playaction="" UID="">/>
1931     <MediaTypeXML playaction="" UID="">/>
1932     <SKOMsg playaction="" UID="">/>
1933     <UseAIML playaction="" UID="">0</UseAIML>
1934     <PlayStyle playaction="" UID="">auto</PlayStyle>
1935     <EnableBigImage playaction="" UID="">0</EnableBigImage>
1936   </PageConfig>
1937 </ITEM>
1938 <ITEM type="scene" playaction="" UID="">
1939   <TITLE playaction="" UID="">Turn 17: Yellow/Delayed</TITLE>
1940   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1941   <mattextS playaction="Msg_4_27_2" UID="Msg_4_27_2"><![CDATA[<bubble text=" Yellow is the triage category for victims t
hat have injuries requiring treatment but do not meet the "immediate" triage category criteria. These victims should be
triaged as delayed and tagged as yellow. "/>
1942   Yellow is the TreeAhge category for victims that have injuries requiring treatment but do not meet the "immediate" TreeA
hge category criteria. These victims should be TreeAhged as delayed and tagged as yellow. ]]></mattextS>
1943   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1944   <mattextD playaction="" UID=""><![CDATA[Yellow is the triage category for victims that have injuries requiring treatme
nt but do not meet the "immediate" triage category criteria. These victims should be triaged as delayed and tagged as ye
llow. Victims who are triaged as delayed must be continually re-evaluated as they are at risk of decompensating and becomin
g an "immediate"; especially if transportation is slow.]]></mattextD>
1945   <PageConfig playaction="" UID="">
1946     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1947     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">/>
1948     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
1949     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
1950     <SKOMsg playaction="" UID="">/>
1951     <UseAIML playaction="" UID="">0</UseAIML>
1952     <PlayStyle playaction="" UID="">auto</PlayStyle>
1953     <EnableBigImage playaction="" UID="">0</EnableBigImage>
1954   </PageConfig>
1955 </ITEM>
1956 <ITEM type="scene" playaction="" UID="">
1957   <TITLE playaction="" UID="">17.1</TITLE>
1958   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
1959   <mattextS playaction="Msg_4_28_2" UID="Msg_4_28_2"><![CDATA[<bubble text=" Victims who are triaged as delayed must be
continually re-evaluated as they are at risk of decompensating and becoming an "immediate"; especially if transportation
is slow. "/>
1960   Victims who are TreeAhged as delayed must be continually re-evaluated as they are at risk of decompensating and becoming an
"immediate"; especially if transportation is slow. ]]></mattextS>
1961   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
1962   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
1963   <PageConfig playaction="" UID="">
1964     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
1965     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">/>
1966     <MediaURLXML playaction="" UID="">/>
1967     <MediaTypeXML playaction="" UID="">/>
1968     <SKOMsg playaction="" UID="">/>
1969     <UseAIML playaction="" UID="">0</UseAIML>
1970     <PlayStyle playaction="" UID="">auto</PlayStyle>
1971     <EnableBigImage playaction="" UID="">0</EnableBigImage>
1972   </PageConfig>
1973 </ITEM>
1974 <ITEM type="scene" playaction="" UID="">
1975   <TITLE playaction="" UID="">Turn 18</TITLE>
1976   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

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1979 <mattextS playaction="Msg_4_29_2" UID="Msg_4_29_2"><![CDATA[An injury such as a dislocated hip, with a pulse present in the distal leg or foot, is the type of injury that would fit the delayed category.]]></mattextS>

1980 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

1981 <mattextD playaction="" UID=""><![CDATA[An injury such as a dislocated hip with a pulse present in the distal leg or foot is the type of injury that would fit the delayed category.]]></mattextD>

1982 <PageConfig playaction="" UID="">

1983 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

1984 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

1985 <MediaURLXML playaction="" UID="">

1986 <MediaTypeXML playaction="" UID="">

1987 <SKOMsg playaction="" UID="">

1988 <UseAIML playaction="" UID=""><0</UseAIML>

1989 <PlayStyle playaction="" UID="">auto</PlayStyle>

1990 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

1991 </PageConfig>

1992 </ITEM>

1993 <ITEM type="scene" playaction="" UID="">

1994 <TITLE playaction="" UID="">Turn 19</TITLE>

1995 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

1996 <mattextS playaction="Msg_4_30_2" UID="Msg_4_30_2"><![CDATA[Yes, but what if one of the legs was amputated and tourniqueted? Would you still give a yellow, delayed tag?]]></mattextS>

1997 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

1998 <mattextD playaction="" UID=""><![CDATA[Yes but what if one of the legs was amputated and tourniqueted? Would you still give a yellow, delayed tag?]]></mattextD>

1999 <PageConfig playaction="" UID="">

2000 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2001 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="true" playaction="" UID="">

2002 <MediaURLXML playaction="" UID="">

2003 <MediaTypeXML playaction="" UID="">

2004 <SKOMsg playaction="" UID="">

2005 <UseAIML playaction="" UID=""><0</UseAIML>

2006 <PlayStyle playaction="" UID="">auto</PlayStyle>

2007 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

2008 </PageConfig>

2009 </ITEM>

2010 <ITEM type="scene" playaction="" UID="">

2011 <TITLE playaction="" UID="">Turn 20</TITLE>

2012 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

2013 <mattextS playaction="Msg_4_31_2" UID="Msg_4_31_2"><![CDATA[The tag would probably not change from yellow, as long as the following criteria are met: a present pulse, no respiratory distress, mental alertness, and the hemorrhage is controlled.]]></mattextS>

2014 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

2015 <mattextD playaction="" UID=""><![CDATA[The tag would not change from yellow as long as there is a pulse, no respiratory distress, mental alertness, and the hemorrhage is controlled.]]></mattextD>

2016 <PageConfig playaction="" UID="">

2017 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2018 <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

2019 <MediaURLXML playaction="" UID="">

2020 <MediaTypeXML playaction="" UID="">

2021 <SKOMsg playaction="" UID="">

2022 <UseAIML playaction="" UID=""><0</UseAIML>

2023 <PlayStyle playaction="" UID="">auto</PlayStyle>

2024 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

2025 </PageConfig>

2026 </ITEM>

2027 <ITEM type="scene" playaction="" UID="">

2028 <TITLE playaction="" UID="">Turn 21</TITLE>

2029 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

2030 <mattextS playaction="Msg_4_32_2" UID="Msg_4_32_2"><![CDATA[Correct, as long as you can account for all of those features, a tag of delayed can be given. In this situation though, if the hemorrhaging became uncontrolled, a tag of immediate may need to be given.]]></mattextS>

2031 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

2032 <mattextD playaction="" UID=""><![CDATA[Correct, as long as you can account for all of those features. A tag of delayed or minimal can be given. In this situation though, if the hemorrhaging became uncontrolled, a tag of immediate may need to be given.]]></mattextD>

2033 <PageConfig playaction="" UID="">

2034 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2035 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="true" playaction="" UID="">

2036 <MediaURLXML playaction="" UID="">

2037 <MediaTypeXML playaction="" UID="">

2038 <SKOMsg playaction="" UID="">

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2039     <UseAIML playaction="" UID="">0</UseAIML>
2040     <PlayStyle playaction="" UID="">auto</PlayStyle>
2041     <EnableBigImage playaction="" UID="">0</EnableBigImage>
2042 </PageConfig>
2043 </ITEM>
2044 <ITEM type="scene" playaction="" UID="">
2045     <TITLE playaction="" UID="">Turn 22: Green/Minimal</TITLE>
2046     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2047     <mattextS playaction="Msg_4_33_2" UID="Msg_4_33_2"><![CDATA[<bubble text=" Green is the triage category for victims wi
th minor injuries that are limited and if not treated, can be tolerated without increasing the risk of mortality. "]/>
2048
2049 Green is the TreeAhge category for victims with minor injuries that are limited and if not treated, can be tolerated without
increasing the risk of mortality. ]]></mattextS>
2050     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2051     <mattextD playaction="" UID=""><![CDATA[Green is the triage category for victims with minor injuries that are limited
and if not treated, can be tolerated without increasing the risk of mortality.]]></mattextD>
2052     <PageConfig playaction="" UID="">
2053     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2054     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">
2055     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
2056     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
2057     <SKOMsg playaction="" UID="">
2058     <UseAIML playaction="" UID="">0</UseAIML>
2059     <PlayStyle playaction="" UID="">auto</PlayStyle>
2060     <EnableBigImage playaction="" UID="">0</EnableBigImage>
2061 </PageConfig>
2062 </ITEM>
2063 <ITEM type="scene" playaction="" UID="">
2064     <TITLE playaction="" UID="">Turn 23</TITLE>
2065     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2066     <mattextS playaction="Msg_4_34_2" UID="Msg_4_34_2"><![CDATA[This seems pretty straight forward. These are the victims
that are not at risk for decompensation even if they don't receive treatment during the incident or disaster.]]></mattextS
>
2067     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2068     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
2069     <PageConfig playaction="" UID="">
2070     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2071     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="
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2073     <MediaTypeXML playaction="" UID="">
2074     <SKOMsg playaction="" UID="">
2075     <UseAIML playaction="" UID="">0</UseAIML>
2076     <PlayStyle playaction="" UID="">auto</PlayStyle>
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2078 </PageConfig>
2079 </ITEM>
2080 <ITEM type="scene" playaction="" UID="">
2081     <TITLE playaction="" UID="">Turn 24</TITLE>
2082     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2083     <mattextS playaction="Msg_4_35_2" UID="Msg_4_35_2"><![CDATA[That's what I'm thinking. So if a victim walks over to
you with an obvious broken arm without any hemorrhages, has a pulse in the wrist of the broken arm, and is alert but in pai
n, he would be tagged with a green for minimal.]]></mattextS>
2084     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2085     <mattextD playaction="" UID=""><![CDATA[That's what I'm thinking. So if a victim walks over to you with an obvious
broken arm without any hemorrhages, has a pulse in the wrist of the broken arm, and is alert but in pain, he would be tagge
d with a green for minimal.]]></mattextD>
2086     <PageConfig playaction="" UID="">
2087     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2088     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID="">
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2090     <MediaTypeXML playaction="" UID="">
2091     <SKOMsg playaction="" UID="">
2092     <UseAIML playaction="" UID="">0</UseAIML>
2093     <PlayStyle playaction="" UID="">auto</PlayStyle>
2094     <EnableBigImage playaction="" UID="">0</EnableBigImage>
2095 </PageConfig>
2096 </ITEM>
2097 <ITEM type="scene" playaction="" UID="">
2098     <TITLE playaction="" UID="">Turn 25</TITLE>
2099     <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2100     <mattextS playaction="Msg_4_36_2" UID="Msg_4_36_2"><![CDATA[Correct. We can say yes to the following: the victim has a
pulse, no distressed respiration, purposeful movements, and no hemorrhages. ]]></mattextS>

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2101     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2102     <mattextD playaction="" UID=""><![CDATA[Correct. We can say yes to the following: the victim has a pulse, no distresse
d respiration, purposeful movements, and no hemorrhages. This means we would give either a delayed or minimal tag. Since the
injuries are only minor, this victim may receive assistance much later as there is no risk for decompensation.]]></mattextD
>
2103     <PageConfig playaction="" UID="">
2104     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2105     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">
2106     <MediaURLXML playaction="" UID="">
2107     <MediaTypeXML playaction="" UID="">
2108     <SKOMsg playaction="" UID="">
2109     <UseAIML playaction="" UID=""><0</UseAIML>
2110     <PlayStyle playaction="" UID="">auto</PlayStyle>
2111     <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2112     </PageConfig>
2113 </ITEM>
2114 <ITEM type="scene" playaction="" UID="">
2115 <TITLE playaction="" UID="">25.1</TITLE>
2116 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2117 <mattextS playaction="Msg_4_37_2" UID="Msg_4_37_2"><![CDATA[This means we would give this victim a minimal tag. Since
the injuries are only minor, this victim may receive assistance much later as there is no risk for decompensation.]]></matte
xtS>
2118     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2119     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
2120     <PageConfig playaction="" UID="">
2121     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2122     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">
2123     <MediaURLXML playaction="" UID="">
2124     <MediaTypeXML playaction="" UID="">
2125     <SKOMsg playaction="" UID="">
2126     <UseAIML playaction="" UID=""><0</UseAIML>
2127     <PlayStyle playaction="" UID="">auto</PlayStyle>
2128     <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2129     </PageConfig>
2130 </ITEM>
2131 <ITEM type="scene" playaction="" UID="">
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2133 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2134 <mattextS playaction="Msg_4_38_2" UID="Msg_4_38_2"><![CDATA[<bubble text=" Let's work on an example together.Conside
r a boy who appears to be 8 or 9 years old. He is apneic and doesn't start to breathe after an airway is opened, but does
after two rescue breaths. What type of tag would you give him? "/>
2135
2136 Let's work on an example together.Consider a boy who appears to be 8 or 9 years old. He is apnyik and doesn't start to b
reathe after an airway is opened, but does after two rescue breaths. What type of tag would you give him?
2137
2138 ]]></mattextS>
2139     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2140     <mattextD playaction="" UID=""><![CDATA[Let's work on an example together.Consider a boy who appears to be 8 or 9 ye
ars old. He is apneic and doesn't start to breath with an airway opening but does after two rescue breaths. What type of t
ag would you give him?]]></mattextD>
2141     <PageConfig playaction="" UID="">
2142     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2143     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">
2144     <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
2145     <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
2146     <SKOMsg playaction="" UID="">
2147     <UseAIML playaction="" UID=""><0</UseAIML>
2148     <PlayStyle playaction="" UID="">auto</PlayStyle>
2149     <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2150     </PageConfig>
2151 </ITEM>
2152 <ITEM type="scene" playaction="" UID="">
2153 <TITLE playaction="" UID="">Turn 27</TITLE>
2154 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2155 <mattextS playaction="Msg_4_39_2" UID="Msg_4_39_2"><![CDATA[We shouldn't give him the black tag because the life sav
ing intervention used allowed him to start breathing.]]></mattextS>
2156 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2157 <mattextD playaction="" UID=""><![CDATA[We shouldn't give him the black tag because the life saving intervention use
d allowed him to start breathing.]]></mattextD>
2158     <PageConfig playaction="" UID="">
2159     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2160     <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="

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true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
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2162 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
2163 <SKOMsg playaction="" UID=""/>
2164 <UseAIML playaction="" UID="">0</UseAIML>
2165 <PlayStyle playaction="" UID="">auto</PlayStyle>
2166 <EnableBigImage playaction="" UID="">0</EnableBigImage>
2167 </PageConfig>
2168 </ITEM>
2169 <ITEM type="scene" playaction="" UID="">
2170 <TITLE playaction="" UID="">Turn 28</TITLE>
2171 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2172 <mattextS playaction="Msg_4_40_2" UID="Msg_4_40_2"><![CDATA[Given the information, it sounds like he is in respiratory
distress. I would have to say he needs to be tagged as immediate or expectant.]]></mattextS>
2173 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2174 <mattextD playaction="" UID=""><![CDATA[Given the information, it sounds like he is in respiratory distress. I would
have to say he needs to be tagged as immediate or expectant.]]></mattextD>
2175 <PageConfig playaction="" UID="">
2176 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2177 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="false" playaction="" UID=""/>
2178 <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
2179 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
2180 <SKOMsg playaction="" UID=""/>
2181 <UseAIML playaction="" UID="">0</UseAIML>
2182 <PlayStyle playaction="" UID="">auto</PlayStyle>
2183 <EnableBigImage playaction="" UID="">0</EnableBigImage>
2184 </PageConfig>
2185 </ITEM>
2186 <ITEM type="scene" playaction="" UID="">
2187 <TITLE playaction="" UID="">Turn 29</TITLE>
2188 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2189 <mattextS playaction="Msg_4_41_2" UID="Msg_4_41_2"><![CDATA[I think it is important to know, what are the resources in
the area?]]></mattextS>
2190 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2191 <mattextD playaction="" UID=""><![CDATA[I think it is important to know, what are the resources in the area?]]></matte
xtD>
2192 <PageConfig playaction="" UID="">
2193 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2199 <PlayStyle playaction="" UID="">auto</PlayStyle>
2200 <EnableBigImage playaction="" UID="">0</EnableBigImage>
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2204 <TITLE playaction="" UID="">Turn 30</TITLE>
2205 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2206 <mattextS playaction="Msg_4_42_2" UID="Msg_4_42_2"><![CDATA[Good question! The location is close to a large city, ambu
lances are ready to take victims to nearby hospitals and there is a surplus of medical responders.]]></mattextS>
2207 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2208 <mattextD playaction="" UID=""><![CDATA[Good question! The location is close to a large city, ambulances are ready to
take victims to nearby hospitals and there is a surplus of health care professionals at the site.]]></mattextD>
2209 <PageConfig playaction="" UID="">
2210 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2211 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="
true" showTeacher="true" useTeacher="true" playaction="" UID=""/>
2212 <MediaURLXML playaction="" UID=""/>
2213 <MediaTypeXML playaction="" UID=""/>
2214 <SKOMsg playaction="" UID=""/>
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2216 <PlayStyle playaction="" UID="">auto</PlayStyle>
2217 <EnableBigImage playaction="" UID="">0</EnableBigImage>
2218 </PageConfig>
2219 </ITEM>
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2221 <TITLE playaction="" UID="">Turn 31</TITLE>
2222 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2223 <mattextS playaction="Msg_4_43_2" UID="Msg_4_43_2"><![CDATA[It sounds like there are adequate resources to provide app
ropriate treatment or transport, but his condition sounds pretty serious.]]></mattextS>
2224 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

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2225 <mattextD playaction="" UID=""><![CDATA[It sounds like there are adequate resources to provide appropriate treatment o
r transport but his condition sounds pretty serious.]]></mattextD>

2226 <PageConfig playaction="" UID="">

2227 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2228 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

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2234 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

2235 </PageConfig>

2236 </ITEM>

2237 <ITEM type="scene" playaction="" UID="">

2238 <TITLE playaction="" UID="">Turn 32</TITLE>

2239 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

2240 <mattextS playaction="Msg_4_44_2" UID="Msg_4_44_2"><![CDATA[Agreed. I would say that he should be tagged as red or imm
ediate because he was previously unconscious and not breathing.]]></mattextS>

2241 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

2242 <mattextD playaction="" UID=""><![CDATA[Agreed. I would say that he should be tagged as red or immediate because he wa
s previously unconscious and not breathing. He could be at risk for decompensating, which is why we shouldn't label him as
yellow.]]></mattextD>

2243 <PageConfig playaction="" UID="">

2244 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2245 <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

2246 <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>

2247 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>

2248 <SKOMsg playaction="" UID="">

2249 <UseAIML playaction="" UID=""><0</UseAIML>

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2253 </ITEM>

2254 <ITEM type="scene" playaction="" UID="">

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2256 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

2257 <mattextS playaction="Msg_4_45_2" UID="Msg_4_45_2"><![CDATA[He could be at risk for decompensating, which is why we sh
ouldn't label him as yellow.]]></mattextS>

2258 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

2259 <mattextD playaction="" UID=""><![CDATA[]]></mattextD>

2260 <PageConfig playaction="" UID="">

2261 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2262 <AVATAR Teacher="" Student1="" Student2="" useStudent1="true" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="false" playaction="" UID="">

2263 <MediaURLXML playaction="" UID="">

2264 <MediaTypeXML playaction="" UID="">

2265 <SKOMsg playaction="" UID="">

2266 <UseAIML playaction="" UID=""><0</UseAIML>

2267 <PlayStyle playaction="" UID="">auto</PlayStyle>

2268 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

2269 </PageConfig>

2270 </ITEM>

2271 <ITEM type="scene" playaction="" UID="">

2272 <TITLE playaction="" UID="">Turn 33</TITLE>

2273 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>

2274 <mattextS playaction="Msg_4_46_2" UID="Msg_4_46_2"><![CDATA[Great observation! The question about the resources is als
o important as that may make the difference between expectant and immediate. When would you be comfortable assigning this ch
ild into the delayed category?]]></mattextS>

2275 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>

2276 <mattextD playaction="" UID=""><![CDATA[Great observation! The question about the resources is also important as that
may make the difference between expectant and immediate. When would you be comfortable assigning this child into the delayed
category?]]></mattextD>

2277 <PageConfig playaction="" UID="">

2278 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>

2279 <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2="true" showTeacher="true" useTeacher="true" playaction="" UID="">

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2285 <EnableBigImage playaction="" UID=""><0</EnableBigImage>

2286 </PageConfig>

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2287     </ITEM>
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2291         <mattextS playaction="Msg_4_47_2" UID="Msg_4_47_2"><![CDATA[Once his breathing had stabilized, I would tag him with the
e yellow, delayed tag.]]></mattextS>
2292         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2293         <mattextD playaction="" UID=""><![CDATA[Once his breathing had stabilized I would tag him with the yellow, delayed tag
.]]></mattextD>
2294         <PageConfig playaction="" UID="">
2295             <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2296             <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="true" showStudent1="true" showStudent2="
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2304     </ITEM>
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2307         <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2308         <mattextS playaction="Msg_4_48_2" UID="Msg_4_48_2"><![CDATA[He would also need to be conscious and making purposeful m
ovements for the delayed tag. Then if he only sustained minor injuries, he could be placed in the delayed category with the
yellow tag.]]></mattextS>
2309         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2310         <mattextD playaction="" UID=""><![CDATA[He would also need to be conscious and making purposeful movements for the del
ayed tag. Then if he only sustained minor injuries, he could be placed in the minimal category with the green tag.]]></matte
xtD>
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2312             <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2315             <MediaTypeXML playaction="" UID="">
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2321     </ITEM>
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2323         <TITLE playaction="" UID="">Turn 36</TITLE>
2324         <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2325         <mattextS playaction="Msg_4_49_2" UID="Msg_4_49_2"><![CDATA[Correct! Excellent work.]]></mattextS>
2326         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2327         <mattextD playaction="" UID=""><![CDATA[Correct! Excellent work.]]></mattextD>
2328         <PageConfig playaction="" UID="">
2329             <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2332             <MediaTypeXML playaction="" UID="">
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2334             <UseAIML playaction="" UID=""><0</UseAIML>
2335             <PlayStyle playaction="" UID="">auto</PlayStyle>
2336             <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2337         </PageConfig>
2338     </ITEM>
2339     <ITEM type="scene" playaction="" UID="">
2340         <TITLE playaction="" UID="">Turn 37: --Versatile tags</TITLE>
2341         <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2342         <mattextS playaction="Msg_4_50_2" UID="Msg_4_50_2"><![CDATA[<bubble text=" Triage tags are used to represent each vict
im's condition after the initial assessment. These tags will alert care providers to a victim's medical and transport p
riority, as well as serving as a tracking system."/]>
2343
2344         TreeAhge tags are used to represent each victim's condition after the initial assessment. These tags will alert care prov
iders to a victim's medical and transport priority, as well as serving as a tracking system. ]]></mattextS>
2345         <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2346         <mattextD playaction="" UID=""><![CDATA[Triage tags are used to represent each victim's condition after the initial
assessment. These tags will alert care providers to a victim's medical and transport priority, as well as serving as a tr
acking system. Remember, triage categories are dynamic and may change over time, frequent reassessment is necessary.]]></mat
textD>

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2348 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2350 <MediaURLXML playaction="" UID="">http://goo.gl/j04GLC</MediaURLXML>
2351 <MediaTypeXML playaction="" UID="">ImageOnly</MediaTypeXML>
2352 <SKOMsg playaction="" UID="">
2353 <UseAIML playaction="" UID=""><0</UseAIML>
2354 <PlayStyle playaction="" UID="">auto</PlayStyle>
2355 <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2356 </PageConfig>
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2360 <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2361 <mattextS playaction="Msg_4_51_2" UID="Msg_4_51_2"><![CDATA[<bubble text=" Remember, triage categories are dynamic and may change over time, frequent reassessment is necessary."/]>
2362 Remember, TreeAhge categories are dynamic and may change over time, frequent reassessment is necessary.]]></mattextS>
2363 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2365 <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
2366 <PageConfig playaction="" UID="">
2367 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2369 <MediaURLXML playaction="" UID="">
2370 <MediaTypeXML playaction="" UID="">
2371 <SKOMsg playaction="" UID="">
2372 <UseAIML playaction="" UID=""><0</UseAIML>
2373 <PlayStyle playaction="" UID="">auto</PlayStyle>
2374 <EnableBigImage playaction="" UID=""><0</EnableBigImage>
2375 </PageConfig>
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2377 <ITEM type="scene" playaction="" UID="">
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2380 <mattextS playaction="Msg_4_52_2" UID="Msg_4_52_2"><![CDATA[When I worked with military personnel, their tags looked slightly different. The expectant category was blue, not gray. I was a little confused when we were going over the tag colors.]]></mattextS>
2381 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2382 <mattextD playaction="" UID=""><![CDATA[When I worked with military personnel, their tags looked slightly different. The expectant category was blue not gray. I was a little confused when we were going over the tag colors.]]></mattextD>
2383 <PageConfig playaction="" UID="">
2384 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2387 <MediaTypeXML playaction="" UID="">
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2394 <ITEM type="scene" playaction="" UID="">
2395 <TITLE playaction="" UID="">Turn 39</TITLE>
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2397 <mattextS playaction="Msg_4_53_2" UID="Msg_4_53_2"><![CDATA[<bubble text=" I've seen that as well. Sometimes the colors can change depending on who produces the tags. Some tags may fold over and others may be tear offs. This may be why the CDC is attempting to create more of a standardized approach."/]>
2398 I've seen that as well. Sometimes the colors can change depending on who produces the tags. Some tags may fold over and others may be tare offs. This may be why the CDC is attempting to create more of a standardized approach.]]></mattextS>
2400 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2401 <mattextD playaction="" UID=""><![CDATA[I've seen that too. Sometimes the colors can change depend on who produces the tags. Some tags may fold over and others may be tear-offs. This may be why the CDC is attempting to create more of a standardized approach.]]></mattextD>
2402 <PageConfig playaction="" UID="">
2403 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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a variety of triage tag types and there may be slight color variations or shades. The important thing to remember is that th
e tagging provides a systematic way of categorizing victims. "/>
2417
2418 It is important to remember that there are a variety of TreeAhge tag types and there may be slight color variations or shade
s. The important thing to remember is that the tagging provides a systematic way of categorizing victims. ]]></mattextS>
2419   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2420   <mattextD playaction="" UID=""><![CDATA[It is important to remember that there are a variety of triage tag types and t
here may be slight color variations or shades. The important thing to remember is that the tagging provides a systematic way
of categorizing patients. Its why we emphasized the steps of SALT and what to look for over the particular color of the tag
.]]></mattextD>
2421   <PageConfig playaction="" UID="">
2422     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2435   <mattextS playaction="Msg_4_55_2" UID="Msg_4_55_2"><![CDATA[<bubble text=" Its why we emphasized the steps of SALT and
what to look for over the particular color of the tag. "/>
2436
2437 Its why we emphasized the steps of SALT and what to look for, over the particular color of the tag. ]]></mattextS>
2438   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2439   <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
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2453   <NOTES playaction="" UID=""><![CDATA[]]></NOTES>
2454   <mattextS playaction="Msg_4_56_2" UID="Msg_4_56_2"><![CDATA[<bubble text=" Please feel free to review any of the conte
nt presented to you in the last 4 modules. You will now be asked a few questions about the content we just covered. "/>
2455
2456 Please feel free to review any of the content presented to you in the last 4 modules. You will now be asked a few questions
about the content we just covered. ]]></mattextS>
2457   <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2458   <mattextD playaction="" UID=""><![CDATA[Please feel free to review any of the content presented to you in the last 4 m
odules. You will now be asked a few questions about the content we just covered. After that you will be presented with some
patient scenarios and will be asked to label them with the correct SALT triage tag.]]></mattextD>
2459   <PageConfig playaction="" UID="">
2460     <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
2461     <AVATAR Teacher="" Student1="" Student2="" useStudent1="false" useStudent2="false" showStudent1="true" showStudent2=
"true" showTeacher="true" useTeacher="true" playaction="" UID="">
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2463     <MediaTypeXML playaction="" UID="">
2464     <SKOMsg playaction="" UID="">
2465     <UseAIML playaction="" UID="">0</UseAIML>
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2469 </ITEM>

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scenarios and will be asked to label them with the correct SALT triage tag."/>
2474
2475 You will then be presented with some victim scenarios and will be asked to label them with the correct SALT TreeAhge tag.]]>
</mattextS>
2476     <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
2477     <mattextD playaction="" UID=""><![CDATA[]]></mattextD>
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2493 <mattextR playaction="" UID=""><![CDATA[]]></mattextR>
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2495 <PageConfig playaction="" UID="">
2496 <BKIMG playaction="" UID=""><![CDATA[http://goo.gl/hzIjnw]]></BKIMG>
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2509 <NOTES><![CDATA[For Config Semantic Engine: Set all to 0.3. Test all at 0.2.]]></NOTES>
2510 <LogicalNext><![CDATA[]]></LogicalNext>
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2527 <MediaTypeXML></MediaTypeXML>
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2529 <POPChoice Title="" Message="" enabled="false"/>
2530 <UseAIML>1</UseAIML>
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2535     </SKOConfig>  
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