Intercultural Competence Game-based Training that Fosters Reflection

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Abstract

In this paper we describe the development of a multiplayer computer game created to train intercultural competence and metacognitive agility (self-awareness and self-regulated learning) of Special Forces team leaders. We describe the unique game design that features real-time, in-game peer performance assessment & feedback to encourage user reflection and self-explanation. We also discuss how the multiplayer game is successfully used in Special Forces intercultural education.

Keywords

Game, metacognition, reflection, training, in-game performance assessment, peer learning,

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. H.5.1 Multimedia Information Systems: Artificial, Augmented and Virtual Realities, H.5.2 User interfaces: User-centered design

Introduction

Special Forces are people-centric. Their unique strength is their ability to operate in cross-cultural contexts alongside host country nationals while exhibiting intercultural competence. Intercultural competence is expressed through openness, cognitive adaptability, and behavioral flexibility toward unfamiliar cultures. Thus Special Forces are trained in languages, regional

expertise, intercultural communication, interpersonal skills, and critical thinking, or metacognition. Honing one's metacognitive agility is integral to intercultural competence [1]. Metacognitive agility is the ability to actively control the learning process [2] such as possessing the ability to reflect and analyze the way oneself or others think, discern when different cognitive strategies are needed, and employ those strategies to enhance one's learning and performance [1]. Operating competently in cross-cultural settings requires the ability to be aware of oneself and others, reflect on salient experiences, evaluate or assess situations, and act purposefully on those evaluations.

The U.S. Army John F. Kennedy Special Warfare Center and School (schoolhouse) approached Sandia National Laboratories (Sandia) with the following question: "How can we train troops to think critically, to sense opportunities when at first glance there appear to be none, or to make good decisions regardless of the complexity of a socially and ethically ambiguous situation?" Since the users operate shoulder-to-shoulder with host country nationals in unfamiliar multicultural contexts, our particular challenge was to create a memorable classroom training experience that could engender a transfer of training from the virtual environment to the real world.

The Special Forces schoolhouse knew they wanted to address the question above and also knew they wanted to inject experiential technology into their training pipeline, but they did not know how to start. Therefore we spent the next 12 months working closely with the schoolhouse. We conducted a 3-month; in-depth ethnographic study of Special Forces as participant observers [3] to understand their needs and requirements, and 9 months developing a serious game that would hone intercultural competence [4]. Details of our ethnographic study can be found in [3] and in the interest of space we focus on the development of our approach to engendering in-game reflection below.

Our study revealed that the Special Forces organization is high adventure, high stakes, and high visibility. Constructive peer assessment was as important as individual achievement, and they approached learning in a fashion that was highly experiential. After studying the organization for 3 months we determined with our sponsor that game-based training for the classroom could add problem-solving immersion for all. Since the subject matter focused on small group communication, we had to be creative if we were going to immerse the entire class of 30.

Sandia then assembled and led a team in the development of a multiplayer game. We proposed experiential game sessions as classroom activities that would allow trainees to practice and internalize skills taught in a lecture-based, didactic learning environment. Sandia collaborated with the Office of Economic Manpower & Assessment Army Game Project (contractor Virtual Heroes, Inc.). The Army Game Project is responsible for the internet-based multiplayer first-person shooter game called *America's Army* that hosts several million registered users worldwide (www.americasarmy.com).

Game Development

The subsequent 9-month phase involved designing and developing a training game for use in the classroom which was based upon the learning objectives mentioned above. Rogers & Steinfatt indicate that

"intercultural communication training must be highly experiential if it is to increase intercultural competence" [5]. Therefore the goal of the game was to serve as a highly engaging virtual sandbox within which trainees could role-play and practice the content they learned from classroom instruction and exercise intercultural competence and metacognitive agility.

figure 1. Screen shot of *America's Army Adaptive Thinking & Leadership* cultural environment. Image courtesy of JFK SWCS.

The game content was based on real world stories and lessons learned from culturally diverse subject matter experts involved in socially ambiguous situations that had a number of "right" answers. Our content design involved creating roles for soldiers, host country civilians, and diverse members of non-governmental organizations (see figure 1). The scenarios we developed focused on intercultural negotiations, trust and rapport building, and decision-making in unexpected, high stress situations.

We used a variety of methods to develop the roles and game content including the HCI persona methodology [7]. Instead of referring to an unidentified "user" in a scenario, a specific persona of a Special Forces team leader was constructed to guide the design process. The game design also involved content storyboarding, creating single-player and multiplayer mini-games, motion capture, animating cross-cultural nonverbal gestures, incorporating culturally relevant ambient sounds and voiceovers, scenario scriptwriting, and developing new interfaces for reflective observation & evaluation [8]. Some trainees did not role-play game characters, but instead observed and evaluated other trainees' performance from camera views that they could switch independently or track trainees in-game.

As shown in figure 2, each trainee, instructor, observer/evaluator, or subject matter expert playing a role in the scenario, was equipped with a client on a laptop along with a mouse and headphone/microphone set. A self-paced single-player tutorial was developed to practice multiplayer game navigation and operation of a nonverbal gesture menu. We created 5 different game levels (e.g. hospital, courtyard, etc.) and over 15 different mission scenarios. In each of the different multiplayer sessions, trainees played roles for characters or peer observer/evaluators. Trainees role-playing as game characters communicated on a private VOIP channel, or communicated to all on a public channel. They also communicated using nonverbal gestures (such as culturally appropriate greetings) selected from a pull-down menu. The game used scripted non-player characters (NPCs) in the scenarios, but all primary roles were played by trainees or experts. The game environment was designed without any language cues (neither visible nor audible) so that

role-play sessions could be conducted in a variety of foreign languages, or with multicultural groups. Voice communications were also slightly distorted to preserve trainee anonymity among peer evaluators.

figure 2: Members of Special Forces Directorate of Training Division (DOTD) demonstrate the game. Image courtesy of JFK SWCS, Public Affairs Office, Ft. Bragg.

Observer/evaluators listened to all communications on the VOIP channels, but did not speak directly to game characters. They could text chat with the instructor or others in the evaluator role. Their evaluations were both quantitative and qualitative. The aggregate scores across all persons evaluating different trainees' intercultural competence performance on a 5-point Likert-type scale and free text feedback were displayed by the debriefing tool on all computers immediately following the game session. Our design goal with the introduction of this new role for reflective learning (observation/evaluation) was to encourage growth toward intercultural sensitivity [6] and cultural relativism [5], or the ability to reflect and evaluate phenomena relative to cultural context. Therefore our intent was to expand trainees' solution set for ill-defined problems through their game session and subsequent participation in a follow-up discussion. The new role and interface for reflection and evaluation are discussed in greater detail in the following section.

In each role, the trainees learned how team communication, cultural expectations, negotiating from different perspectives, and being self-aware are relative to the cultural context [6, 8]. The different roles we created provided increased replayability, authentic scenarios that engaged trainees emotionally, and free-play options that could be cued off the environment [9]. In particular, learning could be accelerated when trainees rotated among the different roles to better understand negotiating from diverse points of view and providing constructive feedback.

Finally, a debriefing tool (known as after action review) was created to augment large group discussions. The debriefing tool recorded each game session using time-stamped, synchronized sound and video sequences for playback and analysis of peer evaluations.

Reflective Observer/Evaluator Role

No one would have objected had we merely delivered a high adventure first person shooter game to Special Forces and left it at that, but we took a risk and exceeded expectations by introducing a reflective observer/evaluator role. During our ethnographic investigation, we learned that role-playing, observing others model behavior, reflecting to analyze best practices, and providing constructive peer feedback were key elements to the way Special Forces trained across their education curriculum. It was appropriate

that our game mechanics be inspired by these values as well as Special Forces' penchant for high adventure.

The reflective observer/evaluator role is based on the Real-time In-Game Assessment, Evaluation and Feedback system [1, 8] which consists of a game interface and role for making in-game evaluations of player's actions, decisions, communications, etc. as they occur in real-time and as they correspond to competencies and learning objectives. During the game session, evaluators observed a trainee's performance in a scenario. At a specific moment in the scenario, the instructor prompted the evaluators to rate performance by selecting the appropriate value on a Likert-type scale that appeared in the evaluator's interface above the trainee's character see figure 3).

figure 3: Early screenshot of Observer/Evaluator interface.

Evaluators then assessed how well the trainee performed based on behaviors or communication. Some evaluators also entered annotations in the interface text field. Following the game session, participant roles could be switched for the subsequent session. Evaluators' feedback is both quantitative and qualitative and corresponds to logged, time-stamped game events. These evaluations are aggregated and statistical analyses performed on the individual and group evaluations. Team and individual assessments can be displayed either in real-time or during group debriefings. The debriefing tool allows trainees to verify decision points and discuss them in detail by rewinding the playback to a particular moment (time stamped) that corresponds to the mean score of aggregate evaluations across 24 observer/evaluators. A report form of the feedback can also be given to trainees or instructors following each game session. Displaying the peer assessments in the debriefing tool ensures that the content of evaluation (e.g. measures of intercultural competence) and the products of reflection are a prominent focus of the discussion. Peers in the reflective role help focus and teach others participating in the debriefing to connect theories and/or concepts to actions demonstrating stages of intercultural competence and sensitivity [6, 8]. Trainees in the reflective role were therefore held accountable for explaining criteria of intercultural competence to others after observing modeled behaviors and thus learned better. They internalized the concepts and new vocabulary more quickly than others.

Conclusion

By training in roles that allow users to act (character roles) and reflect (reflective Observer/Evaluator role) the trainees performed different cognitive tasks. More concrete, active experimentation (e.g. negotiating from a different point of view) took place with character role participation, while abstract conceptualization and reflection was fostered by the reflective

Observer/Evaluator role (e.g. pause, look at the problem in light of the cultural context, critically consider best practices, and communicate solutions to others). Thus our intercultural competence game was grounded in experiential learning theory—namely concrete experience, active experimentation, reflective observation, and abstract conceptualization [10]. Following delivery of the game we asked 51 Special Forces team leaders to complete questionnaires on their game participation. The questionnaires were self-report, Likert-type scale instruments measuring the participants' attitudes about their game experience [1].

We learned that trainees believed they learned more about their strengths and weaknesses from participating in the game than they would have if they had not participated.

The game is used with multicultural groups to engender out-of game discussions of cultural differences and diverse approaches to problem-solving. We continue to strive to create memorable classroom training experiences that engender a successful transfer of training from the virtual environment to the real world.

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