Human Terrain System (HTS) students practice engaging with and interviewing members of a foreign culture 31 March 2012 during the Research Operations Exercise conducted at Fort Leavenworth, Kansas. The exercise was the capstone assessment activity for the training program prior to student graduation and deployment. HTS trainers found that the more realistic and engaging the training, the better the students retained and applied their new skills to their in-theater jobs.

A Way to Teach Critical Thinking Skills so Learners Will Continue Using Them in Operations

Marcus B. Griffin, PhD

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It was a special kind of failure. Of course, members of human terrain teams—sociocultural research teams deployed with U.S. and partner forces in Iraq and Afghanistan—had no monopoly on cognitive rigidity. Nor were all team members guilty of it. But as he stood there in the waning heat of October in Baghdad, Dr. Marcus Griffin, the team's lead social scientist, found himself confronting an extreme case of rigid thinking. It was 2008, and the team was struggling to come up with recommendations about how to promote reconciliation between Sunni and Shia.

Someone recommended that the team should consider interviewing families who had married their sons and daughters across the sectarian divide as a starting point for understanding how families reconciled sectarian differences and tensions. The reasonable assumption was that marriage and family were the basic building blocks of communities, and since Iraqis usually arranged their children's marriages, knowing how and why some would knit diverse families into a new whole could yield insight.

As they discussed the recommendation, one of the team's analysts, an Arab Christian who had immigrated to the United States after the first Gulf War, quickly spoke up, "Sunna and Shia do not marry each other."

"What do you mean?" Griffin asked. "Of course they do. There is a long history of it."

"Well they don't do that anymore," he stated authoritatively.

"How do you know?" Griffin asked, knowing that Hussein, the Shia interpreter sitting across the room studying, had married his son to a woman from a Sunni family the previous year.

"I'm Iraqi," said the analyst. "You can ask me anything. I know everything about Iraq."

And there it was: "I know everything about Iraq." Not only was this trained analyst wrong, but he was so sure of himself that he was not open to new information and, in essence, he was incapable of learning.

Good Classes, Poor Results

It was displays of this type of rigid, overgeneralization based on knowledge of a small or nonrepresentative sample, or premature acceptance of an idea as fact, coupled with the persistent adherence to a belief even in the face of evidence to the contrary, that

caused the Human Terrain System training and education program to reexamine its curriculum, method of instruction, and academic assessment process. Like virtually all Army education programs, the curriculum already included classes in critical thinking skills. Also like most Army education programs, not only did the instructors enjoy teaching the critical thinking classes, but also, for the most part, the students provided very positive feedback about the classes on student surveys.

However, despite both instructors and students enjoying the critical thinking classes, many graduates were failing to think critically where it mattered most—on the job.

Critical Thinking Education for Complex Cultural Interactions

An experimental program quickly created in 2006 in response to a Joint Urgent Operational Needs Statement (JUONS), the Army's Human Terrain System aimed to provide a sociocultural analysis capability to Army and partner forces in Iraq and Afghanistan. The program recruited and trained civilian and former military personnel who attended a training program at Fort Leavenworth.[1] Individuals would deploy after training, joining teams already embedded in Army or coalition partner staffs. The teams conducted research and interacted with the local peoples to help their military leaders better understand the dynamic and complex societies in their areas of operation.

Team members needed effective cross-cultural skills they could apply well beyond a traditional two-dimensional model. They needed to be able to communicate and work effectively with individuals and groups (both homogeneous and heterogeneous) with a wide range of cultural backgrounds, including their own diverse team members, U.S. and coalition military commanders and staffs, host-nation forces, and diverse civilian populations.

Team members needed to recognize and interact with numerous individual and collective cultural frameworks, all the while being aware of how their own cognitive lenses and filters influenced their understanding. Success in these complex interactions, illustrated in figure 1, page 110, would depend on applying critical thinking skills.

As the Human Terrain System training and education managers recognized how important critical thinking skills were to the graduates, and how poorly some were applying those skills, they began to reexamine what was taught, how it was taught, and how the results were assessed.

The managers conducted research for five years. They reached out to and collaborated with experts such as Dr. Diane Halpern, former president of the American Psychological Association.[2] A true educator and professional, she not only provided invaluable insights and advice throughout the process but also delivered an in-person faculty development session on the effective instruction of critical thinking skills, free of charge. In addition, the researchers worked with Dr. Suzanne Bell, associate professor of industrial and organizational psychology at DePaul University.[3] Her research and consulting specialties include team composition, fostering team effectiveness, predictors

of job performance, and organizational training. The researchers discovered that team interactions and climate also significantly affected the degree to which graduates would use their critical thinking skills on the job. Bell provided vital insights, particularly regarding the design and management of high-performing teams.

The researchers also consulted with experienced human terrain team members and military commanders and staffs. They experimented with different program designs and assessed results until, finally, they identified five keys to teaching critical thinking skills so that human terrain team members would apply them after leaving the classroom:

1. An effective talent management program to inform hiring and assignment practices and ensure person–job fit (with *fit* in this context referring to *compatibility*) and person–organization fit for team members and faculty
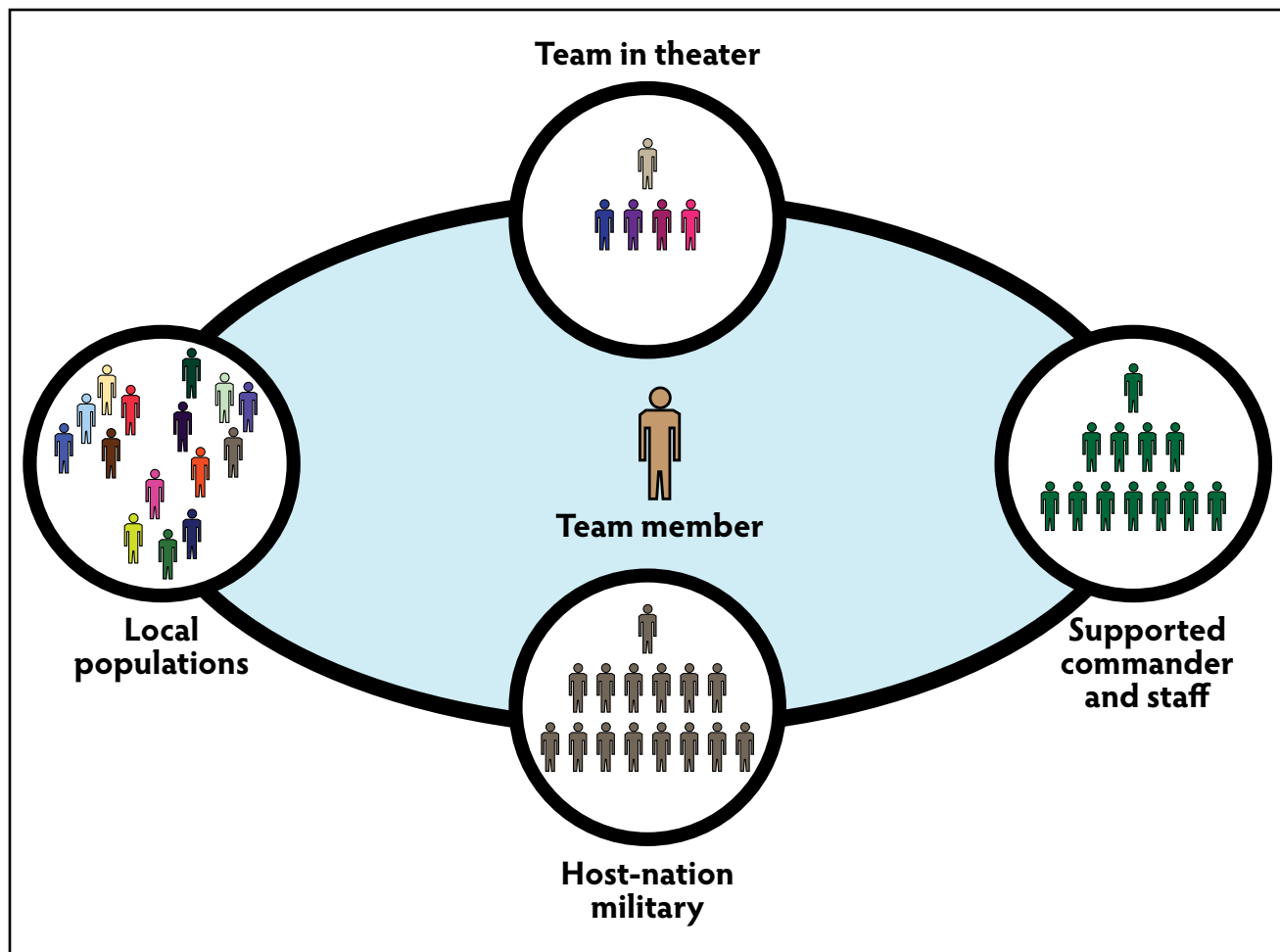

Figure 1. Multidimensional Cultural Understanding

2. An organizational climate that values, expects, and rewards critical thinking and innovation

3. A shared understanding of the specific critical thinking skills and behaviors most important for on-the-job success

4. Faculty members who integrate critical thinking instruction into all classes and effectively model critical thinking skills

5. A comprehensive assessment program to facilitate organizational agility

Although the researchers identified these keys specifically for implementing a program in the Human Terrain System (which hired civilians for its teams), their findings are relevant to any military educational program that measures its success by the degree to which graduates think critically on the job—and not merely how much learners enjoy their classes.

An Effective Talent Management Program to Inform Hiring, Employment, and Retention Practices

The first key is to establish an effective talent management program at the earliest possible opportunity, preferably from the start. Until an organization gets talent management right, with a high degree of person-job and person-organization fit, it will have very limited success with its other functions.[4]

Designing an effective talent management program, however, takes time. Because the Human Terrain System was started in response to a JUONS, there was a great sense of urgency in fielding teams. This urgency, unfortunately, precluded the type of initial talent management analysis that was needed, with the result that many Human Terrain System staff and team members were hired solely based on the academic degrees they held. Some members were not very compatible with the organization and tasks.

To avoid hiring unsuitable applicants, a talent management program should include the following:

• A job-task analysis that identifies the knowledge, skills, attitudes, and behaviors required for each position on a team

• A comprehensive applicant screening that includes cognitive, social, and physical suitability for the job and organization

• An evaluation of applicants' critical thinking skills

• An evaluation of prospective faculty members' critical thinking and teaching skills before hiring

Much has been written elsewhere about the program's struggles early on. Suffice it to say that until the Human Terrain System implemented the talent management program, none of the other necessary innovations and improvements in training and education were possible.[4]

An Organizational Climate that Values, Expects, and Rewards Critical Thinking and Innovation

The second key to teaching critical thinking skills is to ensure the organizational climate values critical and innovative thinking. Building upon, and made possible by, a talent management program, an organization demonstrates its commitment to these values by expecting and rewarding critical thinking and innovation. An organizational climate emerges when a majority of the members form consensual, collective perceptions regarding such things as organizational purpose, values, and priorities.[5] An organization's leaders, both formal and informal, must play the main role in establishing an organizational climate.[6]

Indeed, some of the informal leaders in the Human Terrain System training and education directorate were instrumental in helping generate the collective feeling that critical thinking was an essential requirement for the team members. Examples of this include faculty members with recent experience on human terrain teams emphasizing the importance of critical thinking, and the supervisor for the contractor faculty leading the critical thinking faculty development sessions. The establishment of the climate was not instantaneous. Through the talent management program—screening and selective hiring of faculty; dismissal of individuals who lacked the required knowledge, skills, and behaviors; and the continual efforts of the leadership—the change in organizational climate became effective.

A Shared Understanding of the Specific Critical Thinking Skills and Behaviors Most Important for On-the-Job Success

The third key is to achieve a shared understanding of the needed skills and behaviors—to identify them and

achieve consensus on their definitions. Following research and collaborative discourse during faculty development sessions, the researchers adopted the definition used by Army Doctrine Reference Publication 5-0, *The Operations Process*: "Critical thinking is purposeful and reflective judgment about what to believe or what to do in response to observations, experience, verbal or written expressions, or arguments."[7]

To determine the specific critical thinking skills most needed by the graduates, the researchers started with the results from the job-task analysis. Then, they drew upon doctrine and the input from deployed and experienced team members.

Because any human terrain team's research and analysis would be valuable only if they could be communicated in a manner that fit into the supported staff's battle rhythm, the researchers also drew heavily upon the staff's and faculty's experiences working on Army staffs and teaching at the United States Military Academy and the School of Advanced Military Studies. The researchers also conducted an extensive review of the academic and professional literature. Through this process, they identified three main critical thinking skills:

- *Verbal reasoning*: the ability "to comprehend and defend against the persuasive techniques found in everyday language."[8]
- *Argument analysis*: the ability to judge how well reason and evidence support a given conclusion or assertion.[9]
- *Thinking as hypothesis testing*: the ability to base hypotheses on and formulate beliefs effectively from observations while remaining open to new and possibly disconfirming information.[10]

Individuals combine these three skills using cognitive self-regulation so they can separate an argument from rhetoric (verbal reasoning), determine the validity and soundness of an argument (argument analysis), and remain open to—and even seek—new information that challenges their existing belief or conclusion (thinking as hypothesis testing).

The researchers also learned early in the process that a person's disposition to think critically was just as important as his or her critical thinking skills. Moreover, the more emotionally involved people were with a subject, the less they tended to use their critical thinking skills even if they were naturally inclined to think critically.[11] The program managers

accounted for this through the design of realistic training scenarios that would engage the students both cognitively and emotionally.

Faculty Members Who Integrate Critical Thinking Instruction into All Classes and Effectively Model Critical Thinking Skills

The fourth key is to ensure faculty members integrate and reinforce critical thinking skills instruction throughout all other classes and exercises. The entire faculty must be engaged. They need to view themselves as instructors of critical thinking skills in addition to their assigned subjects. Moreover, individual instructors need to see the relationships between their and other instructors' subjects.

Initially, the Human Terrain System was like many other military and civilian educational institutions in that the program taught critical thinking skills as stand-alone classes. During this time, the instructors enjoyed teaching critical thinking skills, and the students generally provided very favorable feedback on post-course surveys. However, although everyone was enjoying the instruction, reports from the field repeatedly indicated that graduates were failing to demonstrate the required critical thinking skills and behaviors where it mattered most—on the job.

Made possible by the then-established organizational climate that embraced change, the Human Terrain System implemented a faculty development program focused on critical thinking skills, with three main purposes: (1) to ensure the entire faculty understood the specific critical thinking skills required of the graduates; (2) to identify where these critical thinking skills would be applied, reinforced, and assessed throughout the curriculum; and (3) to ensure the faculty were fully prepared to model the desired critical thinking behaviors and coach the students.

As part of faculty development, all staff and faculty completed the Halpern Critical Thinking Assessment (HCTA).[12] The HCTA helped identify the faculty members' individual critical thinking strengths and weaknesses, thereby enabling informed self-improvement efforts and coaching by the leadership. The faculty then integrated critical thinking skills reinforcement and rubric-based assessments into their classes, assisted by the faculty supervisor and the curriculum designers.

(Photo by Human Terrain System)

Human terrain team social scientist Muna Molyneux interviews a widow 21 July 2010 at Karmah-Subayhat, Anbar Province, Iraq during a combined U.S. and Iraqi Army medical engagement. The widow's husband and sons were killed by al-Qaida operatives during the Anbar Sunni tribal Awakening circa 2006. Molyneux was conducting a research project that included ascertaining how persons who lost their family support network during the Awakening were able to continue sustaining themselves.

For example, the program sought to reinforce the skill of cognitive self-regulation. The intent was to help students improve their ability to remain open to new information and to continuously reevaluate their existing beliefs as new information becomes available.[13] To reinforce this skill, practical exercises were designed so that information provided initially would be ambiguous. Some information would intentionally lead the students to form one conclusion, but subsequent information would, ideally, lead them to question and refine it. Faculty members would then be able to coach the students to reinforce their cognitive agility or to correct their cognitive rigidity as appropriate. By the end of the program, students were expected to actively seek out such disconfirming information and fully demonstrate the skill of thinking as hypothesis testing.

Changing one's thinking about something based on new information, what design methodology calls "reframing," is not easy for most people. It becomes even more difficult when the dynamic of an authority figure is added. Since the human terrain teams' purpose was to enable commanders to make more informed plans and decisions, their training needed to be built upon realistic scenarios and supported by realistic role players who served as the staff and commander of a brigade combat team. We found that exercises limited to planning and to preparing initial reports were insufficient to develop students' abilities to use what Christopher Paparone calls "the two faces of critical thinking."[14] Only in a realistic, execution-based practicum were students required to reevaluate their conclusions, reframe, or adapt to unanticipated events. For human terrain team members,

(Photo by Staff Sgt. Whitney Hughes, Task Force Wolverine PAO)

Malal Loynab, a human terrain analyst with Combined Joint Task Force 101, teaches an Afghan child English during a literacy program 28 October 2010 at the Egyptian Field Hospital on Bagram Airfield, Afghanistan. The program, which Loynab helped start, was facilitated by members of the CJTF-101 Human Terrain Analysis Team to educate children who visited the hospital for Women and Children's Day twice a week.

and likely for all Army leaders, these skills are essential. The training designers therefore ensured that exercises included some aspect of execution. Finally, to add to the challenge, they added an ethical dilemma to the critical thinking task by introducing disconfirming information after the commander had been briefed and had fully endorsed the students' initial conclusions.

A Comprehensive Assessment Program to Facilitate Organizational Agility

The fifth and final key to teaching critical thinking skills is to use a comprehensive assessment program that enables the leadership to continuously monitor the students in class, the graduates in the field, and

the operational environments where they deploy. With feedback from monitoring, the leadership can then make changes to the curriculum, learning environment, and instructional approach to ensure mission accomplishment.

As mentioned earlier, the program had been receiving generally positive feedback from students about the critical thinking classes but generally disappointing feedback from the supported commanders about the team members' performance on the job. The training and education directorate's leadership came to realize that although monitoring students' reactions to their classes was important, they needed to have a more robust assessment process that would help guide effective change. Therefore, the training staff created an assessment process based on Donald L. Kirkpatrick's model for evaluating training programs. In addition to the four levels of assessment included in the Kirkpatrick model, they added a "level 0."[15]

Training assessment level 0: preexisting knowledge and skills. The program needed to identify incoming students' individual and collective strengths and weaknesses with regard to critical thinking. This information would help instructors avoid wasting time on topics for which students were not ready or were already proficient. Every class needed to achieve maximum effectiveness and seek ways to accelerate learning in every way possible because the training was limited to ten weeks.

The program designers adopted a critical thinking pretest administered as part of student orientation. They used a modified version of the HCTA that focused on the three high-priority critical

thinking skills: verbal reasoning, argument analysis, and thinking as hypothesis testing (this test also served as a posttest in level 2). The pretest accomplished numerous objectives.

First, the pretest enabled training managers to identify incoming students' individual and collective strengths and weaknesses. Then, they could customize the instruction to meet their precise learning needs.

Next, it enabled trainers to empower those incoming students who had already mastered particular subskills to assist in teaching. This practice extended the learning environment to include times and locations beyond the classroom, such as in the dining facilities and student lodging. Informal peer-to-peer teaching accelerated the learning for many students during training and facilitated graduates' continued learning when deployed.

In addition, the pretest provided a baseline from which student learning throughout the training program could subsequently be measured.

Finally, it provided learners with an enhanced self-awareness. Many of the incoming students who most needed critical thinking instruction arrived feeling confident in their critical thinking skills. For them, the pretest was an invaluable means to ignite their desire to learn.[16]

Training assessment level 1: reaction. According to Kirkpatrick, "if training is to be effective, it is important that trainees react favorably toward it."[17] Student reactions to training were collected through anonymous online surveys. These enabled managers to continuously refine the program to keep students challenged but not overwhelmed.

Training assessment level 2: learning. According to Kirkpatrick, assessing the learning is important because unless students have gained some new knowledge, skills, or attitudes, there will be no change of behavior on the job.[18]

The faculty assessed students' learning in two ways. First, they used a posttest based on the HCTA, which students would take during their final week of training. As illustrated in figure 2, the students in the 2013 and 2014 cycles increased their average critical thinking composite scores by 18 percent, from the 71st percentile on the pretest
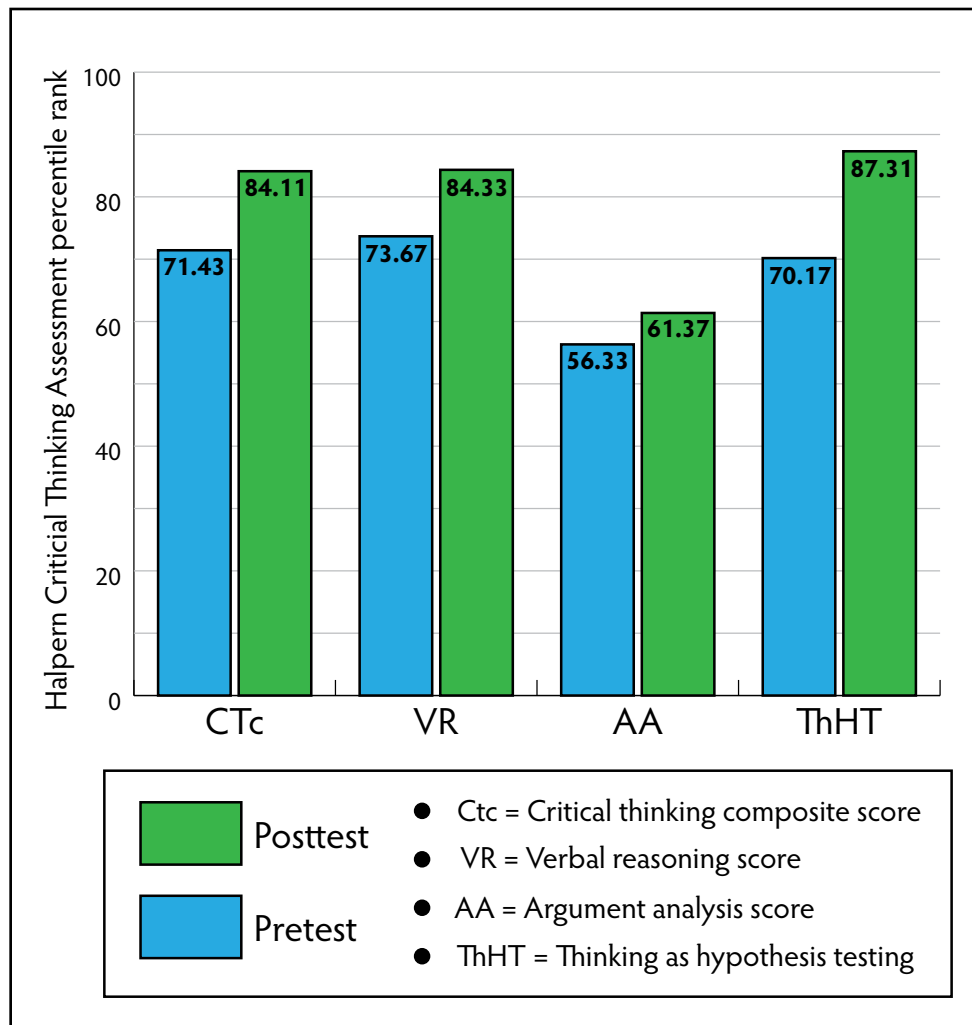

Figure 2. Student Gains in Critical Thinking Scores during Fiscal Years 2013 and 2014

to the 84th percentile on the posttest. The organization benefitted from the use of a valid, reliable, impersonal instrument for feedback on teaching success, and the students also were very motivated to show improvement.

The assessment program also incorporated continuous observation, rubric-based assessment, and coaching by the faculty. Observing the students during their exercises enabled assessment of their disposition to think critically during the performance of their duties (as opposed to thinking critically "on demand," as measured by the HCTA).

Training assessment level 3: behavior. The next level of assessment in the Kirkpatrick model is *behavior*: the degree to which participants apply on the job what they learned during training.[19] Assessment consisted of surveys completed by the staffs that the teams supported, weekly communications with deployed team leaders, and evaluations of the research products developed by deployed teams.

Training assessment level 4: results. The highest, and most important, level of the Kirkpatrick model is the assessment of the degree to which desired organizational outcomes occur as a result of the learning event(s).[20] The means of assessment were similar to level 3. For example, in response to 138 organizational surveys conducted throughout 2013 and 2014, 99 percent of deployed commanders and staffs reported they agreed or strongly agreed their supporting human terrain teams provided information that effectively contributed to their sociocultural understanding. These results indicate that team members performed consistently with strategic objectives, lines of effort, and key tasks of the Army's 2015 human dimension strategy.[21]

In sum, the assessment program integrated feedback from a range of stakeholders within the schoolhouse, from deployed teams, and from the units they supported. The chief of training and education, the assessments lead, and often the curriculum planner joined weekly teleconferences with deployed team leaders to ascertain emerging needs that should be incorporated into classes, and to get timely feedback on the performance of newly deployed personnel.

Graduates completed posttraining surveys after ninety days on the job. Often, their reactions changed once they gained experience in the field.

Finally, with this rich body of feedback from across the organization and supported units, training meetings became idea meetings, and the training calendar became more of an organizational learning tool than a spreadsheet that merely depicted scheduled activities.

Integration Consistent with the Human Dimension Strategy

By the end of 2011, the Human Terrain System managers had developed an essential task list for the teams and a job-task analysis for each team position. Additionally, all new personnel joining the program came in as contractors, and the main organization supplying personnel had established a comprehensive screening process that included assessment of applicants' physical fitness levels, job-related experience and skills, and psychological suitability for service on small teams operating in conditions of ambiguity, danger, and adversity. The integrated five-part model developed through years of experimentation, innovation, and organizational learning became an effective program for teaching critical thinking skills in the Human Terrain System.

Other Army training and education programs could apply this design, illustrated in figure 3, which proved its effectiveness in operations. The model reflects the important connection between the Army's operational capabilities and its institutional processes. It also represents a way to integrate the strategic objectives, lines of effort, and key tasks of the Army's human dimension strategy so that soldiers, civilians, and leaders can win in complex operational environments.[21]

The first step in the model, at the far left, is the talent management system. To develop leaders and team members who can thrive and win in the expected complexity of future operations, the organization must first ensure there is a means to ensure person-organization fit and person-job fit. For the Human Terrain System, this required an overhaul of the recruiting process and implementation of an effective applicant assessment and screening process. For organizations that do not conduct their own recruiting, this would likely require effective processes for organizational socialization. The talent management system also must ensure that individuals selected for

Institutional Settings

Operational Settings

Institutional Agility
· Organizational climate that values critical thinking and innovation
· Multidimensional assessment program (evidence-based resourcing decisions)

Talent Optimization
· Person-organization fit
· Person-job fit
· Standards and qualifications that promote trust

Realistic Training
· Realistic operational scenarios
· Customized learning
· Participants required to reevaluate assumptions and reframe
· Faculty and cadre who model critical thinking

The Objective

Individuals and teams with effective critical thinking skills
· Verbal reasoning
· Argument analysis
· Thinking as hypothesis testing

Operational scenarios and challenges

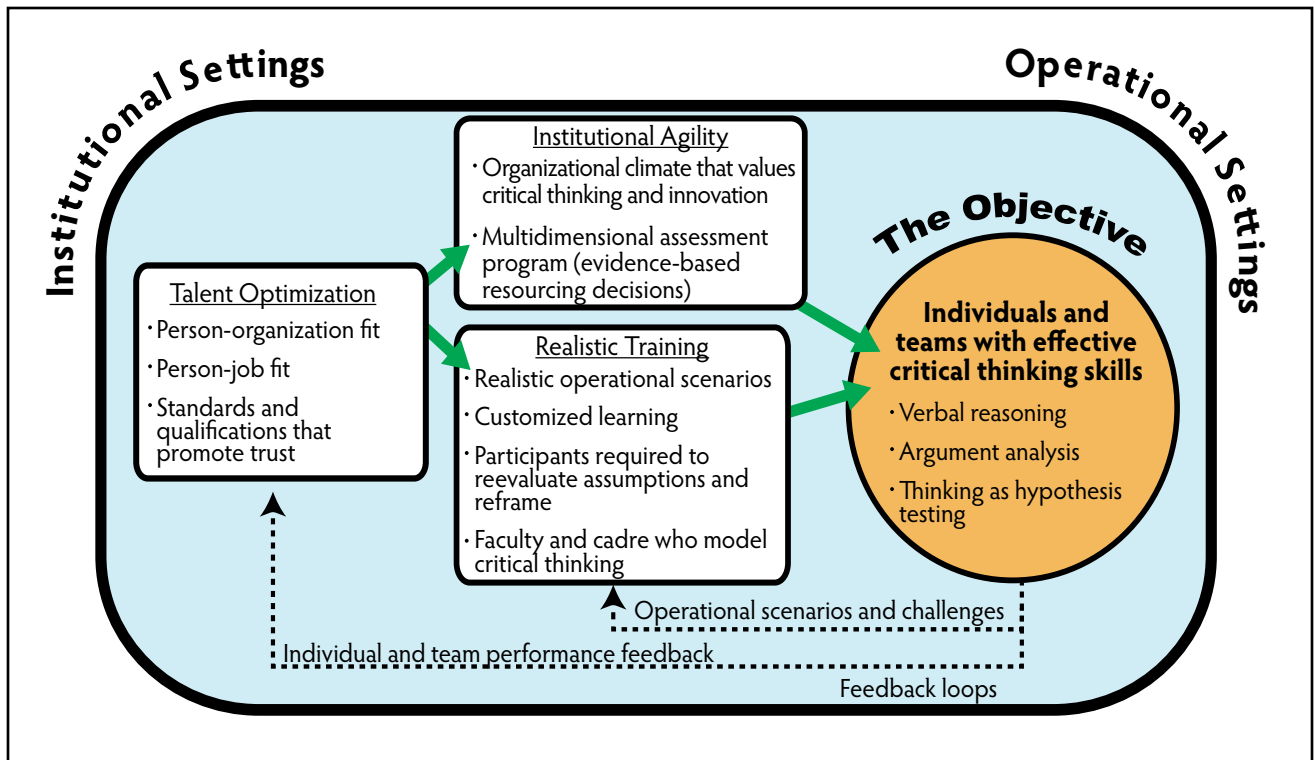Individual and team performance feedback

Feedback loops

Figure 3. An Integrated Training Model for Increasing Critical Thinking Skills

teaching assignments have effective critical thinking skills and can model them for their students.

Building upon the talent management program, the organization needs to develop a climate that values critical thinking and innovation. The critical thinking skills, coupled with a multidimensional organizational assessment program, enable members and leaders in the organization to detect when change is needed. The innovative mindset enables the organization to develop and implement creative ideas. The climate of critical thinking and innovation, together with the organizational assessment processes, generates institutional agility.

Institutional agility is important to the organization's ability to develop and continuously refine realistic training. Deployed soldiers and leaders are continually required to wrestle with complex situations and make decisions in ambiguous conditions. Training situations must require them to do the same.

Too often, especially in classroom settings, Army training and education sessions are built upon complex scenarios but require students only to develop and brief a plan. To prepare soldiers, civilians, and leaders to thrive in ambiguity, the training must

continue past planning and into execution. The training must require the students to avoid confirmation bias and remain open to new and contradictory information, to objectively assess the unfolding events, and to reevaluate their assumptions, inferences, and conclusions. Otherwise students likely will graduate with the erroneous notion that success in complex environments is the result of a perfect plan.

Conclusion

Although presented sequentially, the five keys to teaching critical thinking skills are interdependent. Together, they form an integrative model that illustrates a way to integrate the strategic objectives, lines of effort, and key tasks of the Army's human dimension strategy. The specific critical thinking skills required by individuals and teams in other organizations could be, and probably will be, different from those required by the Human Terrain System's sociocultural research teams. However, because this model is not restricted to specific jobs or tasks, it is relevant to any units. Successful implementation would depend on integrating the talent management, assessment, and training processes. ∎

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1. See the Human Terrain System website, accessed 3 September 2015, http://humanterrainsystem.army.mil, for more about the now-discontinued program.

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7. Army Doctrine Reference Publication 5-0, *The Operations Process* (Washington, DC: U.S. Government Printing Office, May 2012), 1-10.

8. Halpern, "Teaching Critical Thinking": 452.

9. Ibid., 182.

10. Ibid., 231.

11. Peter A. Facione et al., "The Disposition toward Critical Thinking," *Journal of General Education* 44(1) (1995): 3, describes the disposition to think critically and its importance in everyday life. Per Facione et al., someone with a high disposition toward critical thinking is "habitually inquisitive, well-informed, trustful of reason, open-minded, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, [and] willing to reconsider …."

12. Heather A. Butler, "Halpern Critical Thinking Assessment Predicts Real-World Outcomes of Critical Thinking,"

Applied Cognitive Psychology, 26(5) (2012): 721-729. The training managers selected the HCTA from among several assessments piloted because of its validity and reliability, its open-ended questions, and its ability to assess participants' cognitive abilities in both free recall and recognition domains. Two versions allowed the program to alternate the pretest and posttest.

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14. Christopher Paparone, "Two Faces of Critical Thinking for the Reflective Military Practitioner," *Military Review* (November-December 2014): 104.

15. Donald L. Kirkpatrick, *Evaluating Training Programs: The Four Levels* (San Francisco: Berrett-Koehler, 1994), 27.

16. Malcom Knowles, *Self-directed Learning: A Guide for Learners and Teachers* (Englewood Cliffs: Prentice Hall/Cambridge, 1975), offers a description of self-directed learning and adult learning theory.

17. Donald L. Kirkpatrick, *Evaluating Training Programs: The Four Levels,* 27.

18. Ibid., 42.

19. Ibid., 52.

20. Ibid., 63.

21. U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-7, *The U.S. Army Human Dimension Concept* (Fort Eustis, VA: TRADOC, 21 May 2014), describes the human dimension concept. *See also* Army Human Dimension Council, *The Army Human Dimension Strategy 2015* (Washington, DC: Department of the Army, June 2015), accessed 3 September 2015, http://usacac.army.mil/pubs/Force-2025-and-Beyond-Human-Dimension.