The Benefits of Granularity
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A potential benefit of the TLA is better visibility to instructors/administrators into the learner's progress on a more granular level – that is, a micro-granular view into the learner's assessment process. Of particular interest in many domains is cognitive performance and the evolution of mental models. The dominant approaches for assessing these aspects of learner progress typically only provide visibility at a macro-level. Additional aspects of performance and progress could be captured. Yet they rarely are, and it is not evident that such granularity would provide "better" visibility.

Concept mapping tasks provide an alternative assessment approach that presents opportunities to capture, analyze and visualize learner cognitive progress at a micro-granular level. Sero!, an ADL Test and Demonstration (T&D) TLA Activity Provider for 2018, is using xAPI statements to capture these micro-granular level aspects in order to offer assertions of learner cognitive performance. Assertions may be made at and across the concept-, linking phrase-, propositional- and even map-level, providing another vector of granularity. This poster demonstrates how Sero!'s concept mapping assessment activities executed during the 2018 live prototype test and demonstration (LPTD) generated meaningful, micro-level granular statements about learner progress and provides an exemplar of the visibility benefit intended by a TLA-enabled learning ecosystem.
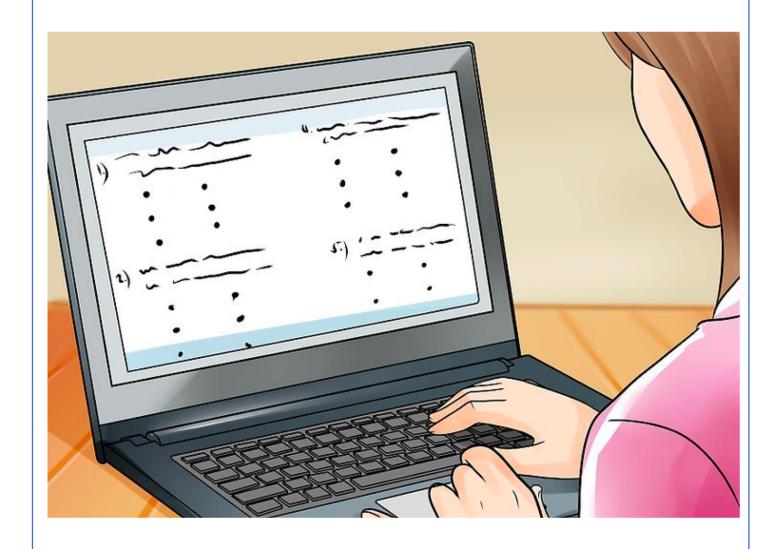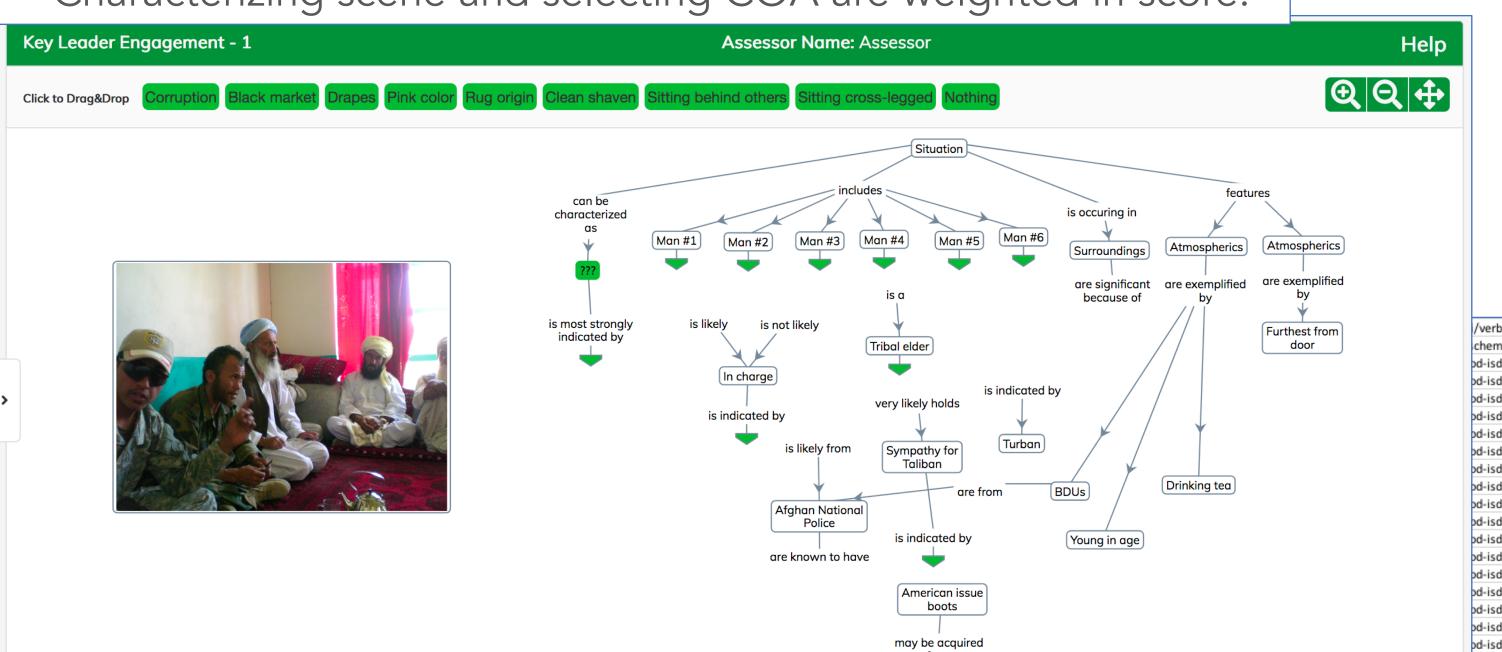
State of the art

Discreet item knowledge assessments, typically comprising multiple choice, true/false items.

Provides macro-level granularity:
- Correct/incorrect

Could provide, but rarely does:
- Total duration
- Time between answers
- Changed answers (typically only captures final answer)
- Sequence of answers (questions rarely provided at once)

Question

Could micro-granularity into assessment Takers' actions provide a more meaningful assessment of knowledge and understanding?

Concept mapping-based knowledge assessment platform

Holistic assessment using interdependent items applied to organized propositions that describe a domain or challenge problem

Five item types
- Multiple Choice
- Fill-In
- Drag&Drop
- ConnectTo
- ErrorCorrect

Difficulty varies by content of map, number and type of item types. Current version allows for weighting of individual items.

Authoring process: 12 concept maps developed from provided CODIAC scenarios and images. Assessment items introduced to each concept map creates task challenge to Learner to complete/revise/extend map and thus reflect Learner's knowledge about and understanding of the scenario.

Learner view and task: Given the image, determine the nature of discernable cues, state of the scene and (in some cases) COA. Characterizing scene and selecting COA are weighted in score.

xAPI statements generated for every action a Learner takes, including inputting answers, changing of, sequence of and duration between answers.

Macro-view of all answers across all Learners, per item.

Context for Results:
Sero! Activities demonstrated during 2018 live prototype test and demonstration (LPTD)

All Warfighters presented video tutorial and practice assessments

16 Warfighters attempted Sero! assessments

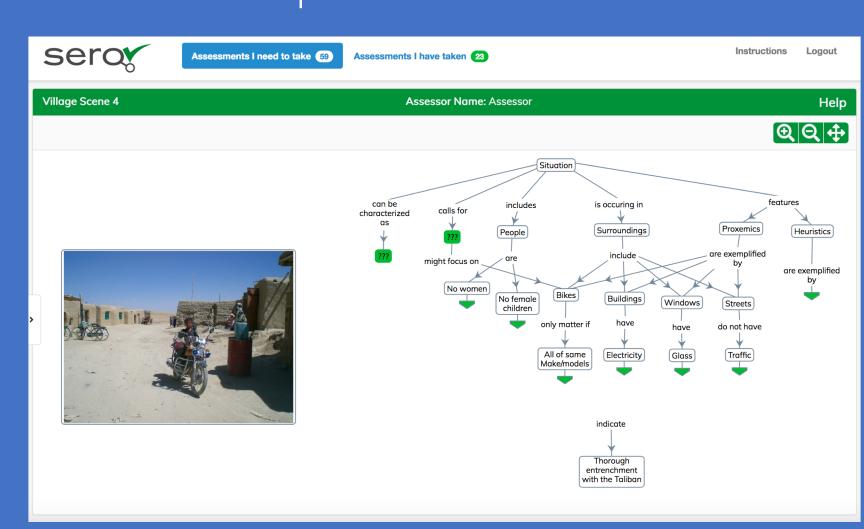4 Warfighters attempted more than 4 assessments

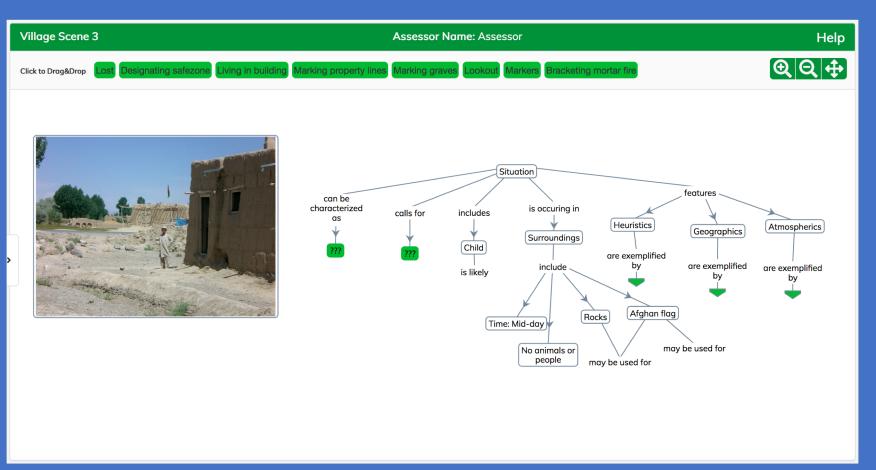Many repeated assessments as a function of recommended activities

Macro-level results:

Average time: 4:00 mins

Average score: 49%

Additional exemplars:

Lessons Learned

Micro-granular view of leaner actions within a concept map-based assessment offer additional insight into learner knowledge and understanding, including the potential to reveal learner insights and discoveries and revisions of misconceptions.

Future Directions

Validation will require controlled experimentation

Analysis and visualization of results requires additional work to show:

- Sequencing and timing pathways
- Correct actions taken | Incorrect actions taken | Actions NOT taken