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Shaping Military Medical Simulation: Blending training technologies to objectively measure Casualty Response System Readiness

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Disclosures

Dr. Dan Irizarry, MD, COL(R): KGS TFX

Dr. Dawn Riddle (PhD): None

Dr. Jon-David Hague (PhD): Cerego

Mr. Alex Hill, BA, MBA: KGS TFX

Technologies

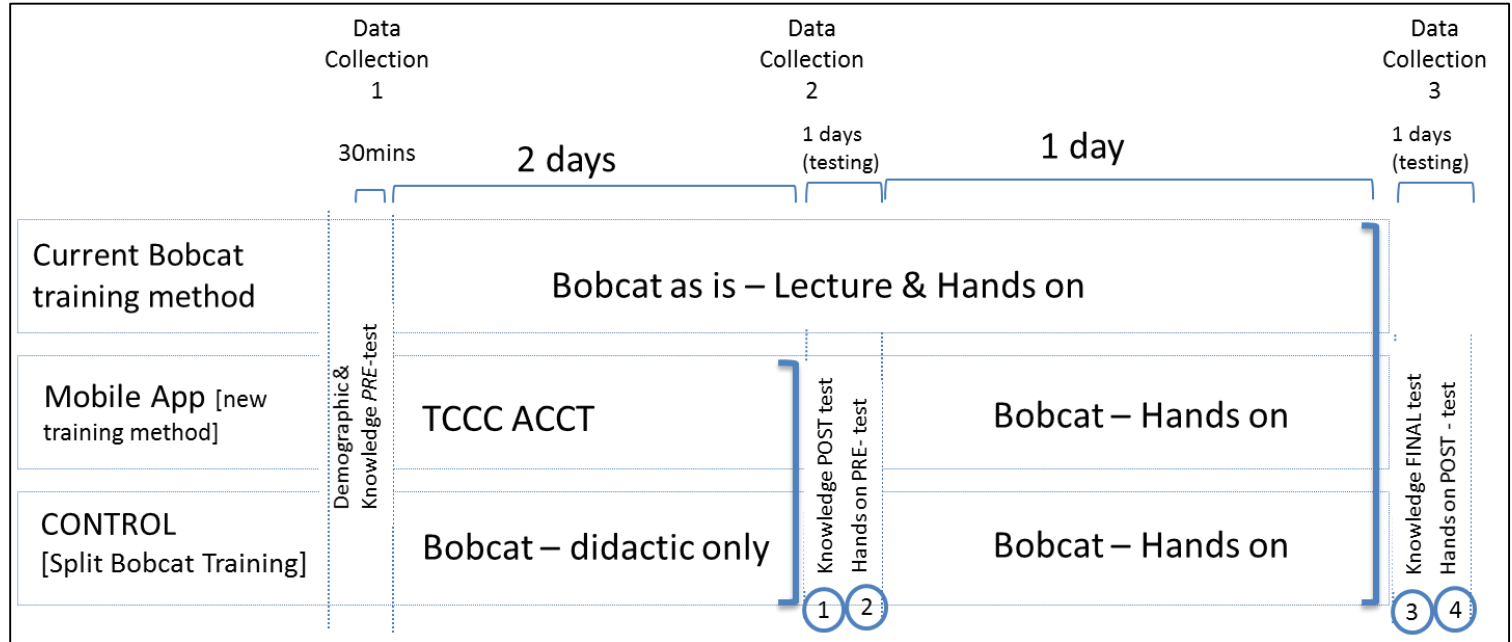
Cerego TC3 All Combatant Cognitive Trainer (TC3 ACCT)



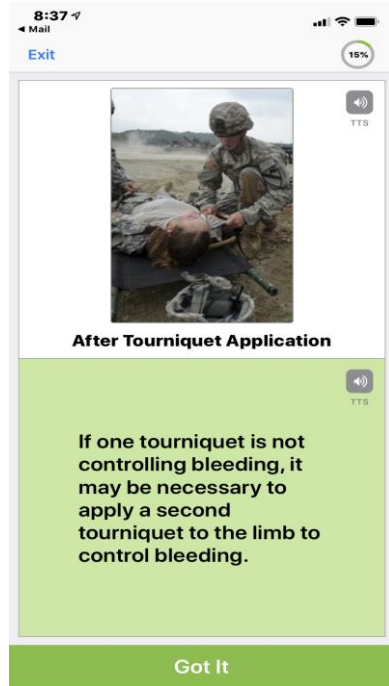
TFX APL-HEMO/ PB



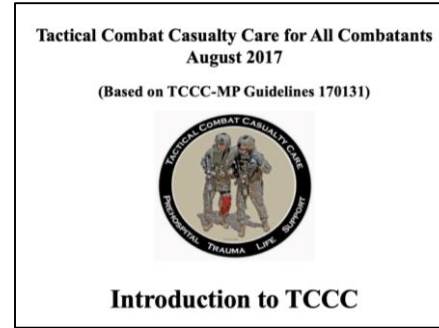
Study Design



Training Arms



Cerego Didactic Delivery



Traditional Didactic Delivery

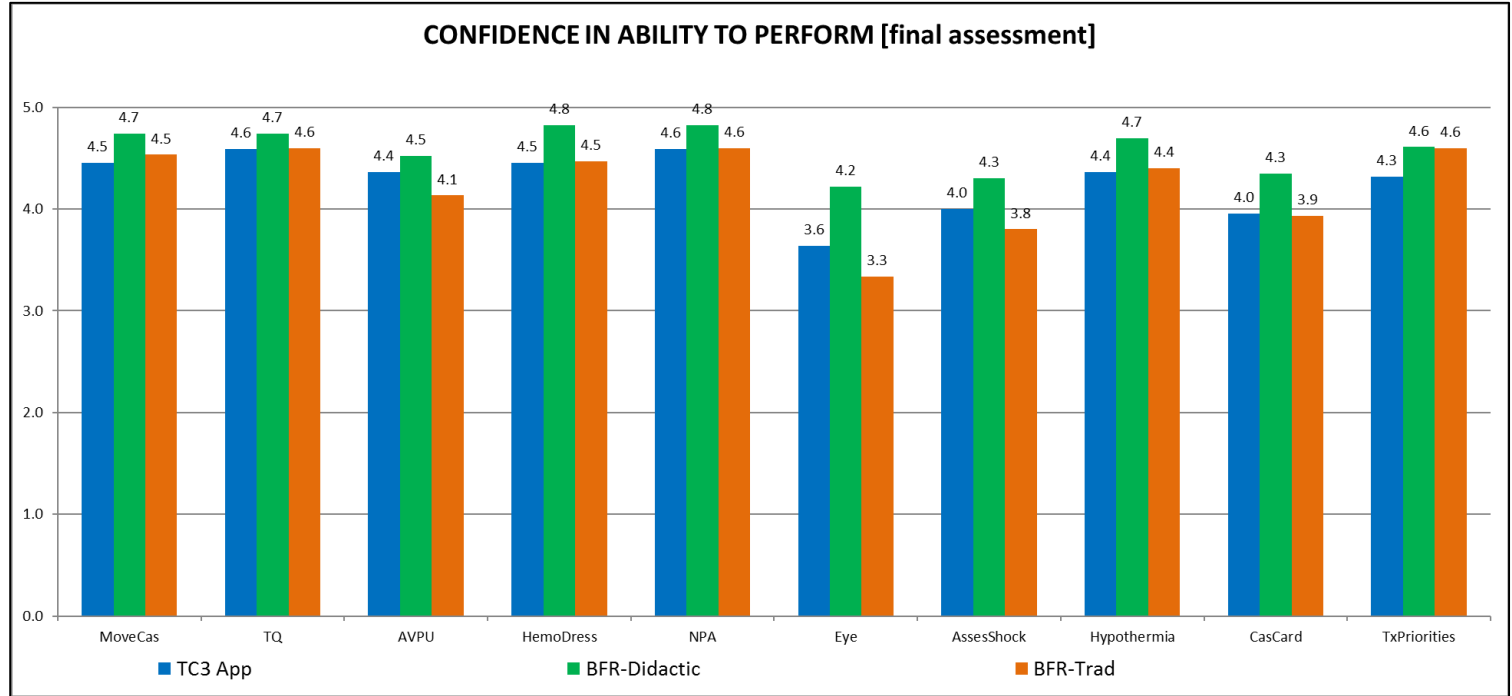


Hands On Practice



Hands On Testing

Confidence to Perform TC3

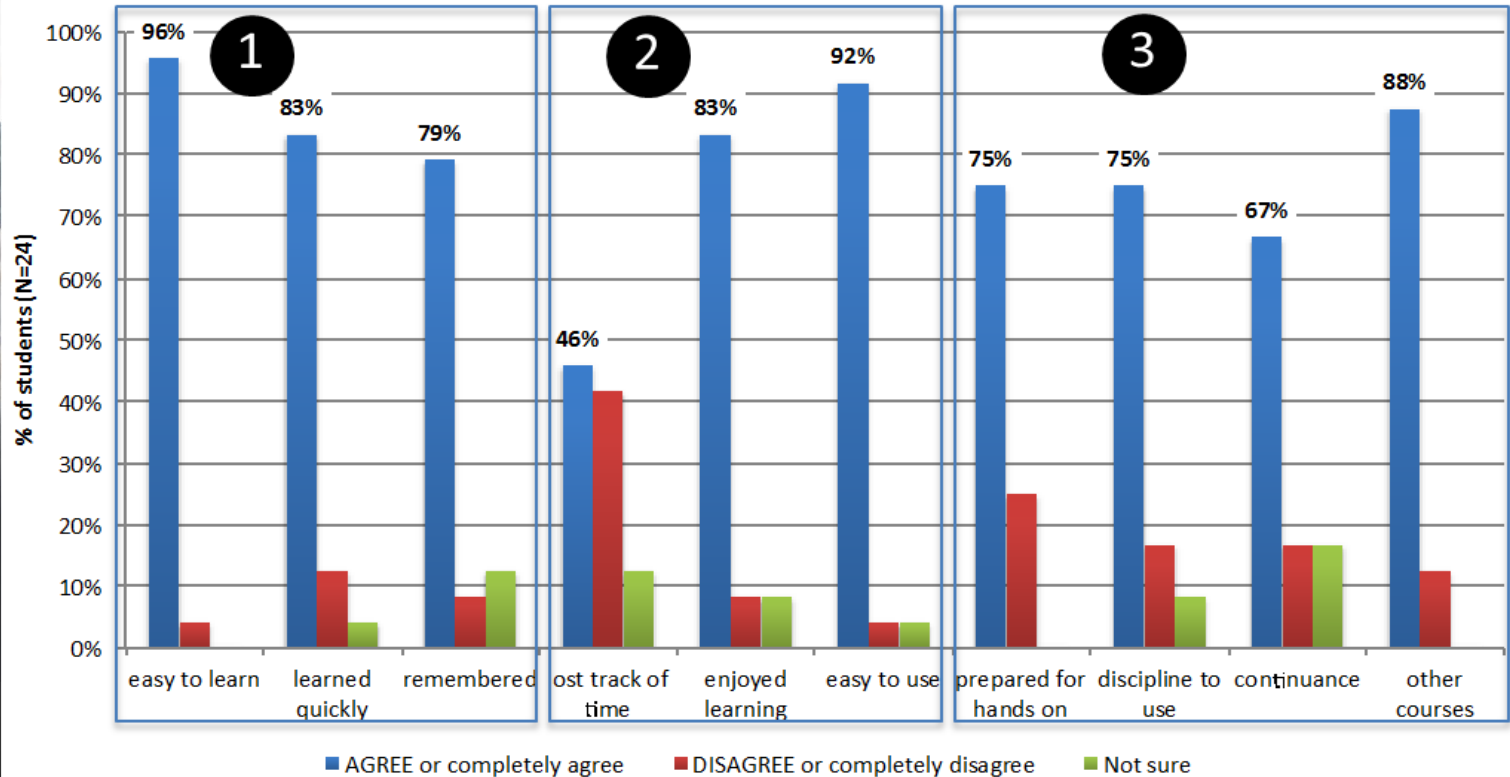


Confidence to Perform TC3 was not diminished by the distributed learning platform

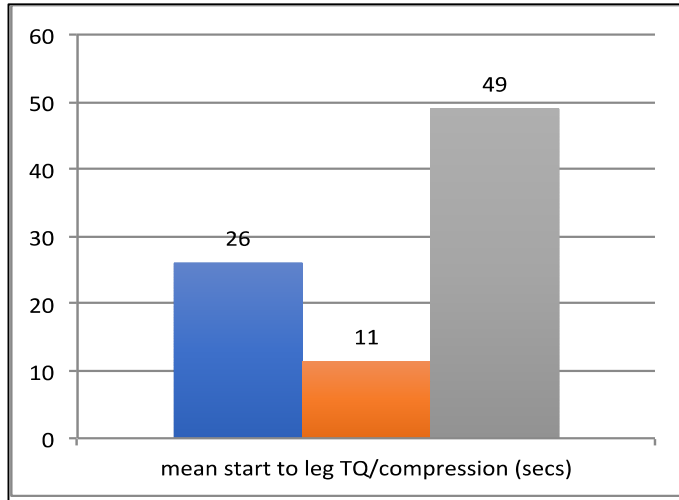


Student Perception of TC3 ACCT

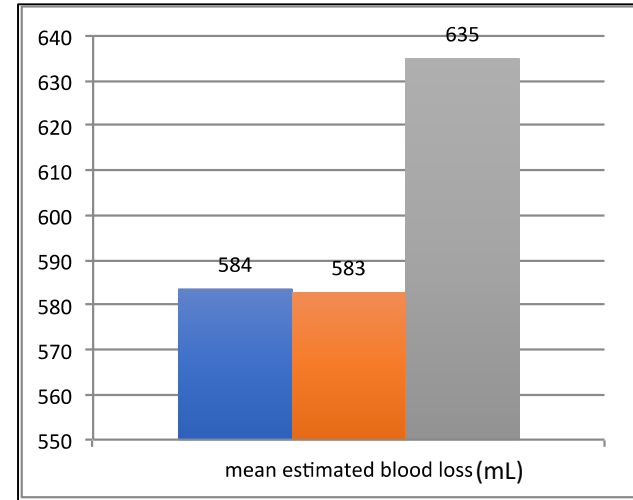
TCCC ACCT App Student Perceptions



Objective Bleeding Measurement



■ 9 TCCC App
■ 4 BFR-Trad
■ 15 BFR-Didactic



Platform capable of objectively measuring performance can be used to assess teaching method effectiveness





Results

5.3 Hours TC3 ACCT vice 12 hours lecture.

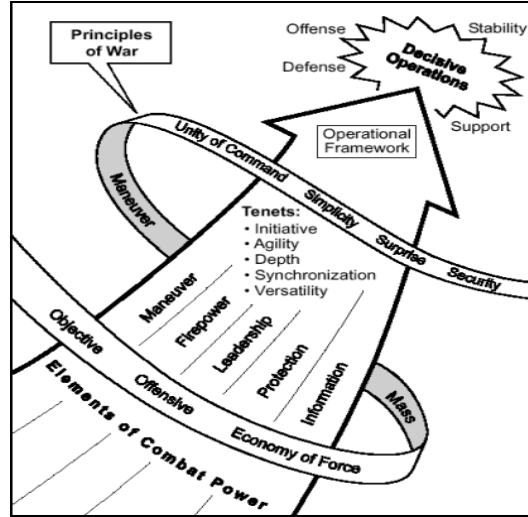
- Students using the App demonstrated a significant increase in TCCC knowledge from pre-test to post test ($t=11.14$; $p<.00001$). In separate analysis, even students with prior CLS training demonstrated significant knowledge gain using the mobile app ($t=8.75$; $p<.05$). Students learning through face to face didactic instruction also demonstrated a significant increase in TCCC Knowledge from pre-test to post-test ($t=4.9$; $p<.05$). Similar gains in knowledge were seen for both App and face to face cohorts as measured by the change in knowledge scores from pre to post test ($X_{\text{gainApp}}=5.31$; $X_{\text{gainBFR-D}}=5.33$; $F=.0005$; $p<.05$).
- Student knowledge gains after an average 5.37 hrs using the app (plus 1-hour scenario review) was comparable to knowledge gains after 12 hours face to face instruction.
- TC3 ACCT methodology = to current methods of training.

Hands on training matters

- In terms of volume blood loss, differences between students in the mobile app condition and the traditional BFR group were negligible ($X_{\text{app}}=584$; $X_{\text{BFR}}=583$), and substantially less than the control condition ($X_{\text{BFR-didactic}}=635$).



Casualty Response and Combat Power



FM 3-0 Operations (2008)



FM 3-0 Operations (2017)

- Casualty Response effects many of the elements of combat power.
- Casualty Response efficiency Increases combat power.
- Objective measurement of readiness increases confidence in combat power

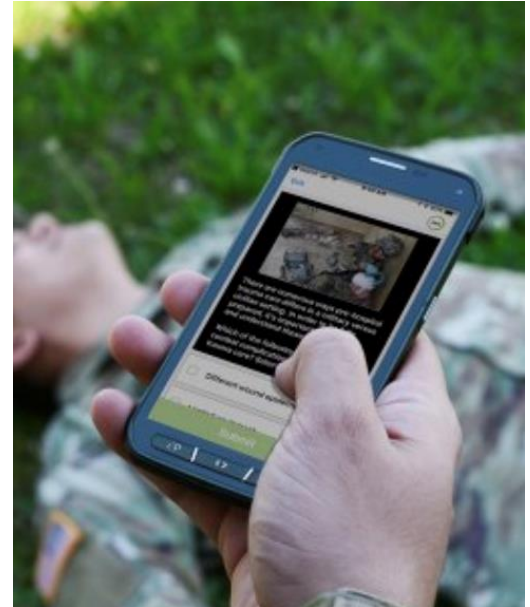


Lessons Learned

- COTS technologies are available today to meet immediate and future training needs. Programmatic funding is the issue.
- Artificial intelligence enhanced distributed learning is a viable option for Soldier training and offers the benefits of standardized presentation, individualized presentation and measurable knowledge mastery.
- Realistic, durable high fidelity trauma manikins that capture objective performance data were foundational to supporting the Commanders assessment of casualty response readiness and training effectiveness. Used at point of need, they sustain medic skills while creating first responder skills.
- Advance development is required to create an integrated, connected training system capable of measuring the trauma system.
- The Army learning model is shifting to a synthetic training environment centric system. Medical simulation must match this paradigm shift by creating capabilities that connect to the the synthetic training environment with the ability to capture and port data from live, virtual and augmented simulation devices into future learning management, training and simulation systems.
- “25 Bloodless Battles” before combat requires sustained investment in medical simulation which starts with user driven requirements generation.
- If throughput is the issue, distributive Point of Need training is the answer for the future Army training system.

Final thoughts

We must make an educational shift from the archaic lecture based training to decentralized, scalable platforms that ensure knowledge mastery and increase learning efficiency.



Final thoughts

We must make investments in simulation training technologies that objectively capture and measure performance.





References

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Acknowledgements

PEO STRI

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The Soldiers of 1-5 IN BN

