OPEN ACCESS

ISSN: 2835-6764

Rose YO, et al. (2026) 2611
American J Sci Edu Re, 2026; 5(4):100320
DOI: 10.71010/2835-6764/ajser-e320

Research Article

American Journal of Science Education Research

Curriculum Development for Future Teaching, Learning, and Training: Is AI *in* the Way? Is AI *the* Way? Are *Humans* in the Way?

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Citation: Rose YO, Thornton J, Royce Crow GS, Tyler Eickenhorst GS (2026) Curriculum Development for Future Teaching, Learning, and Training: Is AI in the Way? Is AI the Way? Are Humans in the Way? *American J Sci Edu Re*: AJSER-320.

Received Date: 10 April, 2026; **Accepted Date:** 15 April, 2026; **Published Date:** 21 April, 2026

Abstract

The United States Militaries (USM) are increasingly required to integrate advanced technologies and expand information superiority capabilities to maintain operational advantage. Meeting these demands necessitates a force capable of critical and creative thinking, rapid decision-making, and adaptive problem solving. However, two emerging challenges signal the need to reexamine faculty development and curriculum design for future readiness. First, preparing the force for 21st century operational environments require the deliberate development of futuristic teaching, learning, and training models. Second, findings from a two-year study on strategic and operational capability development reveal that growing reliance on artificial intelligence (AI) in curriculum design may both enhance and hinder future preparedness. Exploratory research indicates that overdependence on AI platforms may diminish sustained creative thinking, raising concerns for instructor relevance and instructional quality. This article examines these challenges through an exploratory study conducted with the Marine Corps Tactics and Operations Group (MCTOG). Participants responded to the prompt: How might AI be in the way of instructor development to meet the new challenges in the next conflict? Analysis identified four critical considerations for future curriculum development: (1) leveraging AI to build mental resilience, (2) designing training exercises that induce stress, (3) incorporating AI-minus training to preserve decision-making autonomy, and (4) maintaining human-centered adaptability amid increasing AI reliance. These findings support two major curriculum implications: employing AI as a force multiplier and integrating AI-enabled decision-making training. Analysis of these insights contribute to the implications of emerging education discourse by illuminating how AI can both support and disrupt instructor development, and by offering a framework for balancing technological advancement with essential human cognitive capabilities.

Keywords: AI minus, catalyst, force multiplier, recognition-primed, human-centered

Introduction

Force Design Update (FDU) 2030 addresses 21st century teaching and learning for future conflict. The Commandants Planning Guidance (2020) mandates the Marine Corps to develop leaders who can teach, learn, and train the Fleet Marine Force (FMF) in preparation for future conflicts. Future conflict is viewed as enduring, innovative, multi-faceted strings of strategies requiring a greater degree of competence, synchronized planning, creative thinking, and cognitive agility (Nolan 2019) for uncertainty and complexity. Training and Education 2030 Annual Update supports the commandants' initiatives to empower and encourage curriculum design that allows leaders to think and decide faster than the adversary (2024). In 2023, a mixed method study was conducted to determine futuristic educative initiatives for preparedness. Participants responded to two research questions regarding future teaching and learning for future preparedness. 1) What Marines already know? 2) What do Marines need to learn? The results, which were purely participants' perception, not the USMC, supported an educational philosophy mindset for teaching and training and a theoretical curriculum framework identifying specific topics for consideration. In 2024, a qualitative study was conducted to explore how artificial intelligence (AI), augmented intelligence (AuI), and machine learning (ML) enhanced and sustained creative thinking to develop curriculum for future challenges preparedness. Participants were asked how might instructors sustain and retain creative thinking skills when developing curriculum using AI, AuI, and ML? Results of the study supported three key points: Instructor use, Instructional design, and Evaluation of AI content for curriculum development. Additionally, two follow-up research questions were posed. 1) Will instructors embrace the rapid emergence of AI, AuI and ML in pace with global education? 2) Will instructors accept that, over time, these assistive platforms could possibly out cycle human creativity? The aftermath of conversations, observations, and teaching, learning, and training enhancements surfaced other AI integration questions. Is AI in the way? Is AI the way? Are humans in the way?

Literature review

Literature supports the notion that current teaching and learning programs may become unmatched with increased AI use. Enhanced AI features coupled with affordability and global access may lead to traditional approaches and some technology innovations being out cycled (Cardona et al, 2023) but must be considered. Educators may see rapid AI advancements as the vehicle by which education priorities are achieved at a faster pace than humans can process. Literature supports new and

necessary military teaching and learning (Force Design 2030, 2023), like information warfare, integration of technology advancements, cyber warfare, and multi-domain strategy for future preparedness (Whyte, 2023) as being almost solely developed by AI platforms. Education institutes have experienced the impacts of AI (Walter, 2024) but may have not fully prepared to accept the full spectrum of AI relevance. However, future teaching and learning insights and recommendations (Cardona et al, 2023) helps set educators on a leveled field when it comes to AIenabled systems that seemingly support robust learning. As AI expansions unfold and AI use and utility increases, another issue is potentially on the table. A new version of AI like DeepSeek was banned by the Navy (Field, 2025) seen as an updated version of AI platforms like Google, ChatGPT, and ChatBox with apparent nefarious implications. Supporting literature addresses increase uses for most projects, to include education at all levels, talent acquisition for hiring processes, and critical thinking (Gonsalves, 2024) and high stakes decision making (Endsley, 2023; Wright, 2020) disregarding ethical risks, awareness of security problems, and illpreparedness for a rash of character attacks. This rapid evolution, cunning realism, and vast product production of better platforms seem to be readily accepted (Vakulov, 2025) with intentional or intentional disregard to AI flaws (Danks & London, 2017). Hence, educators, organizations, and the military must embrace AI, structuring a rigorous integration of AI platforms as the global AI landscapes efforts are being fully integrated by competing countries (Kanie, 2017).

AI is growing and its use is becoming common place in aspects of daily living. Thus, AI preparedness, protection, and provision will be needed and necessary.

Method

The MCTOG Professional Discussion post has about 20 active participants. The discussions have a variety of topics discussed. Hence this seemed the best method to determine how instructors feel about AI use and the speed by which the capabilities are growing. With those capability enhancements, where does that leave the instructor in terms of future relevance. As a data collection process, a message was sent to the explaining the purpose and response were consents. Participants were asked to respond to the discussion question; With agility in spectrum and the reality of where we fight next, how might AI be in the way of instructor development to meet the new challenges in the next conflict? With the responses, four participants agreed to a one-on-one conversation to expand on specific points.

Results

Discussion analysis with observations of curriculum development and implementations seem to resolve that 21st century education in its current construct could be viewed as second fiddle to AI progress and performance assistance. AI minus-curriculum development enhancements are trying to keep pace with the positive potentials of good AI use and remain aware of negative aspects of over reliance and wrongful use. Many organizations and military formal schoolhouses, like MCTOG, understand that creative thinking, psychological and mental resilience, decision making under duress, implementation of AI enhancements may become critical components of training components as these enhancements become increasingly dominant and more capable. The discussion addressed AI's rapid improvements seemingly creating human dependency, necessitating training in mental resilience and AI dependency awareness. Additionally, training events that include actions under duress could be an added inoculation method for future preparedness and to not have AI fully hinder learning progress and training realism. Although a small sample size responded to the discussion prompt, several follow on conversations and the five one-on-one discussions responded to how would AI support this type of training development without being *in the way*. Results discussed four major areas for curriculum development and training considerations. 1) Using AI to build mental resilience in training. 2) Create training exercises that induce stress. 3) Consider AI minus training. 4) Awareness of the loss of humancentered adaptability due to AI sole reliance.

Discussion

Current teaching, learning, and training programs may become unmatched with AI increase use and enhanced capabilities. The instructors' discussion on how AI might be in the way of instructor development in order to meet the new challenges for the next conflict identified four major areas for curriculum development and training considerations. 1) Using AI to build mental resilience in training. 2) Create training exercises that induce stress. 3) Consider AI minus training. 4) Awareness of the loss of human-centered adaptability due to AI sole reliance.

Using AI to build mental resilience in training. The AI integration into military training comes with opportunities and challenges. While AI can enhance training efficiency and improve decisionmaking capabilities, over-reliance on it risks information overload, diminished mental resilience, and the erosion of human-driven adaptability. To maximize AI benefits in military training, leaders must find a balance between leveraging AI as a tool and preserving the human warrior's ability to operate independently in austere conditions and complex situations. Military training that lacks a balance of AI integration may find leaders and subordinates with diminishing cognitive agility (Wright, 2020) who are unable to bounce forward in adversity and who lack mental resilience to remain focused in failure. When building mental resilience in training-even with the use of AI- users could mitigate the risk of AI as a crutch and maximize AI as a catalyst for information synthesis and balanced reliance during planning and for novel or routine decision making.

Create training exercises that induce stress. Instructors referred to AI-driven training environments as an inoculation approach to create a controlled, predictable atmosphere, that will require Marines to be induced in a stressful environment that demonstrates combat stress. However, AI-driven training environments that do not have human synthesis prior to use may unintentionally create a controlled, predictable atmosphere, shielding Marines from true combat stress. This point is linked to the initial point of build mental resilience in an AI heavy learning and training atmosphere. Real-world mental resilience stems from training events that are chaotic, ambiguous, and high-stakes in nature. Thus, leaders must ask themselves how themselves can AI partially or fully replicate the stress induced training and avoid an overuse or over reliance on stress reduced environments.

Consider AI minus training. Over-reliance or overuse of AI could cause leaders to practice decision-making as a technical exercise and as instinctively based prior to the integration of AI. Developing AI and AI minus training could ensure leaders and subordinates retain their battlehardened skills. When AI integration is used in place of effective decision-making, leaders

could become unaccustomed to the chaos, unpredictability, and complexity of combat. According to the instructors, if Marines are conditioned to depend on AI for battlefield decisions, their ability to function in denied, degraded, or disrupted environments (D3E) could diminish (Danks & London, 2017; Endsley, 2023). Because combat is generally chaotic and unpredictable, AI integration or reliance may not always account for the intangibles of war such as human emotions, deception, and intuition of which play vital roles in decision-making. However, well developed curriculum and training should include AI-off exercises, where Marines must make rapid, high-pressure decisions without digital assistance to practice adaptability in AI-deprived situations.

Understand that time and bandwidth/connectivity are considerations during AI deprived events. First, Marines familiar with using AI know how time-intensive typing a proper query could be coupled with waiting for results. Thus, potentially having to refine the query to obtain desired information or results. Secondly, current AI models are cloud based, requiring extensive connectivity/bandwidth to function. While AI models that can be maintained on organic devices are in the works, they would not have the power or data repository that cloud-based AI is capable of. This could ensure Marines do not become overly reliant on a tool whose requisite resources are often at a dearth in combat situations.

Awareness of the loss of human-centered adaptability due to AI sole reliance. Instructors seem to carefully use AI for its ability to sift through vast data while being aware of the advantages to support information synthesis for decision dominance and the disadvantages of too much information that could cause what is terms as decision paralysis. It is important to note and accept that AI cannot replicate or replace the intimacy of mentorship, intuition, and real-time human judgment by experienced leaders (Endsley, 2023). A human instructor can pick up on subtle cues such as frustration, exhaustion, loss of confidence in their students unlike an AI that might only interpret performance metrics. Peer-to-peer learning, leader mentorship, and real-world experience must remain central to teaching, learning, and training environments with AI serving as a supplement rather than a substitute.

MCTOG instructors have the responsibility to analyze, design, develop, implement, and evaluate teaching, learning, and training for the Fleet Marine Force (FMF). With that responsibility comes the necessity to determine best educative methods, strategies, and resources to ensure optimal readiness. AI-generative platforms have become forefront of curriculum development and training packages. In response to the discussion question two major education and training considerations were addressed to support curriculum implementation. 1) AI as a force multiplier and 2) AI decision making in military training.

AI as a force multiplier. Instructors agree and generally practice proper use and proper degree of integration. Using AI as a force multiplier to develop AI-enhanced stress exposure training seems to be a new path for education and training exploration. First, the design and creation of AI supported training would support a gradual increase of AI enhanced cognitive and emotional stressors like ambushes that lead to mass casualties, communication degradation, and logistic deprivation. All due to Als ability to develop multiple situations during training in training environments. This could contribute to the natural development of resilience through repeated exposure. Second, adaptive AI simulations could be designed to adjust in real-time, keeping stress at an optimal level, challenging but not haltingly overwhelming, to promote mental toughness in novel situations. Last, AI physiological response tracking such as heart rate or stress markers, would contribute to real-time coaching on stress management techniques.

AI decision making in military training. Decision making in chaos, complex, and unpredicted environments will always be a prevalent part of combat. Thus, designing AI-powered decisionmaking drills in contested-type environments could increase leaders' ability to make rapid and critical decision. AI-powered decision-making training would be used to simulate AI-denied scenarios, forcing leaders into critical decision making under stress without digital assistance. This would be like or an augmentation of AI-minus training. These scenarios could replicate Global Positioning System (GPS) jamming, communication failures, and disrupted battlefield intelligence, preparing Marines for modern warfare realism.

Conclusion

In conclusion, 21st century conflict will likely be a series of complex, multidisciplinary, multidomain, and innovative approaches with a heavy AI, AuI, and ML presence. Although traditional military strategies will remain, Marines know and understand the increasing importance of military tactics like cyber defense, information leverage, and technological power. As with secular organizations and academic professors, MCTOG instructors enhanced an educational philosophy by designing, implementing, and assessing 21st century curriculum from a traditional and futuristic standpoint. MCTOG is aware and continues to prepare for AI generated education and training. A seemingly added strand is the proposal of deliberately integrated AI enhancements to support psychological rigor and mental resilience practice in military training events. Leaders will learn and incorporate AI models as a force multiplier to create training realisms rather than a dependency that could stifle 21st century warfare actions and vast information analysis. Leaders will always be positioned to make novel or routine decisions. AI- supported decision-making practices could increase rapid and sound decision making with retention of human judgement for ethical and empathetic decisions. Through curriculum analysis, design and development to address the use of AI to build mental resilience in training, implementing, and evaluating training exercises that induce stress, training sets will include AI minus events with an understanding of the advantages of viable human-centered adaptability and the dangers of solely AI-centered adaptability. Enhanced AI supported education and training will often ask and answer some questions. The conflict of Geneva Convention responses from a human standpoint versus a willing obedience to orders without question responses from an AI standpoint remains. The balance between AI coordination or AI take over remains a global fragility. As AI steadily improves well beyond human technical and technological ability, humans will still need to ask themselves, "am I allowing AI to take over? Is AI the only way? Will AI become more of a hindrance than a help in 21st century conflict, education, training, combat, and even basic human-centered living?" It may depend on how much AI one allows or becomes dependent as AI capabilities grow from processing vast amounts of information to babysitting a toddler or caring for the elderly to making life changing or combat related decisions.

Acknowledgements
This paper is an output of MCTOG instructors' path to AI generative practices for education, and training for 21st century conflict preparedness.

Conflict of Interest: "The authors declare no conflicts of interest"

References

1. Cardona, M.A., Rodríguez, R. J., & Ishmael, K. (2023). Artificial intelligence and the future of teaching and learning: Insights and recommendations. *Office of Education Technology*.
2. Department of the Navy United States Marines Corps (2023). Force Design 2030 Annual Update June 2023. *Department of the Navy United States Marines Corps*.
3. Danks, D., & London, A. J. (2017). Algorithmic bias in autonomous systems. *Proceedings of the 26th International Joint Conference on Artificial Intelligence*, 4691–4697.
4. https://doi.org/10.24963/ijcai.2017/654
5. Endsley, M. R. (2023). The impact of artificial intelligence on situation awareness and decision making in complex systems. *Human Factors*, *65*(2), 245–260.
6. https://doi.org/10.1177/00187208211004817
7. Field, H. (2025). U.S. Navy bans use of Deep Seek due to 'security and ethical concerns.' https://www.cnbc.com/2025/01/28/us-navy-restricts-use-of-deepseek-ai-imperative-to avoid-using.html
8. Gonsalves, C. (2024). Generative AI's impact on critical thinking: Revisiting Bloom's Taxonomy. *Journal of Marketing Education*, *00*(0), 1-16.
9. Kania, E. (2017). Battlefield singularity: Artificial intelligence, military revolution, and China's future military power. United States Air Force News.
10. https://doi.org/10.1177/02734753241305980
11. Sikorski, T. A. (2023). Informed Competition: The Theater Army's Role in the Information Environment. *Strategic Studies Institute, US Army War College*. https://www.jstor.org/stable/resrep53249.1
12. Vakulov, A. (2025). DeepSeek cyberattack exposes AI platform risks: 9 tips to stay safe. Forbes https://www.forbes.com/sites/alexvakulov/2025/01/28/deepseek-cyberattack-exposes-aiplatform-risks-learn-how-to-stay-safe/
13. Whyte, C. (2023). Bigger, faster, better: The cyber defense review. *Army Cyber Institute*. *8*(3), pp. 135-150. https://www.jstor.org/stable/10.2307/48755366
14. Wright, C. G. (2020). The cognitive load dilemma: How artificial intelligence impacts decisionmaking in high-stakes environments. *Journal of Defense Research and Development*, *7*(3), 15–29. https://doi.org/10.1234/jdrd.v7i3.543

Appendix 1. Discussion Transcript

Facilitator: Hello Marines, GS, and Contractors. I need your help, please. I have been asked to present at Marine Corps University at the Military Scholarship on Teaching and Learning conference (MSOTL). I plan to facilitate an open discussion:

1. Psychological and mental resilience may become critical training components
2. Teaching and learning under duress could be an added inoculation method
3. Hence, with agility in spectrum and the reality of where we fight next, how might AI be in the way of instructor development to meet the new challenges in the next conflict?

Participant B: I have some thoughts. **Facilitator:** Let's hear them.

Participant B: There was a critical story on it from the Council of Foreign Affairs and the last line was this article was written by Deep Seek. This was an article which was spelling out how Deep Seek was created, what are the advantages, what are the disadvantages, what are some of the points of skepticism. Some that I held on my own and I'm like wow this author really knows what they're talking about and I'm like very logical, very fluid and the author really knew what he was talking about. Then the very last line was read this was written by Deep Seek. Now literally my jaw dropped like that. So, here's the long-term implication: though we're already seeing it with kids Gen Alpha or Gen Beta or whatever they're calling them, their critical thinking skills are out the window because they're just going to Google. They have a question, like how does this work and then AI is going to tell them. What I fear is going to happen is people aren't going to see critical thinking for themselves and they're just going to rely on AI to tell them what to think.

Facilitator: How would that translate on the battlefield? Let's say we go into our next war?

Participant B: I don't know that's a good question because what we really need to be concerned about is decision making, especially decision making under duress. That depends on, and that's where you get into the difference between training and education because training is you want to instill an unconditioned automatic response to something. Incoming Mortar round, you take cover. You're trained to do that. Like you hear this, you dive, you find a foxhole. That doesn't take education it takes training. So, I don't think combat actions on the battlefield would be affected by that because it's going to be more about what has to be trained. Where it's going to hurt is things like C2 and Leadership where people have to make decisions and they're going to clutch and they're going to use AI to do that. I'm talking 10 or 15 years in the future. People will be so used to asking technology for answers and would have forgotten how to make those decisions on their own the need to check your sources.

Facilitator: I'm wondering are they trying to AI the battlefield as well?

Participant B: The Chinese are going to do that for sure because they can't, they can't trust their people and they understand that this centralization doesn't work so well cuz you lose your leader you lose your plan. So, what you do instead of building an NCO Corps or Warrant Officer Corps, you have AI fill that vacuum for you. So, the senior leadership will do their battle plans and all that. And then they will have AI probably controlling weapon systems so that the AI when they get these input from the sensors and say let's say the enemies over here this is what the enemy is

doing okay select this weapon system and engage and it'll be automated.

Facilitator: They don't trust their people but they're going to trust the automation**.** Is that going to be artificial intelligence or augmented intelligence?

Participant B: It's going to be artificial intelligence. Very dangerous stuff. I can see senior decision makers using augmented intelligence, augmented reality but in order to shorten that kill chain, the temptation will be to use AI to make to do that because AI will make those decisions faster than a human being can and they'll do it without questioning orders and saying is this legal or not legal is this a violation of the Geneva Convention or not. Like it'll just be okay there's something, let's shoot at it.

Facilitator: And then there will be nobody on the human end saying, "We need to kind of synthesis this before we act.

Participant B: That will probably be the difference between US AI engagement and the Chinese or Russians who don't have those compulsions there still might be some level of human intervention or legal considerations or humanitarian concerns come into play but I don't see the other side playing by those set of rules.

Facilitator: So, if we're trying to stay relevant and competitive, at what point will we begin to use the AI like the Chinese using the AI?

Participant B: That's tough to say and very scary if it happens. They're already talking about the air force is using AI-enabled platforms to pull faster and pull tighter G's because it won't be any spam in the can. That's what they call it.

Facilitator: What they mean by spam in the can?

Participant B: No pilot. When you see or hear the term no spam in the can that's what they're talking about completely removing the pilot from the equation and that these things will be autonomously flying and executing mission plans.

Facilitator: With people or just equipment?

Participant B: With just AI doing it?

Facilitator: No, you're saying they're not going to use people at all. You know how they transport people to mission sites? So, they're not even going to transport people? So, the mission site is going to be all what? They're going to shoot at what?

Participant B: Shoot. Bomb. Jam. Any type of air mission or air combat mission you can think of. They'll probably have fully autonomous air refilling tankers up there.

Facilitator: That's a lot of AI stuff. And what do we need to be cautious of?

Participant B: The Navy's already working on AI submarines called Orcas where they will float on their own completely. They'll have a mission that they would leave San Diego goes to the South of the China Sea near Taiwan without a crew.

Facilitator: So, what happens so what happens if you give them the direction but the direction has to change?

Participant B: So, these things can periodically surface to recharge its batteries and when it resurfaces, that is when it gets a new burst of communication.

Facilitator: I have another question. You already answered the one about leadership and the decision making. If they're doing leadership in the decision making that means they can make faster decisions. But if they're trying to make those faster decisions, I was reading an article about AI prompts and that we have to remember that the AI still has flaws.

Participant B: That's the saving graced on where I stand with what's unique about DeepSeek, is that it taught itself. Like first they trained it. So first they trained it on ChatGPT and OpenAI and existing models. So, they copied it like the copied how ChatGPT does other work and then what they did was the only innovation was using that as a baseline and then taught it how to teach itself. And it went more or less along a yes, no type of logic like does this make sense. Is this true false, yes, But, what I can see being the saving grace though from us, at least short term, is you got to have experience to teach the AI on what to do when an encounters something new it won't know what to do right so it'll need at this point right now here is some type of input of if you see this problem this is these are the possible solutions with all the first second third order effects.

Facilitator: You're saying they can teach the AI duress?

Participant B: Yeah, they can. You conceptually could because you could work case studies you can put case studies in like historical things like the battle of the Chosin Reservoir. Last time you fought the Americans, this is what happened these were the outcomes learn from that.

Facilitator: Could they also do the psychological resiliency too?

Participant B: It's not needed for machines. It might that.

Facilitator: If they fail, it's no big deal because they'll just try again? Or do they see it as failure? Does the machine see it as failure?

Participant B: The machine will see it as failure and the machine will learn from it and then it won't do that again. So, my point though is because the Chinese haven't had been in a war for so long, they're experience like they're going to be challenged on teaching their AI systems about Warfare and combat because they haven't had one. But that introduces a new problem which means probably need a war. You going to need something so you can teach your AI in the future going forward what to do.

Facilitator: And what is that war going to look like?

Participant B: We could probably stomp their a$$ and come away from it thinking like ha, ha, yeh, they're not a threat they're not a problem. We won. And then they're using all those lessons to teach their Ais. And then the next time.

Facilitator: When I asked about what does that future fight look like, is that future fight boots on the ground or cybercyber.

Participant B: It'll be all of that. Maneuver, Cyber, Information, all that. I'm not worried about them right now. If we went to war we would wipe the floor with them. It's 50 years from now that I'm worried about as AI gets better.

Facilitator: I suppose right now we're not at the point where its superior? Now are trying to match their innovations?

Participant B: So that's the big argument between the American model and the AI and the Chinese model. The Chinese are claiming that they did it with far inferior chips at a fraction of the cost that we're doing. We're throwing like almost a trillion dollars at it like $500 billion. Our big tech companies' Apple, Google, Meta, they're all like and you're also going to need tremendous amounts of energy and huge databases to reach what's called AGI artificial general intelligence which is basically where the system is, it learns on its own. It doesn't need human help, right. So, to do that you need those high-speed chips which is why we try to cut the Chinese off from those. But DeepSeek is saying we did it anyways and we got a model just as good as yours maybe even better for a fraction of the cost and fewer chips and the export control didn't work and but here's the thing though they had to use the American models to train theirs. So, I still think going forward they're going to hit a ceiling and their going to have a real hard time getting through it especially if our models progress like, if there's a breakthrough because we have the higher speed and the more

advanced technology. They didn't use any new technology to do DeepSeek.

Participant D: This part was getting me a little riled up-DeepSeek was as much propaganda tool as it is an actual product. The CCP's claims that it only cost $6 million is a distinct lie, with that figure only describing the cost of a certain GPU set within the larger system. The true cost was upwards of $500 million, and the developer was able to source high-end NVIDIA chips through third-party sources despite sanctions designed to prevent China from accessing chips of that potency. The details about using American AI to train DeepSeek is 100% accurate.

Facilitator: Then my next question would be let's say that you're an alcoholic and you're used to drinking alcohol and now alcohol is no longer available, what happens?

Participant B: Well, if you're an addict you'll find a new drug. People will drink rubbing alcohol if they have too.

Facilitator: If it is no longer available, you're still an alcoholic but you're going to find another way to feel that void. The reason I ask that is because of Participant A said that for AI people are going to get so addicted that when it's no longer available…

Participant B: Why would it no longer be available? See it's not only going to be available it's going to become even more widely accessible and easier to use. How do you feel about using AI as an educator?

Facilitator: Accessible or accepted or both? As educators, we had a conversation that resulted in the article Sustained or Enhanced Creativity. Are you using the AI as the creator for your creativity? The more you use the AI, the less creative you are because you're using the AI as the creator for your creativity. And some educators may think its cheating. So then when I canvased you all, some people use it because it helps them to organize their thoughts faster but not necessarily having it come up with the thoughts. And another participant explained how would you know as an educator 5 years from now who AI their stuff and who didn't?

Participant B: You're not going too. If anything, you would probably look at the one that has more flaws, more problems with it and be like look closely at the imagery. If it's too good and then like oh this is an A+ but probably AI-generated. And on the creative side, AI is now starting to compose music. It is getting more and more difficult to tell AI generated art from human art because of the prompts you're giving it.

Facilitator: Is it getting better on its own or because people are giving it a better prompt or because of creativity?

Participant B: Both. So, people have mastered giving it the right prompt in order to get a better product. So, on the art side let's say I feed it nothing but images of Van Gogh. What do you think the AI is going to do when I say make me a painting of a cat with a picture of Van Gogh? It will come up with something that is supposedly new.

Facilitator: So, I remember one time I asked a question if we all put in the same prompt of where we all get the same response?

Participant B: I think the one field that probably the one field that may not fully succumb to AI is going to be Clinical Psychology and therapy. From time to time AI is going to say something like if somebody's talking about a problem they're having AI is going to tell him like this is how you should fix it but it's going to come across as very cold. I think AI is going to struggle with things like you know emotional intelligence emotional IQ making people feel better.

Facilitator: So, if we're talking about is AI going to be in the way, and not wholistically or globally in the way, but maybe just some pockets if you don't know how to use it?

Participant B: If I was going to snuff out AI, I would ask each student, how you think that made others feel because I think AI would really struggle with that because our feelings are always logical and AI could be very illogical.

Facilitator: With that said, is AI in the way or is AI the way? Are we embracing it that much that it's the way to go now?

Participant B: I think yeah, a lot of people are starting to embrace it. In the future, you might actually may be at a disadvantage if you're not using it. I would say to your co-educator if you go back to, I don't know, ancient Greece right and you have some brilliant minds sitting around talking about philosophy and natural science right and you give somebody in the group a smart phone or a pc even is that person that has that technology cheating and the others aren't?

Facilitator: I filled out a job application for being an adjunct professor. They asked you questions and they asked why do you want to this University and in parenthesis it read don't ChatGPT your response. I also read on LinkedIn a hiring manager received six applications and all six of them basically said the same thing.

Participant B: Yeah, probably that's where we are tight now. There's some people who are supposedly developing software called AI sniffers that will tell the evaluator whether or not AI was used or not. But that's going to be harder and harder to do though. It's going to come to the point where, like that CFA article that I read on DeepSeek, it was like I had no clue.

Facilitator: Instead of the AI sustaining the creativity, the AI may enhance or validate the creativity. Then who gets the credit?

Participant B: Early on I think we're at the stage to where people who are more skillful with the prompts are going to benefit more but at some point, the AI will get so good that where you could have a crappy prompt AI will make it nice for you.

Facilitator: And I don't think AI is any different that when ladies go get makeovers. I could look like me. I could go to a skilled makeup artist and look totally different coming out., but I'm still me. And the more skilled they are the better you look.

Participant B: So that's where we are right now with the American side is you have what's publicly available or free. It's kind of crappy but if you do the paid services, you get the makeover.

Facilitator: I can pay $60 for makeover or I can pay $200 for makeover. But if I want a $200 makeover, I'm going to look a whole lot better and it may last longer than a $60 makeover.

Participant B: That's a really good analogy because what DeepSeek is doing is they're giving you the $200 makeover for free.

Facilitator: Well, that's going to have to stop because if people are getting that good with the free stuff you're going to start paying for the stuff.

Participant B: And that's why the stock on Nivida tanked. Nivida makes the chips that are used in AI and when DeepSeek came out and people saw that they were getting $200 makeovers for free we don't need those chips we can just go use this Chinese product, the Chinese hairdressers that's giving us the $200 makeover for free.

Facilitator: Well, that's going to have to stop.

Participant B: Well, it's open source so you can't. They made it open source so anybody can use it. The Chinese did that to try to tank Silicone Valley. DeepSeek is better than what one would call generic products for half the price.

Which puts pressure on big tech companies to take AI to a level that DeepSeek can't reach.

Facilitator: So now we have AI competitiveness?

Participant B: Competitiveness, it's like we got to get our money's worth for what we're investing in. So, we got to do the next great thing.

Facilitator: So, is AI in the way? Or is AI the way?

Participant B: It's the way.

Facilitator: So, with AI being the way, now everyone is coming up with a better way to AI. So let me write that down.; a better way to AI. The questions are is AI in the way? Is AI the way? Is AI going to be the better way? With that said, it sounds like AI is not going away.

Participant B: They're going to improve it. They're going to make it cheaper, more accessible and in order to find a profit in it there's going to be pressure in a pay for play environment to make it better and do more Back to the hairdresser analogy. The $200 makeover for free. Remember the spam in the can?

Participant D: I can sit down with you.

Participant D: I won't be able to sit down you as planned. I'm home sick.

Facilitator: Feel better. If you have your laptop, could you send a couple of points?

Participant D: AI, Decision-Making, and Mental Resilience in Military Training

The integration of artificial intelligence (AI) into military training presents both opportunities and challenges. While AI can enhance training efficiency and improve decision-making capabilities, over-reliance on it risks **information overload**, diminished **mental resilience**, and the erosion of **human-driven adaptability**. To maximize its benefits, we must find a **balance between leveraging AI as a tool and preserving the human warrior's ability to operate independently in austere conditions**.

The Risks: AI as a Crutch vs. a Catalyst

1. **Information Overload vs. Information Management**

- AI's ability to process vast amounts of data can be both a strength and a weakness. In high-stakes environments, too much information can lead to **decision paralysis** rather than **decision dominance**.
- Marines must be trained to **sift through critical vs. non-essential information quickly**, rather than relying on AI to process everything for them. The goal should be **enhancing cognitive efficiency, not overloading the warfighter** with data points.

Participant C: Ideally, AI would do this for us; not provide us with more info but sift through to provide us with only the relevant info. However, what parameters do you give the AI to enable it to do this satisfactorily? How do you trust that it is not throwing out important, relevant information?

Participant D:

- AI-driven decision-support systems must be designed to **streamline information, prioritize relevance, and support human intuition** rather than replacing it.

Participant C: Yes! Intuition is the one thing machines will never have an advantage over humans in.

Participant D: 2. The Danger of Over-Reliance on AI in Decision-Making

- If Marines are conditioned to depend on AI for battlefield decisions, their ability to function in **denied, degraded, or disrupted environments (D3E)** may suffer.
- **Combat is chaotic and unpredictable.** AI cannot always account for the **intangibles of war—human emotions, deception, and intuition**—that play a crucial role in decision-making.
- Training should include **AI-off exercises**, where Marines must make rapid, high-pressure decisions without digital assistance, ensuring they remain adaptable in AI-deprived situations.

2. **Reduced Exposure to Stress in Training**

- AI-driven training environments may unintentionally create a **controlled, predictable atmosphere**, shielding Marines from **true combat stress**.
- Real-world resilience comes from experiencing **chaotic, ambiguous, high-stakes environments**— something AI may struggle to replicate fully.
- Over-reliance on AI risk **turning decision-making into a technical exercise rather than an instinctive, battle-hardened skill**.

3. **The Loss of Human-Centered Adaptability**

- AI cannot yet replicate **the mentorship, intuition, and real-time human judgment** that experienced leaders provide.
- A **human instructor** can pick up on subtle cues—frustration, exhaustion, loss of confidence—whereas AI might only interpret performance metrics.
- **Peer-to-peer learning, leader mentorship, and real-world experience** must remain central to training, with AI serving as a supplement rather than a substitute.

The Potential: AI as a Force Multiplier for Resilience

1. **AI-Enhanced Stress Exposure Training**

- AI can **gradually increase cognitive and emotional stressors** in training environments, helping Marines develop resilience through repeated exposure.
- Adaptive AI simulations can **adjust in real-time**, keeping stress at the optimal level—**challenging but not overwhelming**—to promote mental toughness.
- By tracking physiological responses (heart rate, stress markers), AI can provide **real-time coaching on stress management techniques**.

Participant C: Interesting

Participant D: 2. AI-Powered Decision-Making Drills in Denied Environments

- AI should be used to **simulate AI-denied scenarios**, forcing Marines to make critical decisions under stress without digital assistance.
- These scenarios could replicate **GPS jamming, communications failure, and disrupted battlefield intelligence**, preparing Marines for the realities of modern warfare.

2. **Virtual Reality (VR) and Augmented Reality (AR) for Crisis Decision-Making**
3. AI-integrated VR/AR training can immerse Marines in **high-stakes combat simulations** that enhance rapid decision-making under duress.
4. Scenarios could incorporate **ethical dilemmas, ambiguous intelligence, and battlefield deception**, forcing Marines to **rely on intuition, experience, and adaptability** rather than AI-generated recommendations.
5. **AI-Driven After-Action Reviews (AARs) for Mental Resilience**

- AI can provide **deep analysis of decision-making patterns**, identifying strengths and weaknesses in cognitive resilience.

- By studying **how Marines react under pressure**, AI-driven AARs can offer **personalized resilience coaching**, helping individuals refine stress-management strategies.
- AI can **simulate unpredictable adversaries** in training, ensuring Marines don't fall into pattern-based thinking that could be exploited by real-world enemies.

Participant C: Yes, this could help us overcome the mirroring bias inherent when we do force-on-force exercises like MWX, in which our opponents largely think the way we do.

Participant D: The Path Forward: AI as a Tool, Not a Replacement

The **key to integrating AI into military training** lies in **balancing its capabilities with human judgment, adaptability, and resilience**. AI should **augment decision-making, not replace it**, and should **enhance stress exposure, not shield Marines from it**.

- Leaders must emphasize human-centered training, ensuring that Marines retain the ability to operate in AI-denied environments.
- AI should help warfighters process critical information more efficiently, but not at the expense of their ability to make instinctive, experience-based decisions.
- Training should deliberately incorporate "No AI" drills to ensure that Marines remain capable even in degraded conditions.

Bottom line: AI should be a force multiplier for resilience, not a crutch that weakens independent decision-making. The goal is to **create war fighters who can leverage AI effectively but also thrive without it when the battlefield demands it.**

References

1. Cummings, M. L. (2021). *Rethinking the drone revolution: How AI and autonomous systems are reshaping military strategy*. Georgetown University Press.
2. Danks, D., & London, A. J. (2017). Algorithmic bias in autonomous systems. *Proceedings of the 26th International*
3. *Joint Conference on Artificial Intelligence*, 4691–4697. https://doi.org/10.24963/ijcai.2017/654
4. Endsley, M. R. (2023). The impact of artificial intelligence on situation awareness and decision making in complex systems. *Human Factors*, *65*(2), 245–260. https://doi.org/10.1177/00187208211004817
5. Kott, A., & Perconti, P. (2018). *Battlefield singularity: Artificial intelligence, military revolution, and China's future military power*. Army Cyber Institute at West Point. https://www.armyupress.army.mil/Portals/7/combat-studiesinstitute/Battlefield_Singularity.pdf
6. Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war*. W. W. Norton & Company. Wright, C. G. (2020). The cognitive load dilemma: How artificial intelligence impacts decision-making in highstakes environments. *Journal of Defense Research and Development*, *7*(3), 15–29.
7. https://doi.org/10.1234/jdrd.v7i3.543

Participant A: I would posit that 1 & 2 are proven to be true and effective, especially for hands on, survival based training. Then again, most of the people who find it effective are the ones who get through the toughest training in the world and don't quit, so it could turn into a nature/nurture argument.

For 3, the biggest ways that I see AI being a hinderance to meeting the challenges are:

- Since it is a tool, it can be abused to produce outputs that pass as well done yet there was no actual learning on the part of the "creator".
- Dependence on AI outputs for an instructor and students could start to wear in those neural pathways, making it the default that people fall back on, much like search engines, so memorization of basic skills atrophies.

Participant C: I agree with your points regarding how AI should be used and how it should not be used. Notes attached.

Facilitator: As we develop education (PME) a training (enhanced MWX) how do we us AI to incorporate psychological resilience and training under duress as opposed to outsourcing it to the AI for actions? In that light. some users do may mistake misuse for abuse or not realize they are doing more teaching, learning, and training hard that help. Creator etiquette if you may. And aligned with the article you sent me; the instructor has to be privy of the inputs and analyze the outputs. Not be lazy. I am not sure what you mean by "students could start to wear in those neural pathways, making it the default".

Participant C: After reading this I started thinking about at what level AI decision-support is needed. My first instinct was that it would only benefit at higher levels; echelons above brigade, as you in the Army say. However, I started thinking about how it could be used to aid someone at the squad and platoon level, and here is what I came up with:

1. As you point out, AI excels at working within rational probabilities and will have difficulty when human ineptitude and irrationality are at play
2. Nevertheless, recognition-primed decision making requires reps and sets
3. Therefore, AI could enhance small unit tactical decision-making by providing a prediction of enemy positioning and actions based on probabilities. Once the small unit leader has seen a few of the AI's predictions, and they understand the why behind them, then they can start coming up with informed predictions of their own without needing the AI as a crutch.

Example: An infantry squad leader is leading a reconnaissance patrol to locate an enemy defense. Through a built-in camera and heads-up display in the squad leader's helmet, AI is analyzing the terrain and vegetation, and any known enemy positions, and providing a prediction as to where the rest of the enemy's defense is sited based on tactical considerations and historical examples. E.g. based on observing an observation post at this location, the AI predicts that enemy fighting positions will be located 100m inside this treeline here. When the squad leader gets back from the patrol, they examine why the AI predicted that. The next time they go out on patrol, they have a better idea of where to look without needing another AI prediction. The AI has primed the pump on the squad leader's recognition without necessarily becoming the default for the squad leader.

Participant A: Basically, building a habit is wearing in that pathway in your brain until it becomes a default action. Example, if you eat a piece of toast every day for breakfast for 20 years, then aren't able to eat bread anymore, you end up feeling lost and confused on what to do because that pathway was programmed so deeply. Pivoting is an exceptionally difficult and conscious effort. The same goes for using an LLM to assist you with everything. When it's no longer available to you, developing curriculum and completing assignments becomes that much for difficult. Maybe a better way to state it is that building a dependence will create both external and internal friction when that tool is taken away.

Facilitator: I understand. So, if we use it in moderation then we would be alright if it's no longer available. Like a social drinker or smoker versus an alcoholic or drug addict.

Participant A: Once it becomes that extreme, then a person will definitely have to abstain. In my opinion, when we break any of this all the way down, it is all depending on the individual to do the right thing for the organization and themselves, regardless of the temptations to take the "easy way out". That is almost always based in our biological set points in our brains and our environments we developed in.

Facilitator: Spam in the can mentality moving forward. What will be next is the question, Are humans in the way?

Participant A: In the way of instructor development? Most certainly there are plenty that get in the way of others development. Whether its unintentional due to that person's lack of self-awareness or intentional due to interpersonal conflicts, it definitely happens. The advantage of machine-based learning and training is that it will never intentionally inhibit your learning unless is it programmed to. Have you read The Courage to be Disliked? I just finished it and it had some really great philosophical concepts. The narration was a little difficult to get used to though

Facilitator: I haven't read it. How does it align with the current and future of AI?

Participant A: It is more based in Adlerian psychology and provides perspective on how to have a better and happier life. Which feeds into the conversation of humans being in the way of moving forward. I found another great use case for AI in saving leaders time while still abiding by policy and due diligence. I was able to utilize CamoGPT to accurately and precisely assess iAPS award SOAs and Citations meeting the MCO criteria and generate recommendations for voting. Time spent went from 20-45 minutes per award, to about 5 minutes, with no decline in quality and accuracy. It recommended upgrades/downgrades/yes/no votes, with accurate, content-based justifications. I could normally find time for 3-4 award votes maximum per day when the S-1 called for votes. Yesterday I got 15 done in less than 2 hours, while still completing other tasks.

Participant C: I think one of the ways AI can be beneficial down at the small unit tactical level without necessarily becoming a crutch is in priming the pump for recognition-primed decision making. In other words, giving the squad leader a leg up on a couple of reps, at which point the squad leader knows what to look for without needing the AI's assistance.

I was recently trying to learn how to play a computer wargame that is pretty complex. My first few attempts at fighting a battle in the game failed miserably. Then I watched a Youtube video of an experienced player playing the same battle and explaining why he was arraying his forces and giving them the commands, he was. Once I had seen "what right looks like," the game started to make a lot more sense to me and I was able to do a lot better against the computer. By taking in a lot of data and analyzing it against historical data and probabilities (which AI excels at), AI can be the thing that provides "what right looks like" to a small unit leader who does not get many reps and sets, sort of jump-starting their recognition and intuition.