Given the projected complexity of the future operating environment, military officers will continue to require mastery of traditional military topics (e.g., the nature and character of war, command, and planning), but will also require a greater level of understanding of non-traditional military topics as well (i.e., politics, economics, history, cultural anthropology, etc.) The author proposes that to meet these challenges, the Marine Corps should fully integrate narrated animation and problem-based learning into its officer professional military education programs. By employing this complementary concept, the author asserts that students will be able to obtain a better degree of understudying across a wider array of subjects, which will ultimately produce a more capable force able to better serve the nation.
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FUTURE WAR PAPER

TITLE:
Officer Professional Military Education: Effective Education for the Future

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF OPERATIONAL STUDIES

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AY 2012-13

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DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS SCHOOL OF ADVANCED WARFIGHTING OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT
**Introduction**

In a 2010 report on professional military education (PME), the House Armed Services Committee’s Subcommittee on Oversight and Investigations recommended that Congress regularly ask, “What should be done to educate [officers] more effectively in the future?” Answers to this inquiry are intricately linked to our nation’s defense; thus, the question warrants exhaustive study. This paper accepts that challenge, and it promotes a contributory concept toward a solution. *Specifically, the author proposes that the Marine Corps will be able to more effectively educate its officers in the future by fully integrating narrated animation and problem-based learning into officer PME.*

To advocate the above proposal, the author will: provide a brief view on why more effective education is vital in the coming era; introduce the complementary concept of narrated animation and problem-based learning, subsequently examining both components in detail; provide short examples to amplify the vision of future curriculum using narrated animation and problem-based learning; and conclude with foreseen obstacles to instituting this proposal.

**Background: Specifying a Requirement for more Effective Education**

There are several reasons for military institutions to provide more effective education to their service members; one of the most significant is to maintain pace with the ever-changing character of warfare and the interactive complexity of global affairs. The Joint Forces Command’s study, *Joint Operating Environment 2010 (JOE)*, recognizes the accelerating rate of technological and scientific advancement, and argues that the next quarter century will see changes “just as dramatic, drastic, and disruptive as those that have occurred in the past quarter century… Changes will occur throughout the energy, financial, political, strategic, operational,
and technological domains."\(^2\) This author accepts the forecast for a comparatively challenging future and believes that it may be more challenging than the JOE anticipates.

To excel in the JOE's aforementioned environment, officers must continue to demonstrate mastery of traditional military topics (e.g., the nature and character of war, command, and planning), but must also possess a broader and more in-depth understanding of non-military topics as well (i.e., politics, economics, history, cultural anthropology, technology, current events, etc.) The seminal U.S. Marine Corps Officer PME 2006 Study and Findings (the Wilhelm Study) shares this view, claiming, "All evidence points to the need for officers to possess a greater variety of skills and a wider breadth of knowledge if they are to meet the new demands both on and off the battlefield."\(^3\) Given this requirement for greater understanding of more subjects, the question naturally arises: How can the Marine Corps educate its officer corps to meet these growing demands?

**A Complementary Concept: Narrated Animation and Problem-Based Learning**

For Marine Corps officer PME to achieve a greater level of understanding in its students while incorporating more subjects and material into its curriculum, two things are necessary: PME institutions must present material more efficiently to save time; and students must use significant portions of that saved time to build understanding (remaining portions of saved time will go toward the additional subjects and material). This proclamation is at the center of the narrated animation and problem-based learning complementary concept. Narrated animation provides a time saving and effective method for conveying material, and problem-based learning builds and reinforces understanding. Integrating the two components of narrated animation and
problem-based learning together can solve the dilemma of “trying to do more, better.” This paper will now analyze this concept by examining its two key components in detail.

**Narrated Animation**

For many, the mention of narrated animation immediately conjures up thoughts of Disney-Pixar films or Saturday morning cartoons; subsequently, it is easy to dismiss the technology’s applicability to the profession of arms without recognizing its potential aid to the warfighter. The Marine Corps will have to get past this narrow thinking if it wants to improve its PME programs. To help avoid this limited view, it’s important to first establish a base understanding of narrated animation. Drs. Richard Mayer and the late Roxana Moreno, two prominent researchers in the area of multimedia learning, define animation as a “simulated motion picture depicting movement of drawn (or simulated) objects.” By adding auditory cues to animation, one creates narrated animation.

With a definition in place, it’s important to realize why narrated animation, a multimodal educational tool (i.e., consisting of visual and auditory cues), conveys information with greater efficiency and effectiveness relative to traditional unimodal methods (e.g., auditory cues only). Understanding the relative efficiency and effectiveness of multimodal methods in contrast to unimodal methods requires an appreciation for human cognition; and, although there is no definitive explanation for how people learn, there is a significant amount of research on the topic. Some of the research is well-tested and highly suggestive such as the “multimedia principle” which states, “People learn more deeply from words and pictures than from words alone.” Additionally, Dr. Richard Mayer’s, et al., related work regarding how people learn from
words and pictures, known as the Cognitive Theory of Multimedia Learning (CTML) (see figure 1), is also extremely relevant to the discussion and warrants further analysis.

Expanding on the multimedia principle, Mayer, et al., connect three widely accepted assumptions regarding human cognition and use these postulations as foundations for the CTML. These assumptions and a summary of their definitions follow:

1. Dual Channel – the idea that humans have separate channels for processing visual/pictorial representations and auditory/verbal representation;
2. Limited Capacity – the idea that only a few pieces of information can be actively processed at any one time in each respective channel;
3. Active Processing – the idea that meaningful learning occurs when the learner engages in cognitive processes such as selecting relevant material, organizing it into a coherent representation, and integrating it with existing knowledge.

Mayer, et al., contend that to successfully integrate words and pictures into a superior learning experience, the material must link the words and pictures in a manner commensurate with these three assumptions about how the mind works. The CTML suggests that – if designers develop materials properly – providing simultaneous dual-channel instruction (e.g., narrated animation)
will facilitate more efficient and effective learning because it allows for, and maximizes, the
integration of more sensory inputs.\textsuperscript{10}

The caveat above noting that designers must “develop materials properly” is vital, and if
not adhered to will likely result in wasted time, energy, and money, and a potential damnation of
multimedia technology. To avoid this calamity, educational institutions building and employing
multimedia tools (such as narrated animation) must understand the principles that make a
multimedia tool effective. In the article, “Animation as an Aid to Multimedia Learning,” Mayer
and Moreno summarize research spanning more than a decade and provide an essential
collection of principles for creating quality multimedia presentations.\textsuperscript{11} A partial list follows:

- **Modality Principle:** Students learn more deeply from animation
  and narration than from animation and on-screen text.
- **Temporal Continuity Principle:** Students learn more deeply when
corresponding portions of the narration and animation are
presented at the same time than when they are separated in time.
- **Coherence Principle:** Students learn more deeply from animation
  and narration when extraneous words, sounds, and video are
excluded rather than included.
- **Personalization Principle:** Students learn more deeply from
  animation and narration when the narration is in conversational
rather than formal style.\textsuperscript{12}

Dr. Mayer’s, et al., work on the above principles and the CTML in general is thoroughly
researched, well tested, and painstakingly documented, and it offers convincing support for the
effective development and application of narrated animation in education. Educators and
curriculum developers should consider their works and solicit their expertise prior to developing
narrated animation-based curriculum for Marine Corps PME programs.
Example of Narrated Animation

This section provides a brief example of the author’s vision for narrated animation in officer PME. The following vignette represents a junior officer period of instruction (POI) on the Principles of War at an appropriate level PME institution (e.g., Expeditionary Warfare School). The institution provides a fifteen to thirty-minute narrated animation POI on the principles of war to students through an on-line host site (e.g., Blackboard). The clip depicts on-screen graphics for a given battle. The graphics can be as simple as unit symbols or monikers, or as detailed as providing boundaries, phase lines, order of battle, etc., depending on various factors such as, learning objectives, difficulty of material, placement in the schedule, etc. The graphics are presented on top of appropriate battlefield maps and a narrator describes events of the battle as the graphics go in motion.

As an example, for instruction on the principles of war, the courseware could depict a two-minute clip of Napoleon’s use of the central position during the Italian Campaign to reinforce the principle of economy of force. As the narration describes Napoleon’s movements, graphics simultaneously move and display how Napoleon fixed Austrian forces through an economy of force mission in the east, while he attacked and defeated the forces of Piedmont to the west. Instruction could then turn to a different historical battle and emphasize a different principle, such as Hannibal’s legendary use of maneuver at the battle of Cannae. Instruction could then go on to another principle, or could reinforce the principle of maneuver by displaying Stonewall Jackson’s flank march at Chancellorsville, or by providing a negative example of maneuver such as much of the fighting on the Western Front in World War I. Throughout the video, the narrator could provide doctrinal definitions to support the learning and historical background behind each of the case studies. The possibilities are endless.
There are numerous benefits to the above depicted instruction, not the least of which is the leveraging of dual-channel processing to enable greater understanding. Additional benefits include: the wide exposure to countless case studies, vignettes, examples, etc.; the ability to easily layer instruction (i.e., reduce or induce additional detail – think multiple map overlays) through advancing technology to suit the learning objectives of the class; the ease with which students can replay particular lessons for review, as well as the luxury of viewing the instruction at the student’s pace, as well as multiple times if needed; etc. Perhaps the greatest benefit of such presentation is in its inherent efficiency and effectiveness, and what can emerge from those outputs.

**Problem-Based Learning**

When analyzing the theoretically assigned fifteen to thirty-minute video in the above sample, many educators and curriculum developers will immediately hone in on the short duration and question, or place demands on what “should” fill the additional allocated study hours. Some may see these additional hours as a forum for more lecture, more directed reading, and/or more Socratic discussion. This author sees inherent value in these forms of instruction; however, the author thinks that officer PME institutions should leverage other forms of instruction to a greater degree in the future, specifically problem-based learning.

In an article titled, “Overview of Problem-based Learning: Definitions and Distinctions,” author John Savery defines PBL as “an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem.” Although initially adopted by the medical profession in the late 1960s, an abbreviated review of three of the approach’s general
principles reveals PBL's inherent application to the profession of arms as well as some of the benefits of complementing it with narrated animation:

- "The problem simulations used in problem-based learning must be ill-structured and allow for free inquiry."¹⁵ War is the supreme example of an ill-structured problem and war's practitioners must be able to frame problems and develop and implement solutions at a rate faster than the adversary. The mental processes required for this higher order of thinking are tied to the cognitive view of learning, but repetition as espoused by behaviorists also has a key role in building these capabilities and capacities in the officer corps. Officer PME must present problems to its students that reflect the ill-structured nature of war and must do so with great frequency. The efficiencies gained by narrated animation provides the opportunity, PBL facilitates the execution.

- "Learning should be integrated from a wide range of disciplines or subjects."¹⁶ Throughout the history of military organizations, solutions to problems often emerge from outside traditional disciplines. Solutions may emerge from technology, agriculture, economics, or a plethora of other fields; the point is that Marine officers must 'cast their nets widely'¹⁷ in order to meet the demands of officer-ship and warfare. PME must integrate a wider swath of subject areas as prescribed earlier in this paper in order to expose officers to various fields, which may hold the solution to the problems they will certainly face. Benefitting from more efficient and effective instruction through narrated animation, PME can cover more subject areas and with greater clarity. Problem-based learning gives students the opportunity to apply those newly discovered topics and reinforce understanding of lessons that would otherwise remain on the periphery.
• “Collaboration is essential.”18 Warfare is a team effort and the author can think of no profession that requires greater collaboration than the profession of arms. PBL emphasizes and builds teamwork and associated skills through execution of group work. This group work also has the added benefit of generating ideas that would otherwise go undeveloped; because of the forming process, these ideas also carry a greater degree of “stickiness.” By capitalizing on efficiencies gained through narrated animation, officer PME can spend more time devoted to group work—expanding individual knowledge and understanding, while developing vital collaboration skills.

Two additional characteristics of PBL are worth noting. First, the instructor, often referred to as a “tutor” in PBL, is more of a facilitator of learning than a teacher.19 Although this requirement may initiate a shift in faculty role, this certainly does not eliminate the need for oversight. As Savery notes, “The reality is that learners new to PBL require significant instructional scaffolding to support development of problem-solving skills, self-directed learning skills, and teamwork/collaboration skills to [attain] a level of self-sufficiency where the scaffolds can be removed.”20 Additionally, in this author’s opinion, having a tutor that is both an expert in subject matter as well as an expert at facilitating learning is essential to assisting officer development.

The final characteristic of PBL to mention is possibly the most significant and applicable to the Marine Corps; the characteristic states that the student is responsible for his/her own learning.21 The profession of arms requires a serious undertaking by the Marine officer in both professional study and personal pursuit throughout one’s career and lifetime. The theory and practice of PBL inculcates this trait into its practitioners.
Example of Problem-Based Learning

The following exhibit is a continuation of the example provided earlier and describes a potential integration of PBL with narrated animation... After viewing the brief video on the principles of war, the student-officer begins to prepare for the following day’s deliverable – a five-minute brief applying various principles of war to the historic battle of Yorktown, while comparing and contrasting with those examples presented in the narrated animation. The officer reads a few short recommended readings on the battle of Yorktown and the principles of war, and conducts his own research through Internet searches and a visit to the Gray Research Center. Having collected the appropriate materials and completed his/her research, the officer prepares his/her brief, and rehearses it multiple times. The next day the officer introduces himself/herself to the temporary conference group – consisting of roughly five to eight students. As the brief commences, the student highlights the unity of command enjoyed by Washington, and compares and contrasts Washington’s economy of force mission in vicinity of Clinton’s forces in New York with Napoleon’s usage of economy of force in Italy. The student completes his/her brief and receives immediate feedback from the tutor and contemporaries. Because of the intimate group size, this is not drawn out and since this routine is frequent, the student has improved greatly in his/her presentation skills and enjoys a favorable review with a few noteworthy comments to target for improvement.

Upon completion of the remaining briefs on other battles applying the principles of war, the students are then divided into two groups and assigned a planning problem based on a current event unfolding half way around the world. The tutor provides a brief description of the scenario and then the students are tasked with applying each of the principles of war to the situation. After an hour of practical application, the students brief out their respective applications. At this
time, a new scenario is provided and the drill is executed again. Upon completion, the group huddles and formulates a short list of the big ideas learned from this POI. The tutor provides a couple additional salient comments that the students missed, but most of the key points were demonstrated and captured during application and review. A week later, the big ideas captured are reviewed again and applied to a new scenario. A month later, the student reviews the narrated animation again, and this time, with a greater understanding than before – likely due to “prior knowledge”.

The benefits to this type of instruction are significant. Because of the efficiencies gained through narrated animation, time is available to apply some of the methods depicted above, e.g., routine independent research, repetitive briefing, repetitive group work, repetitive review, examination of current events, and application of big ideas to potential operating environments, etc. This short list is certainly not all encompassing, but provides a general list of some of the advantages available as a result of curriculum efficiencies.

**Obstacles to Employing Narrated Animation and Problem-Based Learning**

The most significant obstacles to employing the complementary concept of narrated animation and problem-based learning are institutional paradigms and complacency. Some will argue – and many will – that the current system has worked in the past and has produced one of the finest officer corps in the world. The author willingly cedes this point, but asks, “Does that mean we should not attempt to do better in the future?” It’s a common human condition to seek comfort, often, unfortunately, to the detriment of the greater good; and changing systems and schemas that have been in place for extensive periods of time is a glacial undertaking. This hurdle will be the hardest to negotiate – but the Marine Corps must accept the challenge.
Some may question the timing of implementing the proposed complementary concept with respect to the economic problems facing our nation. These problems will continue to impact our military, to include our PME programs. As budgets tighten, it will be difficult to advocate for new programs requiring start-up costs; and narrated animation, like most other programs, will require significant start-up and operating fees. The author rebuts the given argument, however, and counters that the current economic situation provides an even greater reason to employ the concept espoused in this paper. Although cliché, the adage, “Gentlemen, we have run out of money; now we have to think,” is quite pertinent and summarizes the situation adequately. To face tomorrow’s challenges with a decreasing military budget, education is more important than ever. The Marine Corps must invest in its PME programs – and must do so wisely through an objective lens.

Still others may question the timing with regard to continuing uncertainty over how the mind works and consider any investment in narrated animation as a gamble. The author again cedes the point that there is no guarantee that the proposed concept aligns exactly with how the mind works – the top researchers in the world still only understand a fraction of that mystery. In fact, the President of the United States, President Barack Obama has recently proposed a project entitled the BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative and requested $100 million dollars to develop new technologies that will “explore how the brain records, processes, uses, stores, and retrieves vast quantities of information, and shed light on the complex links between brain function and behavior.” The uncertainty over how the mind works may never dissolve – and it likely won’t be in our lifetimes; however, the concepts proposed within this paper are founded on sound evidence and reasoning. It would be absurd to
wait for a more definitive understanding of how the mind works before undertaking this paper’s proposal.

**Conclusion**

The enduring nature and dynamic character of war combined with the trajectory of an interactively complex world require a world-class education for those charged with the nation’s defense. As time passes and mandates grow, the “good enough” of the past will no longer meet the threshold of future requirements. At that point in time, it will be too late to compensate for lost opportunities. Therefore, the Marine Corps must act now and invest in the complementary concept of narrated animation and problem-based learning. By exploiting this concept, the future officer corps will obtain the necessary education to better serve our nation.
Endnotes


10 Mayer and Moreno, “Animation,” 87-98.


15 Savery, 13.

16 Savery, 13.

17 Wilhelm, 12.

18 Savery, 13.

19 Savery, 15.

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