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AN EXPLORATION OF TRAINING ALTERNATIVES

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AN EXPLORATION OF TRAINING ALTERNATIVES

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ABSTRACT

In an effort to address the Navy's attempts to incorporate greater distributed learning experiences and achieve gains in learning effectiveness, this project explores training alternatives to the traditional classroom model for accession training. The training alternatives examined include distance learning, learning in groups, learning with virtual reality, and learning by teaching. For each alternative, I discuss the relative strengths and weaknesses as compared to the traditional face-to-face classroom-based training model. To support decision making toward acquisition and incorporation of these alternatives into future instructional design, I recommend on-site assessments to address the efficacy of meeting training objectives, resources used, and the potential impacts on Fleet readiness.

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LIST OF ACRONYMS AND ABBREVIATIONS

CNET	commander, naval education and training
CSFE	center for Seabees and facilities engineering
DL	distance learning
EXCEL	excellence through commitment to education and learning
ID	instructional design
NETC	naval education and training command
RRL	ready relevant learning
VR	virtual reality

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I. INTRODUCTION

Navy training goals are currently aligned with initiatives such as Sailor 2025 through the pillar of Ready, Relevant, Learning (RRL) (Sailor 2025 Overview, 2020). The main goal of RRL is to provide training at the right time and in the right way. To that end, blended training, as a mix of distributed, online, and in-person training, may offer practical alternatives to current classroom training, better facilitating the instructional needs of tomorrow's Navy's war fighting capabilities. In the current training model, all accession training is delivered at the beginning of a Sailor's career, often long before the service member needs to use skills cultivated through that training on the job (Naval Education and Training Command [NETC], n.d., Welcome). In this project, I explore blended training alternatives that would support a continuum of training, closer to the when the respective skills are used on the job. The alternatives to current training, explored here, could potentially contribute to enhanced learning by incorporating ways to interact with the content that could ensure meeting the learning objectives more efficiently and contribute to increased Fleet readiness.

A. AREA OF RESEARCH

In the project, I explore blended learning training alternatives to the traditional Navy classroom accession face-to-face training model. I discuss the advantages and tradeoffs associated with these alternatives and recommend using a cost benefit analysis conceptual framework to measure those advantages and tradeoffs in terms of reaching various learning objectives, improving the experience of the trainee, and balancing resource use. The goal is to provide support for building a roadmap to more efficient Naval education and training that generates and sustains a growth mindset for service members to better support the mission.

B. RESEARCH QUESTIONS

The questions addressed in this project are as follows:

1. What is blended and distance learning education and training in a contemporary context? What are some practical alternatives to the traditional classroom model, and their relevant strengths and weaknesses when compared to traditional training?

2. How should we compare the efficacy of blended and distance learning education and training to the traditional approach? In order to show proof of learning, how can we measure the achieved learning outcomes measured and the resource use?

3. Which training alternatives do we expect to be most effective in producing a growth mindset and generate an overall deeper, longer lasting, and mission-supporting learning for service members?

C. DISCUSSION

In one of its most recent efforts known as Ready, Relevant, Learning, the Navy is looking to develop modernized, efficient, and adaptable training that impacts Fleet readiness (NETC, n.d., Welcome). In doing so, the Navy could benefit from examining training alternatives namely, blended and distance learning options, in order to improve and streamline its ability to train and assess a variety of skills and abilities. Evidence suggests that incorporating various forms of learning into the classroom environment could achieve significant gains to learning effectiveness (Straus et al., 2013). The Straus et al. (2013) case study on blended training used a distance learning format for U.S. Army leaders and suggested that Instructional Design (ID) is key to effective learning, not necessarily the location in which the training takes place.

In this project, I examine the advantages and tradeoffs related to blended and distance learning (DL) training environments as alternatives to the current classroom training as it relates to meeting career training requirements. The goal is to generate a better understanding of what constitutes a learning environment that is conducive to producing a growth mindset for the training participants and generate an overall deeper, longer lasting and missions supporting learning for service members that benefits the Navy.

D. SCOPE OF THE PROJECT

The scope of the project focuses on initial Naval ratings training, which are typically offered in a face-to-face classroom instruction in addition to hands-on shop modality. In this project, I examine and compare blended and DL training alternatives to current, traditional training, reviewing their advantages and disadvantages in terms of adaptive training capabilities, attempts to improve learning outcomes to better produce a growth mindset within the students, and resource use (high or low touch instructor modalities). This project aims to contribute to defining blended learning educational training alternatives, where blended training can have a mix of distance learning or distributed learning blended along with different approaches of in-person training. This is done in today's context of a Navy expanding its efforts to incorporate greater distributed learning experiences and to achieve gains in learning effectiveness and skill acquisition.

E. APPROACH

After establishing context with information on training within the Navy, I conduct a literature review of relevant prior published studies and evidence-based reports of what constitutes blended and DL training and education and on their efficacy in the private sector, academia, and military. Based on the findings from the literature review, I define training alternatives for Navy ratings. Further, I propose a conceptual cost-effectiveness framework to discuss diverse ways to measure learning outcomes as well as the tradeoffs that are associated with the different training modalities compared with the status quo. Then, I provide recommendations for a roadmap to evaluate training alternatives that may be the most effective in producing a growth mindset and generate an overall deeper, longer lasting and mission supporting learning within service members.

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II. BACKGROUND

A. CURRENT NAVY TRAINING

The Navy has a variety of different schools and trainings offered, from basic training and Navy indoctrination to courses that are, quite literally, rocket science. For each individual rating in the Navy, from Aviation Boatswain's Mates to Yeoman, there are typically follow-on trainings better known as "A" and "C" schools.

"A" school is typically a more basic-level training where Sailors are taught the fundamentals of their rating. This type of training typically takes place right after basic training, or as close as possible, depending on schoolhouse availabilities and space. Later on in a career path, the service member returns to the schoolhouse and goes to what is better known as "C" school. This is a more advanced version of the aforementioned "A" school curriculum. "C" school operates under the assumption that the service member has a few years of experience and lessons learned to bring to the table and thus, allows for the training to delve deeper into particular subjects, depending on the rating.

Students often spend hours of their time in the standard face-to-face classroom modality. They observe lectures based on PowerPoint slides and then take an exam. Following this, they report back to their commands and carry on with their careers. Some of these training programs may be considered a requirement or a "check in the block" for the service member to advance in their career and earn higher ranks, depending on the rating. Once a Sailor completes the requisite course and returns to their command, the benefit of this schoolhouse training is often not fully realized and the level of knowledge they are expected to have upon return is not always evident. For many years, the Navy has looked to revitalize its training and actively sought out ways to make training more efficient. In order to achieve a deeper, longer-lasting learning that can be built upon from previous trainings and carry forward into future trainings, the Navy is looking to turn training into a dynamic and more practical experience, rather than maintaining a static schoolhouse circumstance.

B. WHAT IS BLENDED LEARNING AND TRAINING?

The term ‘blended learning’ has various iterations. The word ‘blended’ means to mix a substance with another so that they combine. As a verb it means to combine or associate so that the separate constituents cannot be distinguished (Merriam-Webster, 1963).

> There is no generally accepted definition of blended learning. There are many forms of blended learning, but a generally accepted taxonomy does not exist. One school’s blended is another school’s hybrid, or another school’s mixed-mode. Without administrative systems in place for identifying blended learning courses and without a widely accepted definition or taxonomy, collecting data on blended learning becomes difficult. (Picciano, 2019)

In education, people most often associate blended learning with implementing some form of technology into the classroom. However, as stated above, this is not always the case. As long as there is a blend of two or more educational approaches in order to produce a different outcome this can be defined as blended learning. Introducing forms of blended learning and training into the classroom environment can lead to better understandings, evaluations, and assessments of students undergoing the training. (Picciano, 2019). Blended learning and training should include approaches used to enhance learning and allow for continued growth outside of the classroom as the students gain more real-world experience. Research on blended learning considers, in most cases, a few factors that appear to stand out above the rest in defining a blended learning environment. They are as follows:

- Instructor presence: Having the instructor present to guide training participants ensuring they reach the courses terminal objectives.
- Interactions between trainee participants: If in groups, ensure no one person dominates the group or shoulders the majority of the workload. If acting in the role of student teacher, ensure required topics and objectives are adequately covered.

- Course content: The content covered must meet the course terminal objectives and engage the course participants at their current knowledge level.

- Designed connections between activities: The training participants need to be able to make the connection between what is taught in the classroom to what is done in the workshop.

These factors are not the end all be all to blended learning, in fact, far from it as no one definition currently prevails. They do, however, offer a good starting point as we begin to look at defining the alternative blended learning and training methods compared to the current training model (Nortvig et al., 2018).

C. WHAT IS DISTANCE LEARNING AND TRAINING?

Distance learning can be carried out primarily in two different ways:

- Completely online - carried out synchronously, asynchronously, or a mix of synchronously and asynchronously.

- Combined, using blended learning techniques - online in a synchronous or asynchronous format and in class with face-to-face instruction

Synchronous training is instructor led training that occurs in real time and is used in conjunction with a learning management system. It is designed to mimic many of the experiences that trainees or students would encounter in a face-to-face classroom. The trainees are able to access lectures and have discussions in a classroom like setting (Gardiner, 2020). As this type of training most closely mimics standard face-to-face instruction, it is particularly effective for student engagement. Instructors are there to facilitate learning and classroom collaboration and provide guidance to the training participants, as necessary (Gardiner, 2020).

Asynchronous training is similar to synchronous training, in that, trainees can access lectures and engage in discussion via learning management system discussion boards, which are typically part of a learning management system that serves as the online

host for instruction as well as a repository for syllabi, readings, and instructional materials. The key difference between synchronous and asynchronous instruction is that the latter relies on individual participants to engage with the material at their own pace, often (but not always) with a particular schedule for the learning to be accomplished. That is, there is no need for the participants to be online at the same time (Gardiner, 2020). This method proves viable when participants cannot or choose not to keep to a specific schedule, such as, if they are still experiencing a normal workday outside of the classroom environment. This method allows trainees to access materials and assignments at their own pace introducing more flexibility within the learning environment (Gardiner, 2020)

It is important to recognize the differences between DL methods and traditional training in order to ensure appropriate measures are taken to exploit DL training strengths and bolster areas where weaknesses with this alternative may arise. Instructors must acknowledge this and understand that something that may have worked in the classroom face-to-face may not work in the DL environment. In fact, it might have significant negative impacts on training and education, in turn, undermining the potential learning to be accomplished (Wisher, Sabol, Moses, 2002). One of the major differences to this method of learning is that it requires more of the student. This is due to the instructor's inability to assess a participant's comprehension of the material presented in each classroom session. Thus, it is crucial for the student to play an active role in seeking out the information they need (Wisher, Sabol, Moses, 2002).

There are more paths to providing DL today than ever before due to rapid advances in technology-based systems. Given the widespread distribution of Sailors across the globe, providing a way for Sailors to access DL opportunities becomes a highly attractive option as we explore different workable training alternatives.

Current Navy approaches to ID might not adequately address the development of the growth mindset or implementation of adaptive training techniques within the classroom. While the Navy has primarily operated using a lecture style course format for many years, it is plausible that using blended learning or DL as feasible alternatives could yield better results for both learning and cost savings within the long term and is something that should be researched further. Adopting an alternative training model might provide a

balanced solution for the current classroom to meet the needs of the Navy, produce a growth mindset within their students, and facilitate the integration of Navy training into future learning continuum concepts.

D. NAVY'S EFFORTS ON REVOLUTIONIZING TRAINING

In recent years, the Navy has begun to overhaul its training and learning experiences. One recent initiative is the Education for Seapower Strategy, which is based on three pillars: "Creating a Continuum of Learning for the Entire force; Integrating Education into our Talent Management Frameworks; and Strengthening and Investing in our Naval University System." In accomplishing those three pillars the Navy "seeks to advance the intellectual capability of our naval forces" (Department of the Navy, 2020). Likewise, almost twenty years ago, the Navy introduced a system known as the Task Force for Excellence through Commitment to Education and Learning (EXCEL). Though this program no longer exists, it was the foundation for much of what the Navy is still trying to carry out in terms of integrating training and technology, to improve the training experience and produce better learning outcomes. This program took Commander, Naval Educations and Training (CNET) and restructured it to become the Naval Education and Training Command (NETC) we know today (Hitchcock, 2004).

EXCEL was a completely new concept to the Navy at the time of its introduction, using DL and self-paced iterations of teaching and learning. It revolutionized how training and education was viewed and implemented. These changes were all designed to make training more easily integrated with the rapidly growing technology of the time (Hitchcock, 2004). Although this program is no longer extant, some of the thoughts and ambitions have been revitalized by NETC. With better and more easily integrated technology, their goal of introducing alternatives to the current training environment within the classroom can be achieved much more efficiently.

Training for a rating within the Navy is a multistep process; it happens in sequential "components" or portions. Therefore, it is important to be able to have a deeper, longer lasting comprehension and to be able to build upon previous training. Today, NETC refers to one of their newer attempts at restructuring Navy training as Ready Relevant Learning

(RRL). “RRL is a long-term investment in improving individual Sailor performance and enhancing Fleet readiness with three major components that address the **WHEN**, **HOW** and **WHERE** we train” (NETC, n.d., Welcome). See Figure 1.

Figure 1. Ready Relevant Learning. Source: NETC (n.d.).

This plan attempts to change the current way the Navy thinks about training: rather than a classroom environment filled with hours of PowerPoint instruction, it reframes training as something that happens throughout a Sailor’s career. The idea being that training is not just a “one and done” approach but rather an ongoing, ever-changing, ever-developing training environment whether in the classroom or on the job (NETC, n.d., 2020, Welcome). “RRL is a tremendous modernization effort, requiring collaboration across multiple stakeholders throughout the Navy, all in the interest of meeting future fleet requirements. At its core, RRL is about creating more proficient and technically capable Sailors as they head to operational fleet units” (NETC, n.d., Welcome).

III. LITERATURE REVIEW

The aim of this literature review is to present some alternatives that constitute distance and blended learning and training opportunities, as evidenced by previous studies.

A. DISTANCE LEARNING: EVIDENCE FROM MILITARY TRAINING AND HIGHER EDUCATION

A study done by Wisher, Sabol, and Moses (2002) looked at DL from the military perspective. It examined the potential benefits and tradeoffs to using DL in order to provide better training opportunities to service members, improve the quality of the training, provide more access to training, and reduce the amount of time service members were away from their commands. One of the main goals of the study was to assess, the attitudes of the service members toward DL (Wisher et al., 2002).

This study compared DL to face-to-face instruction, with learning outcomes from DL on par with face-to-face instruction, and in some cases, DL seemed to have better results in producing more positive learning outcomes. Although this was the case when compared to the face-to-face method, DL received lower ratings in course satisfaction from participants and, surprisingly, course completion rates dropped (Wisher et al., 2002). This could be because participants who were more familiar with technology and the information presented performed better than those who were not as familiar with technology or the information presented and may not have been able to keep up with this method of instruction. This suggests, like the Strauss et al. (2013) study, that ID is more important that the location in which the instruction takes place.

Mahlangu (2018) looked at the opportunities and challenges of distance learning in higher education. The challenges result from continual changing perceptions of what learning should be and new learning opportunities that arise from more modern technology. To minimize these challenges, it is recommended that the use of technology should be made more readily available and that infrastructures should be updated to accommodate more modern technology. It is noted that both instructors and training participants should

have the requisite skills necessary to use the technology in order to understand and properly utilize the method in which the DL information is conveyed (Mahlangu, 2018).

Technology is constantly changing, and as a result it can sometimes be difficult for DL to keep pace. It is important to pinpoint best practices that will promote learning and are adaptable to the rapid, ever changing technological environment. Mahlangu (2018) lays out six principles that could serve as guidelines for best practices. When implemented, they are designed to withstand the test of time even when new technological advances take place that may alter the method in which DL takes place. They are as follows:

- Encourage student-faculty contact both during class and outside of class sessions
- Encourage collaboration amongst students
- Give prompt feedback
- Emphasize time required to accomplish assigned tasks
- Clearly communicate course expectations
- Respect diverse opinions and learning aptitudes

Another, more recent, study by Yarovaya, Yarovaya, and Bogatskaya (2020) examined DL advantages and disadvantages during the COVID-19 pandemic. They discuss the importance of appropriately delivering DL training, and some problems with DL with possible solutions to those problems drawn within the current dynamic learning environment. They note that while DL should be considered a type of general, continuing education, it is also important to not treat DL the same as face-to-face instruction. The interactions between training participants and instructors will be different and in order to have success in the DL environment the way the material is presented, likewise, must be different and structured appropriately (Yarovaya et al., 2020). The researchers further discuss different programs and learning management systems used and their benefits, positive and negative characteristics associated with the DL classroom, and features of DL they found to be the most beneficial.

B. BLENDED LEARNING: EVIDENCE FROM MILITARY TRAINING

The 2013 RAND study by Straus et al., presents an analysis of the efficacy of a blended training approach within an Army officer training program. The course was offered either in residence or via distance learning which allowed students to attend the course from anywhere in the world. Both courses occurred simultaneously and were intended to be identical to one another as best as possible and practical. Both the in residence and online courses utilized a collaborative approach to instruct the class and assigned personnel into groups. The goal of the study was to test whether the distance learning alternative presented evidence of increased effectiveness within the Army officer course, to identify best practices, and use these findings to improve Army classroom training. To help measure the efficacy of the proposed blended training, exit surveys to measure student satisfaction and perception of the course's contribution to their learning were administered to students in the traditional in class model and in the blended distributed learning program. The goal was to examine the efficacy of this type of blended model.

The analysis approach presented in the RAND study included an examination of the relation between three key factors: inputs, defined as all resources and factors that contribute to the learning experience; learning process, seen as ways through which people learn; and outcomes, measured as learning effectiveness and student satisfaction. The authors found that "student motivation for taking the course was strongly associated with satisfaction and perceived learning effectiveness" (Straus et al., 2013). Those who took the class for personal and professional development of their own accord reported a greater learning experience than those who were taking the course out of mandate. The students' rating of their overall learning during the course was highly predicated by their interactions with peers and instructors throughout the duration of the course. They rated collaboration with both, the instructors and their peers, on par with the learning outcomes (Straus et al., 2013). No matter how the class was offered, learning outcomes were the same. It was not a matter of whether they were in a classroom or taking the class via the standard in-class method, instead the key was how well collaboration with their peers and instructors was carried out.

This study's findings provide valuable insight into features of alternative training programs that emphasize activities involving peer collaboration and the high-touch, instructor guided, activities in the classroom, to meet learning objectives more efficiently and show that ID was more important than the location in which the instruction takes place.

C. BLENDED LEARNING: LEARNING SCIENCE BEST PRACTICES

As we begin to explore alternatives that emerge from the learning science studied, it is important to point out that learning programs are better and more effective when they are seemingly more natural and compatible with human learning styles (Straus et al., 2013).

The reference text *Seven Ways of Learning* by Davis and Arend (2013) explores findings on the variety of ways in which we, as humans, learn, and evidence on the effectiveness of various approaches that facilitate learning. Given that Navy training provides education and training to adult learners, three blended learning approaches to instruction emerge from the literature as practical alternatives that might be worth exploring—group learning, virtual reality learning, and experiential learning.

Group work provides an effective means for teaching and learning while also building upon collaborative skills (Davis and Arend, 2013). This form of learning has received early support. Collins and Guetzkow (1964) show that groups consistently perform better than individuals when synergy is achieved. Davis and Arend (2013) point out it is important for the groups to be appropriately sized for the task at hand, and in most cases smaller group sizes yield more desirable results. In this type of learning, the instructor is key to ensuring groups are going in the right direction and can provide re-direction and guidance to aid and ensure the students meet the learning objectives more efficiently as opposed to the learning effort of the individual student's alone (Davis and Arend, 2013).

Davis and Arend (2013) present the case for the virtual reality (VR) learning experience and discuss the benefits derived from a training in a risk-free environment. In this type of environment students can pause and ask clarifying questions, while imitating the real-life pressures they may find themselves in at some point on their job assignments. VR training can be used for almost any kind of training scenario and can be adapted and reset as many times as necessary. It can also be recorded and replayed for trainees to review

and discuss their performance with instructors to reinforce learning, specifically focusing on transfer—the student's ability to take learning in one context and apply it to a different situation.

Experiential learning is another example of learning that may lend itself well to support the Navy throughout current and future education and training initiatives. Experiential learning refers to the interaction between an individual and the environment, with the experience itself being a continuous flow of knowledge from previous experience and built upon with novel experiences in order to further increase learning and knowledge. The key to this approach is the intentional effort to establish and facilitate a reflection process, because often the learning may not happen automatically (Davis and Arend, 2013). In order to answer the question 'how much experience is needed for some or all of the learning outcomes to occur', the concepts of intensity, frequency, and duration of learning are used. Intensity refers to how deep the experience is and to whether significant responsibilities were involved. Frequency refers to how often the student engages in the activity and whether they are merely an observer or an active participant. Duration refers to how long the experience lasts for the students (Davis and Arend, 2013). They found that these three factors and how they interact with one another was key in order to produce a better overall learning experience and ensure learning outcomes were being achieved. These factors can be essential building blocks for alternate, blended, training environments.

Another reference text, *ABCs of How We Learn* (Schwartz et al., 2016) presents evidence on the different ways we learn, how to teach to them, and how to achieve long lasting, effective learning. This text references multiple studies to discuss different learning approaches and define when is the appropriate time to use the different learning methods. The three primary methods discussed in this study are Listening, Participation, and Teaching.

Listening can be compared to what Davis and Arend referred to as learning in groups or teams. The key here is that listening to someone else's perspective concerning different topics can help crucial learning to take place because it provides learners with a novel way to consider issues and topics (Schwartz et al., 2016). Using collaboration, as not

just a tool for learning, but rather the medium in which learning takes place, leads to better cooperation outside of the classroom as well (Gillies, 2002).

Participation may initially be viewed as a further build upon collaboration. However, on a deeper look, it becomes clear that participation, while it has some aspects of collaboration, is a different concept that can be used and applied to many different learning environments. In a classroom without participation, it is difficult to produce any deep or meaningful learning. In order for one to learn through participation, a broader context needs to be created that reveals the ultimate meaning and goals of the curriculum. The desired goal of participatory learning is that, as the class progresses, learners can participate and contribute to the class discussions and engage with their peers with minimal oversight or support from the instructor (Schwartz et al., 2016).

Learning by teaching is another approach examined during review of best practices, and it can pair well with experiential learning. It is important to note, that while they sound similar in function, they are not the same in pedagogical nature. Where experiential learning is the learning that takes place through experience, learning by teaching examines taking that concept a step further by using the experiences that have been absorbed and to teach others about said experiences. Better put, learning by teaching occurs when people accept the responsibility of teaching others and further develop their own understanding of the subject matter in order to teach well (Schwartz et al., 2016).

The authors present learning by teaching as having three phases that one must go through in order to fully learn from teaching. The phases are as follows: preparing, teaching, and observing, as shown in Figure 2.

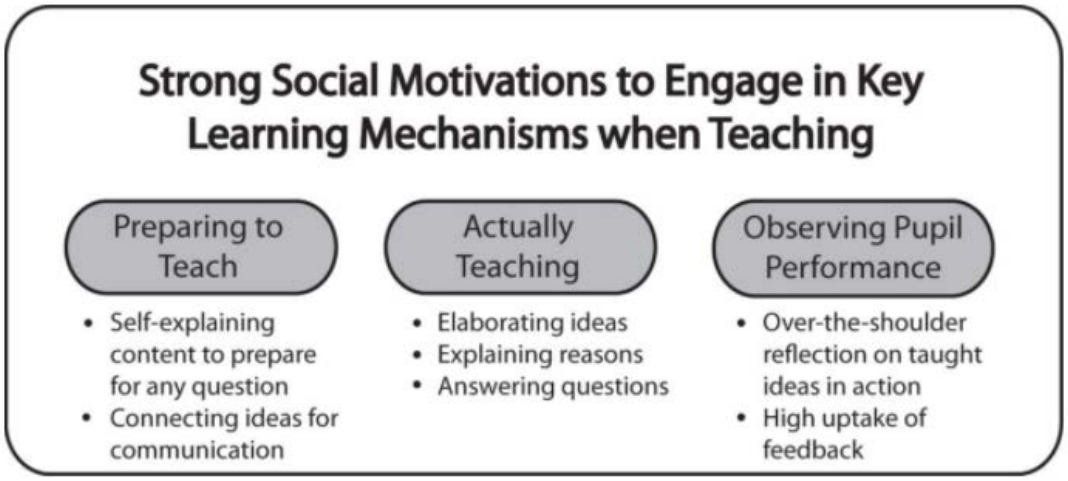

Figure 2. Three Phases of Teaching. Source: Schwartz et al. (2016).

Preparation is seen to better acquaint oneself with the prerequisite knowledge to teach someone else; teaching is that act of conveying that knowledge and in doing so meaningfully connecting ideas; and observing is the act of allowing the teacher to see their pupils use what they were taught in either an application setting or some other form of assessment. The last step is often and mistakenly left out of the learning through teaching process. The instructor never gets to see their students perform, thus, never knows if their teaching skills were adequate to the task. Marshall and Meltzoff (2014) recognized that children under the age of two showed higher levels of brain activity when they saw other people imitate their actions. This indicated that the feedback we receive from observing others is likely deemed valuable even at young age. Similarly, Okita and Schwartz (2013) demonstrated that individuals in the role of the teacher learned more when they were able to observe their students answer questions than when they themselves were asked.

D. COST EFFECTIVENESS OF NAVY TRAINING AND EDUCATION

An analysis of personalized learning systems for Navy training and education settings was conducted by Robbins in 2016. This study looked broadly at how the Department of the Navy uses a “one size fits all” training approach throughout most of its schoolhouses and suggested using cost benefit analysis to examine the benefits of

alternative approaches to training in the current status quo. The Robbins study specifically examined the resource use associated with training. Estimating the cost structure of training, the study concluded that “long-run average total costs for each were found to be the most sensitive to delivery of instruction, not content development or school infrastructure” (Robbins, 2016).

Based on Robbins (2016), to assess the learning efficacy of these training alternatives, a cost effectiveness or cost benefit analysis can provide decision support by highlighting the relative strengths and weaknesses of the training alternatives in terms of achieving learning outcomes, and resources use. In terms of estimated resource use, this would include more than just the initial financial tradeoffs and advantages of changing the current status quo of the schoolhouse, and instead should involve a deeper examination into the long-term benefits of choosing a training alternative. An approach to evaluating alternative training environments such as this would be beneficial not only for examining costs but also overall training effectiveness which would accomplish the goal of ready relevant learning by utilizing the time at the schoolhouse more effectively. This would enable Sailors to apply the knowledge they received upon reentering the Fleet without revisiting the schoolhouse due to perceived insufficient training under pedagogy of the current system.

In the literature, there are many ways to provide alternative learning opportunities and to measure their effectiveness. In the following chapter, I discuss some of those training alternatives and compare their effectiveness to the current classroom model.

IV. LEARNING ALTERNATIVES ANALYSIS

Here I discuss alternatives based on the best practices discussed in the literature review. Further, I expound upon the benefits and tradeoffs of using each of these alternatives in a training setting. The alternatives considered here to achieve a better learning outcome with lasting results that will carry forward with the student and have future real-life practical applications are as follows:

- Distance Learning
- Groups/Teams Training
- Virtual Reality Learning Opportunities
- Experiential Learning

Effective learning environments provide a trajectory for continued learning and deeper thought and involvement: for a student to understand why they are working on something, the student should be given an end goal and incentive in order to help lead them to success in achieving the goal that has been set forth by the instructors (Schwartz et al., 2016). Below are a few alternative approaches to learning as compared to the traditional classroom environment that might be most effective in meeting learning objectives to create a deeper, longer lasting learning.

A. DISTANCE LEARNING

Distance learning could be an applicable alternative to the current face-to-face classroom method. DL has various forms and ways in which it can take shape. They are as follows:

Synchronous Distance Learning—Learning that takes place completely online with an instructor present and guiding the training.

Asynchronous Distance Learning—Learning that takes place completely online that is self-paced with no instructor present to facilitate learning.

Blended Distance Learning—Learning that uses either Synchronous or Asynchronous forms of DL and combines them with face-to-face instruction.

One of the most important decisions an instructor can take is to determine which method of DL should be utilized to convey the training material. Effective DL teaching methods most likely fall in line with blended DL. However, no matter in which form an instructor chooses to convey the material, the key is to recognize the strengths and weaknesses associated with each and leverage them to their advantage (Gardiner, 2020). When dealing with DL environments, one advantage is that instructors can upload lectures for trainees to watch prior to course instruction. This can allow for a more in-depth conversation amounts students leading to better collaboration and the instructor can then act in more of a facilitator role (Mahlangu, 2018).

DL can provide a way to overcome barriers to training such as geographical distance, family responsibilities, and work hours in order to attend their class. This type of learning is an attractive option because trainees can log and access their course work from anywhere and anytime to do their work, re-watch lectures, and provide their inputs to class discussions (Gendreau, 1999). As technology advances so do the jobs that utilize it. This has opened the doors for providing new methods of instruction through DL (Wisher et al., 2002).

It is not enough for an instructor to simply re-use the lesson plans from the classroom when designing DL courses. Wisher, Sabol, and Moses (2002) identify characteristics of adult learners that need to be taken into account when designing DL programs:

- Adults like to be given a reason for why they need to know what is being taught.
- Adults like to have a role in the learning process, so offering choices of what and how to learn can be of value.

- Adults bring a great deal of experience with them to the learning environment, and instructors should capitalize on this by trying to relate the information being taught to what the trainees already know.
- The application of knowledge should be stressed by emphasizing the immediate, real-world value of what is being taught.
- Motivation is built through success, so strategies should be employed that heighten the probability that students will be able to conquer the material and see its immediate value.

Organization of DL materials allows for a more streamlined DL environment for the training participants. Another way to ensure trainees are getting the most benefit from DL and avoiding any confusion is to ensure detailed instructions are always associated with any training materials. In a survey of training participants during the COVID-19 pandemic, Yarovaya, Yarovaya, and Bogatskay (2020) most commonly received these positive and negative characteristics of DL from the trainee's perspective:

Positive Characteristics of DL:

- Ability to learn from the comfort of your home;
- No class absences as a result of student illness;
- Easy access to the content, to including instructor lectures;
- No need to get up early;
- Ability to type, rather than hand-write homework without adding distractions for the instructor.

Negative Characteristics of DL:

- A large amount of independent work;
- Difficulties with understanding the material; due to the instructor's inability to assess the classes comprehension of the material;

- Lack of contact with the teacher and the group;
- The need to spend a lot of time in front of a computer;
- Lack of training or familiarity with technology used to accomplish the courses by either the instructors or the training participants.

In an effort to address these characteristics and move to a better, more effective DL environment the authors go on to list four features to help ensure success: flexibility, modularity, quality control, and specialized training tools. In DL trainees have the flexibility to work when and wherever they want. They can spend as much time reviewing materials as they want in order to show mastery of a particular subject or idea being taught in a class. The course should offer a holistic view of the training material, and the work should be divided into modules allowing for students to master one module before moving on to the next. The quality control system should be systematic and based on both operational feedback from pervious courses. Prompt access to the instructor at any time convenient for the trainee, for example, during testing periods is needed as well. There are a variety of methods by which the instructor interacts with students in the DL process and a variety of training tools can be used to achieve DL training objectives such as "demonstration, illustration, explanation, story, conversation, exercise, problem solving, memorizing educational material, writing, and repetition" (Yarovaya et al., 2020).

A factor that makes training service members challenging concerns the variety of areas they are located throughout the globe. Because of this DL offers an attractive solution. Not only is this a potential solution with costs savings, but it is also appealing because it can be perceived as more efficient, keeping Sailor's at their day job and allowing them to remain home instead of traveling for a school. These factors may lead to higher job satisfaction, which in turn, leads to higher reenlistment rates (Wisher et al., 2002).

However, DL is not without its risks and potential disadvantages. Depending on the delivery, it can incur additional costs such as converting face-to-face instruction for online delivery, updating installation infrastructure to support advanced technology, and training for faculty. Making training more readily available also puts more responsibility on the

trainee to ensure they are learning the material offered or asking for help when they need it (Wisher et al., 2002). Typically, most training participants do not have an issue transitioning to DL environments, but there are always going to be students who have a harder time with this type of training. In order to level out the learning environment, choosing programs that function most simply are often the better option (Wisher et al., 2002).

Mahlangu (2018) lists a few issues found to have a negative impact on DL:

> Quality assurance plans are often too broad and not favorable to distance-learning settings; as there is no one common institutional approach to present DL, instructors have the freedom to generate lesson plans and present material in ways that may seem practical to them, but not be practical for the DL environment. There are also instances where instructors tend to have a "passive resistance" to applying DL best practices within their classrooms and attempt to carry out instruction as would be normal and practical within the face-to-face classroom. This is also in part due to the lack in provision of standardized best practices training.

DL requires instructors and trainees alike to have a transformation in thinking and conveying information in this dynamic environment. Many believe that DL is missing what they consider to be a key factor in learning, social interaction via face-to-face instruction that would typically take place in other training alternatives. (Gendreau, 1999). Although learning outcomes from DL were seen to be on par with face-to-face instruction, DL still received lower ratings in course satisfaction from participants (Wisher et al., 2002).

B. LEARNING IN GROUPS

Groups and teams instruction and learning can be associated with collaborative learning. Groups can provide an effective means of exploring alternative opinions and perspectives and are useful when collaboration is needed (Davis & Arend, 2013). In this case, a group or team dynamic may prove useful within the classroom environment. In the field, those students who participate in programs using this method will likely be working with others who have also experienced this approach. This is beneficial because, in most cases, groups are seen to outperform individuals. There may be a rare case in which groups

underperform the average individual working alone; however, as shown in Figure 3, most groups perform better than the average solo individual. Based on the contributing factors in the figure, if groups successfully collaborate, they will outperform even the best individual working alone.

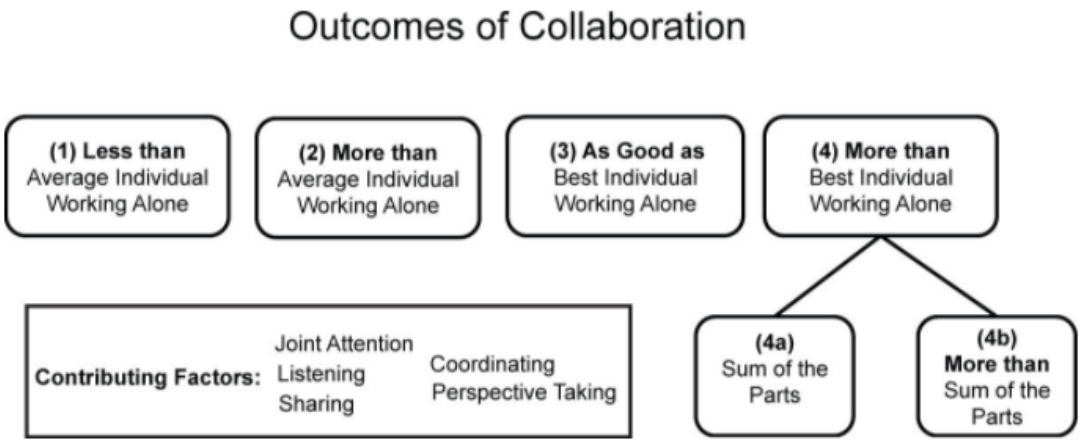

Figure 3. Outcomes of Collaboration. Source: Schwartz et al. (2016).

Groups and teams training is best used when the strengths of the groups are used to explore multiple options while also building teamwork and collaborative skills. Increasing cohesiveness is seen as a good thing as this also increases productivity; however, there are some instances in which productivity may begin to decrease. Ellis and Fisher (1994) state that "when group members become too fond of each other and thus begin to socialize more than stay on task, group productivity will begin to decrease."

Johnson and Johnson (1987) also note that healthy conflict among group members can be beneficial and enhance learning. When forming groups conflict is inevitable, and in most cases is resolved quickly so that the group can continue to function and produce results. If not resolved, however, conflict can prove detrimental to a group's performance and undermine the learning that was supposed to take place (Tuckman, 1965). For groups and teams to be successful, they need to have a high level of collaboration amongst their members. The following is a list of characteristics of high-performance groups and teams:

- Clear and elevating goal: Have a clear goal defined that is intended to enhance learning outcomes.
- Results-driven structure: Have guidelines laid out for the group to produce results and succeed.
- Competent members: Each member is assumed to have a certain level of knowledge prior to being placed in groups.
- Unified commitment: Everyone in the group must be committed to achieving a successful outcome.
- External support and recognition through principled leadership: Having guidance and outside support from instructors helps to keep the groups on task and achieve the terminal objectives of the class (Davis and Arend, 2013).

These characteristics will have a different meaning depending on the tasks.

In order to support a more collaborative learning environment, the following examples would be good guideposts and guidelines to better keep the groups on track. Schwartz et al. (2016) presents them as follows:

- Pay attention to your fellow group members and what information they need. The group will have more success when everyone is efficiently working together and sharing information,
- No one is done until everyone is done. This is to ensure that even the "weakest link" of the group is helped once others begin to finish their tasks and to prevent the group from placing the main workload on one to two people alone ensuring everyone arrives to the finish line at the same time.,

- Explain processes for other group members. If one group member finishes a task first, explaining how they came to finish their task could prove useful to the rest of the group still working on their tasks.
- Do not do it for them. This is similar to the ‘no one is done until everyone is done’ concept. It prevents faster group members from just doing the work themselves and instead turns them into coaches helping to guide their fellow group members to the finish line.
- Get group consensus. This is done at any point throughout the group’s assignment. It is to make sure everyone is on the same page and concurs with the way ahead on particular tasks.
- Keep track on other members’ thoughts and opinions on how the work is progressing. This is typically done by the groups “leader” and is done to facilitate a better, more efficient group environment, keeping the majority happy and on task.
- Have ideas and have reasons as to why those ideas could be applicable. Throughout the group’s duration, people will have different ideas on how to accomplish different tasks, this is normal. Ensure that those ideas can be described, understood, and are applicable to the task at hand.
- Have a plan and realize that the plan may not always go the way you want it to at first.

One way to help groups follow these guidelines is to allow group members to brainstorm separately first and then join into groups after a period of time. Doing so will allow students to form their own ideas and opinions on the matter and prevent typical group pitfalls such as groupthink or social loafing from occurring (Schwartz et al., 2016).

As found in Gillies (2002), benefits to collaborative learning can be long-lasting, even after the student has left the classroom environment. Collaborative learning can lead to better cooperation in future scenarios in the work environment. This is because they

were already immersed in a collaborative environment and they saw successful results, meaning they are now more open to cooperating with others in the future to problem solve and come to a solution rather than working alone (Schwartz et al., 2016). The key here being that the collaborative environment in which they learned was a success. Otherwise, if the collaborative environment in which they took part in was not one conducive to collaboration or learning, they will be less likely to cooperate in future scenarios because of the failures they experienced with collaboration in the past.

Risks associated with this type of learning environment are that group work and collaboration is not always the right answer. Effectiveness of this learning environment component depends on several factors including but not limited to group dynamics and size, scope of the work, and the type of task that is to be completed. Depending on how groups are formed and how long they are maintained, they may have to go through the typical stages of group development (Tuckman, 1965) which can take time depending on the task given. Even still once a group has gotten to the performing stages there may be a limited time left to completed the project or task assigned which could put undue pressures on the groups and not allow them to come to a conclusion within the prescribed time.

The size of the group also comes into play. In most cases, having a smaller group size yields better results. For example, you do not need to assign six or more people to the task of changing a lightbulb when two people would suffice. Any more people at that point become distracting to the group dynamic and what goals are trying to be accomplished (Davis & Arend, 2013). In their work, *Collaborative Learning Techniques,* Barkley, Cross, and Major (2004) found that groups should be small enough for everyone to fully participate but large enough to include a diversity of opinions, viewpoints, and availability of resources to complete the task.

Depending on the type of work or the goal set forth by the instructor a group may not need to even be utilized. There are certain tasks and information, particularly process oriented tasks that students need to learn and be competent in every portion of the exercise. In this case, a group may not be the best alternative for producing a successful learning environment (Davis and Arend 2013).

C. LEARNING WITH VIRTUAL REALITY

Another alternative to groups and teams is learning opportunities that are available when utilizing technology in such a way to include Virtual Reality (VR) into the learning process. Certain skills need to be learned and practiced outside the actual setting in which they will be performed. In some cases, making mistakes, whether big or small, can be costly or even life threatening. VR makes it possible to simulate equipment malfunctions or any variety of scenarios all without causing damage to either the participants or any real-world equipment (Lele, 2011).

Through the use of VR, students can display systemic thinking and procedural logic as they develop their understanding of how multiple variables work together in complex systems or machinery. VR allows the students to connect these dots on screen before they've even seen these possible scenarios. They may be introduced to scenarios they would not be able to normally experience within the bounds of the classroom environment. Being able to withstand a simulated system malfunction is now something the classroom can incorporate instead of just spending time on during the lecture portion of class.

The basic requirement of VR learning is to ensure every instrument functions exactly like its real-world counterpart and then select those elements of a real situation that occur most frequently and are the most important to know based on the terminal objectives of the class in order to produce the most beneficial learning outcomes (Lele, 2011). The primary goal in using VR is to bridge the gap between the real-world and the classroom as much as possible. There are clear advantages to this, a few being that using VR bridges that gap safely and often inexpensively. In this respect, learning that is accomplished when using VR is far superior to just telling students what they are supposed to do when a crisis arises.

Not only can you run multiple scenarios to help students better acclimate to crisis situations, but they can be repeated and reviewed as individual scenarios that allow the student and the instructor to review what happened together in order to produce and provide a more effective learning scenario. The instructor can use the learning outcomes and terminal objectives to ensure students are hitting the mark, and if they are not the instructor

can use that information to help target specific shortcomings or areas that students may need additional work on (Davis and Arend, 2013). Further, this method saves time and money as setting up these simulations can be done in mere minutes and requires no additional consumable resources to use making this not only an efficient option, but over the course of time, a more inexpensive option as well (Lele, 2011).

The key element when using VR is to ensure there is a clear purpose defined for the students. Instructors should be prepared to facilitate and demonstrate the use of the VR system to the students to ensure time is not lost on learning how to use the system itself. Stopping or pausing simulations to correct egregious errors is vital, meaning instructor attentiveness and feedback is key. Ultimately the goal is to get through each simulation and debrief and breakdown the experience with the students and discuss the essential learning points (Davis and Arend, 2013).

Risks associated with VR learning environments is that, if those key points are not followed or adhered to, the VR learning environment can quickly develop into nothing more than a simulation with no learning benefit to the students. Leaving students feeling inadequate and unprepared for real-world scenarios as they rise, defeating the purpose of using VR systems as powerful learning tools. While VR training cannot fully replace the experience gained from using real world equipment, it can still play a major role in training both because of technological and financial advantages (Lele, 2011).

D. LEARNING BY TEACHING: EXPERIENTIAL LEARNING

Learning by teaching, a form of experiential learning, can also contribute toward a blended training environment. Palmer and Zajonc (2010) lay out in their work, *The Heart of Higher Education*, what is crucial to this method of learning, which is that we not only know the information, but we see it differently and further develop through transformational experiences when teaching others. Unlike learning through VR, where the learning experiences are simulated, learning by teaching involves real experiences that put students in a new or challenging situation that can result in valuable learning (Davis and Arend, 2013). In order to teach content, one must have previously learned and understood the content they will be presenting. Drawing from Kolb's work *Experiential Learning:*

Experience as the Source of Learning and Development, Davis and Arend (2013) state that understanding is a process of continuous construction, built on the interaction of ideas and experience. Kolb (1984) states, "failure to modify ideas and habits as a result of experience is maladaptive and to offset this one must engage in a continuous cycle of experiences, reflection, abstractions, and testing, finally returning to experience once again."

Professionals must think about what they are doing while they are doing it, and it is in this way experiential learning occurs. Learning grows out of this experience and some desired learning outcomes are developed from this; they are as follows:

- Developed awareness of the overall big picture
- Ability to identify problems and opportunities in unfamiliar settings
- Apply previous learning to new settings
- Improvise new on-the-spot solutions to problems
- Develop broader observational powers and reflective thought patterns

These learning outcomes can be measured in terms of intensity, frequency, and duration. Intensity refers to how deep the experience is and whether there were significant responsibilities involved. Frequency captures how often the student engages in the activity, and whether they are an observer or merely an active participant. Lastly, duration refers to how long does the experience for the students last (Davis and Arend, 2013).

A key to experiential learning is placing more emphasis on the process of learning itself rather than the outcomes of the training given (Kolb, 1984). Much like Kolb's experiential learning model (see Figure 4), human learning goes in productive cycles as people learn to recognize patterns, improve upon them, and revisit them through recurrent iterations, meaning that learning is more iterative than it is linear, which is the tactic typically employed in formal education. Kolb (1984) defines experiential learning as "the process whereby knowledge is created through the transformation of experience" and he places emphasis on three things throughout the process: adaptation and learning being the focus rather than just completion, knowledge being defined as a transformative process not

something to be acquired or transmitted independently of learning, and lastly no matter what form of experience is had, experiential learning can transform that into a deeper longer lasting knowledge.

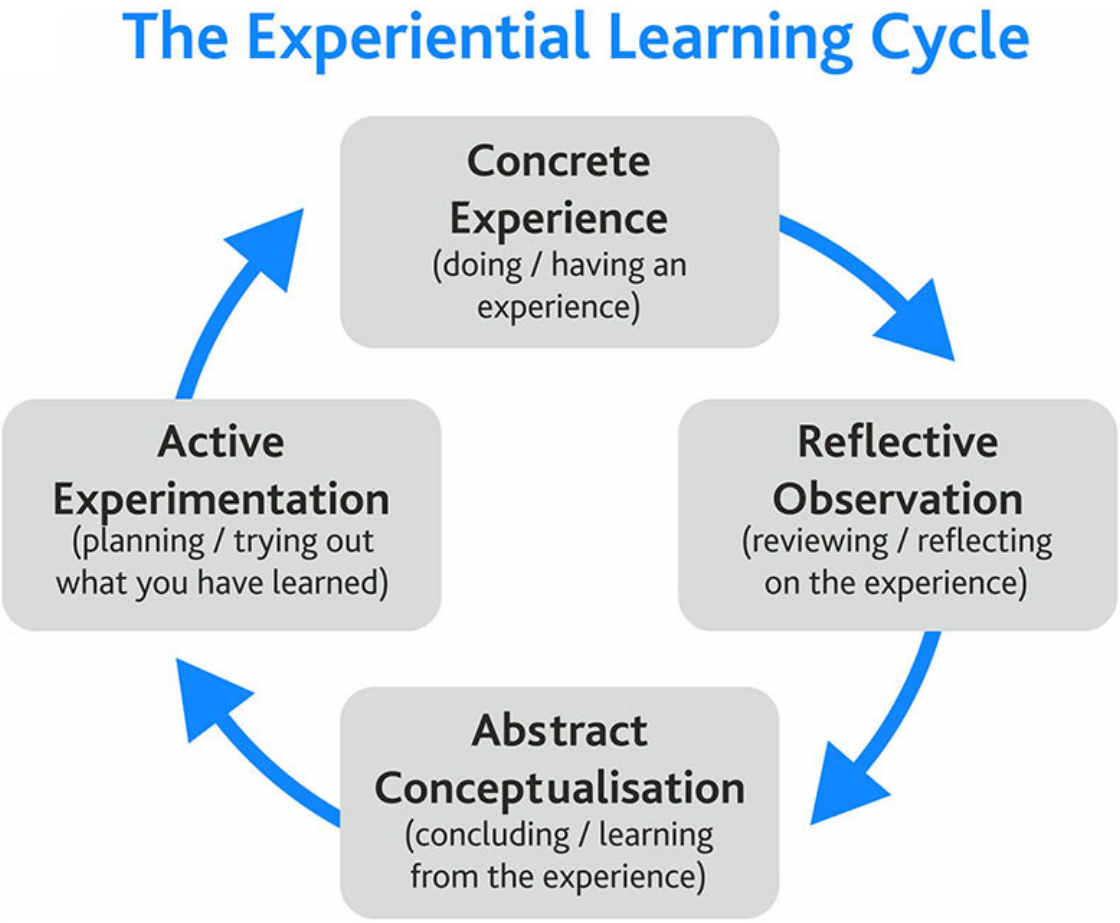

Figure 4. Kolb's Experiential Learning Model. Source: McLeod (2013).

A key piece of the experiential learning experience is reflection. Reflection provides an outlet for the students to think about what they have experienced throughout the course. Instructors should be helping the students frame the experiences they have in the classroom and relate them back to experiences they may have in their professional lives once they transition back to their workspaces (Davis and Arend, 2013). Good ways to

reflect adapted from Cress, Collier, and Reitenauer's work *Learning Through Serving*, are as follows:

- Describe interactions between yourself and others.
- Did your interaction turn out the way you expected?
- What assumptions did you bring with you into the activity?
- What concepts or theoretical models were at play during your interactions?
- What connections did you find between the experience and the course lectures/readings?
- What could you apply from this experience to future scenarios? (Cress et al., 2013).

One of the most important things an instructor can do is to facilitate these reflections—this is a form of helping the students arrive at conclusions and learning by helping them to see the big picture that may not be obvious to them in the moment. These reflections help to fill learning gaps and engage areas where missed opportunities and unused potential may be. More often than not students find themselves in a situation in which they are at a loss to know what they can or should learn from an experience and it is the instructor's prerogative to step in and fill those potential learning gaps (Davis & Arend, 2013). Egan (2010) suggests it is key at this point for the instructor to introduce the student to three things: the current picture, the preferred picture, and the way forward. The current picture is how the student currently perceives the learning; the preferred picture is to align the student's current picture to what the desired outcome is to be; and the way forward is the big picture and how to move beyond it after understanding the current experience and the benefits of it. This solidifies the learning within the student and allows the facilitator to ask bigger, more intricate questions to the student. A simpler way to look at this is based on Kolb's experiential learning model which frames the questions to ask as: What? So what? And, now what? (Kolb, 1984).

Once experiential learning has taken place, it can now shift in learning by teaching. That is to say, the student can take the experiences just learned and further solidify this information by teaching it to their peers. In 2009, Chase, Chin, Oppezzo, and Schwartz showed in their study that students will make greater efforts to learn on behalf of others than they will for themselves alone. People learn better when they prepare to teach a pupil or peer who will take a test then when they prepare to take a test themselves. This is because teaching requires the need to consider what and how to communicate their knowledge. Moreover, teachers need to prepare themselves for any questions that students might ask Teaching can lead to connecting ideas on the go and this process improves memory and solidifies understanding of subject matter. When asked questions by students that the teacher may not know this prompts the teacher to look for the correct answer and spend time thinking about the problem further solidifying the knowledge and learning of the subject matter (Fiorella & Mayer, 2013).

Creating situations where the teachers have an opportunity to observe their pupils or peers' subsequent performance is ideal. Observing one's pupil is not just good feedback for teacher learning, it is also good motivation for teaching well (Schwartz et al., 2016). Thus, a good arrangement is one that gives the teachers a way to prepare, an opportunity to teach, and a chance to observe their students' independent performance via assessments after being taught

There are three risks involved with this method:

1. Students may adopt a poor teaching style because the responsibility of the new students learning is not placed on them.
2. Performance anxiety may occur.
3. The tutors/teachers may have an incomplete knowledge of their own misconceptions, which can lead to confusion for the students being taught.

Having an overall instructor/monitor facilitating this peer teaching can alleviate this concern. The best way to carry this out is to allow the future peer teachers to develop and learn their own knowledge or the processes to be taught and then allow them to teach the class or other students what they have learned, then allow the student teachers to see how

other students respond to questions and assessments posed by the main instructor of the course. The student teacher then has an opportunity to reflect and address the class again the next day, improving their teaching and solidifying their own learning based on the students' responses they observed (Okita & Schwartz, 2013). This not only solidifies learning but also allows the student to leave the course with a new and valuable skillset: the ability to pass on the information learned and new information via teaching to others once they return to the workforce.

E. A CONCEPTUAL FRAMEWORK FOR EVALUATING ALTERNATIVE FORMS OF TRAINING

One way to measure the effectiveness of blended and distance learning alternatives is to conduct a Cost Effectiveness or a Cost Benefit Analysis of each alternative compared to the status quo. When applied, this would provide a unique conceptual framework to evaluate alternative forms of training.

> Cost-effectiveness analysis is a technique that relates the costs of a program to its key outcomes or benefits. Cost benefit analysis takes that process one step further, attempting to compare costs with the dollar value of all (or most) of a program's many benefits. These seemingly straight forward analyses can be applied any time before, after, or during a program implementation, and they can greatly assist decision makers in assessing a program's efficiency. (Cellini & Kee, 2015)

In their chapter contribution to the *Handbook of Practical Program Evaluation, 4th Ed.*, the authors list ten steps to effectively conduct a cost effectiveness or cost benefit analysis, as seen in Figure 5.

STEPS IN COST-EFFECTIVENESS AND COST-BENEFIT ANALYSIS.

1. Set the framework for the analysis.
2. Decide whose costs and benefits should be recognized.
3. Identify and categorize costs and benefits.
4. Project costs and benefits over the life of the program, if applicable.
5. Monetize (place a dollar value on) costs.
6. Quantify benefits in terms of units of effectiveness (for CEA) or monetize benefits (for CBA).
7. Discount costs and benefits to obtain present values.
8. Compute a cost-effectiveness ratio (for CEA) or net present value (for CBA).
9. Perform sensitivity analysis.
10. Make a recommendation where appropriate.

Figure 5. Steps in Cost Effectiveness and Cost Benefit Analysis.
Source: Cellini and Kee (2015).

These steps offer a framework for assigning value to the effectiveness and learning out comes of these training programs while also examining their advantages and tradeoffs in order to make a recommendation to implement and improve training methods. This type of evaluation can then equate each alternative with a monetary value. This evaluation approach would allow decision makers to examine at each learning alternative and choose the best one for its overall value to the Navy both in terms of learning and cost effectiveness. When conducting a cost effectiveness analysis, it is beneficial to describe the status quo of the traditional training program, resource use and learning objectives. Once those have been well defined and established, describe and compare the blended training alternatives to the status quo. It would be best to state assumptions upfront and then describe and measure how resource use is different from the status quo. Researchers should describe the methodology used to measure effectiveness of meeting learning objectives in alternative training environments, compared with the status quo. The Straus et al., 2013 paper uses an exit survey of students to capture the students' perceptions of the benefits of the blended training. It might be useful to also survey instructors to measure resource use (their time, for example) associated with the training alternatives. A comprehensive analysis of the benefits of tradeoffs (costs) can support decision makers when selecting the training environment that is most efficient.

Each learning alternative described in the previous section, whether implementing groups, VR, experiential learning, or distance learning, presents both benefits and tradeoffs. Moreover, the costs related to acquisition and implementation of new IDs must be considered as well. For a robust approach to cost effectiveness, as shown in Robbins (2016), the costs and benefits need to be projected for the entire life of the "project" or the years the new ID is estimated to be in use.

In the case of training that is very process and task oriented as far as type of learning that must take place, group and team learning may not be the most suited to take on such an endeavor. Something like VR or student teaching would be.

The VR method could prove to be beneficial for many types of learning and the tasks involved; however, this is a costly method and cannot be implemented with haste. A careful evaluation of VR use in a blended training environment, before acquisition and implementation, is needed to fully examine its efficacy.

Strong evidence in the learning science literature points to the success of learning by teaching. If chosen to be used in a blended training alternative to the current traditional training, it does not require new assets to be obtained. One way to implement this option could be to rework the course curricula to include an additional time within a current course. This additional time would be to allow the recent graduates of the course to teach the incoming students. Upon completion of the additional time in training used to teach others, students will have seen their peer pupils succeed, fail, struggle, and learn the course material and the hands-on portion of the class that was taught by them and will have received feedback from their instructors. At the completion of the course, they could gain a deeper understanding of the material that would be longer-lasting, returning to the workforce better prepared to do the job and with a mindset more opened to continuously improve.

DL could be a feasible option due to the cost savings, accessibility, and flexibility this learning environment provides. While learning outcomes are seen to be on par with face-to-face classrooms, Wisher, Sabol, and Moses (2002), found that course completion rates had dropped. There seems to be apprehension when it comes to DL base on a lack of

institutional standards. A trainee may take two different DL classes simultaneously and they both may be delivered in different methods. Naturally, this can lead to dissatisfaction with the DL process.

Future work would certainly need to set up experiments, collect and analyze data in order to have a more detailed, in depth analysis of each alternative to support recommendations for the roadmap to the future of Navy training.

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V. CONCLUSIONS AND RECOMMENDATIONS

Based on evidence on the efficacy of different types of learning, this project explores alternatives to the current training model used for accession training, to be evaluated in today's context of a Navy expanding its efforts to incorporate greater distributed learning experiences and to achieve gains in learning effectiveness and skill acquisition.

The Navy has been focusing on improving its assessment and quality of training provided and the impacts they have on Fleet readiness. This can be seen through the support of the Ready, Relevant, Learning initiatives. Blended or DL training alternatives might offer a solution and better facilitate the integration of Navy training into the future learning continuum concept.

In this project, I examined training alternatives to the traditional classroom model and discussed the relative advantages and tradeoffs associated with each alternative. From examining the evidence in published military and learning science studies, I proposed viable training alternatives to the traditional classroom training that would include:

- Distance Learning
- Groups/Teams Training
- Incorporating Virtual Reality
- Experiential Learning

These types of training features appear best aligned with the learning objectives of hands-on Navy training and seem to have the potential to achieve a better learning outcome with lasting results that will carry forward with the trainee and have future, real-world, practical applications.

For these alternatives, I discussed the relevant strengths and weaknesses when compared to traditional training, proposing the use of a cost effectiveness framework to conduct a data-driven evaluation of their effectiveness.

Future studies are needed to conduct on-site assessments of the efficacy of the training alternatives discussed in terms of meeting training objectives, the resources used, and the potential impact of Fleet readiness. This is to provide support for building a roadmap to an acquisition and implementation of more efficient education and training ID, that generates and supports a continuum of learning, a growth mindset and an overall more efficient learning for service members in order to better support the mission.

Naturally, given the Navy's large variation in training programs, the assessment of training alternatives will have to be tailored to the different learning outcomes and enabling objectives of each system and rating-based training. The procedures and terminal objectives of traditional navy trainings are typically process based and the goal is to have students leave with a valuable tested skillset to take back with them into the work force. Due to this, my recommendation would be to conduct a cost effectiveness analysis in order to collect, analyze, and interpret data for decision makers and have readily available information for them to choose from the previously mentioned learning alternatives.

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