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THESIS

A NEW SCHOOL FOR BRATS: IMPROVING THE K–12 EDUCATION OF MILITARY-CONNECTED CHILDREN

by

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September 2017

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This thesis answers the question: How can recent changes in the educational environment be leveraged to improve K–12 education for military-connected children? In 2011, the Obama Administration issued a report, *Strengthening Our Military Families*, in which the president, the vice president, and every member of the president's cabinet committed to ensuring the well-being of military families, including the education of military-connected children. This study examines the current American public school system and its reliance on the traditional "factory-based" education model to determine the system's efficacy in educating military-connected children, a student population with unique academic, social, physical, and psychological challenges. Rather than depending on the traditional education model to educate military-connected children, this study recommends the implementation of a competency-based personalized learning model—strengthened by technology—within an expanded domestic network of the United States Department of Defense Education Activity to improve the K–12 education of military-connected children.

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A NEW SCHOOL FOR BRATS: IMPROVING THE K–12 EDUCATION OF MILITARY-CONNECTED CHILDREN

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

This thesis answers the question: How can recent changes in the educational environment be leveraged to improve K–12 education for military-connected children? In 2011, the Obama Administration issued a report, *Strengthening Our Military Families*, in which the president, the vice president, and every member of the president's cabinet committed to ensuring the well-being of military families, including the education of military-connected children. This study examines the current American public school system and its reliance on the traditional "factory-based" education model to determine the system's efficacy in educating military-connected children, a student population with unique academic, social, physical, and psychological challenges. Rather than depending on the traditional education model to educate military-connected children, this study recommends the implementation of a competency-based personalized learning model—strengthened by technology—within an expanded domestic network of the United States Department of Defense Education Activity to improve the K–12 education of military-connected children.

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Throughout my life, I have had the good fortune of learning from many good teachers, none more important to me than my wife, Rachael. Your influence touched every page of this work. Words cannot express how thankful I am to have you in my life.

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I. INTRODUCTION

A. THESIS QUESTION

This thesis answers the question: how can recent changes in the educational environment be leveraged to improve K–12 education for military-connected children?

B. DISCUSSION

On January 14, 2011, President Barack Obama released a report, *Strengthening Our Military Families: Meeting America's Greatest Commitment*, identifying the well-being of military families as a national security policy priority. Developed by representatives of each Cabinet member and signed by each member of the Obama Cabinet, the report identifies "ensur[ing] excellence in military children's education and their development"[1] as one of four priorities to strengthen the military family. Specifically, the report calls on all members of the government to improve the overall quality of the educational experience, to reduce the negative impact of military parents' deployments and relocations, and to encourage the development of the military-connected child.[2]

While any idea of strengthening military families is appealing, are American public schools the best venues for educating military-connected children given the social, psychological, physiological, and academic challenges unique to the children of military members? Furthermore, is it fair to expect American public schools to provide the infrastructure necessary to focus on the specific needs of military-connected children who represent a small fraction—approximately 2 percent—of the 50.4 million students enrolled in public elementary and secondary schools?[3]

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[1] United States White House Office, *Strengthening Our Military Families: Meeting America's Commitment* (Washington, DC: White House, 2011), 2, http://permanent.access.gpo.gov/gpo6289/Strengthening_our_Military_January_2011.pdf.

[2] Ibid., 2.

[3] "Fast Facts: Back to School Statistics," National Center for Education Statistics, accessed October, 22, 2016, http://nces.ed.gov/fastfacts/display.asp?id=372.

C. SIGNIFICANCE OF THE THESIS QUESTION

An Independent Task Force from the Council of Foreign Relations issued a 2012 report, *U.S. Education Reform and National Security*, that identifies the failures of the American educational system as a national security crisis.[4] Included in the discussion on the erosion of the country's human capital and its consequences to the nation as a whole is a claim that "most young people do not qualify for military service."[5] The authors cite a report that notes that 75 percent of U.S. citizens between the ages of 17 and 24 cannot qualify to serve in the armed forces often due to a lack of educational attainment or ability.[6]

According to the 2014 United States Department of Defense's Demographics Report for fiscal year 2014, the Department of Defense numbers more than 3.5 million people, including more than 1.3 million Active Duty personnel, more than one million Ready Reserve members, and more than 850,000 civilian personnel. Of those numbers, Active Duty personnel have 1,802,615 associated family members, and 37.5 percent of Active Duty personnel are married with children. Single parents represent an additional 4.7 percent of the Active Duty force. Of Reserve and Guard (Selected Reserve) members, there are 1,084,069 associated family members, and 32.9 percent of the force are married with children. Single parents represent an additional 9.2 percent of the Selected Reserve force. Of the 1,819,659 military-connected children who are considered dependents, 92.9 percent are 0 to 18 years old (680,552, 0–5 years old; 565,834, 6–11 years old; 443,964, 12–18 years old).[7]

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[4] Council on Foreign Relations Independent Task Force on U.S. Education Reform and National Security, *U.S. Education Reform and National Security*, ed. Joel I. Klein, Condoleezza Rice, and Julia Levy (New York: Council on Foreign Relations, 2012), 7, ProQuest Ebook Central.

[5] Ibid., 3.

[6] William Christeson, Amy Dawson Taggart, and Soren Messner-Zidell, *Ready, Willing, and Unable to Serve: 75 Percent of Young Adults Cannot Join the Military, Early Education Across America Is Needed to Ensure National Security* (Washington, DC: Mission Readiness, 2009), 1, http://cdn.missionreadiness.org/MR-Ready-Willing-Unable.pdf.

[7] "2014 Demographics: Profile of the Military Community," Military OneSource, iii, vi, accessed October 25, 2016, http://download.militaryonesource.mil/12038/MOS/Reports/2014-Demographics-Report.pdf.

More than 40 percent of the Active Duty, Reserve, and Guard force have children, and according to the Military Child Education Coalition, 1,105,267 military-connected children attend American K–12 public schools.[8] Studies have also shown that children of individuals who have served in the military are more likely than their peers to serve in the military,[9] which in turn creates an environment that goes beyond President Obama's call to strengthen America's military families. If 80 percent of military-connected children, who themselves are more likely to join the military, attend public schools and these public schools do not provide the education required to join the military, then the United States is facing a strategic gap in its ability to produce the future leaders of its armed forces.

The inability of the American public school system to provide an equitable education for all students has led reformers to suggest solutions to reverse this declining trend. A general theme of the proposals to reform the American education system lies in a classroom design that has changed little in the last 150 years: modern-day classrooms used to train students during the Information Age remain largely unchanged from the classrooms used to teach generations of factory workers during the Industrial Revolution. Many students toil through six to eight hours of instruction each day, interrupted at various intervals by a bell that prompts students and teachers to move to the next topic regardless of whether the students have mastered the information provided. Twenty-first century classroom instruction by way of a 19th century model suggests a strong weakness in the American public school system and validates the claim that schools cannot produce the skills required to thrive in the Information Age.

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8 "Student-Identifier: Where Are Our Military Kids Attending School? And How Are They Doing?," Military Child Education Coalition, accessed October 26, 2016, http://www.militarychild.org/student-identifier.

9 Valerie A. Stander and Lex L. Merrill, *The Relationship of Parental Military Background to the Demographic Background to the Demographic Characteristics of 11,195 Navy Recruits* (Report No. 00-14) (San Diego, CA: Navy Health Research Center, 2000), http://handle.dtic.mil/100.2/ADA432135.

D. LITERATURE REVIEW

To determine the best manner to educate military-connected children, the literature review focuses on two areas: the incorporation of technology into the classroom and the challenges of military-connected children.

1. Technology in the Classroom

The effective use of technology in the classroom is generally considered an important factor in the implementation of more capable education systems throughout the world, but what capabilities does technology allow that other strategies cannot duplicate? As many researchers and global institutions have argued, simply putting more technology in the classroom does not lead to education innovation.[10] Education experts such as Mayer assert that pedagogy must remain "learning-centered" rather than "technology-centered."[11] Technology advocates denote that the incorporation of technology into teaching methods can provide highly mobile, effective tools to augment mastery-based learning,[12] to aid in project-based work,[13] and to enhance inquiry-based learning.[14]

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[10] Andreas Schleicher, *Schools for 21st Century Learners: Strong Leaders, Confident Teachers, Innovative Approaches* (Paris: OECD Publishing, 2015), 61, doi: https://dx.doi.org/10.1787/9789264231191-en; Sean Kennedy estimates the United States has spent more than $100 billion on K-12 classroom technology with little effect. See Sean Kennedy, "School Tech Plan Unlikely to Help Blend Learning," Lexington Institute, May 9, 2013, http://lexingtoninstitute.org/school-tech-plan-unlikely-to-help-blended-learning/.

[11] Richard E. Mayer, "Learning With Technology," in *The Nature of Learning: Using Research to Inspire Practice*, eds. Hanna Dumont, David Istance, and Francisco Benavides (Paris: OECD Publishing, 2010), 179, doi:http://dx.doi.org/10.1787/9789264086487-en.

[12] Salman Khan, "Let's Teach for Mastery—Not Test Scores," TED, November 2015, https://www.ted.com/talks/sal_khan_let_s_teach_for_mastery_not_test_scores; Chris Sturgis and Susan Patrick, *When Success Is the Only Option: Designing Competency-Based Pathways for Next Generation Learners* (Quincy, MA: Nellie Mae Education Foundation, 2010), 24, http://www.inacol.org/wp-content/uploads/2015/03/iNACOL_SuccessOnlyOptn.pdf.

[13] Schleicher, *Schools for 21st Century Learners*, 70.

[14] Jennifer Groff, "Technology-Rich Innovative Learning Environments," OECD Centre for Educational Research and Innovation, February 2013, 17, http://www.oecd.org/edu/ceri/Technology-Rich%20Innovative%20Learning%20Environments%20by%20Jennifer%20Groff.pdf; Katie Salen et al., *Quest to Learn: Developing the School for Digital Kids* (Cambridge, MA: The MIT Press, 2010), ProQuest Ebook Central.

Understanding that American public schools have spent more than two decades and approximately $100 billion[15] incorporating computers into K–12 classrooms with little improvements in nationwide academic performance, Christensen et al. see the traditional public school system falling into the trap of incorporating new technologies into its existing structure. Thus, the claim of computers acting as expensive word processors or Smart Boards as expensive chalkboards abound in critiques of education technology.[16]

In *The Innovator's Dilemma*, Christensen introduces his theory of "disruptive innovation" to explain how successful companies fail when they neglect to address changes in "the processes by which an organization transforms labor, capital, materials, and information into products and service of greater value."[17] According to the theory, true disruption occurs when "nonconsumers"[18] gain access to a new or different technology[19] that continues to improve until the new technology's capabilities supersede the original.

In the world of education, nonconsumers can be thought of as students who lack a schooling option in the most extreme case or as students who lack access to a specific

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15 Horn and Staker update the $60 billion estimate from *Disrupting Class* in *Blended*. See Michael B. Horn and Heather Staker, *Blended: Using Disruptive Innovation to Improve Schools* (San Francisco: Jossey-Bass, 2015), 31.

16 Rebecca Winthrop, Timothy P. Williams, and Eileen McGivney, *Global Debates: Skills in the Digital Age—How Should Education Systems Evolve?* (Washington, DC: Brookings, 2016), https://www.brookings.edu/research/skills-in-the-digital-age-how-should-education-systems-evolve/.

17 Clayton M. Christensen, *The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business* (New York: Collins Business Essentials, 2005), xi, xvi. Christensen provides examples of disruptive technologies on p. xxix.

18 Nonconsumers are individuals who are not served by the existing technology. In the case of automobile manufacturing, a nonconsumer could be thought of as someone who bought a cheaper, less safe, more reliable Honda rather than a more expensive Chevrolet. In essence, the disruptive innovation creates a new market for new consumers. For an expanded discussion on nonconsumption and innovated technologies, see Craig Lambert, "Disruptive Genius: Innovation Guru Clayton Christensen on Spreading His Gospel, the Gospel, and How to Win the Electric Car," *Harvard Magazine* 116, no. 6 (2014), 38–43, http://harvardmag.com/pdf/2014/07-pdfs/0714-HarvardMag.pdf.

19 Christensen distinguishes sustaining technologies that "improve the performance of established products" from disruptive technologies that "underperform established products in mainstream markets" but are "typically cheaper, simpler, smaller, and frequently, more convenient to use." See Christensen, *Innovator's Dilemma*, xviii–xix.

class in the more common case. For instance, Christensen et al. highlight the following areas of nonconsumption in American public schools: the lack of

> advanced Placement (AP) and other specialized or advanced courses; small, rural, and urban schools that are unable to offer breadth; 'credit recovery' for students who must retake courses in order to graduate; home-schooled students and those who can't keep up with the schedule of regular school; high-school dropouts; students needing special tutoring; and pre-kindergartners.[20]

Christensen and his colleagues suggest the key to finding disruptive innovation in education is studying these areas of nonconsumption where computer-based learning is supplanting traditional, teacher-led learning.[21] Thus, for disruption theorists, computer-based technology that focuses on student-centered learning will flourish if incorporated outside the traditional K–12 public school system.[22]

2. The Challenges of Military-Connected Children

To determine the ability of the school system to provide for its military-connected children, one must first understand the challenges unique to these students. Studies on the challenges faced by military-connected children—those with at least one parent or guardian who is serving in the military—focus on the psychological, social, physical, and academic tolls that their parents' service has on their lives and suggest a strong correlation between military-related parental absences and resultant problems in externalizing behaviors, internalizing behaviors, and academic achievement.[23] Another

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[20] Clayton M. Christensen, Michael B. Horn, and Curtis W. Johnson, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*, 2nd ed. (New York: McGraw-Hill, 2011), 91.

[21] Ibid.

[22] Ibid., 12.

[23] Anita Chandra et al., "Children on the Homefront: The Experience of Children From Military Families," *Pediatrics* 125, no. 1 (2010): 16–25, doi:10.1542/peds.2009-1180; Patricia Lester et al., "The Long War and Parental Combat Deployment: Effects on Military Children and At-Home Spouses," *Journal of the American Academy of Child & Adolescent Psychiatry* 49, no. 4 (2010): 310–20, doi:http://dx.doi.org/10.1016/j.jaac.2010.01.003; Alan Lincoln, Erika Swift, and Mia Shorteno-Fraser, "Psychological Adjustment and Treatment of Children and Families With Parents Deployed in Military Combat," *Journal of Clinical Psychology* 64, no. 8 (2008): 984–92, doi:http://dx.doi.org.libproxy.nps.edu/10.1002/jclp.20520; Eric M. Flake et al., "The Psychosocial Effects of Deployment on Military Children," *Journal of Developmental and Behavioral Pediatrics* 30, no. 4 (2009): 271–78, doi:http://dx.doi.org.libproxy.nps.edu/10.1097/DBP.0b013e3181aac6e4.

study shows an increase in children self-reporting psychosocial symptoms during a parental deployment as well as an increase in similar reports from the parent that remained at home.[24] Similarly, a report presented to Congress by the Department of Defense notes that during the deployment of an Active Duty parent, 64 percent of surveyed children showed increased levels of fear and anxiety, and 54 percent of children ages 14–18 and 41 percent of children 6–13 showed decreased academic performance.[25]

a. Mobility

In addition to the stress that arises in children as a result of a parent's deployment, military children must also contend with the stress related to frequent moves. One of the most oft cited statistics in the research of military children is that military families, on average, move every two to three years, meaning an average military child could move six to nine times during their K–12 years.[26] Multiple studies have correlated high student mobility with lower academic performance,[27] and one report in particular recommends the use of Department of Defense Education Activity schools to model best practices in the education of highly mobile students.[28]

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[24] Mary Catherine Aranda et al., "Psychosocial Screening in Children With Wartime-Deployed Parents," *Military Medicine* 176, no. 4 (2011): 402, doi:http://dx.doi.org.libproxy.nps.edu/10.7205/MILMED-D-10-00202.

[25] Department of Defense, "Report to Congress on the Impact of Deployment of Members of the Armed Forces on Their Dependent Children," Military OneSource, October 2010, 17, http://download.militaryonesource.mil/12038/MOS/Reports/Report-to-Congress-on-Impact-of-Deployment-on-Military-Children.pdf.

[26] Military Interstate Children's Compact Commission, *Guide for Parents, School Officials and Public Administrators: Successful Educational Transitions* (Lexington, KY: Military Interstate Children's Compact Commission, 2016), 1, http://mic3.net/pages/resources/documents/MIC3_Parent_Guide-FINAL.pdf.

[27] Lisa Eddy, "The Effect of Student Mobility on Academic Achievement" (PhD diss., University of Kentucky, 2011), ProQuest (917472473); Darin K. Gullion, "The Study of Interstate and Intrastate Mobility Effects on Student Achievement" (EdD diss., Indiana University, 2009), ProQuest (304899890); Erik J. Bentzel, "The Combined Effects of Low Socioeconomic Status and High Mobility on Elementary Achievement Scores in Pennsylvania, (PhD diss., Capella University, 2012), ProQuest (945731927).

[28] Dale N. Titus, "Strategies and Resources for Enhancing the Achievement of Mobile Students," *NASSP Bulletin* 91, No. 1 (2007), 81–97, doi:10.1177/0192636506298362.

b. Interstate Compact on Educational Opportunity for Military Children

Groups like the non-profit Military Children Education Coalition, whose mission is "to ensure inclusive, quality educational opportunities for all military and veteran-connected children affected by mobility, transition, and family separation," advocate for the military child by performing research and developing resources for military families, local educational agencies, and local and state governments.[29] The Military Children Education Coalition, the National Military Family Association, Department of Defense Education Activity schools, and the Department of Defense have promoted the agreement by all 50 states to the Interstate Compact on Educational Opportunity for Military Children, which attempts to resolve "key educational transition issues encountered by military families including enrollment, placement, attendance, eligibility and graduation";[30] however, the compact only applies to public schools. Additionally, Esqueda, Astor, and De Pedro note how enforcement and accountability of the state-approved compact is not equitable across all local school districts,[31] and other literature suggests a frequent lack of knowledge of the compact among military parents, educators, school officials, and policymakers.[32] Extended research shows that the interstate compact attempts to solve the most frequent issues as military children transition schools,[33] yet no data exists on the compact's effectiveness in enhancing the educational experience of military-connected children.

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29 "Mission/Vision," Military Child Education Coalition, accessed November 17, 2016, http://www.militarychild.org/about-us/mission.

30 "About MIC3," Military Interstate Children's Compact Commission, accessed November 17, 2016, http://mic3.net/pages/About/about.aspx.

31 Monica Christina Esqueda, Ron Avi Astor, and Kris M. Tunac De Pedro, "A Call to Duty: Educational Policy and School Reform Addressing the Needs of Children From Military Families," *Educational Researcher* 41, no. 2 (2012): 67–68, doi:10.3102/0013189X11432139.

32 Bruce L. Wykes, *Support and Defend: The K–12 Education of Military-Connected Children* (Boston: Pioneer Institute for Public Policy Research, 2015), 38, ProQuest (1826523006); Karen Jowers, "Parents: Know What the School Compact Does—And Doesn't—Do," *Navy Times*, June 24, 2013, ProQuest (1418404674); Susan E. Jackson, "What We Can Learn From Military-Connected Families about Relocation and Transitions," *Parenting for High Potential* 3, no. 7 (2014): 12, ProQuest (1564286396).

33 Joanna K. Garner, Pamela L. Arnold, and John Nunnery, "Schoolwide Impact of Military-connected Student Enrollment: Educators' Perceptions," *Children & Schools* 36, no. 1 (2014): 31–39, doi:10.1093/cs/cdt026; Keith R. Aronson and Daniel F. Perkins, "Challenges Faced by Military Families: Perceptions of United States Marine Corps School Liaisons," *Journal of Child and Family Studies* 22, no. 4 (2012): 516–25, doi:10.1007/s10826-012-9605-1.

c. Impact Aid

Through another program aimed at helping both the military-connected child and local educational agencies, the federal government has provided local school districts financial assistance through its Impact Aid program, which became law by the signing of the Elementary and Secondary Education Act of 1965. Impact Aid funds are intended to supplement the lost property tax revenue local educational agencies incur due to nearby tax-exempt, federally owned property. Additionally, Impact Aid funds provide extra money to educate federally connected students, such as children who live on Native American reservations, children who live in low-rent housing, or children who have a parent in the armed forces.[34]

A 2001 study by Buddin, Gill, and Zimmer challenges the effectiveness of the Impact Aid statute, whose purpose they describe as "defray[ing] the local share of expenses for educating federally connected students."[35] Also, a 2011 U.S. Government Accountability Office report notes that districts have no reporting requirements on their use of Impact Aid funds, making it difficult to determine the true effectiveness the funds have on their intended target.[36] As noted by the Government Accountability Office report and reinforced by Wykes, accountability for the use of Impact Aid funds cannot occur without the use of a military-connected child identifier linked to performance in student standardized tests,[37] an identifier that is included under the new Every Student Succeeds Act.

E. RESEARCH DESIGN

After conducting a thorough review of the history of American public schools, I began to understand how the country's various socio-political-economic challenges

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[34] "About Impact Aid," U.S. Department of Education, last modified August 27, 2008, http://www2.ed.gov/about/offices/list/oese/impactaid/whatisia.html.

[35] Richard Buddin, Brian P. Gill, and Ron W. Zimmer, *Impact Aid and the Education of Military Children* (Santa Monica, CA: Rand, 2001), xi, ProQuest (62258022).

[36] George A. Scott, *Education of Military Dependent Students: Better Information Needed to Assess Student Performance* (Washington, DC: U.S. Government Accountability Office, 2011), ProQuest (860368889).

[37] Scott, *Education of Military Dependent*, 32; Wykes, *Support and Defend*, 39.

affected the notion and the design of the traditional school model, namely the organization of students into age-defined grade levels; the reliance on teacher-led, "one-size-fits-all" instruction; the manner of assessments; and the use of the A–F grading system to name a few. This historical perspective allowed me to challenge the notion of the traditional school model and to determine that a student-centered approach based on the mastery of core competencies is needed.

The thesis will first evaluate the traditional school model's ability to educate today's K–12 students and will then study if changes in the educational landscape can be applied to better educate military-connected children. Implicit within this study is the question of where and how education technology fits. If the existing K–12 public school system cannot absorb a student-centered approach for its students while providing for the various challenges unique to military-connected children, the Department of Defense Education Activity will be considered for implementation of a student-centered model to determine if recent changes in the educational landscape can improve the K–12 education of military-connected children.

I begin Chapters III, IV, and V with the story of a fictional military-connected child and her family, the purpose of which is to contrast the experience of a military-connected student within the current K–12 public school system to that of a student within an expanded Department of Defense Education Activity school system that has incorporated a student-centered learning environment—strengthened by technology—to ensure personalized, competency-based learning. Julia's story begins in Chapter III as she reminisces about her past experiences in various public schools throughout the country. Chapter IV illustrates how the use of mobile education technologies allowed Julia to continue her academic progress as the family relocates to her father's new duty station and introduces what could be possible within the proposed expansion of the Department of Defense Education Activity. Chapter V concludes Julia's story as she remembers her past year within the student-centered learning environment provided by her new Department of Defense school.

II. BACKGROUND

If my generation were to compare our K–12 learning experiences with those of our parents, even though separated by multiple decades, the classroom descriptions and methods with which we were all taught would likely sound fairly similar. I suspect the same would be true if my generation compared experiences to those of our grandparents, and I also suspect the same would be true if my generation compared our experiences to the learning experiences of our children currently in school. Thus, a system that pre-dates my generation's grandparents remains largely unchanged to the system teaching my generation's children.

By describing the evolution of American public schools, discussing education reform legislation since 2001, and introducing the origins of a traditional school model that remains dominant today, this chapter provides the reader with the information necessary to rethink what has come to be accepted as common practices within schools.

A. THE EVOLUTION OF AMERICAN PUBLIC SCHOOLS

Discussions on the evolution of American K–12 public schools generally reflect the politico-socio-economic challenges that proponents of the public school system hoped to solve. Historians often categorize the history of the public school system into roughly four time periods: 1770–1900, 1900–1950, 1950–1980, 1980–present.[38] Each time period presents the numerous challenges that shaped the education model, curricula, and teaching practices within American public schools. Understanding the evolution of public schooling in the United States and the development of the traditional school model is critical in understanding the current debate surrounding K–12 education.

[38] Sheila Curran Bernard and Sarah Mondale, *School: The Story of American Public Education* (Boston: Beacon Press, 2001); Paul E. Peterson, *Saving Schools* (Cambridge, MA: Harvard University Press, 2011), ProQuest Ebook Central; Michael B. Katz, *Reconstructing American Education* (Cambridge, MA: Harvard University Press, 2009), ProQuest Ebook Central; David Tyack and Larry Cuban, *Tinkering Toward Utopia: A Century of Public School Reform* (Cambridge, MA: Harvard University Press, 2009), ProQuest Ebook Central.

1. 1770–1900

Conditions and debates of public schooling from 1770–1900 provided the foundation of the current American public school system. As Bernard and Mondale note, "to leaders like Thomas Jefferson, the survival of the democracy depended on educating all Americans," yet despite the importance Jefferson saw in a system that would provide the population with the basics of democracy while enabling the identification of a small group of talented students to be educated at the government's expense for future service to the country, Jefferson's efforts to provide statewide schooling were continuously defeated in his home state of Virginia.[39]

Sharing Thomas Jefferson's goal of providing statewide schooling for all citizens, Horace Mann, the Secretary of Education of Massachusetts from 1837–1848, worked to provide statewide "common schools" that "would serve all boys and girls and teach a common body of knowledge that would give each student an equal chance in life."[40] The inequality of schools throughout the state greatly upset Mann, who was among the first education reformer to propose state control of a school system supported by tax dollars.[41] Collectively reformers like Jefferson and Mann are remembered as "nation builders who sought to construct schools suitable for a burgeoning democracy" that required elementary schooling that was "universal, compulsory, and free of sectarian influences."[42]

Another important outcome of the late 19th century was the influence the needs of the industrial economy had on the traditional school model,[43] a topic that will be expanded later in this chapter.

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39 Bernard and Mondale, *School*, 22–25.

40 Ibid., 29.

41 Bernard and Mondale, *School*, 28; Peterson notes how affected Mann was by his observations of the Prussian school system with its "centralized institutions, a state-directed curriculum, statistical information, and professional cadres . . . to create a unified national spirit, a common language, and an identity that would transcend parochial loyalties," see Peterson, *Saving Schools*, 13.

42 Peterson, *Saving Schools*, 13.

43 Watters provides a detailed history of "the factory model of education" in Audrey Watters, "The Invented History of 'The Factory Model of Education,'" Hack Education, April 25, 2015, http://hackeducation.com/2015/04/25/factory-model.

2. 1900–1950

From 1870 to 1890, largely because of the increase of state-funded common schools throughout the country, U.S. public school expenditures had increased from $117.9 million to $263.8 million while public school enrollment had risen from 7.6 million to 12.7 million, making the country's public school system the largest in the world.[44] Responding to pressures from industrialization and immigration, a new group of Progressive reformers sought to reshape the American public school system "to teach the skills and knowledge needed for participation in a democratic industrial society to a rapidly growing and diverse population."[45]

Rizga notes an important distinction in the Progressive movement between Administrative Progressives, "who focused on the top-down organizational reforms to create 'efficient' schools to produce productive workers," and Child-centered Progressives, "who prioritized transforming learning and teaching at the classroom level to make schools more intellectually and emotionally engaging for students."[46] Whereas John Dewey, a leading child-centered Progressive, preached the importance of child-led learning and stressed that the true aim of schools should be to teach students "to find out how to make knowledge when it is needed,"[47] Administrative Progressives preferred the application of the "corporate factory model" to "create an efficient structure of school governance and curriculum that would prepare students for their most useful future roles."[48]

Rizga notes the effects of the so-called victory of the Administrative Progressives on the modern K–12 public school system as two-fold. First, Rizga claims Administrative

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[44] Dollar amounts have been converted to 2017 USD. Data obtained from National Center for Education Statistics, *120 Years of American Education: A Statistical Portrait*, ed. Thomas D. Snyder (Washington, DC: U.S. Department of Education, 1993), 34, https://nces.ed.gov/pubs93/93442.pdf; Bernard and Mondale, *School*, 58.

[45] Diane Ravitch, Introduction, in *School*, 63.

[46] Kristina Rizga, *Mission High: One School, How Experts Tried to Fail It, and the Students and Teachers Who Made It Triumph* (New York: Nation Books, 2015), 64.

[47] John Dewey and Evelyn Dewey, *Schools of To-Morrow* (New York: E. P. Dutton & Company, 1915), 16, https://archive.org/details/schoolsoftomorro005826mbp.

[48] Rizga, *Mission High*, 64, 69.

Progressives shaped the education reform decision-making process to occur outside of the school system, meaning policy makers—not educators—were assigned the role of shaping curriculum standards and examinations. Secondly, Administrative Progressives, facing the pressures of educating a growing number of students particularly within high schools, began tracking students based on perceived abilities, essentially allowing students from the working class to be funneled into what was seen as a less-rigorous educational path. Educational tracking relied heavily on the use of intelligence tests, which led to a gradual dependency on standardized achievement testing that remains today.[49]

3. 1950–1980

As the K–12 public school system continued to grow,[50] debates on the effectiveness of schools, particularly with respect to the inequality and "watering down" of academic rigor that some people argued was inherent in providing vocational tracks in schools, reached their peak with the Supreme Court decision in *Brown v. Board of Education of Topeka* in 1954 and with the launch of *Sputnik* in 1957.

Reversing the 1896 Supreme Court decision which found that schools could be separate and equal, the ruling in *Brown* began many of the federal reforms—through the use of providing or withholding federal aid—to achieve greater equality within the American public school system. Seeing the resistance of schools to enact *Brown*, President Lyndon Baines Johnson signed the Elementary and Secondary Education Act of 1965, which provided $4 billion in federal aid to ensure state compliance with the *Brown* decision. Other reforms during this time period include 1972's Title IX, which denied federal funding to any institution that discriminated because of gender, and 1975's Education for all Handicapped Children Act, which required schools that accepted federal funds to provide equal access to children with physical and mental handicaps.

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[49] Rizga, *Mission High*, 70–71.

[50] Bernard and Mondale note that by 1945, 51 percent of 17 year olds were high school graduates, up from 6 percent in 1900. See Bernard and Mondale, *School*, 113.

The Soviet Union's launch of Sputnik galvanized those who saw weakness in the K–12 public school system. Ravitch writes that "the public response to the Soviets' technological coup was outrage, and the schools became the scapegoat for the nation's wounded pride."[51] In response, Congress passed the National Education Defense Act, which, among other things, provided more than $1 billion of federal money to strengthen science and math programs. The result was an increasing focus on science and math and the reduction or elimination of such programs as vocational training that reformers argued decreased the effectiveness of schools.[52]

4. 1980–Present

In 1981, the U.S. Department of Education established the National Commission on Excellence in Education composed of leaders from education, business, and government to provide an assessment on the quality of American education. Their assessment, entitled *A Nation at Risk*, provided the grim warning that "our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world" because "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people."[53]

Noting the commission's "alliance of public officials, corporate leaders, and educators," Cuban identifies three of the commission's assumptions that remain in educational reform debates today: the need for school choice, the importance of math and science skills in an "information-based economy," and the use of standardized test scores as a measure of school performance.[54] Furthermore, Cuban criticizes the "corporate

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[51] Ravitch, Introduction, 69.

[52] Rizga notes how "even though child-centered education had limited influence in the classrooms, by then critics of public schools associated the term 'progressive' education and the name of Dewey with everything that they viewed as wrong with American schools: curriculum that wasn't hard enough, lax discipline, and too many classes focused on life skills." See Rizga, *Mission High*, 115–16.

[53] The National Commission on Excellence in Education, *A Nation at Risk: The Imperative for Educational Reform* (Washington, DC: U.S. Department of Education, 1983), https://www2.ed.gov/pubs/NatAtRisk/title.html.

[54] Cuban provides many examples of measures proposed by business leaders that exist in schools today. See Larry Cuban, Introduction in *School*, 177–78.

model of market competition, choice, and accountability" that led to "strengthening traditional instructional practices while weakening progressive ones."[55] Cuban's ultimate critique is the result of the so-called standard and accountabilities movement provoked by *A Nation at Risk*, namely that "ensuring that American schools produce fully prepared graduates who can perform well in the workplace has led to an intense concentration on achieving high test scores in academic skills and subjects and a hardening of already dominant patterns of teacher-centered instruction."[56]

B. EDUCATION REFORM SINCE 2001

Any study on the redesign of the existing K–12 public school system must include a brief review of recent educational reform legislation.

1. No Child Left Behind

Beginning with the passage of the No Child Left Behind Act of 2001, which focused on resolving the achievement gap—particularly in grades 3–8 reading and mathematics—between lower and higher income families and between minority and non-minority groups, the federal government provided funding to states and local schools if students reached proficiency standards developed by the state.[57] While No Child Left Behind provided the most extensive federal education reforms since the Elementary and Secondary Education Act of 1965, much of the literature since its passage has focused on its reliance on student assessments through high-stakes testing to determine whether a school is adequately educating its students.[58] Additionally, researchers have focused on

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[55] Cuban, Introduction, 179–80.

[56] Ibid., 180.

[57] Office of the Press Secretary, "Fact Sheet: No Child Left Behind Act," The White House, January 8, 2002, https://georgewbush-whitehouse.archives.gov/news/releases/2002/01/20020108.html; "No Child Left Behind Executive Summary," U.S. Department of Education, last modified February 10, 2004, http://www2.ed.gov/nclb/overview/intro/execsumm.html; Alan Ginsburg and Adriana de Kanter, ed., *No Child Left Behind: A Desktop Reference 2002*, (Washington, DC: U.S. Department of Education, Office of Elementary and Secondary Education, 2002), https://www2.ed.gov/admins/lead/account/nclbreference/reference.pdf.

[58] Scott Franklin Abernathy, *No Child Left Behind and the Public Schools* (Ann Arbor: University of Michigan Press, 2008), ProQuest Ebook Central.

the inconsistencies among individual state accountability systems,[59] noting that each state had its own unique accountability system by 2010 with no nationwide agreement on which standards to uphold for schools, teachers, and students.[60]

2. Common Core State Standards

Developed by the Council of Chief State School Officers and the National Governors Association Center for Best Practices, organizations that support the "international benchmarking" of the best educational practices throughout the world,[61] the Common Core State Standards Initiative attempts to solve the inconsistencies across state accountability systems by identifying accepted sets of learning standards adopted by participating states, specifically in English language arts and mathematics in grades K–12.[62] The Common Core is currently implemented in 42 states, the District of Columbia, and the Department of Defense Education Activity.[63]

3. Race to the Top

In 2009, the Obama Administration announced the Race to the Top initiative, a $4.35 billion incentive program designed to reform America's schools.[64] While many Americans misinterpreted the federal Race to the Top initiative as an incentive program solely for states that had adopted the Common Core, it is important to note that the Common Core is a state-led initiative whose adoption by individual states was not a

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[59] Brian M. Stecher and Georges Vernez, *Reauthorizing No Child Left Behind* (Santa Monica, CA: Rand Corporation, 2010), ProQuest Ebook Central; John W. Borkowski and Maree Sneed, "Will NCLB Improve or Harm Public Education?," *Harvard Educational Review* 76, no. 4 (2006): 503–25, ProQuest ID (212290658).

[60] Stecher and Vernez, *Reauthorizing No Child*.

[61] Craig D. Jerald, *Benchmarking for Success: Ensuring U.S. Students Receive a World-Class Education* (Washington, DC: National Governors Association, Council of Chief State School Officers, and Achieve, Inc., 2008). https://www.nga.org/files/live/sites/NGA/files/pdf/0812BENCHMARKING.PDF.

[62] "About the Standards," Common Core State Standards Initiative, accessed October 27, 2016, http://www.corestandards.org/about-the-standards/.

[63] "Standards in Your State," Common Core State Standards Initiative, accessed October 27, 2016, http://www.corestandards.org/standards-in-your-state/.

[64] Office of the Press Secretary, "Fact Sheet: The Race to the Top," The White House, November 4, 2009, https://www.whitehouse.gov/the-press-office/fact-sheet-race-top; "Race to the Top Program Executive Summary," U.S. Department of Education, November 2009, http://www2.ed.gov/programs/racetothetop/executive-summary.pdf.

requirement to apply for Race to the Top federal funds; however, the 22 Race to the Top winners—21 states and the District of Columbia—have all adopted the Common Core State Standards.

4. Every Student Succeeds Act

Building on the themes of accountability introduced by No Child Left Behind, the benchmarked standards introduced by the Common Core, and the incentivized system introduced in Race to the Top, the Every Student Succeeds Act of 2015 aims to reform the "one-size-fits-all solutions"[65] in place since the 2001 passage of No Child Left Behind. A side-by-side comparison of the two education reform acts highlights the shift of student assessment and school ratings from the federal government to the states and from testing alone to performance-based items similar to those introduced by the Common Core.[66]

As the Every Student Succeeds Act does not take effect until the 2017–2018 school year, literature on its capability is non-existent; however, proponents of the bill highlight its focus on maintaining high standards for all students in preparation for college and career successes.[67] Additionally, reformers note how the use of testing will allow states to identify low-performing schools as well as smaller subgroups of struggling students to enable local school districts to determine the practices required to improve testing scores.[68] Some reformers argue that the Every Student Succeeds Act will not

65 Executive Office of the President, "Every Student Succeeds Act: A Progress Report on Elementary and Secondary Education," The White House, December 2015, 7, https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/ESSA_Progress_Report.pdf.

66 "Every Student Succeeds Act Versus No Child Left Behind," *Outlook-12* 1, no. 11 (2016): 19, ProQuest (1820572287); "Every Student Succeeds Act (ESSA)," U.S. Department of Education, accessed November 8, 2016, www.ed.gov/essa?src=rn.

67 "Every Student Succeeds Act (ESSA)," U.S. Department of Education; Executive Office of the President, "Every Student Succeeds Act," 1, 3–4.

68 Alyson Klein, "The Every Student Succeeds Act: An ESSA Overview," *Education Week*, March 31, 2016, https://www.edweek.org/ew/issues/every-student-succeeds-act/.

likely change the education landscape in the United States in that it reflects a policy similar to what existed in President Obama's waiver system to No Child Left Behind.[69]

5. Education Governance

Regardless of the specific policy in place, critics note that educational reform suffers a federalist fate similar to many nationwide programs managed at the local level—a fate summarized by McGuinn and Manna in their question, "Who leads when everyone is in charge?"[70] Their claim about how "the structure of American education governance—highly fragmented, decentralized, politicized, and bureaucratic . . . undercut[s] the development and sustenance of changes needed to improve the education opportunities and academic performance of students"[71] persists in the discussion of the true effectiveness of all government-led education reforms, including No Child Left Behind, the Common Core, Race to the Top, and the Every Student Succeeds Act.

C. THE TRADITIONAL SCHOOL MODEL

The increasing number of educated workers required within the rapidly developing industrial system of the late 19th century United States necessitated the efficient schooling of more Americans. To increase efficiency within schools, education reformers—often individuals outside of the school system, like policymakers, corporate leaders, and university researchers—began redesigning what Tyack and Cuban describe as the "one-room country school" characterized by one teacher providing ungraded, personalized instruction to each of his or her students of varying ages and abilities.[72] Tyack and Cuban note that reformers saw these country schools as incredibly inefficient and turned to practices common in factories to increase the productive capabilities of

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69 Alia Wong, "The Bloated Rhetoric of No Child Left Behind's Demise," *The Atlantic*, December 9, 2015, http://www.theatlantic.com/education/archive/2015/12/the-bloated-rhetoric-of-no-child-left-behinds-demise/419688/.

70 Patrick McGuinn and Paul Manna, "Education Governance in America: Who Leads When Everyone Is in Charge?," in *Education Governance for the Twenty-First Century: Overcoming the Structural Barriers to School Reform*, ed. Paul Manna and Patrick McGuinn (Washington, DC: Brookings Institute Press, 2013), 1, https://muse.jhu.edu/book/28619.

71 Ibid., 3.

72 Tyack and Cuban, *Tinkering Toward Utopia*, 88.

schools, practices that led to "concentrating the work of a teacher on one grade in which students could be grouped by academic proficiency and could learn a uniform curriculum."[73]

Another lasting effect from the early 20th century involves the decision to use instructional time as the basis for the awarding of graduation credits, particularly in high school. Implementation of the Carnegie Unit—defined as "120 hours of contact time with an instructor, which translates into one hour of instruction on a particular subject per day, five days a week, for twenty-four weeks annually"[74]—shaped instruction for more than a century, and instruction within the public school system remains largely based on the use of the Carnegie Unit's measure of "seat time" to meet high school graduation requirements.[75] While the Carnegie Unit was extremely useful in providing efficiency to the school day and in standardizing the amount of instruction time in the growing educational system of the early 20th century, many educational reformers question the continued use of "seat time" to assign academic credits.[76]

In general, students remain subjected to a 19th century education model created to solve issues of inefficiency and non-standardization that reformers saw inherent in the 19th century "one-room country school." Today's K–12 students remain grouped into grade levels; students receive six to eight instructional hours per day, interrupted at scheduled intervals by bells that prompt teachers and students to move to the next subject regardless of understanding of the material presented previously; instruction remains

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[73] Tyack and Cuban note education reformers being impressed by the "division of labor and hierarchical supervision common in factories." See Tyack and Cuban, *Tinkering Toward Utopia*, 89.

[74] Colleges and universities also remain focused on the use of Carnegie Unit-based "credit hours." See Elena Silva, Taylor White, and Thomas Toch, *The Carnegie Unit: A Century-Old Standard in a Changing Landscape* (Stanford, CA: Carnegie Foundation for the Advancement of Teaching, 2015), 8 https://www.carnegiefoundation.org/resources/publications/carnegie-unit/.

[75] As of March 2012, Cavanagh notes "36 states have adopted policies that allow districts or schools to provide credits based on students' proficiency in a subject, rather than the time they physically spend in a traditional classroom," noting as of 2005, New Hampshire has done completely away with dependence on the Carnegie Unit. See Sean Cavanagh, "States Loosening 'Seat Time' Requirements," *Education Week*, March 5, 2012, http://www.edweek.org/ew/articles/2012/03/07/23biz-state.h31.html.

[76] Dale Frost, "Moving from Seat-Time to Competency-Based Credits in State Policy: Ensuring All Students Develop Mastery," International Association for K–12 Online Learning, April 12, 2016, http://www.inacol.org/news/moving-from-seat-time-to-competency-based-credits-in-state-policy-ensuring-all-students-develop-mastery/.

teacher-led with little personalization to individual students; assessments cover the previous 2–4 weeks of instruction; instruction on a new topic continues before students receive feedback on their previous assessments; students take a standardized test at the end of the year; students move to the next grade so long as they do not fail the course or standardized, end-of-year exam; and the cycle continues regardless of the true knowledge attained.

Opponents of the traditional model argue that its focus on "seat time" or "contact time" has led to a system that holds the time and pace of instruction as fixed and the understanding or mastery of concepts as variable.[77] Education reformers describe the traditional system as ill-suited in preparing students to succeed in the 21st century and recommend a competency-based system that holds the mastery of concepts as fixed and allows variability in the pace and duration of instruction.[78]

Reformers also critique the use of assessments within the traditional model. Farrington and Small describe a system in which students have only "time-limited incentives to learn course material and no opportunity or incentive to improve performance or learn more after grades are issued."[79] They also highlight that students who earn a passing grade—even a low grade that often indicates minimal understanding of a subject—receive an academic credit for graduation in the Carnegie-based system. Once again, reformers suggest changes to the traditional model's current use of

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77 Khan, "Let's Teach for Mastery."

78 In brief, competency-based education, also known as mastery-based, proficiency-based, or performance-based education, focuses on students meeting established learning goals before proceeding to the next learning goal. Students in a competency-based system would not move to the next grade simply because the school year ended. See Susan Patrick and Chris Sturgis, *Maximizing Competency Education and Blended Learning: Insights from Experts* (Vienna, VA: International Association for K-12 Online Learning, 2015), 14, http://www.competencyworks.org/wp-content/uploads/2015/03/CompetencyWorks-Maximizing-Competency-Education-and-Blended-Learning.pdf; Susan Patrick, Kathryn Kennedy, and Allison Powell, *Mean What You Say: Defining and Integrating Personalized, Blended and Competency Education* (Vienna, VA: International Association for K–12 Online Learning, 2013), http://www.inacol.org/wp-content/uploads/2015/02/mean-what-you-say.pdf; Khan, "Let's Teach for Mastery."

79 Camille A. Farrington and Margaret H. Small, *A New Model of Student Assessment for the 21st Century* (Washington, DC: American Youth Policy Forum, 2008), 3, http://www.aypf.org/documents/ANewModelofStudentAssessmentforthe21stCentury.pdf.

assessments to a model that enforces the student's ability to attain mastery of core competencies.

D. CONCLUSION

The current debate on the usefulness of the traditional education model in K–12 public schools continues. Silva, White, and Toch argue that the use of the Carnegie Unit "was never intended to function as a measure of what students learn" and claim that many criticisms of the Carnegie Unit are founded on that idea.[80] They also highlight President Obama-era grant competitions like Race to the Top and Investing in Innovation as evidence that schools are moving away from the time-based model to a competency-based model;[81] however, many proponents of student-centered learning based on mastery of core competencies want further reforms to the traditional model, reforms that often include some element of education technology. The remainder of the thesis will discuss the applicability and efficacy of these reforms on the K–12 education of military-connected children.

[80] Silva, White, and Toch, *Carnegie Unit*, 5.

[81] Ibid., 23.

III. COMPETENCY-BASED, PERSONALIZED LEARNING STRENGTHENED BY TECHNOLOGY TO IMPROVE THE K–12 EDUCATION OF MILITARY-CONNECTED CHILDREN

Julia was nervous about school today. It was her first full day at a new school in a new city at a new base, a day she had experienced multiple times as the daughter of a Navy sailor. Before today, she had always attended the local public schools near the bases where her dad was stationed; however, as the child of a military parent, her school experience was different from many of her classmates whose parents were not in the armed forces. She is one of about a million military-connected children in the American public school system that serves more than 50 million students.

Julia's parents wanted to believe in the promise of American public schools. They understood nationwide access to free schooling as one of their country's crowning achievements; however, they feared that Julia's schools were not the best environment for her to thrive, particularly when Julia's father was away on deployments, detachments, and other Navy-related travel. Julia's parents had considered homeschooling, an increasing trend among their friends, but it wasn't a feasible option because Julia's mother worked. They also looked at some local private schools, an option that proved too expensive for the family.

Julia's parents had decided to keep Julia and her younger brother in public schools. Besides, both children seemed to do well in school. Sure, their grades dipped when their dad was gone, but that was to be expected, just like the changes in their behavior. Perfectly normal, right? At least that's what all the support websites had told Julia's mother to expect when her husband was gone.

Her father's absences seemed to affect Julia more than her little brother. As the older sister, she felt increased responsibility to make up for her dad being gone. Julia noted how her mom was more quiet and seemed more serious during her dad's trips, but she really respected how hard her mom worked, especially when her dad was gone.

Julia liked going to school and worked even harder when her dad was away so he'd be proud of her accomplishments when he got home. She found it more difficult to

concentrate while her dad was gone, but she often didn't feel challenged with her schoolwork and realized her lapses of concentration didn't negatively impact her grades.

The toughest part of her dad being away from home was all the stuff she wanted to share with him. He always tried calling and emailing to ask about her soccer games while he was gone, but she was getting tired of doing recaps and sending pictures and videos on the computer. Julia realized how lucky she was to have soccer. Not all of the other military kids shared her passion for athletics or other group activities, and she saw how some of these kids struggled to fit in when they arrived at a new school. Soccer, Julia thought, was her best way of fitting in.

Julia thought often of the many moves she had made and of the various teammates she had left behind. She wasn't angry about moving, just frustrated at all the changes it meant. For the family's previous move, Julia's father remained behind, finishing his old job while Julia, her brother, and her mother went ahead to get settled in their new house before the school year started. Julia often found herself having to explain to her new teachers and new friends that her dad would be rejoining the family once his assignment was completed.

While Julia hated the extra five months away from her father, she understood the reason why: when she was younger, she and her family had moved together from Virginia to California in the middle of the school year. Because her parents had family in the middle of the country, they decided to spend a few extra days with their relatives along the way. When all was said and done, Julia had missed three weeks of school in the middle of the school year.

She remembered a meeting she and her parents had with school administrators shortly after checking into her new school. After being told what subjects Julia would be taking, her parents had asked the school administrators about the Interstate Compact on Educational Opportunity for Military Children, the compact agreed to by all 50 states with the goal of easing the transition of military children, but the administrators didn't have much experience with implementation of the compact.

One of the issues seemed to relate to the Virginia state history class she had taken at her previous school and how to award credit for the class as it was not required in California. Another issue arose when the 5th grade science class in California focused on what she had learned in 4th grade in Virginia. After discussing the situation with the base's lone School Liaison Officer, whose many jobs included coordination between the local school district and military parents, Julia's parents were able to resolve the issue, but Julia remembered the boredom of sitting in her new science class in California while she was re-taught lessons from the year prior.

The school experience for Julia is not good. Despite such policies as Impact Aid, the Interstate Compact on Educational Opportunity for Military Children, and the School Liaison Officer program, the American public school system has not met the various academic, social, physical, and psychological needs of its military-connected children. Issues remain for students particularly while transitioning between schools and across state lines. Additionally, this highly mobile student population requires highly mobile tools to allow for more control of its academic progress. If the various needs of military-connected children cannot be met within the current public school system, perhaps an alternative system should be considered.

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Julia's experiences are far from ideal. Her academic environment does little to mitigate the extra challenges she faces as a military child. Additionally, she remains subjected to a K–12 school model that most education experts agree is outdated, which leads to the question: why does the traditional education model remain dominant in American public schools?

My research suggests that today's education model would look drastically different if education experts could simply start over. Using Tyack and Cuban's "one-room country school"[82] as a starting point, I ask the reader to imagine a school system that allowed for the personalized instruction of all K–12 students to ensure mastery of core competencies without the need of grade levels, teacher-led instruction, routine

82 Tyack and Cuban, *Tinkering Toward Utopia*, 88.

examinations, standardized testing, or the common A–F grading system. Mastery of topics could be held as fixed as the pace, duration, and modality of learning could vary.[83]

A. COMPETENCY-BASED LEARNING

Competency-based learning[84] differs from the time-based system reinforced by the traditional school model's reliance on "seat time" standards implemented with the Carnegie Unit. What, then, is competency-based learning? Following the 2011 Competency-Based Learning Summit sponsored by the Council of Chief State School Officers and the International Association for K–12 Online Learning, Sturgis, Patrick, and Pittenger provided the following working definition of competency based-learning:

- Students advance upon mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive timely, differentiated support based on their individual learning needs.
- Learning outcomes emphasize competencies that include application and creation of knowledge, along with the development of important skills and dispositions.[85]

Clearly a competency-based education model challenges the traditional time-based system; however, an increasing number of states are currently allowing alternate

83 Khan, "Let's Teach for Mastery."

84 Throughout education literature, competency-based learning is also called mastery-based, proficiency-based, or performance-based learning, see Horn and Staker, *Blended*, 8. Patrick et al. define competency-based learning as "a system of education . . . in which students advance and move ahead on their lessons based upon demonstration of mastery," see Patrick, Kennedy, and Powell, *Mean What You Say*, 22.

85 Chris Sturgis, Susan Patrick, and Linda Pittenger, *It's Not a Matter of Time: Highlights from the 2011 Competency-Based Learning Summit* (Vienna, VA: International Association for K – 12 Online Learning, 2011), 6, https://www.inacol.org/wp-content/uploads/2015/02/iNACOL_Its_Not_A_Matter_of_Time_full_report.pdf.

pathways to achieve academic credits.[86] Additionally, the Every Student Succeeds Act allows federal funding of state governments for "evaluating student academic achievement through the development of comprehensive academic assessment instruments . . . that emphasize the mastery of standards and aligned competencies in a competency-based education model."[87]

In 2009, facing the challenges of educating a large number of low-income students, some of whom were also English Language Learners, Colorado's Adams 50 school district, now known as Westminster Public Schools, transitioned to a competency-based system.[88] Students were no longer batched into traditional K–12 grade levels based on their ages but placed into smaller groups based on their proficiency on a subject. While the district's schools were able to raise their students' scores on the state's annual standards-based assessment, as of December 2016, the district itself remained on the state's watch list for low academic performance.[89] Highlighting just one of the many challenges incurred when transitioning to a competency-based system, Westminster school officials note that the state's accountability system is at odds with the district's proficiency-based system because the state's standardized testing is based on traditional grade levels.[90]

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86 A CompetencyWorks map indicates "36 states have already revised policies to allow for proficiency-based diplomas, waived seat-time to allow competency-based pathways, created credit flexibility, or initiated a redesign of their education system around student learning." See "Aligning K–12 State Policies with Competency Education," CompetencyWorks, 2, accessed June 26, 2017, http://www.competencyworks.org/wp-content/uploads/2014/09/CWorks-Aligning-State-Policy.pdf.

87 Elementary and Secondary Education Act of 1965, Pub. L. No. 114–95, 20 U.S. Code 6361 (2015), 109–10, https://www2.ed.gov/documents/essa-act-of-1965.pdf.

88 Lark Turner, "Four Years Later, a District's Standards-Based Reform Evolves and Pays Off," Chalkbeat, May 23, 2013, http://www.chalkbeat.org/posts/co/2013/05/23/four-years-later-a-districts-standards-based-reform-evolves-and-pays-off/.

89 Robles describes the persistent issues the district has faced: "Teachers have been inconsistent in tracking data, the district hasn't pinned down just how long for a student to linger on a single level, and many students and parents remain confused about how the model works." See Yesenia Robles, "Is Westminster Public Schools' Investment in Competency-Based Learning Paying Off?," Chalkbeat, December 5, 2016, http://www.chalkbeat.org/posts/co/2016/12/05/is-westminster-public-schools-investment-in-competency-based-learning-paying-off/.

90 Yesenia Robles, "Can Westminster's Different Approach to Learning Get a Fair Shot Under Colorado's Accountability System?," Chalkbeat, October 14, 2016, http://www.chalkbeat.org/posts/co/2016/10/14/can-westminsters-different-approach-to-learning-get-a-fair-shot-under-colorado-accountability-system/.

While Westminster's competency-based system continues to face challenges integrating into the state's accountability system, its approach illustrates a useful model. The system includes a series of learning targets, represented as blocks of knowledge and skills, which make up a total of 12 performance levels in each content area.[91] Different performance levels have a different number of learning targets. For instance, Math Level Two consists of ten learning targets.[92] Students learn at their own pace by showing proficiency in each learning target before progressing to the next performance level in that content area, and students must reach performance level 12 in all content areas to graduate.[93] Therefore, in the Westminster Public School District, a traditional fourth grader could be Math Level Five, Science Level Four, Social Studies Level Four, and Literacy Level Two, indicating strengths in math and challenges in literacy. School officials highlight how the system allows progress between performance levels during the school year for students who show proficiency and additional time at the beginning of a school year for those students who need continued focus in a challenging content area.[94]

B. PERSONALIZED LEARNING

While the construct of the traditional school model has enabled the K–12 education of all Americans, it limits the ability of teachers to provide personalized, differentiated instruction to each individual student. Patrick et al. provide a working definition for personalized learning: "tailoring learning for each student's strengths, needs and interests—including enabling student voice and choice in what, how, when and where they learn—to provide flexibility and supports to ensure mastery of the highest

91 "Show What You Know and Graduate Ready for the Real World: About Personalized Learning in Your Child's School," Westminster Public Schools, accessed June 27, 2017, https://www.westminsterpublicschools.org/cbsinfo; Westminster has tinkered with its number of performance levels before deciding on 12 to correspond with the traditional K–12 grade levels, see Turner, "Four Years Later."

92 "Show What You Know," Westminster Public Schools.

93 Learning target proficiency is indicated by achieving a score of 3 or higher—on a 4-point scale—in that learning target, Ibid.

94 In the example above, students would not be forced to maintain instruction at the "fourth grade level" simply because they are nine-years-old. They could progress to Math Level 6 when ready and remain in Literacy Level 2 until they are proficient in each of the required learning targets in literacy, "Show What You Know," Westminster Public Schools.

standards possible."[95] Education reformers note the importance of personalized instruction and highlight the conclusions of Benjamin Bloom's "The 2 Sigma Problem," in which data indicate students with the aid of a one-on-one tutor outperformed students in a traditional classroom by an average of two standard deviations, or approximately 98 percent, above the traditional student.[96]

While ensuring mastery of a topic links personalized and competency-based learning, they are not the same. Personalized learning truly allows the learner—with the help of a teacher serving more as a tutor or guide than as the sole source of information through classroom lectures—to take ownership of his or her education. It is in this idea of ownership in which students can become intrinsically motivated to excel in school.[97]

In his book, Daniel H. Pink notes the importance of autonomy as one of three essential principles of what he calls Type I behavior, or intrinsically motivated behavior.[98] Pink argues that "all kids start out as curious, self-directed Type Is" and suggests that parents, teachers, and school administrators play a large role in replacing this intrinsic motivation with extrinsic motivation often through their reliance on "if-then" rewards.[99] He notes—and his research on the work of psychologists Harry F. Harlow and Edward Deci among others suggests—that extrinsic rewards "require people to forfeit some of their autonomy" because they are no longer personally motivated to

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[95] Patrick, Kennedy, and Powell, *Mean What You Say*, 4.

[96] Bloom's conclusion also showed students in "mastery learning" classrooms, in which detailed feedback was given to improve deficiencies on assessments, outperformed students in a traditional classroom by one standard deviation. See Benjamin S. Bloom, "The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring," *Educational Researcher* 13, no. 6 (1984): 4, doi:10.3102/0013189X013006004.

[97] Patrick and Sturgis note the role the traditional grading system of A–F has on a student's external motivation and describe how this leads to a gap in educational achievement. See Patrick and Sturgis, *Maximizing Competency Education*, 5.

[98] The other principles are mastery and purpose. See Daniel H. Pink, *Drive: The Surprising Truth About What Motivates Us* (New York: Riverhead Books, 2009), 75, 78.

[99] Pink describes a study by psychologists Mark Lepper, David Greene, and Robert Nisbett, in which preschoolers who had been previously awarded a "Good Player" certificate for drawing showed less long-term interest in drawing than their counterparts who had not been previously awarded certificates. The experiment showed—as did many that followed—that individuals who received awards if they acted a certain way were less inclined to continue that same behavior if not rewarded for it. See Pink, *Drive*, 35-38.

undertake an activity.[100] Rather, Pink argues the importance of intrinsic rewards to enhance "our innate need to direct our own lives, to learn and create new things, and to do better by ourselves and our world,"[101] needs that are better met for K–12 students through a transition to personalized learning.

Pink's discussion on Type I behavior links autonomy and mastery, his second essential principle for intrinsic motivation. He argues that "autonomy leads to engagement" and that "only engagement can produce mastery."[102] Pink draws his conclusion from the research of Stanford University's Dr. Carol S. Dweck in what she calls mindset. In her book, Dr. Dweck presents two mindsets: the fixed mindset and the growth mindset. She characterizes a fixed mindset as the belief that ability cannot be changed, whereas a growth mindset is the "belief that your basic qualities are things you can cultivate through your efforts."[103] For instance, a person with a fixed mindset believes their intelligence is something that cannot change; however, Dweck's research shows an individual's mindset itself can be changed in the right atmosphere.

Unfortunately the traditional school model tends to exacerbate the problem for those with fixed mindsets and for those without the ability to personalize their learning. According to Dweck's research, fixed mindset students stay engaged in a subject only when they succeed in class and lose interest once they begin to struggle.[104] Thus, for fixed mindset students, the receipt of a bad grade causes further disengagement when the necessary correction is the assurance and personalized feedback from a teacher whose guidance promotes a personal belief of success within the student. Such feedback within an educational system that allows for subject mastery and autonomy through personalization and differentiation provides students with the intrinsic motivation required to sustain the lifelong learning and skills necessary in the 21st century.

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[100] Pink, *Drive*, 36.

[101] Ibid., 10.

[102] Ibid., 108–9.

[103] Carol S. Dweck, *Mindset: The New Psychology of Success* (New York: Ballantine Books, 2008), 6–7.

[104] Ibid., 23.

C. BLENDED LEARNING

While education experts tend to agree that systems that allow for competency-based, personalized learning are ideal in schools, the ability to do so effectively is limited by the traditional K–12 school model. One-on-one tutors are unrealistic in any school system, and the average classroom is not designed to allow students to advance at their own pace after demonstrating mastery in a topic. How, then, can school administrators transition to a competency-based system that allows for personalized learning? For a growing number of education reformers, the answer is blended learning.

Horn and Staker provide a three-part definition for blended learning:

- "Blended learning is any formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace."[105]
- Blended learning involves a student learning "at least in part in a supervised brick-and-mortar location away from home."[106]
- Blended learning includes "modalities along each student's learning path within a course or subject [that] are connected to provide an integrated learning experience."[107]

Advocates of blended learning understand that pedagogy must remain "learning-centered" rather than "technology-centered"[108] and realize the transformative possibilities allowed through the appropriate use of technology in a supporting role to ensure "student-centered learning."[109] Patrick et al. discuss the difficulty in realizing a truly personalized, student-centered learning environment without the use of technology,

105 Horn and Staker, *Blended*, 34.

106 Ibid., 35.

107 Ibid.

108 Mayer, "Learning with Technology," 179.

109 Horn et al. describe "student-centered learning" as a combination of competency-based learning and personalized learning and argues that "today's students are entering a world in which they need a student-centered schooling system" that will ensure their success in the 21st century. See Horn and Staker, *Blended*, 8–10.

particularly because the "tools in blended and online learning can support flexible pacing, differentiated instruction, immediate interventions, and anywhere, anytime learning"; however, they argue the importance of "redesigning instructional models first, then applying technology, not as the driver, but as the enabler for high-quality learning experiences that allow a teacher to personalize learning and manage an optimized learning enterprise in the classroom."[110] Thus, the key to incorporating blended learning is to realize the necessity for personalized learning first and then to use education technology as a gateway that allows for personalized, differentiated instruction.

The use of technology, specifically to provide personalized learning, is integral to the online lessons offered by the not-for-profit Khan Academy; however, Sal Khan, the founder and CEO of Khan Academy, has identified limited access to technology as a key problem for the delivery of online instruction.[111] Despite the connectivity issues, Khan appreciates that technology can supplement differentiated learning within the classroom, an important aspect in the shift towards learning strategies based on the mastery of topics rather than a focus on performance-based examinations.[112]

Vander Ark argues that while differentiated classrooms would improve learning for the individual student, a teacher's ability to do so effectively is limited by the traditional school setting.[113] The incorporation of technology, he says, allows teachers to customize their lessons and provide differentiated, personalized learning to each of their students.[114] Similarly, the aggregation of personalized learning data can enable educators to target their instruction methods, leading to improved measurements of student mastery and teacher effectiveness.[115] Finally, aggregated data can travel with the student,

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110 Patrick, Kennedy, and Powell, *Mean What You Say*, 9.

111 Vernon M. Billy, "A Discussion With Khan Academy's Founder," *The Education Digest* 81, no. 1 (2015): 30, ProQuest (1708016090).

112 Billy, "A Discussion With Khan," 35; Khan, "Let's Teach for Mastery."

113 Tom Vander Ark, *Getting Smart: How Digital Learning Is Changing the World* (San Francisco: Wiley, 2011), 35, ProQuest Ebook Central.

114 Ibid., 34–35.

115 Darrell M. West, *Digital Schools: How Technology Can Transform Education* (Washington, DC: Brookings Institution Press, 2012), ProQuest Ebook Central.

allowing the individual student more freedom to learn and more control on his or her learning.

D. MILITARY-CONNECTED CHILDREN AS NONCONSUMERS

When service members are relocated due to military orders, particularly if the move occurs during the school year, they can take their children with them and interrupt their academic progress, or they can leave their family behind until their children complete the school year. The service members and their families suffer either way. Similarly, when service members return from a lengthy deployment, a key time for them to reconnect with their family is immediately following their return.[116] The largely inflexible public school system limits the ability of its military-connected students to be absent during these crucial times after a parent's return from a deployment, causing additional instances of nonconsumption for its military-connected children.

Based on the psychological, physical, social, and academic challenges unique to military-connected children, one could argue that the traditional public school system—despite policies and programs like the Interstate Compact on Educational Opportunity for Military Children, Impact Aid, or the School Liaison Officer program—does not adequately provide the support structure these vulnerable students need. In essence, a large portion of military-connected children remain in the traditional public school system because they lack any viable alternative.[117]

By expanding the Department of Defense Education Activity school system and restructuring the learning environment within these schools, administrators and educators can leverage disruptive education technologies to create a more flexible school system designed with the unique challenges of military-connected children in mind. No longer would the critical needs of these children be identified as yet another problem the public school system is required to fix. Instead, an expanded Department of Defense school

[116] For instance, a 2010 study of military youth found that many children noted the readjustment time after deployment was as difficult as the deployment itself. See Kristin N. Mmari et al., "Exploring the Role of Social Connectedness Among Military Youth: Perceptions from Youth, Parents, and School Personnel," *Child Youth Care Forum*, 39, no. 5 (2010), 358, doi:10.1007/s10566-010-9109-3.

[117] Some military families choose other schooling options like private schools or home-schooling; however, this is clearly not viable for all families.

system, whose focus would remain solely on meeting the educational needs of military children not met within the public school system—those areas of nonconsumption—would be free to implement sweeping changes to the traditional education model within the United States. Such changes would allow school administrators, faculty, and teachers to transition to student-centered educational practices that focus solely on meeting the unique academic, social, physical, and psychological challenges of military-connected children while allowing more time to nurture a student population greatly affected by their parents' demanding profession.

In summary, an expansion of the Department of Defense Education Activity can lead to the development of curricula and tools that can improve the academic experience of military-connected children outside of the traditional public school system. Disruptive theory suggests education technologies that focus on the unique needs of military children will avoid competition with other public school priorities and lead to platforms dedicated to meet these needs. Additionally, education technologies that are developed for military children and have a proven record of success within an expanded Department of Defense school system could then be adapted and absorbed into school systems throughout the nation.

IV. EXPANSION OF DEPARTMENT OF DEFENSE EDUCATION ACTIVITY SCHOOL SYSTEM

On their most recent move across the country, Julia's family decided to relocate together as a family, even though it was once again in the middle of the school year. Just prior to the move from Washington State to Virginia, Julia's family enrolled Julia and her brother into the newly expanded Department of Defense Education Activity. Julia's parents uploaded her entire academic profile, along with her brother's, into the Department of Defense's Online Student Portal, which ensured her new teachers in Virginia would know Julia's and her brother's past academic experiences upon arrival. Additionally, Julia and her brother were able to gain access to online lessons during their move. With a temporary stop that took the family to Naval Station Great Lakes in Illinois, Julia's father spent a week in training while Julia and her younger brother went to a school within the Department of Defense Education Activity network. Here, teachers were able to access Julia's and her brother's online academic profiles and see the progress they had made during their week of travel from Washington. Julia, who was normally exceptional at mathematics, had required extensive time while learning about intercepts. With direct access to Julia's progress of the previous week, one of the Great Lakes school teachers, someone she had never met before this week, was able to suggest an alternative method for understanding graphical interpretations of intercepts. The instruction was personalized and direct. It was based on the knowledge—and with an understanding—of Julia's progress from the previous week on the road.

The compiled data from the previous week showed the amount of time Julia had dedicated on learning intercepts, and it showed some of the mistakes she had made were based largely on an incomplete understanding of linear equations, which she had been taught at her previous school. The new teacher in Great Lakes was able to make the connection to the previously misunderstood material and recommended some new lessons to learn the missed material. Julia logged into her Student Portal later that night in the family's room at the Navy Lodge. By reviewing the previous material, she found a glaring deficiency in her understanding of linear equations and worked through the suggested

lessons until she had mastered the topic. The next morning, Julia logged back into her Student Portal and breezed through the lessons on intercepts. When she arrived at the school building after spending extra time with her dad eating breakfast in the galley, Julia told her teacher all about the progress she had made since yesterday's recommendation, knowledge the teacher already had because she had checked on Julia's progress before her arrival that morning. Having overcome the difficulty of understanding intercepts, Julia's effort was rewarded with the confidence of undertaking and mastering her next lesson.

In addition to collaborating with other students on their academic progress, Julia's schedule that day included a peer-to-peer counseling session in which she was able to meet with a small group of students of varying ages to talk about her move. Normally guarded while sharing her feelings, especially in her previous school settings filled with non-military-affiliated peers, Julia was slow to share the anxiety she felt about the move and about her dad's upcoming deployment schedule. As the session continued, she realized how unique her new environment was: surrounding Julia were other children whose families faced uncertainties familiar to her. One girl, a soccer player like Julia, was moving to the base Julia's father had just left and was relieved when Julia told her about the local soccer league.

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This second scenario details what could be possible if policymakers, rather than focusing solely on changes within the existing American public school system, implemented wholesale changes to the traditional education model within an expanded network of Department of Defense Education Activity schools to improve the K–12 education of military-connected children. Such a network could focus specifically on meeting the unique academic, social, physical, and psychological challenges of these children while maintaining its current standardized curriculum and incorporating education technologies to enable highly mobile tools that allow for personalized, differentiated, blended learning conducted by professionalized and supported teachers whose effectiveness can be more accurately measured through the use of aggregated student performance data. Additionally, the expanded network of schools could serve as a

learning laboratory in which new curricula, teaching methods, and supporting education technologies are tested to determine effective tools for implementation within the public school system.

A. STANDARDIZED CURRICULUM WITHIN DEPARTMENT OF DEFENSE EDUCATION ACTIVITY SCHOOLS

The implementation of a standardized curriculum based on international benchmarks is vital to the success of any school system. It is reasonable to consider that a federally governed and federally funded Department of Defense Education Activity school system would face fewer obstacles maintaining and refining a standardized curriculum than the current public school system, which faces inputs from federal, state, and local governments.

In addition to the academic benefits a standardized curriculum provides to students within an expanded Department of Defense K–12 school network, standardization greatly enhances the transferability of a student's progress during the academic year. For instance, a student moving within a school system whose standards are aligned reduces the interruption caused by the move, an experience not replicated in American public schools despite policies like the Interstate Compact on Educational Opportunity for Military Children. Similarly, military-connected children could conceivably travel with their military parent during shorter military assignments[118] to areas with a school within the expanded Department of Defense school network, knowing that the network's standardized curriculum provides the possibility of uninterrupted academic progress regardless of the specific school.

1. A Standardized Curriculum Based on International Benchmarks

The debate on education reform within American public schools, specifically on the policy better known as the Common Core, often focuses on the appropriate level of education governance or the cost incurred to make required curricular changes.

[118] Brief military assignments, more commonly referred to as temporary duty, TAD, or TDY, occur regularly throughout a military career. Some last only a few days, like attendance at a conference or training at a location away from home, while other training requirements last multiple months.

Individuals and organizations who dislike the Common Core frequently argue that the standards remove local control over what is taught in schools;[119] however, a federally operated Department of Defense Education Activity school network would eliminate state and local inputs in determining its core educational standards, a key factor for the highly mobile children of military families.

Proponents of the Common Core, on the other hand, highlight the necessity of "international benchmarking" to determine the best educational practices throughout the world and to adopt these best practices and standards within the American system.[120] Determining the best educational practices throughout the world is the function of the Organisation for Economic Co-operation and Development's (OECD's) Programme for International Student Assessment (PISA), which "assesses the extent to which 15-year-old students, near the end of their compulsory education, have acquired key knowledge and skills that are essential for full participation in modern societies."[121] The Common Core State Standards simply follow the advice of the OECD to use PISA findings "to gauge the knowledge and skills of students in their own countries in comparison with those in other countries, set policy targets against measure goals achieved by other education systems, and learn from policies and practices applied elsewhere."[122]

2. Benefits of Standardization to Military Families

Understanding the importance of aligning education standards to international benchmarks, the current Department of Defense Education Activity school system has adopted the rigorous Common Core framework, calling its program "College and Career

119 Examples critiquing the appropriate level of governance abound, but articles that focus on the educational needs of military-connected children also take exception to the Common Core State Standards. See Wykes, *Support and Defend*, 7.

120 Jerald, *Benchmarking for Success*.

121 *PISA: PISA 2015 Results in Focus* (Paris: OECD Publishing, 2016), 3, https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf.

122 Ibid., 3.

Ready Standards."[123] The implementation of focused standards not only ensures the academic rigor for the military-connected student but also strengthens the academic experience for the school system's highly mobile student population, leading to enhanced force readiness as members of the armed forces spend less time worrying about their child's academic wellbeing. Such standardization eases school transitions during military moves and could allow increased travel opportunities for students with their military parents during periods of temporary duty away from home.[124] As summarized by the Department of Defense Education Activity, "no matter where or when they move, our students will know that the standards and expectations remain consistent."[125]

B. THE EFFECTIVE INTEGRATION OF TECHNOLOGY INTO DEPARTMENT OF DEFENSE EDUCATION ACTIVITY SCHOOLS

Instruction must become student-centered, and the use of new education technologies provides teachers the necessary tools to offer personalized, differentiated, blended learning that ensures mastery of core competencies. Additionally, the incorporation of highly mobile education technologies benefits the highly mobile military-connected student population and allows schools to redesign student and teacher assessments.

1. Blended Learning within the Department of Defense Education Activity

Data collected by the National Center for Education Statistics show that American public schools added nearly 10 million computers between 1995 and 2008, increasing the

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123 Thomas Brady, the current director of the DoDEA school system, explained the different terminology by identifying the politicization of the term "Common Core." See The Hechinger Report, "On Military Bases, Common Core by Another Name," *U.S. News & World Report*, March 6, 2015, https://www.usnews.com/news/articles/2015/03/06/schools-on-military-bases-opt-for-common-core-by-another-name.

124 A similar system is in place at AltSchool, which has locations in New York, Palo Alto, and San Francisco. In essence, AltSchool students can maintain their academic progress in any of these schools within the AltSchool network. Such mobility requires the effective use of education technology capable of maintaining a student's academic profile. See "About Us," AltSchool, accessed March 13, 2016, www.altschool.com/about/about.

125 "College and Career Ready: A World-Class Education for Military-Connected Students," U.S. Department of Defense Education Activity, accessed March 13, 2017, http://www.dodea.edu/collegeCareerReady/index.cfm.

average number of computers per school from an average of 72 computers per school to 189 during that period.[126] Additionally, the ratio of students to computers with Internet access dropped by more than half, from 6.6 students per computer in 1995 to 3.1 in 2008.[127] The lack of measurable improvement in academic achievement during this time period suggests little to no correlation between the number of accessible instructional computers and academic achievement. To explain why technology has yet to succeed within the traditional public school system, a Brookings paper notes how "technology still functions more or less like an expensive substitute for textbooks and chalkboards."[128]

To ensure the integration of technology leads to academic achievement, instruction within an expanded Department of Defense Education Activity school network must embrace a student-centered learning approach.[129] In review, Horn and Staker note that student-centered learning combines personalized learning and competency-based learning, two things they argue the traditional public school system cannot provide in its current factory-based model.[130] Rather than focus on the traditional, factory-based education model in the public school system, an expanded Department of

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126 See "Table 218.10. Number and Internet Access of Instructional Computers and Rooms in Public Schools, by Selected School Characteristics: Selected Years, 1995 Through 2008." Thomas D. Snyder, Cristobal de Brey, and Sally A. Dillow, *Digest of Educational Statistics: 2015* (Washington, DC: National Center for Education Statistics, Institute of Education Science, U.S. Department of Education, 2016), 231, https://nces.ed.gov/pubs2016/2016014.pdf.

127 Ibid.

128 Winthrop, Williams, and McGivney, *Global Debates*.

129 Student-centered, or learner-centered, instruction relies on active learning, emphasizes deeper understanding, assumes greater student responsibility, increases learner autonomy, and creates an interdependence between the teacher and student. See Susan J. Lea, David Stephenson, and Juliette Troy, "Higher Education Students' Attitudes to Student-Centred Learning: Beyond 'Educational Bulimia'?," *Studies in Higher Education*, no. 3 (2010), 321–34, doi:http://dx.doi.org/10.1080/03075070309293. For a discussion of technology-enhanced student-centered learning and "direct instruction approaches, see Michael J. Hannafin and Susan M. Land, "The Foundations and Assumptions of Technology-Enhanced Student-Centered Learning Environments," *Instructional Science* 25, no. 3 (1997): 167, doi:http://dx.doi.org/10.1023/A:1002997414652.

130 Horn and Staker describe "personalized learning" as "customized or individualized to help each individual succeed" and "competency-based learning," or "mastery-based," as "the idea that students must demonstrate mastery of a given subject . . . before moving on to the next one." See Horn and Staker, *Blended*, 7–10.

Defense K–12 school network could completely redesign its daily schedule to facilitate a blended learning environment.

If technology allowed teachers the ability to personalize instruction for each student and replicate the one-to-one experience an individual might receive from a private tutor, Horn and Staker reason that a student's academic achievement would increase. Similarly, if technology provided the educational architecture on which to build a competency-based framework, one in which neither students nor teachers progressed to a new concept before mastering the previous concept, Horn and Staker reason that a student's academic achievement would increase.[131]

In summary, the effective use of technology to facilitate blended, student-centered instruction—ensuring personalized, competency-based learning—requires a redesign of the factory-based education model within the traditional public school system. An expanded Department of Defense Education Activity school system that embraces an alternative approach to the traditional model would improve the academic experience of military-connected children.

2. Highly Mobile Educational Interfaces for Highly Mobile Students

The implementation of a blended learning environment[132] requires technology that delivers online content to individual students, who have some control over the time, place, and pace of that content. Well-known examples of personalized, competency-based education technologies include Khan Academy's learning dashboard (see Figure 1) and Redwood City, CA-based Summit School's Personalized Learning Plan (see Figure 2). Both technologies—based on the understanding that students learn at different paces and through different methods—allow for students to control their progress and their learning modality, giving them greater agency on their academic achievement.

131 Horn and Staker, *Blended*, 8–10.

132 Horn and Staker give various models of blended learning to include the rotation, flex, a la carte, and enriched virtual models. See Ibid., 37–51.

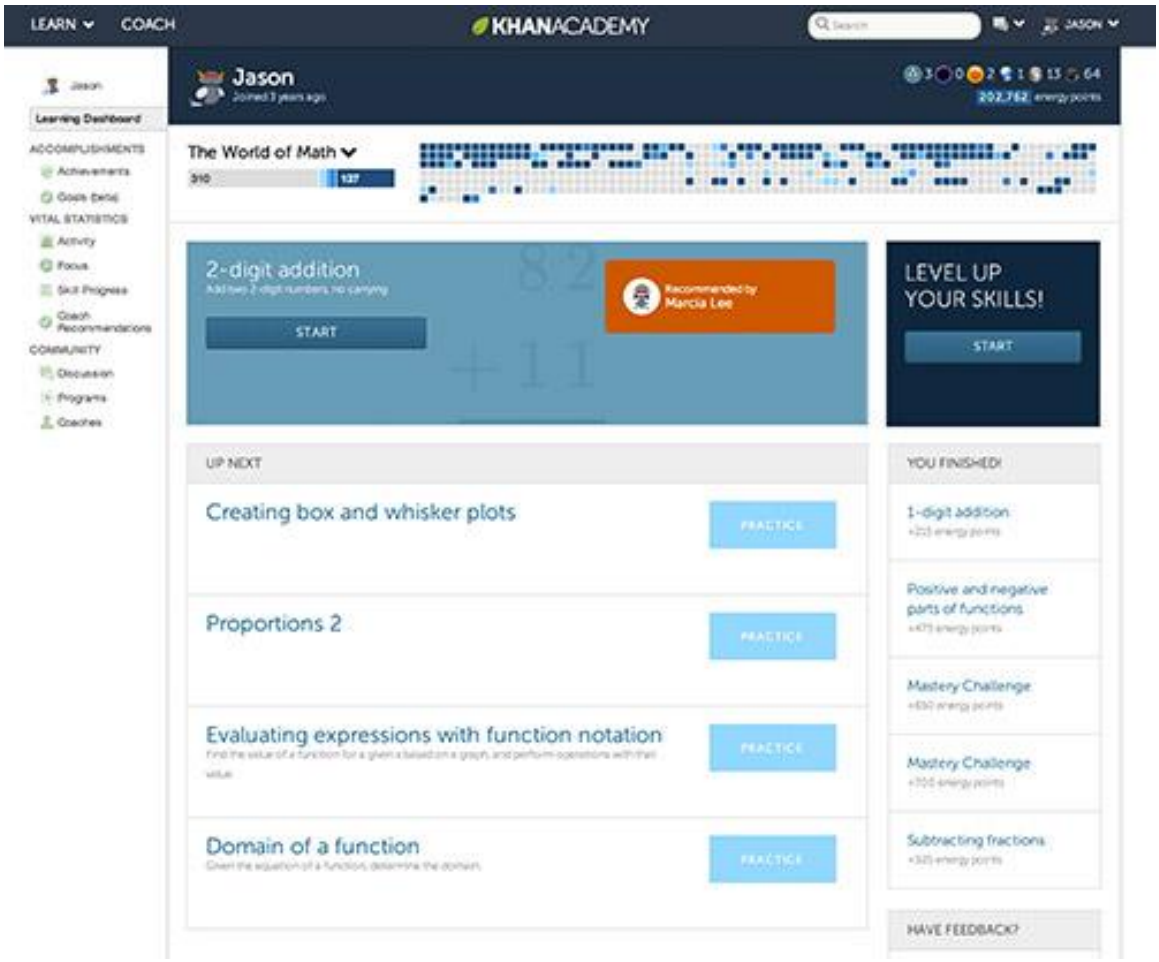

Figure 1. Khan Academy's Learning Dashboard[133]

133 Source: "The New Khan Academy Learning Experience," Khan Academy, accessed July 31, 2017, http://schools.khanacademy.org/post/58337899459/the-new-khan-academy-learning-experience.

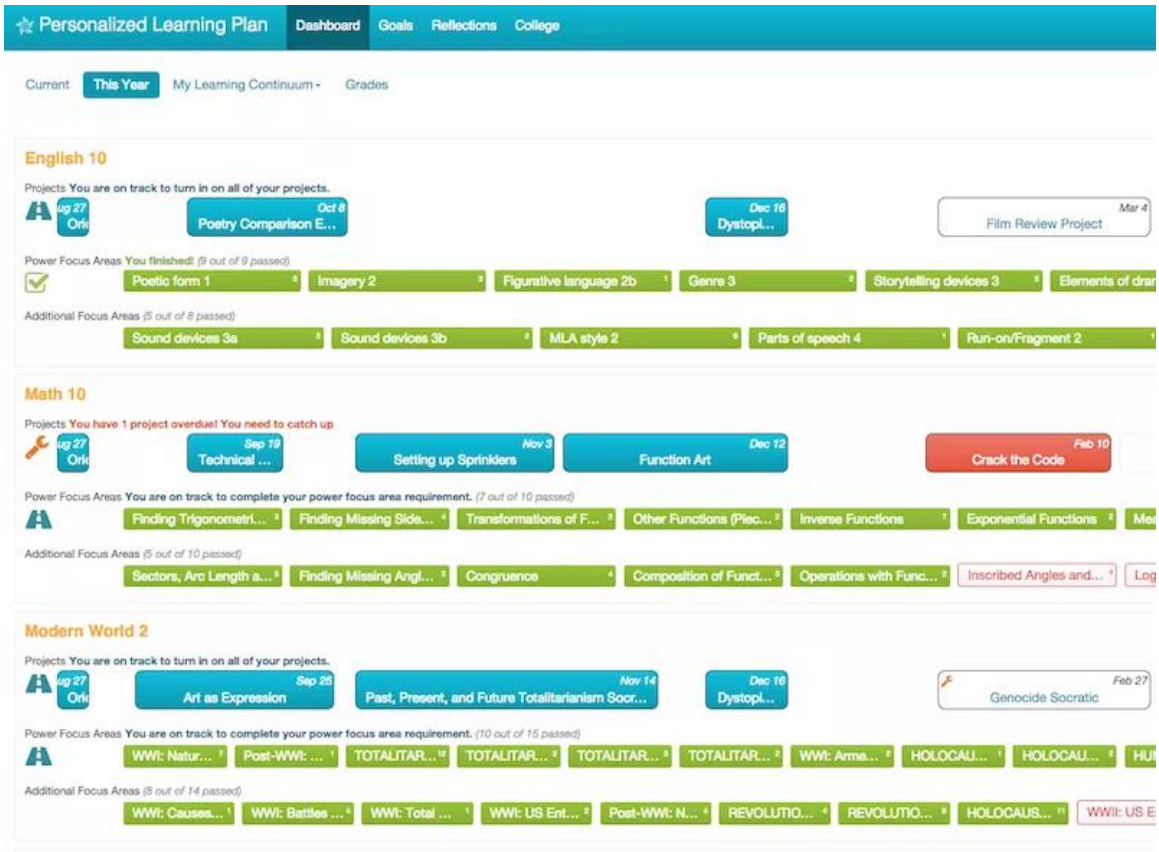

Figure 2. Summit School's Personalized Learning Plan[134]

While military-connected children would benefit in the same way any student would in a blended environment, the mobility of education technologies would alleviate many challenges unique to military-connected children and their families. Mobile education technologies would allow military children to take ownership of their education, even during interruptions caused by the six to nine moves they face during their K–12 school careers. Such ownership of academic progression during periods of transition would help lighten the stress incurred during military moves and would decrease the reticence of military families to relocate, providing these families an increased level of mobility that would directly impact force capabilities. Additionally, mobile education technologies would allow military families the choice to move together

134 Source: "Summit Schools Personalized Learning Plan Screenshot," Innovate Public Schools, May 6, 2015, https://innovateschools.org/parent-guide/parent-guide-what-is-competency-based-learning/attachment/summit-schools-personalized-learning-plan-screenshot-4/.

during a school year rather than separately after the completion of the year because their children would have access to online materials and could maintain their studies between duty stations. Finally, the full academic records of military children would remain online, easily accessible to teachers and administrators at the students' new schools where personalized instruction would continue with minimal interruption.

3. Using Technology to Redesign Assessments

If done correctly, the utilization of technology within a student-centered, competency-based educational approach can end the use of periodic examinations or tests to assess student knowledge. As Darrell West argues, student assessment within the traditional model is "static and fact based and does not devote sufficient attention to skills in critical thinking, collaboration, or problem solving."[135] The use of technology to provide real-time feedback is crucial in reversing the traditional system's repetitive cycle of lecture-homework-test and in allowing competency-based learning. Not only do digital lessons and content give students the ability to personalize their pace and modality of learning, but they also allow for real-time assessments within a competency-based system.

For instance, using the Summit Public Schools' Personalized Learning Plan, students set individual learning goals, work at a level "just above" their current abilities, and receive near-instant feedback that identifies their strengths and weaknesses in achieving core competencies.[136] Similarly, Khan Academy lessons build on each other and do not allow a student to progress through a topic without proving mastery of previous content. Either scenario obviates the necessity of testing as regularly employed within the traditional public school system.

As explained thus far, a redesigned K–12 education system that focuses on competency-based learning benefits the student academically and leads to better knowledge assessments for the student, but teachers could also benefit through the incorporation of aggregated student outcomes in their own assessments. Beginning with

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[135] West, *Digital Schools*, 107.

[136] Horn and Staker, *Blended*, 148–49.

No Child Left Behind, education reform strategies have highlighted the need to assess the efficacy of teachers and have held individual teachers and schools accountable for their students' performance on standardized tests; however, the use of standardized testing in measuring student, teacher, and school performance remains a widely debated practice that is beyond the scope of this paper. Regardless, Eric A. Hanushek, a Senior Fellow at the Hoover Institution of Stanford University, describes teachers as the most crucial determinant of student achievement but notes, somewhat paradoxically, that "it has not been possible to identify any specific characteristics of teachers that are reliably related to student outcomes."[137] Thus, the potential for improved teacher assessments based on students' academic progress and the identification of best teaching practices through the use of aggregated online student outcomes makes the incorporation of technology vital for retaining high quality teachers within an expanded Department of Defense Education Activity school system.

C. THE ROLE OF TEACHERS IN DEPARTMENT OF DEFENSE EDUCATION ACTIVITY SCHOOLS

With an expansion of the existing Department of Defense Education Activity school network and the shift away from the factory-based model of traditional public schools, teachers could provide greater support to combat the academic, social, physical, and psychological stresses unique to military-connected children. A student's online academic profile would provide the teacher with a snapshot of the student's progress that would allow the teacher to pinpoint the student's strengths and weaknesses in order to facilitate a deeper understanding of various topics. Thus, teachers in a student-centered learning system could shift to serve more as mentors guiding students in their personalized, differentiated learning to ensure student mastery of core educational concepts rather than as lecturers providing "one-size-fits-all" instruction to students of varying abilities and understandings.

Additionally, because of the standardized curriculum, teachers could devote less-extensive hours to lesson planning and could shift that excess time to nurturing student

137 Eric A. Hanushek, *The Economic Value of Higher Teacher Quality* (Cambridge, MA: National Bureau of Economic Research, 2010), 1–5, ProQuest (847269775).

behaviors. Similarly, teachers and administrators could capitalize on instruction that occurs outside of the classroom and utilize class time normally devoted to in-class lecture on classroom group projects, peer-to-peer counseling, or professional counseling that strengthens the academic, social, physical, and psychological experience of military-connected children.

D. CONCLUSION

The implementation of a competency-based, personalized learning system within an expanded Department of Defense Education Activity would strengthen the K–12 education of military-connected children. Additionally, the effective implementation of education technologies can provide highly mobile tools for a highly mobile student population while enabling the reform of the traditional school model—reform that would allow Department of Defense Education Activity teachers, administrators, and faculty more time to meet the needs unique to military-connected children.

V. POLICY RECOMMENDATIONS

After her first year in the expanded Department of Defense Education Activity, Julia was really thriving in her new environment. Her ability to have control over the time, pace, and place of her learning was a welcome change to the familiar uncertainties that surrounded her life as a "Navy brat." She was only 14-years-old and had already attended five different schools, but none of those was like her new school on base.

Julia's day started every morning with work on a group project in one of her core courses. Each group analyzed their given problem and had to present their results and recommendations to the class, enhancing the group's collaboration, problem-solving, teamwork, and communication skills. After working within her group, Julia's focus shifted to a dedicated learning time in which she personally chose how to progress through her learning goals, which she had determined for herself at the beginning of each week. She usually spent this time working through the personalized playlist included in her Online Student Portal, but she also had the option to work through problems with a classmate or even visit a Learning Station to receive focused attention from a teacher. At least once a week, Julia met with her personal mentor, a teacher assigned to help her progress through her weekly learning goals while developing a learning plan for the week ahead.[138]

The flexibility allowed in this new student-centered model was ideal for Julia and her family. Not only did Julia benefit academically, she also felt more connected with her dad. During one of her father's temporary assignments to Washington, DC, Julia actually traveled with her dad and attended a local school within the Department of Defense Education Activity network while he was at work. The two extra weeks she spent with her dad were invaluable. The trip itself was something she would have never had a chance to do at her old schools, but because she could continue to work on her weekly learning plan through lessons included within her Online Student Portal, which was also

138 The day described in this paragraph was modeled from a typical day at Summit Public Schools, see "Day in the Life," Summit Public Schools, accessed August 2, 2017, http://www.summitps.org/day-in-the-life/student-day.

accessible by any teacher within the Department of Defense school network, her academic progress proceeded uninterrupted while she was away. Additionally, she got to explore Washington, DC, with her dad and even produced a video documenting her travels for her American History class.

Perhaps the thing Julia appreciated the most about the past year was the time she was able to spend with her dad after his return from a seven-month deployment. In years and deployments past, she had to be checked out from school to see her dad's ships pull into port, which entailed missed lectures and classwork from the day. She then had to go back to school the very next day—with her completed make-up work—when all she had wanted to do was stay home and spend time with her dad. To her past teachers and school administrators who didn't understand what Julia was going through, it was just another day, but to Julia, her dad had just returned from a very long time away!

This year, however, the teachers and counselors at Julia's new school knew her dad's ship was coming home without her needing to tell them. Understanding that a homecoming is both exciting and stressful, the school faculty had organized special "Returning from Deployment" celebrations as well as counseling sessions for Julia and all the other students whose parents were on the returning ships to help the students work through any complicated emotions of their parents' homecoming. School administrators also made sure to arrange for these students' absences, not only for the day the ships arrived in port but also for multiple days after their return. Julia absolutely cherished the time reconnecting with her dad after their seven months apart.

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Thus far, I have provided a theoretical framework upon which to base my proposed expansion of the Department of Defense Education Activity to improve the K-12 education of military-connected children. I believe that the Department of Defense should be the lead organization in implementing a school model that better supports the military family. Through the implementation of a competency-based, personalized learning approach strengthened by technology, the Department of Defense can redesign

the traditional education model with the goal of minimizing the many academic, physical, psychological, and social challenges unique to military-connected children.

A. FULFILL THE MANDATE OF *STRENGTHENING OUR MILITARY FAMILIES*

The act explicitly states that the "government-wide effort will ensure excellence in military children's education and their development by improving the quality of the educational experience, by reducing negative impacts of frequent relocations and absences, and by encouraging the healthy development of military children."[139]

Looking deeper into the report's body, one can see that the report relies on reforms to the K–12 public school system as it is currently. Even though the report identifies that "the quality of education available to military children can affect overall recruitment, retention, and morale" and that "military families frequently say that the quality of their children's education is one of [the] most important criteria when selecting a place to life," it provides little substantive improvement to the academic lives of military-connected children outside the ad hoc public school system.[140]

A RAND study provides background on why the Department of Defense might have difficulty in opening a new school, namely that "the Secretary of Defense may open a new DOD-operated school only upon 'a determination that appropriate educational programs are not available through a local educational agency for dependents . . . residing on a military installation in the United States."[141] But does the language included in *Strengthening Our Military Families* not push members of the Executive Branch to consider all options regardless of how "unrealistic" they might seem? At the very least, *Strengthening Our Military Families* suggests the Secretary of Defense should have the power to consider any strategy to improve the education of military-connected children.

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[139] United States White House Office, *Strengthening Our Military Families,* 2.

[140] The report mentions such reforms as "collecting and reporting" the performance of military-connected children, improving Impact Aid funding, and completing the development of the Interstate Compact on Educational Opportunity for Military Children, Ibid., 13.

[141] Charles A. Goldman et al., *Options for Educating Students Attending Department of Defense Schools in the United States* (Santa Monica, CA: RAND Corporation, 2016), xi, www.dtic.mil/get-tr-doc/pdf?AD=AD1017497.

The RAND study cited above never considers an expansion of the Department of Defense Education Activity, which impels me to discredit the study's findings. *Strengthening Our Military Families*, signed by every member of the Obama cabinet, agrees to "ensure excellence in military children's education,"[142] yet the study, sponsored by the Department of Defense Education Activity, does not consider an expansion of the Department of Defense system.[143] The study suggests a lack of imagination on the part of school reformers to secure the mandate included in *Strengthening Our Military Families*, particularly if policymakers truly want what is best for the military child.

B. INCREASE THE NUMBER OF SCHOOLS IN DODEA AMERICAS

DoDEA Americas, also known as the Domestic Dependent Elementary and Secondary Schools, is the component of the Department of Defense Education Activity that oversees 52 schools within two regions in seven states, Cuba, and Puerto Rico (see Figures 3 and 4). The number of schools within the system has decreased since the January 2011 release of *Strengthening Our Military Families* at which time the domestic network consisted of 64 schools and an enrollment of 27,166.[144]

[142] United States White House Office, *Strengthening Our Military Families*, 2.

[143] RAND provides the following seven options for military-connected students in Department of Defense schools: status quo, transfer to local educational agencies, contract with local educational agencies, coterminous districts, charter schools, and contract with an Education Management Organization, see Goldman et al., *Options for Educating*, 21–33.

[144] "Enrollment Report for Americas as of January 14, 2011," U.S. Department of Defense Education Activity, accessed August 23, 2017, http://www.dodea.edu/datacenter/enrollment_display.cfm.

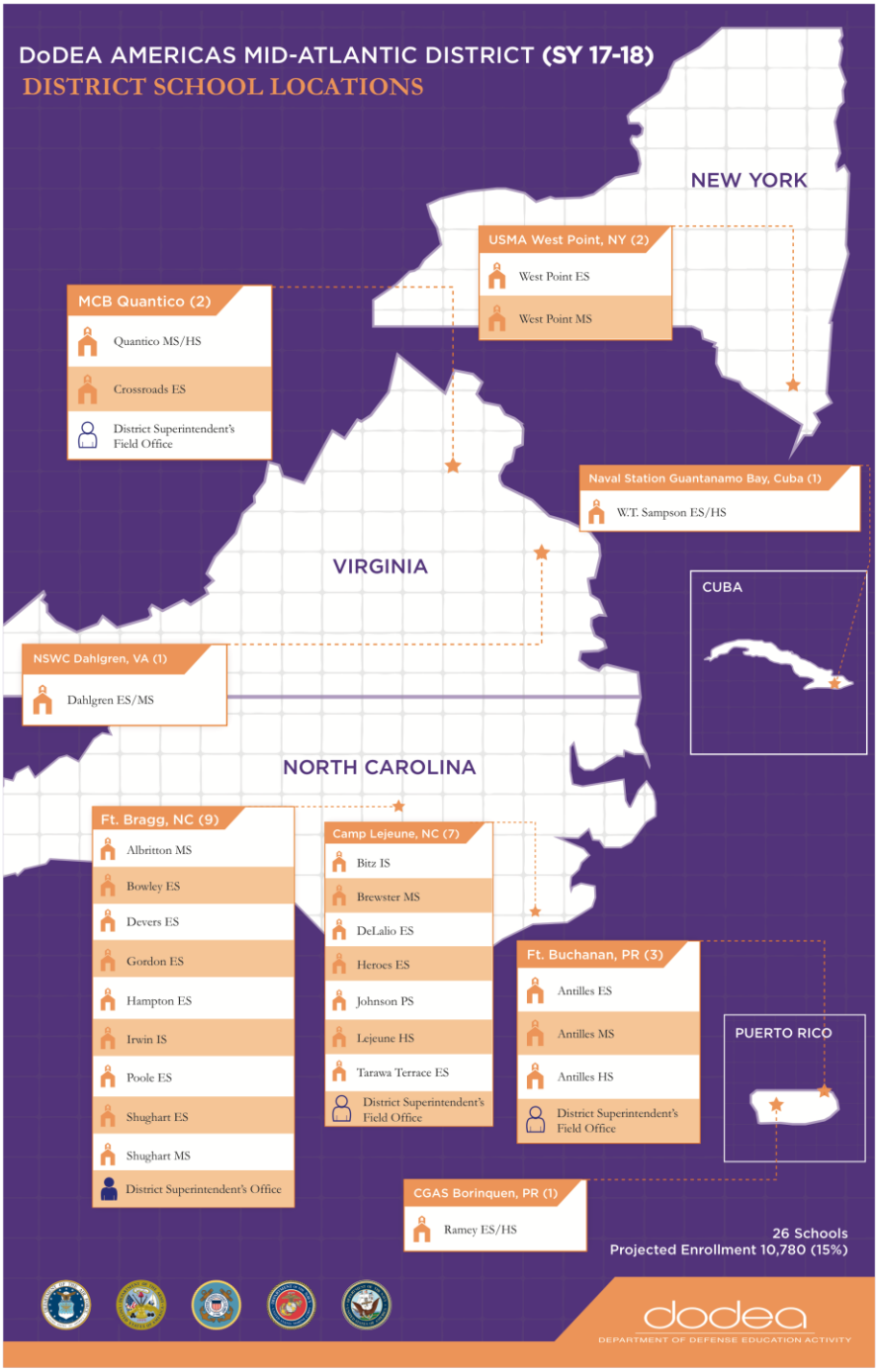

Figure 3. Map of DoDEA Americas Mid-Atlantic District[145]

[145] Source: "DoDEA Americas Mid-Atlantic District (SY 17-18): District School Locations," U.S. Department of Defense Education Activity, accessed August 23, 2017, http://www.dodea.edu/newsroom/downloads/upload/DoDEAamericasMidAtlanticDistrict.pdf.

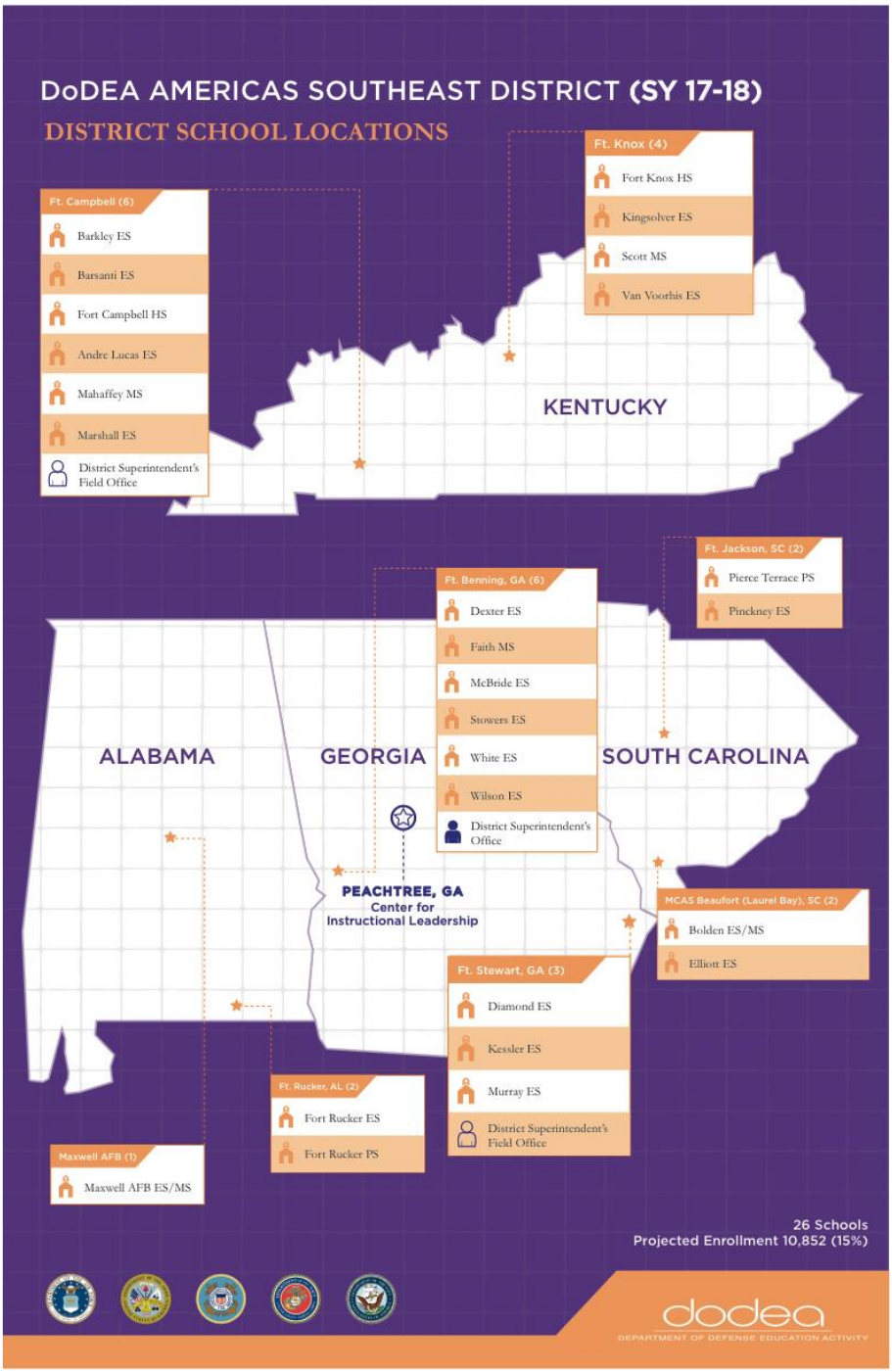

Figure 4. Map of DoDEA Americas Southeast District[146]

146 Source: "DoDEA Americas Southeast District (SY 17-18): District School Locations," U.S. Department of Defense Education Activity, accessed August 23, 2017, http://www.dodea.edu/newsroom/downloads/upload/DoDEAamericasSoutheastDistrict.pdf.

The decrease in DoDEA Americas schools has continued despite the above average performance of the schools network's fourth and eighth grade students on the National Assessment of Educational Progress Reading and Mathematics assessments in 2011 and 2013.[147] Similarly, DoDEA Americas students have scored above the national average on the annual TerraNova 3 assessment, which measures the proficiency of K–12 students in reading, language arts, math, science, and social studies.[148] Department of Defense Education Activity schools, which have a proven record of above average academic achievement for the unique population they serve, should be increased to allow military-connected children to attend on whatever military installation their parents are assigned.

C. SECURE FUNDING

Securing funding will likely be the greatest challenge in expanding the Department of Defense Education Activity. The system's budget for fiscal year 2015 was more than $2.3 billion of which DoDEA Americas received $577.5 million to operate its network of schools for 26,391 students.[149] Increasing the number of Department of Defense schools on bases within the United States necessitates the addition of school administrators and teachers and would increase the overall operating costs of the Department of Defense Education Activity.

One area to consider for these required additional funds is the Impact Aid program, whose budget in fiscal year 2016 is more than $1.3 billion of which more than 93 percent is appropriated to the number of federally connected children each school

[147] A Department of Defense Education Activity press release compares the performance of its students with the performance of students in U.S. public schools. See Elaine Kanellis and Frank O'Gara, "DoDEA 4th and 8th Grade Students Continue Strong Performance," U.S. Department of Defense Education Activity, November 13, 2013, http://www.dodea.edu/newsroom/pressreleases/20131113.cfm.

[148] This statement is based on TerraNova test score data from 2009–2016 compiled from "DoDEA Test Scores," U.S. Department of Defense Education Activity, accessed August 23, 2017, http://www.dodea.edu/datacenter/tdSystem.cfm.

[149] "Budget Book: Fiscal Year 2015," U.S. Department of Defense Education Activity, accessed July 19, 2017, 4, 8, 6, http://www.dodea.edu/Offices/ResourceManagement/upload/DoDEABudgetBook_fy15.pdf. The 2016 Budget Book does not provide figures broken down for each of the three regions under the Department of Defense Education Activity.

district has reported.[150] Currently no mechanism exists for ensuring these funds are used to educate federally connected children, and as the Department of Education notes, "most Impact Aid funds . . . are considered general aid to the recipient school districts" which "may use the funds in whatever manner they choose in accordance with their local and State requirements."[151] Divesting the Impact Aid program and diverting saved funds to an expanded domestic school system within the Department of Defense Education Activity will be a challenge. Individual states, local school districts, and local education activities would suffer from any decreased federal funding, and I would expect these organizations to fight any proposal to withhold or divert these funds.[152]

Determining the exact budget for my proposed expansion is beyond the scope of my thesis; however, I recommend studying the budgets of existing regions and schools within DoDEA Americas to determine the number of schools each base supports, the number of students those schools serve, and the number of staff and faculty those schools require. With those baseline numbers, a proposed budget could be extrapolated depending on the extent of the school network expansion.

D. SECURE AND TRAIN TEACHERS, FACULTY, AND ADMINISTRATORS

If the domestic school system within the Department of Defense is expanded, more teachers must be recruited, trained, and dispersed to bases throughout the United States. The Department of Defense Education Activity currently employs 2,300

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150 "About Impact Aid: Impact Aid Programs," U.S. Department of Education's Office of Elementary and Secondary Education, accessed August 15, 2017, https://www2.ed.gov/about/offices/list/oese/impactaid/whatisia.html.

151 The Department of Education states, "school districts use Impact Aid for a wide variety of expenses, including the salaries of teachers and teacher aides; purchasing textbooks, computers, and other equipment; after-school programs and remedial tutoring; advanced placement classes; and special enrichment programs. Payments for Children with Disabilities must be used for the extra costs of educating these children." See "About Impact Aid."

152 A letter—included on the website of the pro-military Military Child Education Coalition and signed by both military advocacy groups and education groups alike—urges members of the Appropriations Subcommittee on Labor, Health and Human Services, and Education to reject a proposal to eliminate a portion of Impact Aid funding from the fiscal year 2014 budget; however, the proposal was simply a cut, not a diversion of funds as is recommended in this paper. See Susan Conolly, "Proposed Cut for Funding for Impact Aid," Military Child Education Coalition, May 28, 2013, http://www.militarychild.org/blog/proposed-cut-for-funding-for-impact-aid.

educational professionals within DoDEA Americas schools.[153] Teachers within the Department of Defense's domestic school system currently start at salaries of $46,981 for individuals with a bachelor's degree and $53,756 for those with a master's degree,[154] figures well above the national average starting salary according to data from the National Center for Education Statistics.[155]

While maintaining the lucrative compensation for its teachers, the Department of Defense must ensure its faculty and staff have the resources and training required to implement the reforms discussed in this project. A lack of resources and training has been identified as one of the issues with the implementation of the Common Core. As VanTassel-Baska notes, "many teachers are not trained in the practices required to teach higher level skills in either ELA [English Language Arts] or math."[156] Additionally, a 2001 study provides a correlation between periods of major education reform and teacher burnout.[157] Both possibilities make the training and support of teachers imperative, especially because the reforms I have discussed imply a departure from the traditional K-12 education system.

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[153] The Domestic Dependent Elementary and Secondary Schools, also known as DoDEA Americas, oversees and operates "65 schools on 15 installations in seven states, Puerto Rico, and Guam" within the Deparment of Defense Education Activity. See "DoDEA Facts: Domestic Dependent Elementary and Secondary Schools (DDESS)," U.S. Department of Defense Education Activity, accessed August 14, 2017, http://www.dodea.edu/CEOA/upload/DDESS-Fact-Sheet-and-Map.pdf.

[154] Acting Director Domestic Dependent Elementary and Secondary Schools, *DDESS SY 2016–2017 Salary Schedules Educators and Specialists under the Master Labor Agreement (Rest of U.S.–RUS)*, Memorandum of Understanding, Peachtree City, GA: Director Domestic Dependent Elementary and Secondary Schools, July 25, 2016, http://www.dodea.edu/Offices/HR/salary/upload/FEASR-RUS-SY2016-2017_FINAL-SIGNED_md.pdf.

[155] The National Center for Education Statistics indicates an average salary of $39,130 for teachers with one year or less of service and a bachelor's degree. Teachers with one year or less of service holding a master's degree earn an average of $46,000. Salaries are 2011–2012 totals and are held constant in 2012–2013 dollars. See Thomas D. Snyder and Sally A. Dillow, *Digest of Education Statistics 2013* (Washington DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2015), 146, https://nces.ed.gov/pubs2015/2015011.pdf.

[156] Joyce VanTassel-Baska, "Arguments for and Against the Common Core State Standards," *Gifted Child Today* 38, no. 1 (January 2015): 61, doi:10.1177/1076217514556535.

[157] A. Gary Dworkin, "Perspectives on Teacher Burnout and School Reform," *International Education Journal* 2, no. 2 (January 2001): 69–78, https://ehlt.flinders.edu.au/education/iej/articles/v2n2/dworkin/paper.pdf.

E. SECURE ON-BASE FACILITIES

In the ideal scenario, the growth of the school budget would reflect the need to build new schools on military bases throughout the country. Such new schools could proceed in line with the Department of Defense Education Activity's current "21st Century Teaching, Learning, and Leading" initiative in which the Department of Defense supports the construction of "21st Century Schools for 21st Century Learning" within the education activity.[158] Since the program's launch, 14 schools and 280 classrooms have been modified to "employ technology in ways that improve teaching and learning."[159]

In school year 2017–2018, the Department of Defense Education Activity opens six new 21st century schools—two in Japan, two in the United States, and one each in Korea and Germany.[160] One such school, Kingsolver Elementary School in Fort Knox, KY, replaces two on-base elementary schools with a newly constructed, 115,000 square-foot school building that has a capacity of 635 students.[161] Congressional appropriations for military school construction projects paid for the school building, which cost $38.9 million and is described by its principal as "a contemporary, student-centered design" that provides "an adaptable, flexible environment that allows us to put students at the center of the environment."[162]

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[158] To support this program, the Department of Defense allocated $3.7 billion during fiscal years 2011–2016 with Congress contributing nearly $400 million in fiscal year 2011 to start the project that will ultimately see the renovation or replacement of 134 of 194 Department of Defense schools worldwide. See "21st Century Schools," U.S. Department of Defense Education Activity, accessed August 22, 2017, http://www.dodea.edu/director/21stCenturySchools.cfm.

[159] "21st Century Facilities," DoDEA 21, accessed August 22, 2017, https://content.dodea.edu/teach_learn/professional_development/21/facilities.html.

[160] "New School Buildings," U.S. Department of Defense Education Activity, accessed August 21, 2017, http://www.dodea.edu/Back-to-School/newSchools.cfm.

[161] Katherine Knott, "Kingsolver Elementary Returns to Fort Knox," *The News-Enterprise,* August 1, 2017, http://www.thenewsenterprise.com/news/education/kingsolver-elementary-returns-to-fort-knox/article_c2a538bc-3e80-505d-9216-832cf9ff800b.html; "Kingsolver Elementary at Fort Knox," YouTube video, 1:05, posted by "LouisvilleUSACE," November 30, 2016, https://www.youtube.com/watch?v=OGxm5L4qTs4.

[162] Knott notes the building is Leadership in Energy and Environmental Design Silver certified, see Knott, "Kingsolver Elementary Returns;" The fiscal year 2016 Department of Defense Education Activity budget included $376 million to fund the on-going military school construction projects. See "Department of Defense Education Activity (DoDEA) Budget Book," U.S. Department of Defense Education Activity, accessed August 1, 2017, http://www.dodea.edu/newsroom/publications/upload/DoDEA-Budget-Book-FY16-27Feb17.pdf.

Unfortunately budget constraints will likely render the construction of new 21st century schools like Kingsolver Elementary on military bases throughout the United States infeasible. In these instances, the Department of Defense will need to consider the paths of recently opened charter schools as they provide applicable background on the relevant steps in identifying alternate on-base facilities appropriate for schools. For instance, a so-called toolkit provided by the National Charter School Resource Center discusses the following examples of funding and facilities for a variety of charter schools currently located on domestic military bases:

- Belle Chasse Academy located on Naval Air Station/Joint Reserve Base New Orleans in a 92,000-square foot building funded and constructed through various loans and bond measures.

- LEARN 6 North Chicago school located on Naval Station Great Lakes, Illinois, in a renovated training building.

- Flight Line Upper Academy located on Little Rock Air Force Base in a renovated former conference center with funding from commercial and private donors.

- Sonoran Science Academy located on Davis-Monthan Air Force Base in an old school building leased from the local school district.[163]

Many of the startup and operational issues these charter schools encountered are identified in a 2013 Government Accountability Office report, which highlights the financial and land leasing concerns of securing on-base facilities for charter schools; however, these issues should be minimized because the expansion I am proposing should fall under the auspices of the Department of Defense Education Activity rather than the charter school regulations of the applicable state.[164]

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[163] National Charter School Resource Center, *Charter Schools and Military Communities: A Toolkit* (Houston, TX: Safal Partners, 2013), 23–25, https://www.charterschoolcenter.org/sites/default/files/files/field_publication_attachment/NCSRC%20Military%20Toolkit_111314_final_0_0.pdf.

[164] George A. Scott, *Charter Schools: Guidance Needed for Military Base Schools on Startup and Operational Issues* (GAO-13-67) (Washington, DC: U.S. Government Accountability Office, 2009), https://www.gao.gov/assets/660/651951.pdf.

F. INFORM MILITARY FAMILIES

A common refrain from military families about their benefits is that they simply do not know what programs have been appropriated for them. I have presented similar complaints with respect to such military-friendly programs as the Interstate Compact on Educational Opportunity for Military Children and the School Liaison Officer program, both of which do not have the widespread understanding necessary to make them useful for military families. Many military-connected families simply do not know or understand that such programs exist, nor do they realize the wealth of information provided by military-advocacy organizations like the Military Child Education Coalition.

If the Department of Defense were to expand and implement many of the policies discussed in this thesis, military families will need to be informed about the transition to a student-centered approach that focuses on the mastery of core competencies through personalized and differentiated instruction supported by the use of technology. The classroom features and learning environment will likely be different than those of the their own school experiences, and some parents might be apprehensive of such drastic changes.

G. CHOOSE CLASSROOM DESIGN

The Department of Defense Education Activity's 21st century initiative maintains a focus on student-centered learning and provides classrooms with the following features:

- A neighborhood concept that encompasses a central Hub with four to five Learning Studios, a teacher collaboration area, small group rooms, and one-to-one learning rooms.

- Moveable walls for maximizing the flexibility for the use of the space: the Hub and four to five Learning Studios that can be adapted to create larger Learning Studios (two or more Learning Studios combined) or all Learning Studios open to the Hub for a Neighborhood learning opportunity.

- Varying levels of visual separation in the Learning Studios such as glass walls or more glass for eyes on children across the neighborhood.
- Display areas for student work in the Learning Studio and the Hub in the Neighborhood.
- Transition between the Neighborhood and the main school.
- Location that provides identity for the Neighborhood.[165]

Illustrating the Department of Defense's commitment to creating a learning environment that supports such 21st century learning skills as critical thinking and problem solving, initiative and entrepreneurship, effective oral and written communication, collaboration across networks and leading by influence, agility and adaptability, accessing and analyzing information, and curiosity and imagination,[166] the design of 21st century school Kaiserslautern High School, located on the Kaiserslautern Military Installation in Germany, has received the Learning by Design's 2013 Citation of Excellence. The design includes many of the 21st century facility features described earlier and is depicted in Figure 5.

[165] "21st Century Facilities," DoDEA 21.

[166] For examples of the 21st century skills rubrics that DoDEA currently uses, see "Reflection and Evaluation," DoDEA 21, accessed August 22, 2017, https://content.dodea.edu/teach_learn/professional_development/21/docs/21st_century_skills_rubrics/reflection_evaluation_rubrics.pdf.

Figure 5. Kaiserslautern Classroom Design[167]

While the Department of Defense Education Activity's 21st century schools project is currently used to support project-based learning, the "flexible and adaptable" school design can "facilitate multiple modes of learning and provide varying scales of learning environments."[168] Horn and Staker discuss other such blended learning environments and provide a useful tool in determining the best approach for incorporation into Department of Defense schools (see Figure 6).

[167] Adapted from: Frank O'Gara and Natalia Thaniel, "DoDEA School's 21st Century Design Honored with Citation for Excellence," U.S. Department of Defense Education Activity, December 3, 2013, http://www.dodea.edu/newsroom/pressreleases/20131203.cfm.

[168] "21st Century Education Facilities Specifications," U.S. Department of Defense Education Activity, accessed August 22, 2017, http://www.dodea.edu/edSpecs/.

Question	Station Rotation	Lab Rotation	Flipped Classroom	Individual Rotation	Flex	A La Carte	Enriched Virtual
1. What problem are you trying to solve?	Core problem involving mainstream students	Core problem involving mainstream students	Core problem involving mainstream students	Nonconsumption problem	Nonconsumption problem	Nonconsumption problem	Nonconsumption problem
2. What type of team do you need to solve the problem?	Functional, lightweight, or heavyweight	Lightweight or heavyweight	Functional or lightweight	Autonomous	Autonomous	Autonomous	Autonomous
3. What do you want students to control?	Their pace and path during the online portion of the course	Their pace and path during the online portion of the course	Their pace and path during the online portion of the course	Their pace and path throughout most all of the course	Their pace and path throughout most all of the course	Their pace and path throughout almost all of the course, with the flexibility to skip in-person class at times	Their pace and path throughout almost all of the course, with the flexibility to skip in-person class at times
4. What do you want the primary role of the teacher to be?	Delivering face-to-face instruction	Delivering face-to-face instruction	Providing face-to-face tutoring, guidance, and enrichment to supplement online lessons	Providing face-to-face tutoring, guidance, and enrichment to supplement online lessons	Providing face-to-face tutoring, guidance, and enrichment to supplement online lessons	Serving as the online teacher-of-record	Providing face-to-face tutoring, guidance, and enrichment to supplement online lessons
5. What physical space can you use?	Existing classrooms	Existing classrooms plus a computer lab	Existing classrooms	A large, open learning space	A large, open learning space	Any safe, supervised setting	A large, open learning space
6. How many internet-enabled devices are available?	Enough for a fraction of the students	Enough for a fraction of the students	Enough for all students to use in class and have at home or after school	Enough for all students throughout the entire class period	Enough for all students throughout the entire class period	Enough for all students to use in class and have at home or after school	Enough for all students to use in class and have at home or after school

Figure 6. Choosing the Appropriate Blended Model[169]

H. INCORPORATE APPROPRIATE EDUCATION TECHNOLOGY

The importance of education technology lies not just in its ability to strengthen a personalized, differentiated learning approach based on the mastery of core competencies, but also in its ability to provide the highly mobile military-connected student with highly mobile tools that allow for greater personal control of the student's academic progression. Horn and Staker provide a list of strategies and considerations for implementing technology within a school design too comprehensive to be included in this paper; however, their discussion highlights the importance of choosing the appropriate learning model first and then finding the technology that best supports that model.[170]

The most important points to consider for choosing education technology that supports the K–12 education of military-connected children are as follows: the technology must provide pathways for independent learning; the technology must allow

[169] Source: "Choose the Model," Blended Learning Universe, accessed August 25, 2017, https://www.blendedlearning.org/wp-content/uploads/2015/07/8-Choose-the-Model.pdf; for an in-depth explanation of each type of blended learning model, see Horn and Staker, *Blended*, 37–52.

[170] Ibid., 195–209.

for the collection of learning outcomes that can be reviewed by students, parents, and teachers; the technology must allow for the secure storage of compiled student data; the technology must allow for the analysis of stored student data to determine the effectiveness of the various learning methods and the technology itself; and finally the technology must be accessible for students during school transitions.

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