

PARADIGM SHIFTS NECESSARY FOR 21st CENTURY LEARNING FOR PEACE ENGINEERING

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Abstract— One of the core foundations of Peace Engineering is the education system. In the United States, education has undergone radical changes since the turn of the century. It's no secret that there have been numerous debates regarding the efficacy of the system. The public discussion has been centered on the thoughts and opinions of reformers and anti-reformers, with reformers sharing their reasons why our system is failing children, and anti-reformers pointing fingers at the people trying to fix the system. Nevertheless, research and data both signify that the initiatives which have been implemented in recent years have not benefitted students, or their teachers. The time has come to forego the antiquated blueprint and revolutionize our system in a holistic approach to educating children. This will prepare students to become successful citizens in a global society.

Keywords—Common Core; assessment; recess; curriculum; holistic education, Peace Engineering, Whole Child Development, IoT, Global citizens

I. INTRODUCTION

The cornerstone of any Peace Engineering process is the education system. Without an effective education system, the need for a global citizen, who is tolerant, energetic, willing to learn and engage cannot be developed or met. Frankly, without a global citizen mindset, the Peace process cannot be fostered. Therefore, the focus must be on education. The question herein just lies in whether the focus needs to be on elementary education or secondary education – the answer is both. In secondary education systems (e.g. Middle and High Schools), there is already a shift to experiential learning and the use of various other innovative methodologies. However, in elementary education systems, standard initiatives have remained and continue to be a detriment to the system. Young students are just not being prepared for what life has to offer. We are proposing that simple concepts, like extended recess, are the key catalysts to total child development.

II. TRANSFORMING TOTAL CHILD DEVELOPMENT

In shifting our paradigm to a holistic approach of educating children, we refer to human development that is meant to involve

all the parts of a child. This is a pedagogical approach designed to accommodate physical development, cognitive growth, emotional well-being and social competencies in every child. We have found that one example of a value that has gone by the wayside is the practice of play. Play is not a luxury but is a necessity. For the younger students, many schools across the United States have been reducing recess to minutes per day or canceling it all together, in lieu of more time in the classroom. Countless schools are eliminating recess to make more time for test prep, as if childhood development is less important than test scores [1]. For secondary school students, “recess” or “play” simply translates to experiential learning methodologies [2]. Ironically, all suffer at the lack of recess. For the younger generation, the assumption behind the decline of recess and the over emphasis on sustained instruction is a result of the Common Core State Standards, which many states had adopted. This standard puts more pressure on teachers and their students to score better in the classroom and on standardized testing protocols. What is necessary is that we redefine the real purpose of education, especially at an early stage.

“...The fact is that given the challenges we face, education doesn't need to be reformed—it needs to be transformed. The key to this transformation is not to standardize education, but to personalize it, to build achievement on discovering the individual talents of each child, to put students in an environment where they want to learn and where they can naturally discover their true passions...” – Ken Robinson (2010) The Element: How finding your passion changes everything.

In 1983, *A Nation at Risk* misleadingly alarmed our country that the educational foundations of our society were being eroded by mediocrity [3]. Since that time, there have been numerous federal, state, and local reformations to our American education system, none of which have had measurable results in improving the quality of American education. Throughout the last twenty years, states have been incorrectly incentivized to raise graduation requirements by competing for funding. We have also seen the implementation of a faulty accountability system for educators based on test scores. For example, No Child Left Behind (2001) [4], a program introduced by the Bush

Administration that focused on improving the bottom 10% of all students, left *many* more children behind and placed an unwarranted emphasis on scores of numerical grades which left teachers questioning their practices. Consequently, the top students were no longer being challenged, and instructional emphasis came in the form of *drill and kill* in an effort to prepare students for Common Core state assessments.

The Obama administration's version of corporate education reform came in the policy of Race to the Top (2009) [4], with states competing for funds by following the rules of Big Brother. The implementation of Common Core narrowed existing curriculum and forced teachers to instruct from the scripts of packaged programs. These programs, created by profit mongering corporations, promised to raise test scores, which would increase teachers' Annual Professional Performance review scores, which is designed to ultimately make everything "better." The big business model, and ensuing money pit, has not only set us back at least twenty years (by some estimates), it has assisted in the creation of a system which has become dangerously antiquated.

It has yet to be proven that in 1983, when *A Nation at Risk* was released, our system was actually failing our children. The 1980's were a time of threat from a formidable competitor in the Japanese [5]. They were buying up American institutions including Firestone Rubber and Tire, Columbia Pictures and even Rockefeller Center [6]. But, incorrectly, the focus fell onto the education system as the root cause of our inability to compete. The hype surrounding American education as a result of *A Nation at Risk* was a knee-jerk reaction to global pressure and not necessarily that our education system was in dire need of an overhaul. The most famous line of the widely publicized report declared that, "...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..." [7]. Yet in the wake of that hysteria we have caused the destruction of our American public education system. We have lost sight of the true meaning of education, which, according to Webster, is *an enlightening experience* [8].

What is predominantly noteworthy is that the changes to a standards-based, score-based education has not been shown to improve education [9]. To the contrary, research and education experts all support that we must change course from this model, and instead, nurture children in all aspects of their lives if we are to offer a true holistic, whole-child education [10]. To continue focusing exclusively on academics, coupled with testing in limited subject matter, without looking at students' needs in every area of their lives, is to ignore what best serves children, and is, in effect, educational negligence. The current approach seems to focus on acquisition of knowledge and not the ability to learn.

The state-led effort to develop the Common Core Standards was launched in 2009 by state leaders, including governors and state commissioners of education [11]. The Common Core Standards were intended to define the reading and math skills that each student should master at each grade level. They were officially launched in 2009, and in June 2010 the final Common Core Standard was released to the public and state education agencies [12]. By December 2013, 45 states and Washington

DC, under pressure from the Obama administration's Race to the Top initiative, had adopted the Common Core Standards for ELA/literacy and math [13]. By the 2014-15 academic year, every state was required to have in place Common Core aligned assessments to ensure that students were "college- and career-ready." According to Singer, in fall 2015 the National Assessment of Educational Progress (NAEP) tested a representative sample of high school seniors in the graduating classes of 2016 [14]. After seven years of Common Core curriculum and assessment, the NAEP tests showed:

- The average performance of high school seniors dropped in math and failed to improve in reading from 2013 to 2015. Performance was also down on both tests from 1992, the first year that similar tests were used.
- There was a decline in the percentage of students in both public and private schools that are rated as prepared for college-level work in reading and math. In 2013, 39% of students were considered ready for college math and 38% were prepared for college-level reading. But in 2015, only 37% were prepared for college.

In a 1943 paper called "A Theory of Human Motivation," Abraham H. Maslow presented the idea that human actions are directed toward goal attainment [15]. Maslow's Hierarchy of Needs has often been represented in a hierarchical pyramid with five levels. The four levels (lower-order needs) are considered physiological needs, while the top level of the pyramid is considered growth needs. The lower level needs must be satisfied before higher-order needs can influence behavior. Maslow's hierarchy levels include Self-actualization, Esteem, Belongingness, Safety, and Physiological needs. According to Maslow, an individual is ready to act upon the growth needs if and only if the deficiency needs are met. Thus, we cannot expect children to become self-actualized unless their basic needs are being met. Those needs include physiological, esteem and belongingness. Self-actualized people are characterized by being problem-focused, incorporating an ongoing freshness of appreciation of life, having a concern about personal growth, and the ability to have peak experiences. Applying Maslow's Theory, schools and school districts should be focusing on the development and growth of children's basic needs before they can expect them to succeed academically.



Figure 1. Maslow's Hierarchy of Needs Pyramid.

The Common Core’s early childhood requirements, such as reading emergent texts in kindergarten, have been criticized from the start as beyond the developmental ability of a significant portion of young children. In other words, teachers are forced to spend even more time on math and ELA with kindergarteners to learn these advanced skills. Not only is this counter to Maslow’s Hierarchy of Needs, but this is misaligned with Piaget’s Theory of Development [16] as well, which is a staple for proper early childhood education. Piaget’s Theory suggests that children move through four different stages of cognitive development. His theory focuses not only on understanding how children acquire knowledge, but also on understanding the nature of intelligence. In Piaget’s view, early cognitive development involves processes based upon actions and later progresses to changes in mental operations. Piaget’s Theory consists of four distinct stages of development; Sensorimotor, Preoperational, Concrete Operational and the Formal Operational Stage of Development. It is important to note that Piaget did not view children’s intellectual development as a quantitative process; that is, kids do not just add more information and knowledge to their existing knowledge as they get older. Instead, Piaget suggested that there is a *qualitative* change in how children think as they gradually process through these four stages. [16].

Stage	Age Range	Description
Sensorimotor	0-2 years	Coordination of senses with motor response, sensory curiosity about the world. Language used for demands and cataloguing. Object permanence developed
Preoperational	2-7 years	Symbolic thinking, use of proper syntax and grammar to express full concepts. Imagination and intuition are strong, but complex abstract thought still difficult. Conservation developed.
Concrete Operational	7-11 years	Concepts attached to concrete situations. Time, space, and quantity are understood and can be applied, but not as independent concepts
Formal Operations	11+	Theoretical, hypothetical, and counterfactual thinking. Abstract logic and reasoning. Strategy and planning become possible. Concepts learned

Figure 2. Piaget’s Stages of Cognitive Development

III. RECOMMENDATIONS FOR IMPROVEMENT

In moving forward with research-based methods of teaching that we know will improve children’s academic paths, we must abandon one-size-fits-all lesson plans and stop drilling to create high scores on year-end standardized tests. Instead, children should be involved in play (especially younger learners), project-based and experiential learning, cooperation, collaboration, and open-ended inquiry.

Ideally, schools in the United States need to abandon a testing-based curriculum for an interdisciplinary approach to learning, with thematic units of study and differentiated instruction to meet all types of learners. In doing so, students will be better prepared to become life-long, enthusiastic global learners. Interdisciplinary instruction promotes critical thinking and offers students opportunities to make deep connections across the content areas. With this comes increased student engagement in the learning process, with the outcome being greater learning [17]. The key is to leave the mandates of the

current system, which will allow students to engage in “divergent thinking,” meaning “generating multiple approaches to solving a problem” [18]. In contrast, Common Core and its tests promote convergent thinking, where children find the one right answer to a question, as required for high-stakes testing. The hypothesis here is that what provides children with opportunities to refine and enhance skills that will assist them in their learning is **recess**.

In this way, by investing in our teachers to help engage our children in ways that allow their full academic growth, we facilitate divergent thinking and allow our kids to work creatively and collaboratively through problems that are meaningful to them, and not based on a one-size-fits-all curriculum. Our children are able to connect, seemingly separate disciplines, in ways that more accurately reflect our world and their academic successes, and their personal engagement soars. Teachers will be better able to offer students authentic learning opportunities and reflect upon teachable moments.

There also needs to be a strong measure of progress and accountability. This is where key technological concepts come into play. With the whole world fostering more data-driven societies, the development of individual student metrics and milestones provides a more fruitful learning experience for the child. In addition, the introduction of key technologies like Internet of Things (IoT) leverages the tracking individualized curriculum, tracks student progress and even tracks teacher effectiveness, all on an individualized basis [19]. Through machine learning and other data analytic algorithms, all of these can be optimized to foster the success of the student.

In an era of high stakes testing, the stakes will never be higher than they had been with the Common Core. The responsibility of a school’s success or failure with the Common Core Standards has fallen on its leadership. Under state and federal guidelines, administrators who have not prepared teachers and students for the Common Core Standards could have lost their job if students did not perform adequately [20]. Singer, states that, “...these tests, as former U.S. Secretary of Education John King conceded, are basically designed so that 70% of students will fail, with a much higher percentage among students with disabilities, English Language learners, and children who live in poverty,...” [21] and that, “...there has been very little, to no substantiated, research which has proven that more time in the classroom, and less recess, equals better academic outcomes for children...” [21].

Recent initiatives have morphed into a national curriculum inclusive of disproportionately high stakes assessments, whereby quantity superseded the quality of educating children. This curriculum has forced teachers to become robotic in their instructional practice with a myopic focus on high stakes tests, which are not used to determine student knowledge and potential, but instead the perceived adequacy, or inadequacy, of teachers as a key metric for their Annual Professional Performance Review (APPR). According to the Teachers College Record, (2014), these State assessments have been outsourced to large corporations leading to a profit margin estimated at over two million dollars (\$2,000,000) as of 2012 [22]. Although independent verification and testing is good practice, outsourcing millions of dollars to corporations (with

arguably limited domain expertise in educating children) does not make more sense than spending the money on improving the education system and measuring via independent committees with domain expertise.

In 2014, *The Record* also stated that, "...the relative advantage of outsourcing assessment to corporations and external agencies has yet to become apparent, decades after the switch..." [22]. This attempt at a national homogenization of student learning across the United States has resulted in lower teacher morale, narrowed elementary curriculum, convergent instructional practice, increased childhood anxiety, and the unscrupulous education of children who will face a society for which they are unprepared to succeed in [23].

In focusing on an educational vision that supports the entire child, by offering children varied opportunities at school, inclusive of ample time for recess, play and breaks from sustained instruction, project-based learning opportunities, yoga, and portfolio and performance-based assessments, we avoid a structure which could increase childhood anxieties and fears. Each of these components plays an integral role in the future education and development of children.

Since the implementation of rigorous reformations, schools and school districts have been overly focused on myopically improving test scores by increasing instructional time through the reduction of recess. In spite of the fact that current educators and educational leaders have memories of recess (e.g. playing tag, capture the flag, swinging on swings and flying high up on a teeter totter, the children of today), our future leaders and citizens, may end up having very few, if any memories of these types of activities. In many districts across the United States, recess in elementary school is being questioned, reduced, and even eliminated [24, 25]. In an effort to meet federal and state standards, the days of recess are dwindling, yet the reality is that recess may not be the problem, but the solution.

Orchestrating change requires all stakeholders to commit to the reform. The findings of this study offers educational leaders, teachers, the Boards of Education, parents and community members the data they need regarding the values of recess and holistic education and its impact on children's social, emotional and cognitive growth, so that they are best able to commit to making transformational change. The findings also illuminate how the factors surrounding this shift in pedagogy relates to student learning and development, and to teacher morale.

IV. RESULTS

There are very few school districts across the United States that have a progressive vision and approach to educating children. One suburban New York superintendent has paved the way to implementing a progressive shift in educational paradigm in the schools of his district [26]. Together with the support of the elected board, his philosophy is centered on the belief that children flourish when offered authentic learning experiences and should be seen as more than just a standardized test score.

In 2016, the aforementioned school district, the Patchogue-Medford School District, increased daily recess from 20 minutes to 40 minutes for all elementary students, kindergarten through fifth grade, along with incorporating a 40-minute lunch for every

child. They also implemented brain breaks in between sustained instruction so that students had a chance to refocus and recharge in anticipation of sustained instruction. Not only did attendance improve, but teachers and administrators reported significantly fewer disciplinary issues in the classrooms [27].

In most of the elementary schools in this suburban community, the discipline referrals were reduced by over half from the year before. And best of all, according to the school district's superintendent, parents remarked that their children couldn't wait to go to school each day. In moving away from a quantitative model for educating students and towards a more holistic formula, we invest in a "less is more" and "more quality less quantity" approach to educating children, which aims to develop the hearts, minds, and bodies of all children; the whole child.

In the Patchogue-Medford School District on Long Island, we have implemented numerous innovative initiatives inclusive of yoga, mindfulness, tranquility rooms, and recess breaks throughout the school day to meet the needs of our students across the District. We have also partnered with some of the top experts in education including many whom have been referenced in this paper. The District has also entered into a global education partnership with Finland through the Finnish School Lab Immersion Program. This collaboration with Finland has provided insight into a school structure and design which allows children to experience recess breaks throughout the day, yet still meet their academic goals. The Patchogue-Medford School District is paving the way for holistic education in an effort to make transformational change in American education.

Although the early results are promising, the District is conducting ongoing research to validate the qualitative and quantitative results we are witnessing. Preliminary data has indicated that due to the shifts in pedagogical paradigm and practice, student attendance has increased, teacher morale is on the rise, literacy acquisition is highest following a recess break, and children are less anxious. According to teachers in the District, children are taking more risks in the classroom, behavior referrals have decreased, and divergent thinking is at the forefront of the learning process.

Other school districts can achieve a similar shift in paradigm by employing visionary district-wide initiatives and building leaders who are willing to shift the educational paradigm and offer all students physical, emotional, academic and social development opportunities. In looking forward to the future of American education, schools and school districts cannot just teach academics; they must teach the value of knowing where and how to find resources. In addition, they must assist in strengthening a multitude of skills in children. These skills include problem solving, communicating, collaborating, and divergent thinking. This will assist our next generation in being better suited to become successful citizens in our ever-changing global society.

V. CONCLUSIONS

The traditional paradigm in education is powerful, but not so much so that we should be unwilling to look at shifting the paradigm to be centered on what is in the best interest of the

children, and really become child-centric. In looking at successful ways to improve the education of our students in America, leadership matters. Schools and school leaders need to take actions to reconfigure the educational environment they create for students. In maintaining a flexible approach to teaching and learning, our students will be better equipped for the future.

The mandates of the Common Core Learning Standards (and now the newly adopted Next Generation Learning Standards in New York), enforced by high-stakes tests, have led to dramatic changes in our classrooms, to the harm of our children. With a school's very existence riding on the outcome of standardized tests for grades three through eight, and with teachers' jobs dependent on these scores, schools have been forced to narrow their curriculums to focus far too heavily on just these two subjects, neglecting science, social studies, art, music, and so much more.

Things as simple as recess not only offer children the social and emotional growth and development opportunities they so need and desire, it also turns out that moving our muscles produces proteins that actually travel through the bloodstream and into the brain, where they play pivotal roles in the mechanisms of our highest thought processes. With multiple growth opportunities for all children, and in not teaching to specific State standards and preparing for Common Core assessments, we understand that a child's growth, via recess, is just as important as academic teaching, and in fact is integral to maximizing academic success and improving student health. When physical activity through play is relegated to being just a disposable, non-essential filler, our children suffer.

Over the years, American education has endured recurring curriculum transformation. Major modifications have occurred across the elementary curriculum. Schools and school districts are constantly looking specifically at literacy and numeracy gaps since the No Child Left Behind Act (2001). State and federal governments use literacy and numeracy scores to determine school success. The crucial questions in the field of education are hyper-focused on these specific academic achievements, and not on the overall health and well-being of students. Since the beginning of formal schooling in America, multiple points of view have existed on ways to instruct students, and what success means for each individual child.

Finally, without a solid education system that is focused on the whole-child development, it is virtually impossible to take the next steps and to even begin to discuss the Peace Engineering process. What we have really learned from this experience is that educating the whole child must be a pedagogy which begins in the early years. Education must be focused on child development and true acquisition of knowledge for life-long learning. It should not be addressed as a drill and kill exercise, as this only leads to an exercise in futility.

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