The Language Arts as Foundational for Science, Technology, Engineering, Art, and Mathematics

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Abstract To what extent are the language arts relevant, useful, and self-sustaining in an era of rapid technological and scientific innovation? Historically, the language arts have been influenced by three curricular models—competency-based instruction, the Heritage Curriculum, and the process approach. The suitability of these curricular models for the future, the myriad ways that the language arts support and extend innovation, and the unique attributes of 21st century literacies are discussed.

Keywords Technology · English · Language arts · Curriculum · Standards · STEM · Liberal arts

The Language Arts as Foundational

As an undergraduate at the Massachusetts Institute of Technology (M.I.T.), the Nobel-Prize winning physicist Richard Feynman raged against the university's requirement that students take courses in English and the Humanities. "I was interested in science. I was no good at anything else" (Feynman 2006, p. 43). Although Feynman claimed that he had no interest in the language arts, he was a voracious reader. Over the course of his life, he authored books and articles, gave hundreds of lectures, participated in think tanks, wrote about art, and argued endlessly over scientific theories. If anything, Feynman's career provides convincing evidence that the language arts–reading, writing, thinking, and speaking—are integral to the fields of Science, Technology, Engineering, and Mathematics (STEM).

Indeed, the National Research Council (2011) estimates that about half of the time spent by scientists and engineers at work is spent on reading and writing. It is no accident that many of the world's most renowned scientists also happen to be highly accomplished writers. Authors on the *New York Times* bestseller lists routinely include scientists and mathematicians, such as Brian Greene (string theory), Stephen Hawking (mathematics and astronomy), Michio Kaku (physics), Oliver Sacks (psychiatry), Richard Dawkins (biologist), and Atul Gawande (medicine).

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Scientific and mathematical theories, by their very nature, must be articulated coherently and clearly so that they can be evaluated and modified. A scientist who lacks the ability to translate mental constructs into words and symbols likely dooms them to oblivion. Science progresses by determining the precise veracity of new theories; not by accepting fuzzy hunches and inchoate instincts. What is the scientific method if not a vehicle for divining the truth? As Schallert (1987) writes:

> We live alone inside our skin, with our thoughts, wishes, and feelings coursing through the shimmering mass of neural matter locked inside our skulls. When we formulate messages that we wish to express or actions that we need others to perform, we often choose to fashion our thoughts into language. The texts we produce act as road maps or recipes that others like us can use to reconstruct what they believe we intended. (p. 65)

To appease the humanities and to acknowledge the importance of the arts and creativity, reformers have urged a change from a curricular emphasis on STEM to one based upon STEAM (Doss, 2013). The language arts certainly exist as part of the arts (the A in STEAM), but they are more than that. The language arts provide the very foundation upon which knowledge in STEM is created.

Conceptions of the Language Arts

In the book *What is English?,* Elbow (1990) sets out to define the domain of the language arts classroom, but fails, concluding that the field resists categorization. If, as Elbow claims, the language arts are not about "the ingestion of a list or a body of information," but instead about "the making of meaning and the reflecting back on this process of meaning making" (p. 18) then their malleability seems particularly well-suited to STEAM and the continual drive to make sense of the world.

According to Mandel (1980) there exist three models of the language arts curriculum: competency-based, heritage, and process (Baines & Farrell, 2002). Most contemporary standardized testing assumes a competencies approach. What a Certified Public Accountant, lawyer, nurse, or teacher needs to know is decided upon, then an assessment is devised to evaluate the extent to which knowledge has been mastered. A cut-off point is set so that everyone who scores above the cut-off point is considered to have mastered the competencies and everyone who scores below the cut-off point is considered to have fallen short of mastering the competencies.

Among the three approaches to the curriculum, the competency-based approach has become dominant. Today, every state in the nation administers competency tests and 70 % of American students attend high schools that require exit exams (Center for Education Policy, 2012). Some states in the United States, such as New Hampshire, are even attempting to move towards a purely competency-based system of instruction for K-12 education, without regard to a student's chronological age (Gewertz, 2012). A competency-based model for higher education has been proposed for college-level courses as well, and in fact, has been adopted by a few, online, for-profit institutions (Kamenetz, 2013).

Critics of competency-based programs (Thomas, 2012; Stoddard, 2010) typically note that tests do not handle complexity well, nor do they consider the attitudes,

aptitudes, or motivations of the students, themselves. These are substantial criticisms as computers continue to take on more and more rote tasks, leaving humans, at least for now, to handle the more nuanced and complex decision-making. Competency-based instruction is wholly concerned with the curricular objective—not the student, yet the student is the most important variable in any situation involving learning (Slavin, 1987).

The Heritage Curriculum is perhaps best represented by the work of former literary critic cum education reformer, E. D. Hirsch, who turned an article published in 1983 in *American Scholar* entitled "Cultural Literacy" into an influential, multimillion dollar foundation (The Core Knowledge Foundation), a series of books (*What Every ___ Grader Should Know*), and a lucrative consulting business. The rationale behind the Heritage Curriculum is that the great works of literature build identity and create a common heritage. As Krystal (2014), noted, "The canon formalized modern literature as a select body of imaginative writings that could stand up to the Greek and Latin texts. Although exclusionary by nature, it was originally intended to impart a sense of unity; critics hoped that a tradition of great writers would help create a national literature" (p. 91).

The problem with the Heritage Curriculum is in deciding which books and whose heritage will be represented and to what extent these books and representations are relevant to all readers (Kohn, 2004). A second challenge of the Heritage Curriculum is the difficulty of keeping the canon current. Literature is cumulative, so with each new classic, the canon is enlarged, ad infinitum. In *The Western Canon* (1984), Bloom suggests a "modest" reading list of over 800 books, which would take the average reader about 20 years to complete.

The Common Core

In many ways, the new national curriculum in the United States, the Common Core Curriculum, merges aspects of competency-based instruction and the Heritage Curriculum. Common Core exams are purposefully designed to be competency-based, as students who fail to demonstrate mastery by attaining the minimum cut-off score on exams will face consequences—no promotion to the next grade, no graduation from high school, no driver's license, no chance for college.

Although the Common Core carefully avoided naming specific literary works in its initial launch, the now infamous Appendix B names and cites literary works as exemplars of the kinds of texts that would be appropriate (Common Core Standards Appendix B, 2014). While the titles of literary works in Appendix B are supposedly only exemplars, they have become, de facto, the New Literary Canon for students in many schools.

Consider the following standard for students in grades 11–12:

CCSS.ELA-Literacy.RL.11-12.9 Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics. (Common Core English Language Arts Standards, 2014)

If a teacher ever wonders what might constitute a foundational work of nineteenth century American literature, the answer likely can be found in Appendix B.

Although the case for continuing the study of canonical works is explicit in the Common Core (Shakespeare, mythology, and canonical literature are repeatedly mentioned), there is no way around the fact that fewer literary works can be studied over the high school years. The mantra for the Common Core is *fewer, clearer, and higher* (Common Core Standards Initiative Standards-Setting Criteria, 2014), and the curriculum recommends moving to a preponderance of nonfiction, 70 % of all reading, by grade 12 (Jago, 2013).

An examination of the types of questions on sample Common Core assessments reveals an emphasis on the careful reading of challenging canonical works. Consider the following two questions from Oregon's version of the Common Core test for students in grades 9–10 (Oregon Common Core State Standards, 2014):

> Students analyze how the character of Odysseus from Homer's Odyssey—a "man of twists and turns"—reflects conflicting motivations through his interactions with other characters in the epic poem. They articulate how his conflicting loyalties during his long and complicated journey home from the Trojan War both advance the plot of Homer's epic and develop themes. [RL.9–10.3]

> Students analyze how artistic representations of Ramses II (the pharaoh who reigned during the time of Moses) vary, basing their analysis on what is emphasized or absent in different treatments of the pharaoh in works of art (e.g., images in the British Museum) and in Percy Bysshe Shelley's poem "Ozymandias." [RL.9–10.7]

The best training for getting high scores on such questions would be a return to New Criticism and perusing canonical works in search of the *objective correlative*. As coined by T. S. Eliot, the objective correlative is the meaning that must be reached through scrupulous analysis of a text and nothing but the text. According to Eliot (1921), the author must create "a set of objects, a situation, a chain of events which shall be the formula of that particular emotion; such that when the external facts, which must terminate in sensory experience, are given, the emotion is immediately evoked." In other words, if the author writes effectively, then no wrong interpretation is possible—if, and this is a crucial if, the reader is astute enough to grasp the right meaning.

The kind of close reading favored by the Common Core implies a quick and fervent return to New Criticism—not that some teachers ever left it. To be sure, studies of how literature gets taught (Applebee, 1993; Applebee & Squire, 1966; Stotsky, 2010) have always found that literary study has largely remained teacher-centered, analytical, and focused on great works and right interpretations.

The Process Approach

Advocates of the process approach to the English curriculum are less interested in charting competencies and reading specific canonical works than helping students learn techniques that will help guide them through school and through life. For

process-oriented teachers, it is wrong to force reading lists and predetermined competencies upon students who have no investment or interest in them.

Consider the student who is already competent on the first day of school. For such a student, a class devoted to building the competency that he/she already holds would be worthless. Similarly, just because Harold Bloom once praised a literary work as great art does not mean an adolescent will find it revelatory. A literary work is worthwhile only to the extent that it speaks to its reader. Moffett (1965) wrote:

> We must give students an emotional mandate to play the symbolic scale, to find subjects and shape them, to invent ways to act upon others, and to discover their own voice. (p. 248)

Of the three approaches to curriculum, the process approach alone permits the student to have a say in what is to be learned. A student's interests, background, abilities, ambitions, and personality are inconsequential to competency-based instruction and to the Heritage Curriculum.

Because of the difficulty of establishing preset benchmarks and formulating uniform assessments for a fluctuating, individualistic curriculum, the process model has never gained much traction in public schools, where accountability has become a do-or-die affair for more than three decades. To keep students and teachers tethered to standards, most states have legislated that student test scores must be tracked over time. In this way, uniformity and standardization consistently win out over initiatives that advocate for the development of creativity and the "soft" objectives associated with enhancing the welfare of the child.

Yet, when one considers the increasing complexity of the world, the range of talent among students, and the universe of possibilities for the future, the process model would seem more appropriate for a STEAM-age than the other two models, which offer fixed curricula and assume a predetermined right answer for every question.

Consider some of the rudimentary expectations of citizenship in a country like the United States. The knowledge needed to pay taxes, vote, earn money, remain healthy, think logically, make wise choices, and improve one's quality of life cannot be gleaned from a standardized test, nor can they be wrought from close analysis of great literature. For process-oriented teachers, the goal is not assessing the extent to which a student can identify the attributes of canonized authors or reciting passages from great works. The goal is for students to become independent, savvy, deep thinkers who speak with eloquence and panache.

The process approach also presumes that not all students in a language arts class will major in English in college or become professional writers. Rather than prescribe what is to be learned and how it is to be learned, the process approach allows students to develop skills in accordance with their interests and future career aspirations.

Thus, the process approach would appear to be the most versatile, practical way forward for the language arts, especially in light of the sociological, technological, and scientific changes anticipated over the next 100 years. However, the forces favoring an expansion of competency-based learning and the heritage curriculum are formidable. Just because an approach to the curriculum is illogical and

inappropriate does not preclude it from becoming dominant in American public education (Spring, 2010).

The Technolocially-Enhanced Language Arts

As early as 1917 (Dench), film was heralded as a potential replacement for texts as a medium worthy of study. About the transformative power of film, Hoban (1942) wrote, "Motion pictures have all the vital ability to influence and improve education that the printing press had five hundred years ago" (p. 4).

In a cutting-edge article in 1931, Robinson declared that radio would alter the basic structure of schools. "Radio…would carry more genius to the common child than he has ever had or ever possibly could have; that it is the greatest system for training teachers that we know; and all together I think it is justified even in a technical sense as a medium for instruction in public education" (p. 91).

In 1937, the president of the National Council of Teachers of English (NCTE) Holland Roberts advocated that television become an integral part of the language arts curriculum because "English teachers who do not use this new medium in their teaching will be swept into the dust bin of the past" (Radner, 1960, p. 11).

In 1961, when behavioral psychology was in its heyday and B. F. Skinner was one of the most celebrated scientists in the world, programmed learning seemed like a brilliant solution to all that ailed traditional schooling. About machine learning, Foltz wrote, "Programed learning… could very well aid in the amelioration of some of the deplorable conditions in our educational system, to say nothing of feeding the hunger for learning in emergent nations" (p. 66).

Even the overhead projector had a brief run as the "technology that would change everything." Writing in 1965, Schultz proclaimed, "There is no limit on imagination. Thus there is no limitation on how you can use transparencies and overhead projection to communicate effectively with your class. Just as science is opening new vistas for mankind, overhead projection is opening new doors for teaching" (p. 31).

Of course, the early stages of the Internet prompted a flurry of prognostications. In the debut issue of the magazine *Wired*, Perelman (1993) wrote, "In the new economy, where mindcraft replaces handicraft as the main form of work, HL makes obsolete the teaching, testing, and failure on which academic credentialism rests" (p. 71).

More recently, comics have been heralded as effective tools for teaching the language arts. Bitz (2004) found that comics helped students, especially English Language Learners, realize a "noticeable improvement in writing." By using comics, "mechanical errors were fixed, story structures were tightened, and character voices were honed" (Binz, 2004, p. 585).

Undoubtedly, innovation, particularly in the form of new tools for learning, can be exciting and transformative, but too often the tools are mistaken for the messages that they deliver. As media guru Marshall McLuhan (1967) cleverly noted during

the height of his fame in his book, *The Medium is the Massage*, our technologies only carry the meaning; they do not constitute it.

Richard Clark, director of the Center for Cognitive Technology at the University of Southern California states, "The media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition" (2001, p. 2).

The point is that the language arts have always integrated technological innovations as they have emerged. Rather than replace the language arts, technological innovation gives students and teachers ever more tools with which to create and reflect upon meaning (Partnership for 21st Century Skills, 2014).

New Tools

The Executive Committee of the National Council of Teachers of English updated its definition of "21st century literacies" in February, 2013 (NCTE, 2014).

> Literacy has always been a collection of cultural and communicative practices shared among members of particular groups. As society and technology change, so does literacy. Because technology has increased the intensity and complexity of literate environments, the 21st century demands that a literate person possess a wide range of abilities and competencies, many literacies. These literacies are multiple, dynamic, and malleable. As in the past, they are inextricably linked with particular histories, life possibilities, and social trajectories of individuals and groups.

These 21st century literacies are critical to conceptions of the curriculum and expectations for student performance. In two meta-analyses of the teaching of composition, Graham et al. (2007, 2012) found that students who wrote using computers scored higher overall on writing assessments than students who wrote by hand. However, higher scores were not attributable to the delivery system (the computer vs. writing by hand), but rather by the bundle of "extras" that could not be replicated in the "writing by hand" environment—having access to an online dictionary and thesaurus, having experience with revision using word processing programs, and having access to software targeted specifically to struggling writers.

Although the writing assessment administered by the National Assessment of Educational Progress (National Center for Education Statistics, 2012) prohibits the use of any books or other materials during students' timed writing tests (the limit is usually around 25 min), students who type their compositions on the computer rather than handwrite are free to use the computer's online thesaurus/dictionary. As a result, students who have extended experiences with writing on computers and who are used to utilizing online dictionaries are poised to perform better on timed NAEP writing tests than students who have not had much experience writing on a computer.

Relles and Tierney, (2013) found that administering writing tests on computers dramatically disadvantages poor and minority children who may lack access to the latest technological tools. They write:

> The data suggest students who are underprepared according to traditional writing criteria face additional barriers to academic success because of low computer skills. The implications are twofold. First, under preparedness may be systemic across discourses. Second, today's remedial writers may be challenged by a kind of literacy double jeopardy that is unique to the 21st century. (p. 497)

In 2011, the NAEP began administering all its writing tests for 8th and 12th graders using computers. In 2019, the NAEP will begin administering the writing test for 4th graders on the computer. To gain a genuine understanding of student performance on writing, it will be necessary to monitor not only the achievement gap between students, but also the technology gap between students, both at school and at home.

The ability to offer technologically-enhanced educational experiences to students depends upon the relative funding for a particular school as well as the abilities and experiences of the teacher in the classroom. For schools that can acquire top-notch technology and keep teachers employed who know how to use it, rich possibilities abound. Three recent, favorable technological applications in the language arts include:

- Using video games and multimedia as tools for teaching writing (Gerber & Price, 2011; Heaven, 2014; Proske, Roscoe & McNamara, 2014),
- Using multisensory stimuli to enhance the quality of reading comprehension (Baines, 2008, 2013; Dymock & Nicholson, 2010; Laitusis, 2010),
- Using multimedia to teach listening and speaking skills (Fisher & Frey, 2014; Nguyet & Mai, 2012; Skouge, Rao & Boisvert, 2007).

Of course, technology is constantly evolving, so techniques that might help engage students in learning the language arts now might have limited appeal in the future. Curricular initiatives based upon the use of the radio or the transparency machine, for example, are no longer considered cutting edge. On the other hand, emerging technologies such as 3-dimensional printing, enhanced reality (through virtual supplements), and artificial intelligence (AI) hold great promise for the language arts.

Conclusion

In 1930, in an essay entitled "Economic Possibilities for our Grandchildren" economist John Keynes wrote, "We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come–namely, technological unemployment. This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour" (p. XXX)

Unfortunately, technological unemployment has become an all-too-familiar phenomenon in many areas of the world, with countries, such as Greece, Spain, South Africa, and Yemen presently sporting jobless rates among young adults as high as 50 %. In the United States, bankrupt Detroit, with its declining population and shut-

tered factories, recently posted an overall unemployment rate of 25 % (Detroit Free Press, 2014).

In an exacting study on the future of employment, Frey and Osborne (2013) estimate the probability of computerization for 702 occupations in the near future. They write,

> While computerization has been historically confined to routine tasks involving explicit rule-based activities, algorithms for big data are now rapidly entering domains reliant upon pattern recognition and can readily substitute for labour in a wide range of non-routine cognitive tasks. In addition, advanced robots are gaining enhanced senses and dexterity, allowing them to perform a broader scope of manual tasks. This is likely to change the nature of work across industries and occupations. (p. 44)

Some jobs with the highest probability of technological unemployment include: property title examiners, mathematical technicians, insurance underwriters, freight agents, library technicians, insurance claims clerks, bank tellers, and loan officers, all with 98 % or more probability of displacement. Among the jobs with the lowest probability of technological unemployment are: social workers, surgeons, medical researchers, psychologists, teachers, school administrators, and clergy, all with less than 1 % probability of being replaced.

An obvious difference between the 99 % group and the 1 % group is that reading, writing, thinking, and communicating with others are integral to the jobs in the 1 % group. In the 99 % group, literacy skills may be useful, but they are non-essential.

The language arts are foundational in the sense that they provide the supporting structure upon which learning in STEM is built. For example, a person who wants to become a doctor must be able to research, to think, to read critically, and to communicate with clarity because the very lives of patients depend on the ability to do so. The foundational skills of the language arts are essential, not only to doctors, but to all jobs in the 1 % group.

The OECD (Organization of Economic Cooperation and Development) has spent a great deal of effort and money advocating that countries enrich the quality of the educational experiences of children. Through hundreds of publications and vast repositories of *big data* (see www.oecd.org), the OECD presents a convincing case that an inextricable link exists between the quality of education and a country's economic future. According to the OECD (2012), to be successful in the decades ahead, children must become increasingly sophisticated and effective readers—of not only books and print materials—but of all texts, including information available online:

> Technological innovations have a profound effect on the types of skills that are demanded in today's labour markets and the types of jobs that have the greatest potential for growth. Most of these jobs now require some familiarity with, if not mastery of, navigating through digital material where readers determine the structure of what they read rather than follow the pre- established order of text as presented in a book. (p. 1)

A study of the practices of business leaders concurs that high levels of literacy will be required of most future workers (National Commission on Writing, 2004). In a survey of must-have skills for prospective employees, CEOs emphasized that proficiency, not only in reading, but also in writing, is absolutely essential. The survey found that:

- 80 percent or more of salaried employees have some responsibility for writing
- Writing is almost a universal professional skill required in service industries
- More than half of the companies surveyed say that they frequently or almost always take writing into consideration when hiring employees
- Even hourly employees (lower paid workers) often have some writing responsibilities

In the United Kingdom, a study by Kotzee and Johnston (2011) found that "the quality of students' writing seriously affects their chances in the job market" (p. 45). The desirability of reading and writing for prospective employees has been confirmed by many studies in a host of countries across the globe (Casale, 2011; Gatti, Grazia Mereu, Tagliaferro, & European Centre for the Development of Vocational Training, 2000; Jama, Dugdale, & National Literacy Trust, 2012; Rivera-Batiz, 1990; Yang & Sun, 2012).

Even John Keynes (1930), sage of the Golden Age of Capitalism, seems to give teachers of the language arts a nod of recognition when he writes:

> We shall honour those who can teach us how to pluck the hour and the day virtuously and well, the delightful people who are capable of taking direct enjoyment in things, the lilies of the field who toil not, neither do they spin.

The language arts, which undergird knowledge in STEM, offer a hedge against technological unemployment and a reprieve from a life of misery and insignificance. If any field can demonstrate how to pluck an hour virtuously and how to savor the unexpurgated world, it is the language arts.

References

Applebee, A. (1993). *Literature study in the secondary school*. Urbana: NCTE.

Applebee, R., & Squire, J. (1966). National study of high school english programs: A record of english teaching today. *English Journal, 55*(3), 273–290.

Baines, L. (2008). *Teacher's guide to multisensory learning*. Washington, D. C.: ASCD.

Baines, L. (2013). *Teaching challenging texts*. New York: Rowman & Littlefield.

Baines, L., & Farrell, E. (2002). The Tao of instructional models. In J. Flood, D. Lapp, J. Jensen & J. Squire (Eds.), *Handbook of research on teaching the english language arts* (pp. 74–86). Mahwah: Lawrence Erlbaum.

Binz, M. (2004). The comic book project: Forging alternative pathways to literacy. *Journal of Adolesent & Adult Literacy, 47*(7), 574–588.

Bloom, H. (1984). *The western Canon*. New York: Penguin.

Casale, D. (2011). English language proficiency and earning in a developing country. *The Journal of Socio-Economics, 40*(4), 385–393.

Center for Education Policy. (2012). *State high school exit exams: A policy in transition*. Washington, D. C.: Center on Education Policy.

Clark, R. (2001). *Learning with media*. Charlotte: Information Age.

Common Core English Language Arts Standards (2014). The Common Core. http://www.corestandards.org/ELA-Literacy.

Common Core Standards Appendix, B. (2014). The common core. http://www.corestandards.org/assets/Appendix_B.pdf.

Common Core Standards Initiative Standards-Setting Criteria. (2014). The common core. http://www.corestandards.org/assets/Criteria.pdf.

Dench, E. (1917). *Motion picture education*. Cincinnati: Standard Publishing Company.

Detroit Free Press. (2014). Raw data: Detroit's unemployment rate over the last decade. http://www.freep.com/article/20130721/OPINION05/307210033/Raw-Data-Detroit-s-unemployment-rate-over-last-decade.

Doss, H. (2013). The innovation curriculum: Stem, steam, or sea? Forbes. http://www.forbes.com/sites/henrydoss/2013/09/17/the-innovation-curriculum-stem-steam-or-sea/.

Dymock, S., & Nicholson, T. (2010). High 5! Strategies to enhance comprehension of expository text. *Reading Teacher, 64*(3), 166–178.

Elbow, P. (1990). *What is English?* New York: Modern Language Association.

Eliot, T. S. (1921). Hamlet and his problems. In *The sacred wood: Essays on poetry and criticism*. New York: Alfred A. Knopf. http://www.bartleby.com/200/sw9.html.

Feynman, R. (2006). *Classic Feynman*. New York: W. W. Norton.

Fisher, D., & Frey, N. (2014). Speaking and listening in content area learning. *Reading Teacher, 68*(1), 64–69.

Foltz, C. (1961). *The world of teaching machines*. Washington, D.C.: Electronic Teaching Laboratories.

Frey, C., & Osborne, M. (2013). The future of employment: How susceptible are jobs to comperisation? http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf.

Gatti, M., Grazia Mereu, M., Tagliaferro, C., & European Centre for the Development of Vocational Training, T. (2000). *Changing occupational profiles in the hotel industry: Case studies in France, Italy and Spain*. Synthesis Report. Thesaloniki. Greece: European Centre for the Development of Vocational Training.

Gerber, H., & Price, D. (2011). Twenty- First- century adolescents, writing, and new media: Meeting the challenge with game controllers and laptops. *English Journal, 101*(2), 68–73.

Gewertz, C. (2012). N.H. schools focus on competency. *Education Week, 31*(20), 1.

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445–476.

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(4), 879–896.

Heaven, D. (2014). Story is where the action is. *New Scientist, 222*(2970), 22–23.

Hirsch, E. (1983). Cultural literacy. *American Scholar, 52,* 159–169.

Hoban, C. (1942). *Focus on learning: Motion pictures in the school*. Washington, D.C.: American Council on Education.

Jago, C. (2013, January 10). What english classes should like in the common core era. Washington Post. http://www.washingtonpost.com/blogs/answer-sheet/wp/2013/01/10/what-english-classes-should-look-like-in-common-core-era/.

Jama, D., Dugdale, G., & National Literacy Trust. (2012). *Literacy: State of the nation–a picture of literacy in the UK today*. London: National Literacy Trust.

Kamenetz, A. (3. November 2013). Are you competent? Prove it. *New York Times,* p. ED 26.

Keynes, J. (1963, c1930). *Essays in persuasion* (pp. 358–373). New York: W.W. Norton. http://www.aspeninstitute.org/sites/default/files/content/upload/Intro_Session1.pdf.

Kohn, A. (2004). *What does it mean to be well-educated?* New York: Beacon Press.

Kotzee, B., & Johnston, R. (2011). Can't string a sentence together? *UK Employers' Views of Graduates' Writing Skills. Industry And Higher Education, 25*(1), 45–52.

Krystal, A. (2014). What is literature. *Harpers, 328*(1966), 89–94.

Laitusis, C. (2010). Examining the impact of audio presentation on tests of reading comprehension. *Applied Measurement In Education, 23*(2), 153–167.

Mandel, B. (1980). *Three language arts curriculum models: Pre- kindergarten through college*. Urbana: NCTE.

McLuhan, M. (1967). *The medium is the massage*. New York: Penguin.

Moffett, J. (1965). I, you, and it. *College Composition and Communication, 16*(5), 243–248.

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences.

National Commission on Writing. (2004). *Writing: A ticket to work… or a ticket out*. Washington, D. C: College Board.

National Council of Teachers of English. (2014). The NCTE definition of 21st century literacies. http://www.ncte.org/positions/statements/21stcentdefinition.

National Research Council. (2011). *Successful k-12 STEM education: Identfying effewctive approaches in science, technology, engineering, and mathematics*. Washington D. C.: The National Academies.

Nguyet, N., & Mai, L. (2012). Teaching conversational strategies through video clips. *Language Education in Asia, 3*(1), 32–49.

Oregon Common Core State Standards. (2014). Oregon common core state standards for English language arts & literacy in history/social studies, science, and technical subjects grades 9–10. http://www.ode.state.or.us/wma/teachlearn/commoncore/elaappendixb-9-10.pdf.

Organization of Economic Cooperation and Development. (2012). PISA in focus 12. Paris: OECD. http://www.oecd.org/pisa/pisaproducts/pisainfocus/49442737.pdf.

Partnership for 21st Century Skills. (2014). Framework for 21st century learning. http://www.p21.org/our-work/p21-framework.

Perelman, L. (1993). School's out. *Wired, 1,* 72.

Proske, A., Roscoe, R., & McNamara, D. (2014). Game-based practice versus traditional practice in computer-based writing strategy training: Effects on motivation and achievement. *Educational Technology Research & Development, 62*(5), 481–505.

Radner, S. (1960). *Fifty years of english teaching: A historical analysis of the presidential addresses of NCTE*. Champaign: NCTE.

Relles, S., & Tierney, W. (2013). Understanding the writing habits of tomorrow's students: Technology and college readiness. *The Journal of Higher Education, 84*(4), 477–505.

Rivera-Batiz, F. (1990). English language proficiency and the economic progress of immigrants. *Economics Letters, 34*(3), 295–300.

Robinson, J. (1931). Broadcasting to the schools of a city. In L. Tyson (Ed.), *Radio and education* (pp. 91–92). Chicago: University of Chicago Press.

Schallert, D. (1987). Thought and language, content and structure in language communication. In J. Squire (Ed.), *The dynamics of language learning* (pp. 65–79). Urbana: National Council of Teachers of English.

Schultz, M. (1965). *The teacher and the overhead projector*. Englewood Cliffs: Prentice-Hall.

Skouge, J., Rao, K., & Boisvert, P. (2007). Promoting early literacy for diverse learners using audio and video technology. *Early Childhood Education Journal, 35*(1), 5–11.

Slavin, R. (1987). Mastery learning reconsidered. *Journal of Educational Research, 57*(2), 175–213.

Spring, J. (2010). *The American school, a global context: From the puritans to the Obama administration*. New York: McGraw Hill.

Stoddard, L. (2010). *Educating for human greatness*. Sarasota: Peppertree Press.

Stotsky, S. (2010). Literary study in grades 9, 10, and 11: A national survey. Forum: A publication of the association of literary scholars, critics, and writers, 4. http://www.alscw.org/publications/forum/forum_4.pdf.

Thomas, P. (2012). *De-testing and de-grading students: Authentic alternatives to accountability and standardization*. New York: Peter Lang.

Yang, W., & Sun, Y. (2012). The use of cohesive devices in argumentative writing by Chinese EFL learners at different proficiency levels. *Linguistics & Education, 23*(1), 31–48.

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