

## Questioning the Instruction Assumption: Implications for Education Policy and Practice

Karl F. Wheatley<sup>1</sup>

### Abstract

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This article examines and questions *the instruction assumption*, the widespread but usually-implicit assumption that student learning inherently requires direct and formal teacher instruction. The instruction assumption has profoundly influenced education in America and elsewhere, and several indicators of its broad acceptance are described. An alternative assumption is described, one that assumes that students are capable of playing an active role in initiating much of their own learning. Contrasting social contexts, personal experiences, goals, and intellectual traditions influence the acceptance of the instruction assumption or of the assumption favoring substantial student-initiated learning. Evidence is presented that challenges the instruction assumption, including evidence regarding early reading, cross-curricular effects, motivation, soft skills, 21st century skills, alternative schools, unschooling, and large-scale comparison studies. The article explores the possibility that formal instruction may often be counterproductive, and may be unnecessary for much learning that we often assume requires such instruction. Three real-world challenges that can help people transcend the instruction assumption are described: a re-examination of the meaning of test scores; the stories we tell ourselves about education; and reflections on our own non-instructional learning. The broad implication of this analysis is the need for a paradigm change in education.

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**Keywords:** instruction, student-initiated learning, educational reform, paradigm change, educational research

“Learning to read is easy, and most children will do it more quickly and better and with more pleasure if they can do it themselves, untaught, untested, and helped only when and if they ask for help.” – John Holt

### 1. Introduction

Reasonable people will debate the accuracy of this quote, but more interestingly, many adults have no idea that children can learn to read without formal instruction. Why?

In the United States and in many other countries, we have created educational contexts in which students are surrounded by formal teacher-planned instruction during an enormous percentage of their available waking hours. Once children are done with their schoolwork, they are often tired, and turn to play, socializing, television, videogames, or the Internet—to unwind and relax. Most people do not consider these self-chosen activities educational, saying that children are “just playing.” Given this context, it is understandable that many people come to assume that children’s learning primarily does and must result from formal instruction, and that when given freedom, children engage in non-educational pursuits that have modest or questionable benefits.

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<sup>1</sup> Cleveland State University

Also, given the assumptions that naturally develop within this context, most people will wonder how children would learn to read or learn to read better without formal reading instruction. Having observed this phenomenon at work for three decades, I use the term *the instruction assumption* to refer to the widespread belief that learning inherently requires teacher-planned instruction.

We see the instruction assumption at work when nations such as the United States reflexively attempt to improve education through longer school days and school years and more intensive academic instruction. Few Americans assume that education would be improved if there were less formal instruction and more free time and play. The assumption that formal academic instruction is always necessary and beneficial is a crucial issue for researchers because there is a parallel world all around us in which learning occurs without so much explicit instruction, and arguably, often occurs much better.

In this article, I explore a diverse but selective range of research, some of which favors the instruction assumption, but much of which questions it. I define the instruction assumption, outline a contrasting assumption, and provide indicators of the pervasiveness of the instruction assumption in the United States. Next I explore contextual factors that affect the emergence of the instruction assumption, and present evidence that challenges the accuracy of this assumption.

Finally, I outline means by which individuals might come to re-think the instruction assumption, and discuss implications for policy and practice. In addition to the research cited, this analysis is informed by a three-decade career of teaching in, researching, and administering educational programs in which learners learned from substantial learner-initiated activities every day.

### 1.1 The Instruction Assumption and the Contrasting Assumption

The instruction assumption is the assumption that PK-12 learning always (or almost always) requires teacher-directed instruction aimed at specific and pre-determined instructional objectives. People accepting the instruction assumption generally do not examine closely how children might benefit from activities other than teacher-planned lessons, nor do they imagine how schoolchildren might act differently and learn differently if they had substantially more freedom. Those who embrace the instruction assumption are skeptical of educational approaches involving flexible, emergent curriculum and learner-initiated activities. Instead, accepting the instruction assumption typically goes hand and hand with dividing education into academic subjects, dividing subjects into a series of learning objectives, and planning standardized curricular sequences by which students will be directly taught those objectives (e.g., see Clark, Kirschner, & Sweller, 2012).

The contrasting assumption is that much of learning and development occurs best through child-initiated activities (e.g., play, free voluntary reading), or activities planned jointly by teachers and learners (e.g., project-based learning), or transdisciplinary real-world experiences (e.g., field trips, building things, performing, and internships). Those holding this contrasting assumption (e.g., Kohn 1999; Littky, 2004; Stoddard, 2010) still believe that schools need good teachers and that some direct teaching is beneficial, but they believe that much of education should be something other than traditional academic instruction focused on preset objectives. For example, someone rejecting the instruction assumption might recommend a school day that is one third child-initiated learning, one third jointly planned activities, and one third teacher-planned activities and lessons.

### 1.2 Indicators of the Instruction Assumption

The degree to which the instruction assumption envelops U.S. education can be seen by the way in which researchers, policymakers, and practitioners typically respond to concerns about academic outcomes. Overwhelmingly, the assumed cure for poor or disappointing student outcomes is to increase the quantity or quality of formal instruction.

In research, when an article describes a specific gap in students' knowledge and skills, a prescription for some kind of instruction usually follows right away (e.g., Ehri, Dreyer, Flugman, & Gross, 2007). Weak vocabulary yields recommendations for vocabulary instruction, poor computational skills yield suggestions for computation drills, and weak science knowledge yields prescriptions for increasing the number of science courses required. Academic instruction is our default and almost exclusive approach to promoting learning. Such recommendations often do focus on the quality of instruction, but where quantity is the issue, they almost never suggest that there is too much instruction occurring. Outside of early childhood education, one almost never finds researchers interpreting disappointing student outcomes as indicating that perhaps the current school day is too long, or that students should have longer lunches, recess; and more time to play, read books of their own choosing, and pursue their own interests.

In the policy arena, U.S. education is also barraged by recommendations for more instruction—a longer school day and year, more time on core academic subjects, and more homework. Thus, when the roughly \$6 billion dollars spent on the Reading First program resulted in no improvement in children's reading comprehension (Institute of Educational Sciences, 2008), then-education secretary Margaret Spellings remarked, "I don't think anybody is going to assert that the cure would be less focus and fewer resources." On the contrary, those who question the instruction assumption might suggest that the enormous quantity of formal early reading instruction that young children receive is a leading cause of reading problems. However, supporters of the intensive skills instruction used within Reading First concluded that Reading First failed to yield differential advantages for reading comprehension only because the differences in the quantity of formal reading instruction between treatment and control classrooms were not large enough. They assumed that adding even more of the direct skills instruction used in Reading First would have yielded the expected advantages over control classrooms.

Once again, more instruction was the assumed solution, a stance later echoed by the recommendations that the National Early Literacy Panel made for reading instruction for preschool and kindergarten children (Shanahan & Lonigan, 2010).

Furthermore, practitioners, in large part due to external pressures, have also responded to concerns about student achievement with more instruction. Classroom time for play, project-based learning, recess, and the arts has been reduced or eliminated to increase time for formal instruction. Mandatory daily homework has become commonplace even in the elementary grades, despite evidence that homework does not improve elementary students' learning but does hurt their attitudes towards learning (Kohn, 2006).

Moreover, another clear indicator of the instruction assumption is evident in the main responses to the Common Core State Standards (CCSS), the new de facto national standards in the United States. Aside from debating their merits, the main response of educators to the CCSS has been to develop specific teacher-directed lessons tied to specific CCSS standards statements for specific grades. On one level, this is a totally understandable response, especially to those who embrace the instruction assumption. However, on another level, constructing a linear sequence of teacher-directed lessons to fill children's schooldays for 13 years runs counter to a substantial body of research on development and learning, especially regarding student motivation (e.g., Reeve, 2002). To simply assume that new content standards should be followed by specific lessons aimed at teaching those specific standards provides even more evidence of the instruction assumption.

Finally, interesting evidence of the instruction assumption is evident in people's reactions to quotes that question that assumption. I have taught over 70 sections of an early childhood curriculum course to more than 1000 prospective and practicing teachers in the last fifteen years, and have found that my students' acceptance or rejection of the instruction assumption is revealed well by their responses to the following quotes

“... millions of years of evolution have created children who love to learn on their own—it’s how nature has ensured our survival. Humankind has eaten from the tree of knowledge and continues to seek out this delicious fruit from the first moments of life—no force-feeding is necessary.”

- Kathy Hirsch-Pasek & Roberta M. Golinkoff

“Play is the highest form of research.” - Albert Einstein

“Very ambitious early enrichment and teaching programs may lead to crowding effects and to an early decrease in the size and number of brain regions that are largely unspecified and that may be necessary for creativity in the adolescent and adult.”

- Peter Huttenlocher

“Children don’t resist learning: They resist teaching.” – John Taylor Gatto

“A child whose confidence in her learning ability has not been shattered (by someone else’s judgment) will master reading or math as rapidly as they learned to walk, when she is interested.” - Joyce Reed

“I never teach my pupils. I only attempt to provide the conditions in which they can learn.” - Albert Einstein

The more that my university students reject the instruction assumption, the more of these quotes they will accept. Because of the strong tradition of child-initiated learning in our field, many early childhood educators happily agree that young children love to learn. However, the quotes that question instruction in general or reading instruction in particular draw more confusion and disagreement, and the last quote—attributed to Einstein—goes too far for almost everyone.

Of course, both within my sample of prospective and practicing teachers and in the world at large, for those who embrace the instruction assumption, all of these quotes are viewed as misleading or romantic nonsense. They find it difficult to accept the ideas from brain research that early academic instruction could possibly undermine intellectual development (see Hirsch-Pasek & Michnick Golinkoff, 2003, for a discussion).

## **2. Factors Influencing Acceptance of the Instruction Assumption**

### **2.1 Effects of Socio-Educational Context**

Acceptance or rejection of the instruction assumption is deeply context dependent.

In the U.S. and many other countries, we have created a socio-educational context in which children who start school not yet reading will generally learn to read through a series of hundreds of teacher-directed lessons focused on discrete and de-contextualized knowledge and skill objectives. Child-initiated learning has largely disappeared from classrooms, even in the earliest grades, replaced by school days filled with constant academic instruction. Having never experienced alternative pathways to reading, most people simply can’t envision children learning to read without formal reading instruction focus on isolated skills. The same process occurs in other subjects, undergirded by the same assumptions.

The renowned sociologist Clyde Kluckholm noted that “the fish would be the last to discover water,” and for those whose personal and professional lives have been immersed in the instruction-centered world of formal K-12 education, it may be difficult to examine formal schooling from an outsider’s perspective. We also may not realize how our immersion in the context of schools shapes and limits our thinking. Perhaps what appears to be true, necessary and effective within the context of traditional schooling is false, unnecessary, or ineffective within other learning contexts. Significantly, the quotes above came from individuals who experienced or studied significant learning occurring outside of formal instruction, including Einstein from science, Reed and Gatto from homeschooling, pediatric neurologist Huttenlocher, and the developmental psychologists Hirsch-Pasek and Michnick Golinkoff. The truths they experienced in other contexts are very different from what seems to be true to those immersed in formal K-12 schooling.

As I have written elsewhere (Wheatley, 2009), I have a fairly unique set of experiences living and working in both of these socio-educational contexts. On the one hand, I have 24 years of formal schooling and a quarter century as a teacher educator—surrounded by many university colleagues whose lives revolve around focused single-subject instruction and who rarely or never question the instruction assumption. On the other hand, I have taught adults and children of all ages in very learner-centered ways, including directing an experiential arts, sciences, and leadership program for teenagers, teaching young children, and helping homeschool our own children in a highly interest-based way called *unschooling*. I live in a family within which our children learned to read without any formal instruction but work at a state university within a state in which formal reading instruction is seen as so essential that prospective teachers must take four semester-long courses in literacy and reading instruction.

Given these sharply contrasting experiences, and having researched how educational effectiveness appears from the perspectives of traditional K-12 schooling versus developmental psychology and constructivist education, I can see how both views appear true to those operating within those contexts.

## 2.2 Effects of Contrasting Goals and Intellectual Traditions

If we adopt the goals and perspectives of traditional schooling, more formal and focused instruction does generally accelerate short-term acquisition of the knowledge and skills on standardized tests. Given that most educational effectiveness research studies narrow and short-term (one year or much less) academic test score gains, there is indeed a great deal of research that seems to prove that focused single subject instruction is “what works” the best (e.g., National Institute of Child Health and Human Development, 2000).

However, if we adopt the goals and intellectual mindset of those whose thinking about educational effectiveness was shaped by developmental psychology, democratic education, or constructivism, we may reach very different conclusions about relative effectiveness. People influenced by these intellectual traditions embrace educational goals far broader than readily testable academic knowledge and skills, and are more convinced by long-term effectiveness than by short-term gains. For these people, including myself, the very idea that educational effectiveness could be judged based on short-term test score gains totally lacks face validity.

What research do these people marshal to back up this skepticism? I begin with early literacy instruction, the field for which I am best versed in the effects of policies and practices increasingly predicated upon the instruction assumption.

## 3. Evidence Contradicting the Instruction Assumption

### 3.1 Early Reading Research

Instead of being convinced by the superiority of traditional instruction in the short term, those who question the instruction assumption note that these benefits routinely wash out in the long-term (e.g., Lie, 1991; Wise, King, & Olson, 2000).

That is, students who experienced the more child-initiated whole language approach wind up with just as good reading comprehension in the long run as do students who experienced formal reading skills instruction (see Coles, 2003, for a detailed analysis). Complementing this result is the finding that the longer that the studies last, the greater are the advantages of free voluntary reading over formal reading instruction for promoting reading comprehension, an advantage found for both first-language and second-language learning (Krashen, 2004). Finally, there is the provocative example of the Sudbury Valley Schools, in which children from ages 4-18 do what they choose to do all day every day, and only get coaching or teaching if they ask for it.

Greenberg (1995) reports countless children learning to read at Sudbury without any formal instruction over the first three decades of the school's existence, a finding consistent with reports from the student-initiated homeschooling approach known as unschooling (e.g., Wheatley, 2013).

### 3.2 Cross-Curricular Effects

Also, the more student-initiated whole language approach has been found to result in better outcomes than direct skills instruction for attitudes towards reading (Freppon, 1991), writing (e.g., Brennan & Ireson, 1997; Griffith, Klesius, & Kromey, 1992), and student conduct (Powell, McIntyre, & Rightmyer, 2006). One clear but perhaps heretical implication of these significant ripple effects is that if one actually values any subjects or child outcomes other than reading comprehension, then there is in principle no way to judge the best way to learn to read based on reading test scores alone.

Further reinforcing that conclusion, intensive skills-focused early language arts instruction tends to crowd out time for play, recess, integrated curriculum, project-based learning, and other school subjects. In contrast, activities such as recess can be more easily accommodated within whole language, and activities such as play, integrated curriculum, and project-based learning are actually integral components of the more student-initiated whole language approach.

In general, organizing schooldays around the logic of single-subject instruction in traditional academic subjects tends to crowd out other valuable subjects and more transdisciplinary and student-initiated forms of learning.

Any discussion of the effects of basing education on the instruction assumption must factor in what is lost educationally when these enriching and evidence-based subjects and educational approaches get squeezed out.

Even in classic rat research, while the brains of rats from artificially-enriched environments developed better than those from impoverished environments, it is the rats growing up with the freedom and complexity of the natural environment of the wild whose brains developed best of all (Renner & Rosenzweig, 1987). Here, the artificially enriched environment may be viewed as analogous to traditional instruction, while the natural environment is analogous to project-based learning, apprenticeships, and play.

### 3.3 Motivation, "Soft Skills," and 21st-Century Skills

More recent research (e.g., Hirsch-Pasek, Golinkoff, Berk, & Singer, 2009) reveals other benefits of play over instructional alternatives including more positive motivation outcomes, and greater creativity, self-control, persistence, and study habits. Similarly, when compared to traditional instruction, the more student-initiated approach of project-based learning has been found to yield better long-term retention of content, improved attitudes towards learning, and improved problem-solving and collaboration skills (Halvorsen, et al., 2014; Strobel & van Barneveld, 2009; Walker & Leary, 2009).

For motivation and other valued outcomes, more student-initiated education has been found to sustain students' attitudes towards learning (Walberg, 1986), while traditional schooling has been associated with a steady erosion of children's intrinsic motivation (Lepper, Corpus, & Iyengar 2005, Walberg, 1986; Wheatley, 2012). Moreover, compared to more student-initiated approaches to learning, experimental research has found formal instruction to yield reductions in children's curiosity, creativity, independence, and initiative (Bonawitz, et al., 2011; Buchsbaum, Gopnik, Giffiths, & Shafto, 2011). Furthermore, Barker, et al. (2014) found negative relationships between the degree of structured activities six-year-olds engaged in and their executive functioning. Although that study was correlational, schooldays filled with structured activities obviously do not allow for much use or development of executive functioning.

Given the current emphasis on critical thinking, it is worth noting that in large-scale studies of instruction-centered vs. more student-initiated education, critical thinking outcomes are consistently better where there is less formal instruction and more student freedom (Chamberlin, Chamberlin, Drought, & Scott, 1942; Tietze, 1987; Walberg, 1986).

Finally, in student-initiated forms of education, students take an active role in initiating and guiding their own learning, something absent from direct instruction. Those interested in developing the skills and habits of citizenship or entrepreneurship may see this as a profound advantage of rejecting the instruction assumption and adopting more student-initiated learning.

### 3.4 Large-Scale Studies

Given the dominance of teacher-directed instruction in America today, it would be virtually impossible to conduct a large scale experiment on the broad effects of traditional instruction-dominated education and more student-initiated alternatives. However, this was not always the case, and older research is remarkably illuminating in this regard.

In the classic “Eight-Year Study” that started in the 1930s in the U.S., the college outcomes for 1500 students from traditional high schools were compared to those for 1500 students from high schools that were attempting to implement the ideas of the progressive movement (Chamberlin, Chamberlin, Drought, & Scott, 1942). In general, education in the experimental schools was more experiential, transdisciplinary, fashioned jointly by students and teachers, focused on key disciplinary concepts, collaborative, and often ungraded. In short, there was much less traditional instruction. Interestingly, students from experimental high schools did as well in college, and often better than their counterparts from traditional high schools. Especially significant was the finding that the further a school departed from the traditional college preparatory education, the better its graduates performed. That is, the schools that had the least traditional instruction were the ones in which students did the very best (Chamberlin, Chamberlin, Drought, & Scott, 1942).

Walberg’s meta-analysis of open education vs. traditional education in the U.S. found slight advantages in test scores for those experiencing traditional education.

However, as we saw in the example of reading research and also see in today’s test-centric schools, the test scores of students experiencing traditional test-focused instruction often overestimate those students’ real-world competence relative to students experiencing less traditional education. For example, the significantly stronger decoding skills of students who achieved those skills through direct instruction have been found to translate into no better reading comprehension than found among whole language students with lower test scores (e.g., Torgeson, Wagner, Roshotte, Alexander, & Conway, 1997). Thus, the open education students might actually have been as strong or stronger readers than the students traditionally taught. Suggestive in that regard was Walberg’s finding that students from open education classrooms rated higher on creativity, independence, problem-solving, critical thinking, and valuing individual differences.

In a similar large longitudinal study in the 1970s, German researchers compared the long-term effects from 50 play-based kindergartens and 50 academic kindergartens. Interestingly, the children who experienced the more play-based kindergartens did better than the children from the academic kindergartens on every single measure by age 10—social outcomes, cognitive outcomes, language outcomes, and industriousness and creativity (see Tietze, 1987).

### 3.5 When Might Formal Instruction Be Unnecessary?

Depending upon one’s experiential and intellectual contexts, one may question whether *any* formal and de-contextualized instruction is needed in some areas where instruction is routinely assumed. For example, U.S. primary education routinely focuses a great deal of formal instruction upon phonological awareness and word identification. However, MacDonald and Cornwall (1995) found that phonological awareness at age six did not predict students’ reading comprehension at age 17, nor was there a statistically significant relationship between early word identification and reading comprehension at age 17.

If advanced status on these skills at an early age provides no lasting benefits, but efforts to accelerate those skills does incur other costs, as noted earlier for intensive direct reading instruction, is *any* such de-contextualized skills instruction needed at all? Even for children with disabilities, research following children through age 19 found no lasting benefits of early direct reading skills instruction for later reading comprehension (Jenkins et al., 2006). As noted earlier, free voluntary reading yielded better outcomes than did traditional reading instruction, a pattern that intensified in longer studies. (Krashen, 2004).

Finally, there are the Sudbury Valley Schools. Beyond students learning to read without instruction, Greenberg (1995) reported high rates of Sudbury students going on successfully to college, career, and adulthood. Such outcomes raise the most profound questions of all about the instruction assumption.

These and similar studies make up the intellectual context of those whose thinking about educational effectiveness has been shaped by developmental psychology, democratic education, constructivism, or free schooling. For us, the more student-initiated whole language approach appears to be clearly and broadly superior to traditional reading instruction, and more generally, non-instruction alternatives often appear broadly superior to traditional instruction in the long run. In our eyes, the instruction assumption has been decisively falsified. Important questions remain, however, about when instruction is beneficial, and what types and amounts of instruction are beneficial or counterproductive.

## 4. Implications

### 4.1 Escaping the Instruction Assumption

“The difficulty lies not in the new ideas, but in escaping the old ones.”

- John Maynard Keynes

As I've documented in greater detail elsewhere (Wheatley, 2015), the instruction assumption is sustained in many ways, from misleadingly reductionist research to the ways our minds are conditioned by linear curriculum packages and narrow, short-term testing. Even the language we use is heavily biased towards formal instruction, with the common connotations of “teaching” heavily favoring teacher-planned instruction, promoting the illusion that “learning” must primarily result from the teacher's instruction.

There are so many factors keeping the instruction assumption alive, how might we come to question and escape it? If we believe that humans see the world through our current thinking, and that thinking is based largely upon the instruction assumption, then perhaps we need to *learn* our way out of the conceptual box of the instruction assumption. An old Far Side cartoon depicts some fish-like creatures underwater, one of which has a baseball bat under its arm.

These creatures just hit their baseball up onto the dry land of the beach, and are staring at it, seemingly wondering what to do next, with the caption reading “Great Moments in Evolution.” They are staring at a meaningful real-world challenge that requires new thinking and new actions. They need to evolve, to step into the world outside of the water, just as educators now face the challenges of a changing world that requires us to evolve in our thinking and to escape the limiting context of the instruction assumption. Three challenges may aid us in that process.

#### 4.1.1 Re-examining the Meaning of Test Scores

The first real-world challenge that can help us escape the instruction assumption comes from the very same test scores that help create the instruction assumption. As noted in the earlier review of reading research, the kind of instruction-assumption teaching that boosts short-term test scores doesn't improve long-term outcomes, and incurs significant opportunity costs and collateral damage. Looking more broadly, and reflecting a parallel pattern of results, increasing the intensity of instruction in response to accountability pressures may have improved scores on our National Assessment of Education Progress tests (NAEP) in 4th grade, yet the long-term trend scores for 17 year olds in reading and math have remained flat from 2008-2012 for both genders and all racial groups (National Center for Educational Statistics, 2013).



Advocates of standardized testing and traditional instruction have interpreted this pattern as suggesting that the upper grades need to do more of the kind of instruction found in the early grades. An alternative explanation, one more consistent with developmental psychology and with the analysis here, is that the same intense academic instruction that boosts early grade test scores provides a weak foundation for later learning and development, and undermines key developmental outcomes, including healthy motivation to learn. Even long before test-driven accountability, researchers reported steady erosion in the motivation of students experiencing traditional instruction (Walberg, 1986). Over time, the collateral damage caused by this traditional instruction may wash out any resulting short-term test score gains. Another key finding is that average test scores on international tests do not predict economic success for countries most like the United States (Ramirez, Luo, Schofer, & Meyer, 2006). Finally, Aggarwal, Goodell, and Goodell (2013) found that scores of business school students on the Graduate Management Admissions Test (GMAT) were negatively correlated with both the entrepreneurialism that would help keep our economy vibrant and the ethical orientation that would keep the economy more fair and honest.

Commentators quipped that business schools would apparently be better off choosing the candidates with the *lower* test scores. In each of these cases, we might learn that the same test scores that pressure us to initially accept the instruction assumption do not hold up in the long run as indicators of what we value most. If society were to come to value these test scores much less—and teachers thus felt less pressure to teach to them—it would be much easier for educators, researchers, and society to escape the instruction assumption.

#### 4.1.2 Examining the Stories we tell about Education

The second real-world challenge that can help us escape the instruction assumption comes from examining our stories about education. Educators, researchers, and parents all tell themselves that they want students to love learning, but do they really believe that children will love learning after 13 years of schooldays filled with endless pre-planned, teacher-directed lessons? Most adults are enormously bored by a single day filled with meetings, but in the U.S., we have arranged school days that are often equally boring for students, despite teachers' best efforts. We also tell ourselves the story that we want children to develop initiative and creativity, but then ask them to follow instructions all day and to memorize an endless series of correct answers. Next, we tell students and ourselves the story that education prepares them for the real world, but then we usually provide de-contextualized instruction in isolated academic knowledge and skills in a way that has little connection to that real world. Sadly, after long immersion in the de-contextualized instruction that characterizes the *game of school* (Fried, 2005), students may also not realize that they could and arguably should be learning directly from that real world.

#### 4.1.3 Reflecting on our own Learning

Along those lines, the third real-world challenge that can help us escape the instruction assumption comes from our own daily learning—even the learning of those who embrace the instruction assumption. For many hours each day, most adults learn new knowledge and hone existing skills by doing one of two things: learning by doing or learning online. People from countless walks of life get better at what they do just by doing it, through living life, through trial and error, or by watching others on the job. Real life experiences throw challenges and provide opportunities for practice at us, and we learn and improve.

Also, children, youth and adults spend countless hours on line: looking things up, reading, surfing the web, getting smarter about a million different topics. Every day, we read on line, pursue answers to our questions, engage in debates, have our thinking challenged, see simulations, and learn about everything under the sun—all by following our interests, and without any preplanned or formal lessons.

Adults and children alike would let their laptops, cell phones, and tablets collect dust if every time they picked them up, they were ordered to sit still and complete a 50-minute lesson on some academic content not of their choosing. Once we leave school, most of our learning comes through learning by doing or pursuing our own questions, but the evidence is compelling that the instruction assumption steers us instead towards a less engaging and less meaningful approach to learning and development.

#### 4.2 Broader Implications for Education

This analysis challenges the instruction assumption and concludes that we need a paradigm shift in education. This will not be easy, but our situation is not unique.

This proposed paradigm shift is similar to the one facing modern medicine. In medicine, millions of years of evolution have designed a human body that is well equipped to sustain health and fight disease—provided a healthy diet and adequate sleep and exercise. However, Americans have not maintained either a healthy lifestyle or diet, and chronic disease has become rampant, with the vast majority of major chronic diseases (e.g., heart disease) resulting from lifestyle factors (US Burden of Disease Collaborators, 2013). Most major chronic diseases can be prevented or even reversed with dietary and lifestyle changes (Shurner, 2011). However, until recently, modern medicine has emphasized more drugs and more surgeries, treating symptoms of major diseases rather than preventing the diseases and addressing the underlying causes. In short, the next major frontier for medicine does not involve medicine or surgery at all, but rather, wellness counseling in diet and lifestyle.

Similarly, millions of years of evolution have also developed a human brain that learns quite well much of what it needs to learn, and often does so with little or no formal instruction, as long as the person's basic physical and psychological needs are met. However, America has not created either a culture or an educational approach in which children's basic needs are consistently met, and development and learning problems are rampant.

The vast majority of development and learning problems result either from out-of-school factors (e.g., poverty) or from inappropriate and excessive instruction. Most of these problems can be prevented or resolved by having a healthier society and healthy, whole-child education. However, until recently, policymakers and educators have primarily responded with more tests and more academic instruction, treating symptoms of development and learning problems, rather than preventing those problems and addressing the underlying causes. In short, the next major frontier for education does not involve instruction or testing at all, but rather, healthy changes in society and non-instruction alternatives such as play, projects, apprenticeships, and independent study.

There is evidence that many educators around the globe are aware of the limitations of education guided by the instruction assumption. For example, from Finland's well-respected education system we hear Finnish elementary school principal Timo Heikkinen commenting that, "The children can't learn if they don't play. The children must play" (Abrams, 2011). Similarly, China, Korea, and Singapore have attracted attention for their students' high test scores, but within these countries, there is substantial dissatisfaction with their educational systems. Why? Unfortunately, intensive test-focused academic instruction is producing high test scores but is also undermining initiative, creativity, and even students' mental health—leading to high rates of suicide and suicidal ideations. As Zhao (2009) documented, all three countries are trying to implement education reforms that would make education less standardized and test-driven, and more learner-initiated, individualized, and experiential—to better foster autonomy, initiative, creativity, critical thinking, and social and emotional health.

If we pursue one or more of the proposed routes for escaping the instruction assumption, this will make it easier for us to imagine and create educational contexts that support students' broad and long-term development and real-world competence. These contexts would include more exploration and play, more student-chosen reading and independent studies, more transdisciplinary project-based learning that is connected to the real world—and less formal instruction on isolated academic skills and knowledge.

Some of that academic content would still be learned—albeit in ways that are more contextualized and connected to real-world activities and issues—but some of it would come to be seen as no longer essential for developing broad real-world competence.

Education would come to more closely resemble how we learn from the internet and other real-world experiences, while looking less and less like factory assembly lines or Korea's academic cram schools.

To support this transformed view of education, researchers, policymakers, and educators need to agree on a vision of educational research that emphasizes broad and long-term effectiveness for the range of goals parents, employers, and society value most. In the 2007 Wallace Foundation Distinguished Lecture, Ball and Forzani argued that education research should focus largely on the *instructional dynamic* within classrooms, because “Education is the deliberate activity of helping learners to develop understanding and skills” (Ball & Forzani, 2007, p. 530). However, the foregoing review suggests that focusing on just academic knowledge and skills is an unacceptably narrow focus for education, and that *instruction* is an unfortunate word choice because that term suggests to many people the most traditional type of lessons, whereas much of the best development and learning requires no formal *instruction* at all. Just as patient-initiated but doctor-supported lifestyle changes are the next major frontier in medicine, learner-initiated but teacher-supported learning is the next major frontier in education. If researchers accept the conclusions of this analysis, then an essential focus for future research is studying when formal instruction is either unnecessary or broadly counterproductive, and when more indirect types of support (e.g., making interesting materials or web access available; apprenticeships, supporting play, discussions) are more beneficial.

For the U.S., the conclusions of this analysis suggest the need for a profound educational transformation. That is, the vast majority of the U.S. education system—from federal policies to student assessment systems to curricula and teacher evaluation systems—is focused on single-subject academic instruction designed for the narrow and short-term acceleration of test scores. Unfortunately, the Common Core State Standards and their associated tests largely reinforce this counterproductive educational gestalt. Thus, it is difficult to know whether the greater challenge will be to escape the grasp that the instruction assumption has on our collective thinking about education, or to let go of the enormous infrastructure of policies and practices that the U.S. created based upon the instruction assumption. Perhaps the advocates of disruptive innovation (Christensen, Horn, & Johnson, 2008) will be correct in the end: Our evolving technologies will quickly make it impossible to hold onto a view of education that never fit well what we know about human development, but that are simply impossible to cling to in a global information age.

The dramatic disconnect between how we learn outside of school and the dominance of traditional instruction inside schools might bring us to a tipping point at which people ask, “Why on earth are we still doing education this way?”

In conclusion, a broad array of research suggests that the instruction assumption is false and it is deeply counterproductive for education. We must transcend the instruction assumption to create education that truly fits our goals, that reflects the challenges of the 21st century, and that is worthy of our children's amazing minds.

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