



Raiders of the Lost Ark and U.S. Stagnant Test Scores: Are We Digging in the Wrong Place?

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“We sometimes talk as if ‘original’ research were a peculiar prerogative of scientists...But all thinking is research, all research is native, original with him who carries it on even if everybody else in the world already is sure of what he is still looking for.”

--John Dewey, *Democracy and Education*

Abstract

The striking lack of progress in American K-12 student achievement over the last two or three decades for reading and mathematics, and over the last 10 years for science calls to mind a line from the movie, Raiders of the Lost Ark. Sallah, played by John Rhys-Davies, realizes where the Germans are looking for the lost Ark and declares to Indiana Jones, “They’re digging in the wrong place!”. Perhaps we, too, have been digging in the wrong place in our search for higher test scores. Perhaps we have been using the wrong model of knowledge and teaching and learning. To the degree that learning is thinking, it is, as Dewey says, research, and research is knowledge creation. So, knowledge is not something that teachers give and students get. It is what students create in the process of learning. Learning is knowledge creation and teaching is facilitating this creative process. This inquiry-creativity model of teaching and learning should inform our efforts to improve student achievement.

Keywords: Knowledge Creation, AI, U.S. Test Scores, inquiry-creativity model of teaching and learning

1. Introduction: Stagnant Achievement

U.S. 4th grade scores in reading, mathematics and science, as measured by the National Assessment of Educational Progress tests, have been stagnant for the last 10, 20, in some cases even 30 years[1]. In 2009, for example, U.S. 4th graders averaged 149 out of 300 points possible on the NAEP science test. Ten years later, In 2019, the average score was 150, only one point higher. Again, in 2003, the average 4th grade NAEP score in mathematics was 234 out of 500. Almost 20 years later, In 2022, it was 235, one point increase in nearly two decades. Finally, in 1992, the average 4th grade NAEP reading score was 215 out of 500. In 2022, thirty years later, it was 216. The question is: Why so little progress?

2. Reasons for Stagnation

Boldon and Tymms argue that the stagnant scores in the U.S., as well as in other countries, are likely the result of two kinds of mistakes, mistakes in implementation and of omission[2]. One implementation error has been bad timing. In this instance, reforms have been implemented either too soon or too often. Election cycles are usually four or five years, giving newly elected administrations little time to examine the efficacy of proposed reforms. Accordingly, many are too hastily implemented before sufficient evidence of their effectiveness can be shown. It is also the case, they say, that too many reforms are attempted in too short a period, overwhelming the teachers and school administrators who are expected to implement them. A second implementation mistake, they say, has been how accountability has been administered. Administrations have taken a heavy-handed punishment-reward approach that has undermined local education agencies’ confidence in and willingness to cooperate with national ministries or federal and state departments of education.

We would like to suggest that another reason for the stagnant scores may be that we are working with a misconception, a static conception of knowledge. This influences the way we think about and carry out teaching



and learning. Our suggestion is not new. It has long been noted by philosophers and psychologists. We will mention three in particular: Benjamin Bloom, John Dewey, and Paulo Freire. [3,4,5,6]

3. The Inquiry-Creativity Model of Knowledge, Teaching and Learning

3.1 Knowledge

Knowledge is commonly thought of as a thing. But it is not. Knowledge is not a thing, it is an activity. We are reminded of this by Benjamin Bloom's revised taxonomy which replaces nouns with verb forms, The revision emphasizes the dynamic and active nature of knowledge, of knowing [3].

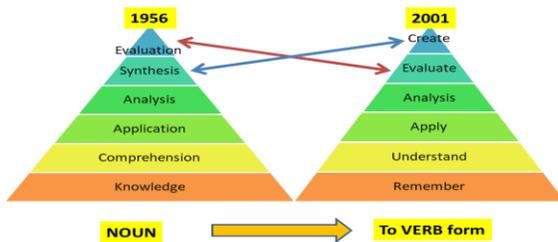


Figure 1. Benjamin Bloom's Revised Cognitive Domain

The cognitive domain gets most of the attention in Bloom's theory, probably because we moderns privilege reason and science, the highest form of reason. But it is important to note that Bloom's taxonomy consists of not one but three dimensions: cognitive, affective and psychomotor (Figure 2).

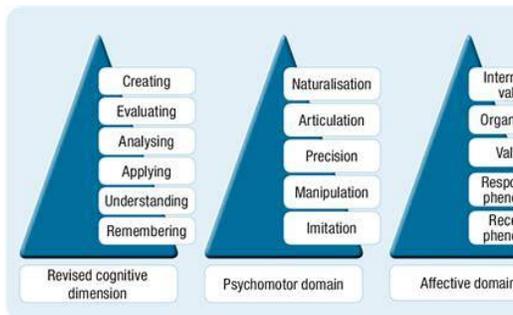


Figure 2. The Three Domains of Bloom's Taxonomy.

Knowledge, as Bloom's complete taxonomy recognizes, involves emotions and physical activity as well as mental engagement. The whole taxonomy reminds us that knowledge is not just a mind- but a mind-body activity. [3]

John Dewey also believed that learning and knowledge are mind-body activities. For him, learning is thinking, and thinking is doing. When we are thinking we are not like Rodin's *The Thinker*, sitting chin-on-hand. We are engaged in some course of action with an end in view. We are trying to achieve some objective, figuring out how to get what we want, and taking acting to get it. At "... any given time," he says, " if we are awake at all, we are always interested in one direction or another...always already doing something" [4]. Living, for Dewey, becomes a kind of ongoing personal experiment (It is no accident, he says, that the words "experience" and "experiment" are similar). We try things and see how they work for us For Dewey, then, "experience" is a process of identifying a problem, interacting with things and people to solve the problem, and reflecting on how well our actions/interactions enabled us to solve the problem or achieve our goal. [5]

The fact that knowledge is an activity is obscured by the nature of fact itself. Facts seem to be things. They are inscribed in ancient stone tablets, preserved in books. They present themselves as done deals. That the earth goes around the sun, for example, is a fact that every well educated person supposedly knows. But what



Copernicus did 500 years ago to discover this fact—to get the evidence to back up the belief that constitutes the fact—this involved not only cognitive activity but a great deal of emotion and physical effort as well. But all his work is behind the scenes, as it were, hidden behind the fact. We do not have to see all that went into the fact for us to be able to cognize it. But to understand it, to extract real meaning from the fact, we do, at least, have to imagine--experience vicariously--what Copernicus had to do to discover and tell the world about it.

A fact, then, is like a coiled spring with all of the thinking and doing that went in to its discovery locked in as it were. Good teaching releases the spring and frees it's meaning. But this kind of teaching is not likely if knowledge is viewed as something that teachers give and students get. It must rather be seen as a set of activities—cognitive-emotional-physical—that students need to recreate at least in imagination if not in reality, virtual or not. Otherwise, knowledge and facts are inert, and teaching and learning are nothing more than what Freire called “banking” education.[6]

3.2 Teaching and Learning

Of course, many of the ideas just mentioned are behind the current interest in “discovery” learning, “problem-based” education, “phenomenon” education and the like. But the point here is not simply to reaffirm the thinking that lies behind these approaches. The point is that the thinking behind them does not yet characterize most teaching and learning. Most educators must still be operating with an image of knowledge as inert, as a thing and not as activity. Besides the stagnant scores themselves, another clue that educators are working with the wrong model of knowledge, is simply the language we naturally use when speaking of pedagogy. We normally say, “teaching and learning”, and not “learning and teaching.” We mention teaching first and learning second. One follows the other. This suggests an image, a habit, wherein learning is taken to be receiving knowledge, as one might receive a package from Fedex, and teaching is portrayed, albeit unconsciously, as delivering the package. Learning as knowledge creation is not in this picture. With a dynamic view of knowledge, learning comes first and teaching follows; learning becomes knowledge creation and teaching its facilitation.

3.3 An Inquiry-Creativity Model

What are the practical implications of knowledge as activity, learning as knowledge creation, and teaching as facilitating the creative process? They would seem to include the following:

- Learning as knowledge creation should result in the creation of some thing. The thing created can, of course, be a digital thing since In our digital age the things that we create are increasingly digital. Moreover, with advances in Virtual Reality and AI our digital creations are fast becoming more sophisticated; we are growing our capacity to recreate immediate experience of objects and the objective world.
- Knowledge creation can and should be organized around specific learning standards which articulate the end in view, the objective to be achieved.
- Knowledge creation—research--can and often should be a team effort involving two, three or even more individuals, depending on the task.
- Team members should be systematically matched according to individual knowledge and skill levels so that the strengths of one member can complement or compensate for the strengths and weaknesses of other members.
- Teams should work on a schedule with deadlines.
- If a virtual reality is to be created or used as part of the learning process, teachers in the VR experience should be highly qualified master teachers who understand the importance of constructing learning environments that require students to solve problems by using things (tools) and collaborating with others.

4. Summary

School reform has a long history in the U.S. as well as elsewhere in the world. But for three decades, at least, little progress has been made. Achievement scores in reading, mathematics and science are flat. No doubt the stagnant scores are in part a function of mistakes in the ways in which reforms have been implemented as well



as factors they have omitted. But we suggest they are also the result of a mistaken notion of knowledge that unconsciously underlies most of the teaching and learning that goes on. Knowledge is viewed as a thing, as a “package”, that students receive and teachers deliver. We suggest that the more accurate rendering is knowledge as research, as set of cognitive-emotional-physical activities in which students engage. Learning is knowledge creation and teaching is the process of facilitating this creative process.

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