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# Theories of Learning

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## Overview

There are a multitude of *theories of learning* in the social sciences. And, it will be seen from these theories why there has never been, and **cannot be**, any general theory of learning obtained as a result of these methodologies of theory development.

All of these attempts at theory development are describing “what is” rather than asserting the general principles that “*result in what is*”—hence, the use of hypotheses. Hypotheses help to answer questions about “what is, “**but do not provide a means to determine “general principles”**”.

As will be seen, hypotheses are a means to inductively validate assertions, but validation does not provide the means to develop the basic assumptions or general principles upon which comprehensive, complete and consistent theories are founded.

Simply put, hypotheses are not designed to develop theory; they are designed to validate theory. But, when the entire research methodology of the social scientist is hypothesis-driven, then there is no means by which legitimate theory can be devised since, by use of the hypothesis-methodology, there is no intent to devise such a theory.

## Current Theories of Learning—A Review of the Literature

There are a multitude of *theories of learning*. Some of these are listed below. And with each it will be seen that what is attempted is not to establish general principles, but to describe the learning process as perceived from a narrow perspective. For example, consider the following list of theories:

Adult Learning Theory	Mathematical Learning Theory
Anchored Instruction Theory	Operant Conditioning Theory
Contiguity Theory	Repair Theory
Constructivist Theory	Script Theory
Conditions of Learning Theory	Sign Learning Theory
Dual Coding Theory	Situated Learning Theory
Experiential Learning Theory	Structural Learning Theory
Functional Context Theory	Subsumption Theory
Genetic Epistemology Theory	Symbol Systems Theory
Information Pickup Theory	Triarchic Theory
Information Processing Theory	

Each theory is framed as a hypothesis that can be tested, rather than a presentation of general principles that include the observations and produce unknown outcomes. Each theory treats learning from a different perspective and introduces hypotheses to validate that perspective. For example, consider the following learning theories:

**Adult Learning Theory**, as the name suggests, is restricted to considering the characteristics of adult learners. Then, the analysis of these learning characteristics is divided into *personal characteristics* and *situational characteristics*. However, such analyses do not lead to theory. What such analyses do is develop the means to interpret what one observes, possibly by the abduction of mathematical models from mathematics, or behavioral models from psychology. *Adult Learning Theory* is actually *Adult Learning Laws* that can be used to assist one in developing adult learning programs by describing learning events or empirical observations. *Adult Learning Theory* does not design theory; it simply establishes predetermined guidelines that are considered of value for the instruction of adults.

**Anchored Instruction Theory** is an **instructional methodology** that has demonstrated success in helping students to learn by utilizing “interactive videodisc technology.” While it is a paradigm for others to emulate in designing problem-focused learning, it is not a theory in that no logically-derived hypotheses are obtained or possible. *Anchored Instruction Theory* does not devise theory; it simply provides a predetermined framework that is considered of value for instruction that can be implemented in various learning programs by describing learning events or empirical observations.

**Contiguity Theory** is framed as a hypothesis: “A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement.” This is an assertion that can be validated through testing. But such validation does not devise theory; it simply establishes that under the given conditions a specific “movement” will be obtained by describing learning events or empirical observations.

**Constructivist Theory** provides guidelines by which it is believed students will learn; for example, “The instructor should try ...,” “The instructor and student should engage ...,” etc. This is but a prescription for learning, and not a theory for discovery of learning processes in that the conclusion is already known. The four major aspects of learning provided are prescriptive of what should be done for a student to learn. These prescriptions do not devise theory; they simply guide one to assist in establishing a predetermined learning environment that it is assumed will be effective by describing learning events or empirical observations.

In each of these cases, theory is not being devised; only guidelines that can help one to design a more effective learning environment—that is, *they describe **known** learning events or empirical observations*. This is the problem with hypothesis-driven methodologies—whereas one may validate that a specific learning methodology may be effective, there is nothing that has been validated that can help to devise theory that can then be used to predict outcomes even in similar environments. Every learning environment must be re-validated to determine if the hypothesis is valid.

But, what no one has done is what is critical to the development of a general theory of learning—devise a theory that encompasses all of these perspectives; devise the *basic elements* that will bring under it all of the hypotheses that have been proposed and validated. And, the reason that this has not been done lies right at the foot of the methodology being used—hypothesis-driven methodologies. Each researcher starts out anew with a new perspective and validates it as a result of a new hypothesis. This methodology must change if there is to ever be a theory of learning founded on general principles that are comprehensive and consistent.

Now, there is no question that the research provided by these hypotheses has resulted in understanding of the learning process and of student development or learning. It is certainly recognized that a vast wealth of information and understanding has been obtained. The value and results of all of the research is not in question. The concern is that all of this research has been designed for just one thing—to amass all of this wealth of information and understanding for its own sake, but not to develop any general principles about learning processes and student development that could be confidently applied to diverse classes of students. With great understanding, exceptional learning programs can be developed within a specific class of students, but no predictive outcomes can be obtained as to just how valuable the learning program is since there is no theory founded on general principles. The great diversity of the learning theories that are available can be seen by those cited above.

And, there is a further problem that results from identifying the above hypotheses as *theories*—when *theory* is reduced to include every *conjecture*, then *theory* is a term that is of limited to no value. When *theory* can include the assertions of one whose only purpose is a political or financial agenda, as well as those that are carefully and logically-developed descriptive or axiomatic theories, then we as scientists have no one to blame but ourselves when the religiously-motivated or financially-motivated, or otherwise personally-motivated layman asserts that something is “only a theory,” implying that it is of little or no value and the pronouncements of a layman concerning the scientific endeavor are just as important and credible as the professional scientist.

Unfortunately this perspective is furthered when texts on *Scientific Research in Education* mislead one on the nature of just such research. The following text edited by Richard J. Shavelson and Lisa Towne purports to present an overview of educational research and theory development, but falls substantially short by not helping to clarify the problems within education research. Of course, as editors, they were but compiling the results of a committee that had been:

Assembled in the fall of 2000 and was asked to complete its report by the fall of 2001. The charge from the committee’s sponsor, the National Educational Policy and Priorities Board of the U.S. Department of Education, was as follows:

This study will review and synthesize recent literature on the science and practice of scientific education research and consider how to support high quality science in a federal education research agency.<sup>1</sup>

The problem, of course, does not lie with the editors, but with the entire education research community. The problem lies with the very assumptions about the development of education as a science and the manner in which “knowledge in education accumulates.” The focus of research in education, as perceived by the committee, was stated as follows:

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<sup>1</sup> Shavelson, Richard J. and Towne, Lisa, Eds. (2002). *Scientific Research in Education*, National Educational Policy and Priorities Board of the U.S. Department of Education, p. 22.

- How can research-based knowledge in education accumulate?

The committee believes that rigor in individual scientific investigations and a strong federal infrastructure for supporting such work are required for research in education to generate and nurture a robust knowledge base. Thus, in addressing this question, we focused on mechanisms that support the accumulation of knowledge from science-based education research—the organization and synthesis of knowledge generated from multiple investigations. The committee considered the roles of the professional research community, the practitioner communities, and the federal government. Since ***we view the accumulation of scientific knowledge as the ultimate goal of research, this issue weaves throughout the report.***<sup>2</sup> [Emphasis added.]

The “goal of research” as the “accumulation of scientific knowledge” clearly states the problem in education research today. As will be discussed below, even Ary, et al., as noted previously, recognize that even with the “*accumulation of a large quantity of reliable knowledge, education and the other social sciences have not attained the scientific status typical of the natural sciences.*”<sup>3</sup> They, and most others, totally miss the point that scientific knowledge as found in the natural sciences is not and cannot be obtained by simply accumulating “a large quantity of reliable knowledge.” Unfortunately, “science” as “accumulation of knowledge” determines the basis for the committee’s report as reflected by the title of the second chapter—“Accumulation of Scientific Knowledge”—which confirms that they totally misunderstand the nature of the scientific endeavor. The first paragraph of the report states the problem, but also the basis for this Committee’s agenda—to refute the obvious. They assert:

The charge to the committee reflects the widespread perception that research in education has not produced the kind of cumulative knowledge garnered from other scientific endeavors. Perhaps even more unflattering, a related indictment leveled at the education research enterprise is that it does not generate knowledge that can inform education practice and policy. The prevailing view is that findings from education research studies are of low quality and are endlessly contested—the result of which is that no consensus emerges about anything.<sup>4</sup>

Unfortunately, rather than take this perception at face value, the Committee tries to refute it. An in-depth analysis of this Committee’s report might be appropriate except that the Committee itself provides the answer that the report is prepared to support an agenda for Federal funding(!) rather than to present an unbiased report about the nature of research and the reason for the lack of any real theory development in education that would provide a basis for “knowledge accumulation” in education. In response to the above perception of education research, the Committee states:

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<sup>2</sup> Ibid. p. 24.

<sup>3</sup> Ary, Donald; Jacobs, Lucy Cheser; and Razavieh, Asghar. (1985). *Introduction to Research in Education*, p. 19.

<sup>4</sup> Op cit., Shavelson, p. 28

Is this assessment accurate? Is there any evidence that scientific research in education accumulates to provide objective, reliable results? Does knowledge from scientific education research progress as it does in the physical, life, or social sciences? To shed light on these questions, we consider how knowledge accumulates in science and provide examples of the state of scientific knowledge in several fields. In doing so, we make two central arguments in this chapter.

First, research findings in education have progressed over time and provided important insights in policy and practice. We trace the history of three productive lines of inquiry related to education as “existence proofs” to support this assertion and to convey the promise for future investments in scientific education research. What is needed is more and better scientific research of this kind on education.

Our second and related argument is that in research across the scientific disciplines and in education, the path to scientific understanding shares several common characteristics. ... The path to scientific knowledge wanders through contested terrain as researchers, as well as the policy, practice, and citizen communities critically examine, interpret, and debate new findings and it requires substantial investments of time and money.<sup>5</sup> [Emphasis added.]

Unfortunately, again, the Committee now elicits the input of the “citizen community” to “critically examine new findings” of the education research community. We continue to contend with the results of just such a position as the “citizen community” bringing to education their own personal agendas disguised as “scientific inquiry”; e.g., the Creationists. When every scientific inquiry is argued in the court of public opinion and bias, then education researchers, or at least this Committee, has brought on itself the problems of scientific inquiry experienced centuries ago. It is true that the religiously-motivated public has replaced the religious clerics who previously mandated “scientific” outcomes to assure their personal agendas as with the findings of Galileo. What was Galileo’s response?

Due to the clear political and financial agenda being pursued by this Committee, little more needs to be said. However, a few points will be made as such will help to clarify just exactly what does have to be done in education research.

To support its position concerning research in education, the Committee tries to rely on the development of research in molecular biology. They assert:

The earliest model of the gene was derived from Mendel’s pea plant experiments in the 1860s.<sup>6</sup>

And the science related to molecular biology and the modern concept of the gene developed from there. The problem with this purported analogy is that the science of molecular biology did in fact build on previous discoveries, each building on the developing theory—unlike any corresponding development in education. **There is no basic theory of education on which to build.**

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<sup>5</sup> Ibid. p. 29.

<sup>6</sup> Ibid. p. 31.

In Chapter 3, the Committee states:

In Chapter 2 we present evidence that scientific research in education accumulates just as it does in the physical, life and social sciences. Consequently, we believe that such research would be worthwhile to pursue to build further knowledge about education.<sup>7</sup>

Unfortunately, such is just not the case. First, the Committee seems to believe that education is not part of the social sciences. The social sciences, of course, have the same problems in research as are found in education—there is no basic theory on which to build, and both are furthered by hypothesis-driven research methodologies that cannot devise theory.

More important, the Committee seems to have no idea how scientific research “accumulates” in the physical sciences. This will be discussed in more detail below; however, for now it must simply be recognized that the physical sciences, and physics, in particular, are furthered as the result of well-defined theories. Education and the social sciences have none.

While Shavelson and Towne have provided some insight concerning the problems in education research today, John W. Creswell (Creswell, 2003) provides additional insight concerning those problems. Most of the problems center on a misunderstanding of the nature of theory and the resulting name-calling, especially with the degradation of the *Post-Positivists*. The easiest to discern, possibly, is the assertion that those taking an “advocacy/participatory approach” are conducting “research” to develop “knowledge.”<sup>8</sup> Creswell states:

This position arose during the 1980s and 1990s from individuals who felt that the postpositivist assumptions imposed structural laws and theories that did not fit marginalized individuals or groups or did not adequately address issues of social justice. ... In the main, these inquirers felt that the constructivist stance did not go far enough in advocating for an action agenda to help marginalized peoples. These researchers believe that inquiry needs to be intertwined with politics and a political agenda. Thus, the research should contain an action agenda for reform that may change the lives of the participants, the institutions in which individuals work or live, and the researcher’s life. ... Therefore, theoretical perspectives may be integrated with the philosophical assumptions that construct a picture of the issues being examined, the people to be studied, and the changes that are needed. Some of these theoretical perspectives are listed below.

- Feminist perspectives.
- Racialized discourses.
- Disability inquiry.<sup>9</sup>
- Queer theory.
- Critical theory.

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<sup>7</sup> Ibid. p. 50.

<sup>8</sup> Creswell, 2003, p. 9.

<sup>9</sup> Ibid., pp. 9-10.

As has been adequately demonstrated by Marx and his ilk, the October Revolution, etc., advocacies of such political agendas are not doing science but propaganda and fear-mongering in the guise of “social justice.” By definition of the special interests, this does not define either “research” or “pursuit of knowledge,” but simply the attempt to impose one’s personal agenda on others who may or may not wish to support the agenda. Even if there is support for the agenda, such still does not bring it under any “pursuit of knowledge” nor “research,” but it remains a personal agenda for the purpose of imposing one’s will on another.

To claim, as in the last sentence of the above quote, that these perspectives are “theoretical perspectives” is to intentionally mislead those laymen who do not know better. These perspectives are nothing more or less than personal agendas. Today, one such perspective is “creationism” strutting itself as “science.” To include these agendas under the guise of science is to do a great disservice to all scientists and serious researchers in education.

As the advocacy/participatory approach apparently grew out of the constructivist stance as one that did not go far enough, we can now go back and have a better understanding of the constructivists. According to Creswell:

Assumptions identified in these works [by Lincoln and Guba, Schwandt, Neuman, and Crotty] hold that individuals seek understanding of the world in which they live and work.<sup>10</sup>

Well, of course they do, but that does not mean that they are creating theory. It is uncertain whether or not this assertion by Creswell is to be taken as something profound. He continues:

They develop subjective meanings of their experiences—meanings directed toward certain objects or things. These meanings are varied and multiple, leading the **researcher** to look for the complexity of views rather than narrowing meanings into a few categories or ideas. The goal of research, then, is to rely as much as possible on the participants’ views of the situation being studied.<sup>11</sup> [Emphasis added.]

And, we wonder why there is no theory of education! When everyone is a “researcher”, then no one is. And to assert that the “*goal of research*” is to “*rely as much as possible on the participants’ views*” indicates a total lack of understanding of what a researcher does or the process of scientific discovery.

Of course, normally science is intended to devise a means to mitigate the influence of subjective evaluation so as not to prejudice the outcomes. But, by relying “*as much as possible on the participants’ views*” the outcome of such research is clearly designed to obtain the **biased** results of the “researcher” and to further a personal agenda. The advocacy/participatory advocates simply make this intent more clear.

Most telling concerning the constructivist approach is the following:

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<sup>10</sup> Ibid., p. 8.

<sup>11</sup> Ibid., p. 8.

Rather than starting with a theory (as in post-positivism), inquirers generate or inductively develop a theory or pattern of meaning.

For example, in discussing constructivism, Crotty (1998) identified several assumptions:

1. Meanings are constructed by human beings as they engage with the world they are interpreting. Qualitative researchers tend to use open-ended questions so that participants can express their views.
2. Humans engage with their world and make sense of it based on their historical and social perspective .... They also make an interpretation of what they find, an interpretation shaped by the researchers' own experiences and backgrounds.<sup>12</sup>

The first question that must be addressed concerning the first point above is: To what end? Are "researchers" simply providing a venue in which anyone can share their own ignorance?

And, the response to the second point is: That is exactly why, in legitimate research, one attempts to preclude personal bias. Of course, the Flat-Earth Advocates do need an outlet, and the constructivists have provided one. But that should not be confused with scientific inquiry, except for the sociologist who wants to determine just what it is that makes these people tick.

As shown in this study, much of the attraction to such advocacies as discussed above rests directly with the problem of comprehending just what a theory is and what is the nature of scientific inquiry. But, it also may simply be a result of the personal agendas of the advocates as discussed above. In those cases, reason is not the issue and there can be no legitimate dialog.

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<sup>12</sup> Ibid., p. 9.