UNIVERSITÄT BERN

Modelle pädagogischer Produktivität in der amerikanischen Psychologie

Prof. Dr. Walter Herzog (Universität Bern)

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Edward L. Thorndike (1874-1949)

The contribution of psychology to education. In: *Journal of Educational Psychology 1910 (1)*, 5-12.

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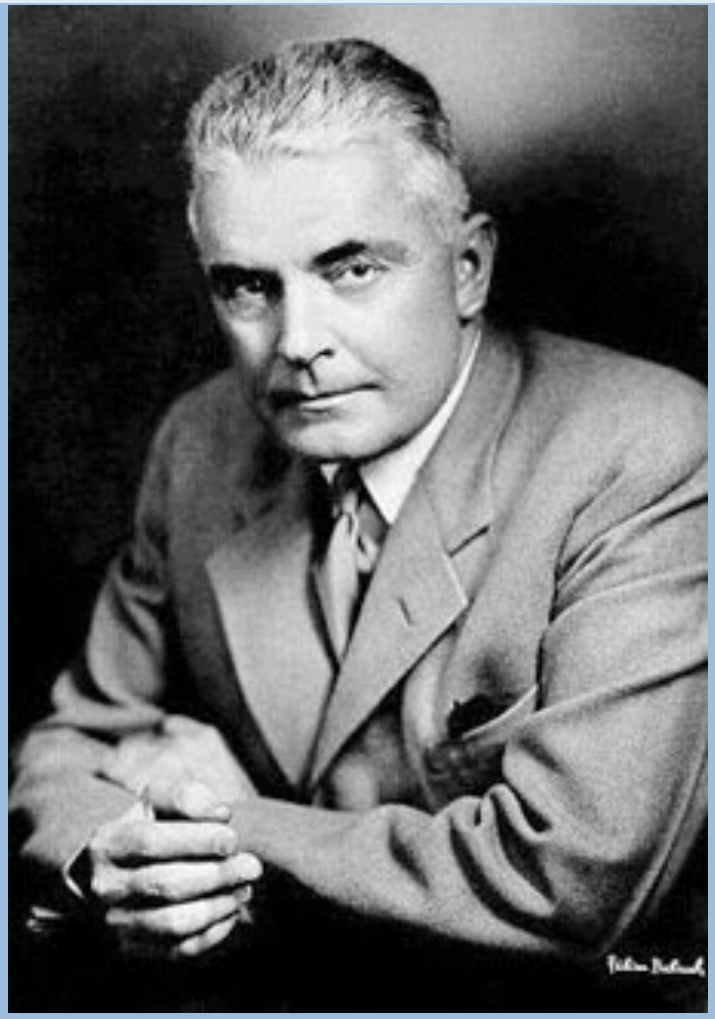

John B. Watson (1878-1958)

Psychology as the behaviorist views it. In: *Psychological Review 1913 (20)*, 158-177.

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«Every scientist feels that he makes progress in his field just to the extent to which he can gain control over the material with which he works – as examples: the harnessing of the tide, protection from lightning by lightning rods, the experimental production of lightning and rain, dissipation of fog. The psychologist likewise, having chosen human behavior as his material, feels that he makes progress only as he can manipulate or control it» (Watson 1924, p. 7).

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Utopia des Behavioristen (Watson 1929):

- Die Menschen in Utopia haben nie etwas gesehen, das nicht auf rein physikalischer Basis erklärt werden kann.
- Die Aufzucht der Kinder ist Sache der Ärzte; diese sind ausgebildete Behavioristen.
- In Verhaltenskliniken werden die Menschen umkonditioniert.

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«Some day we shall have hospitals devoted to helping us change our personality because we can change the personality as easily as we can change the shape of the nose, only it takes more time» (Watson 1930, p. 302).

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«Some day we shall have hospitals devoted to helping us change our personality because we can change the personality as easily as we can change the shape of the nose, only it takes more time» (Watson 1930, p. 302).

«What do we have to do to change the personality? There must be both *unlearning* the things we have already learned (and the unlearning may be an active *unconditioning* process or just *disuse*) and *learning* the new things, which is always an active process. Thus the only way thoroughly to change personality is to remake the individual by changing his environment in such a way that new habits have to form» (ebd., p. 301f.).

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Sidney L. Pressey (1888-1979)

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The Educational Dilemma

«This chapter has reiterated … this theme: that each pupil is a unique individual, different from every other pupil, presenting individual problems which must be understood if there is to be optimal development. But in the public schools of this country there are 26 million pupils. Education is thus a tremendous mass problem. To state that there must be both mass education and individualization seems to present an impossible dilemma» (Pressey 1933, p. 296f.).

«Methods of mass education must be devised which will nevertheless give maximal opportunity for the development of desirable individuality» (ebd., p. 297).

A New Automatic Testing Machine for Testing and Teaching

Developed by S. L. Pressey, Ohio State University

Automatically records and scores (or grades) a student's answers to test questions.

Can also be set to require that the student find the correct answer to each question before going on to the next, and count the number of his tries.

Adapted to both true-false and multiple-response or selective answer test material.
Useful in schools and colleges for both class and individual testing and drill; valuable also in personnel work, in psychological clinics, in experiments in learning.

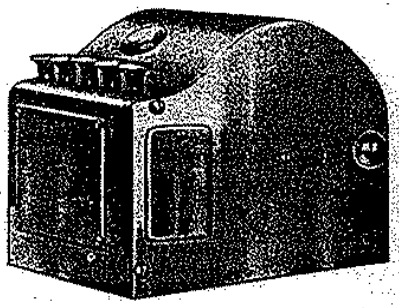
Eliminates grading of papers.

Grade obtained immediately.

Errors eliminated.

Eliminates all writing or marking on tests.

Will either test pupil or drill him on right answers.



Can be instantly changed from test to drill machine (or the reverse).

Reset for next student in a few seconds.

Reset for a different test in half a minute.

Capacity 100 questions.

Blanks may be used repeatedly, or questions put on blackboard.

This instrument consists essentially of a drum and a ratchet counter which are operated by five keys. The drum carries a perforated key sheet, the perforations permitting only right answers to operate the registering mechanism. The overall dimensions are only 5"x4½"x4½".

May be changed from a testing to a drill machine (or the reverse) in one second simply by moving a shift lever.

For Testing

The student registers his answer to each question by pressing a key.

The window at the top keeps his place for him by showing the number of the question to be answered.

The window at the side shows total of questions correctly answered.

For Teaching

The student is required by the machine to find the correct answer to each question before proceeding to the next one.

The question number in the top window does not change until the right answer has been made.

The window at the side shows the total number of tries.

The machine does away entirely with the drudgery of grading tests and quizzes, and eliminates errors in grading.

The grade is obtained immediately from this instrument; the student does not have to wait for days to get back his test paper.

If used as a drill machine the device both tests and teaches the student, informing him immediately of his mistakes and making him correct them and find the right answers before he can go on.

The machine makes possible automatic self-testing and self-instruction by the student.

The Machine Is of Great Value in Educational Research

PRICE NOT OVER $15.00

FIG. 2 Welch Manufacturing Company circular advertising Pressey's Automatic Teacher, circa May 1929. (Photo courtesy of the Ohio State University Photo Archives.)

aus: Petrina 2004, p. 319

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«What the calculator is to the office, the electric sweeper to the home, a simple apparatus which tests, scores, and also helps in teaching, may be to the schoolroom through the efforts of an Ohio State university professor» (*Columbus Dispatch*, 13. April 1930).

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«There must be an ‚industrial revolution' in education, in which educational science and the ingenuity of educational technology combine to modernize the grossly inefficient and clumsy procedures of conventional education. Work in the schools of the future will be marvelously though simply organized, so as to adjust almost automatically to individual differences and the characteristics of the learning process» (Pressey 1933, p. 582f.).

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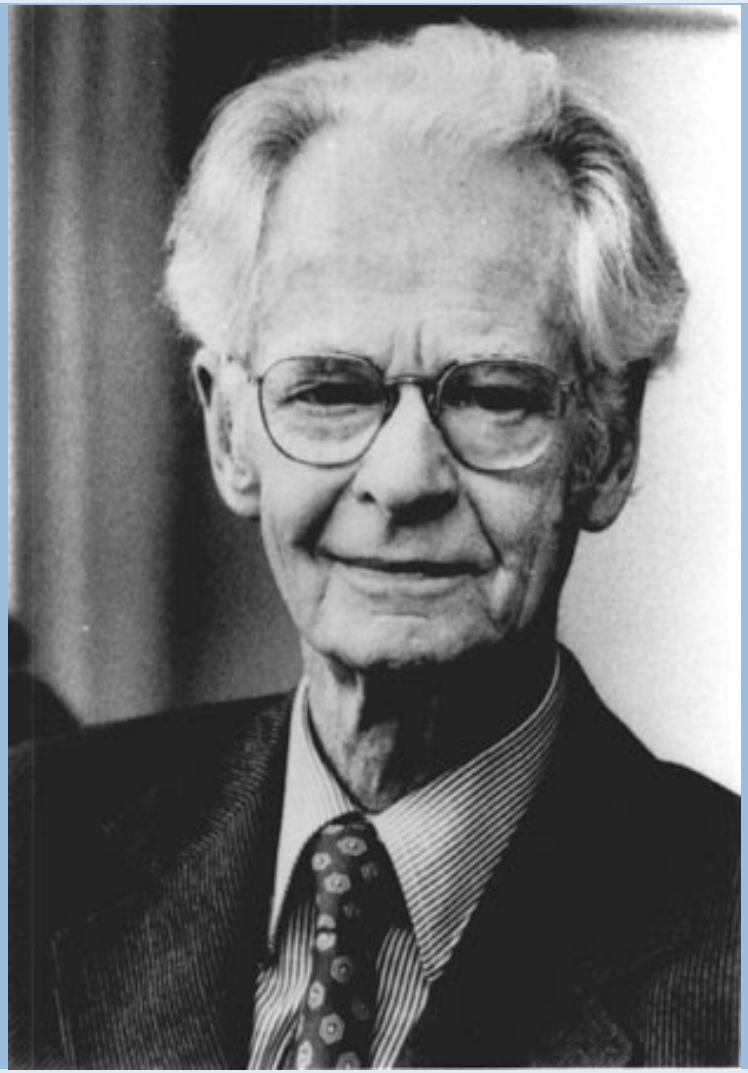

Burrhus Frederic Skinner (1904-1990)

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«We have been too ready to assume that the student is a free agent, that he wants to learn, that he knows best what he should learn, that his attitudes and tastes should determine what he learns, and that he should discover things for himself rather than learn what others have already discovered. These principles are all wrong, and they are responsible for much of our current trouble» (Skinner 1972, p. 234f.).

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The Shame of American Education (Skinner 1984)

«Are students at fault when they do not learn? No, they have not been well taught.»

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The Shame of American Education (Skinner 1984)

«Are students at fault when they do not learn? No, they have not been well taught.»

«Are teachers then at fault? No, they have not been properly taught to teach. … Are schools of education and teacher's colleges then at fault? No, they have not been given a theory of behavior that leads to effective teaching. … Are behavioral scientists then at fault? No, a culture too strongly committed to the view that a technology of behavior is a threat to freedom and dignity is not supporting the right behavioral science.»

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«There is no reason why the schoolroom should be any less mechanized than, for example, the kitchen. A country which annually produces millions of refrigerators, dishwashers, automatic washing machines, automatic clothes driers, and automatic garbage disposers can certainly afford the equipment necessary to educate its citizens to *high standards of competence* in the most effective way» (Skinner 1968, p. 27f. – Hervorhebung W.H.).

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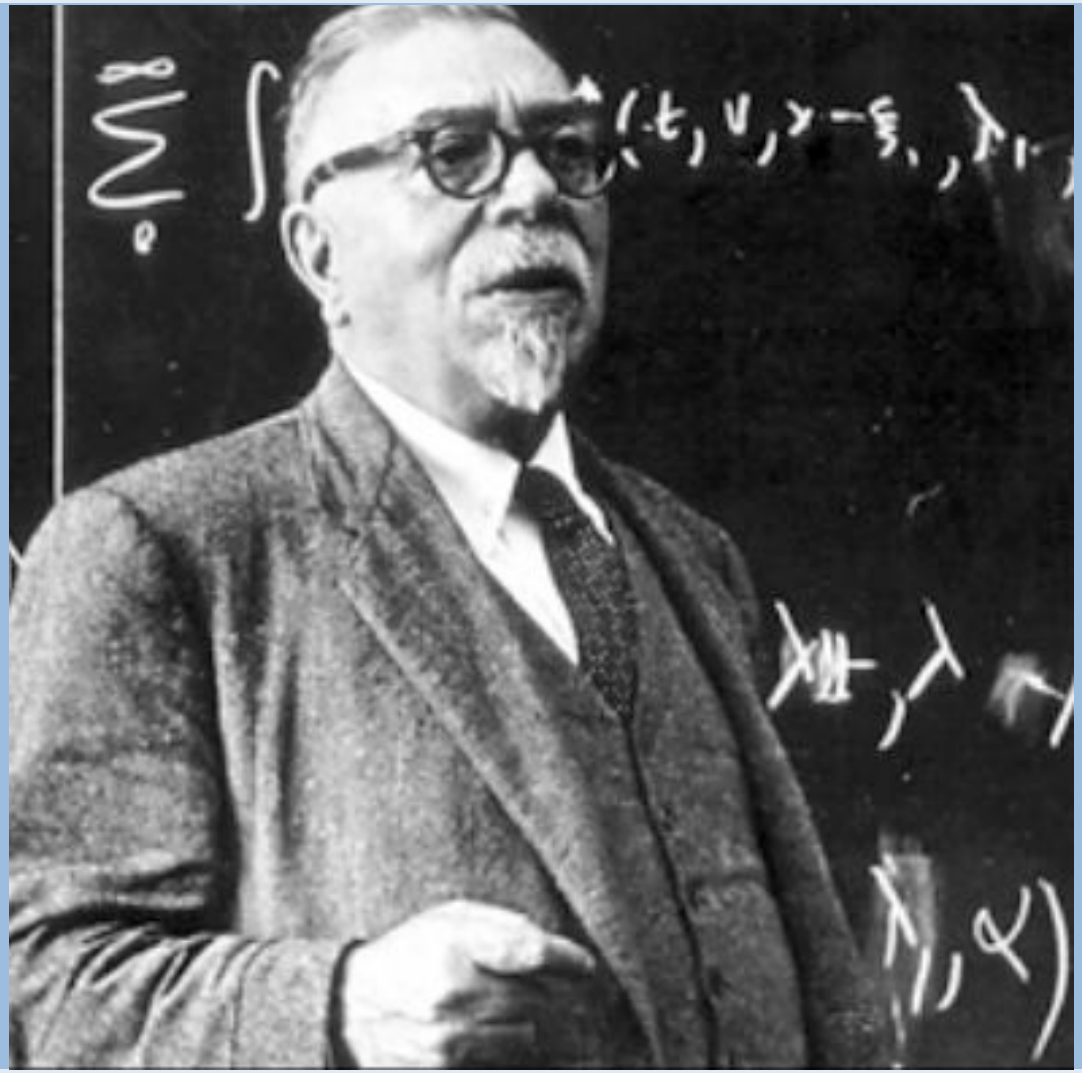

Cybernetics or Control and Communication in the Animal and the Machine (1948)

Norbert Wiener (1894-1964)

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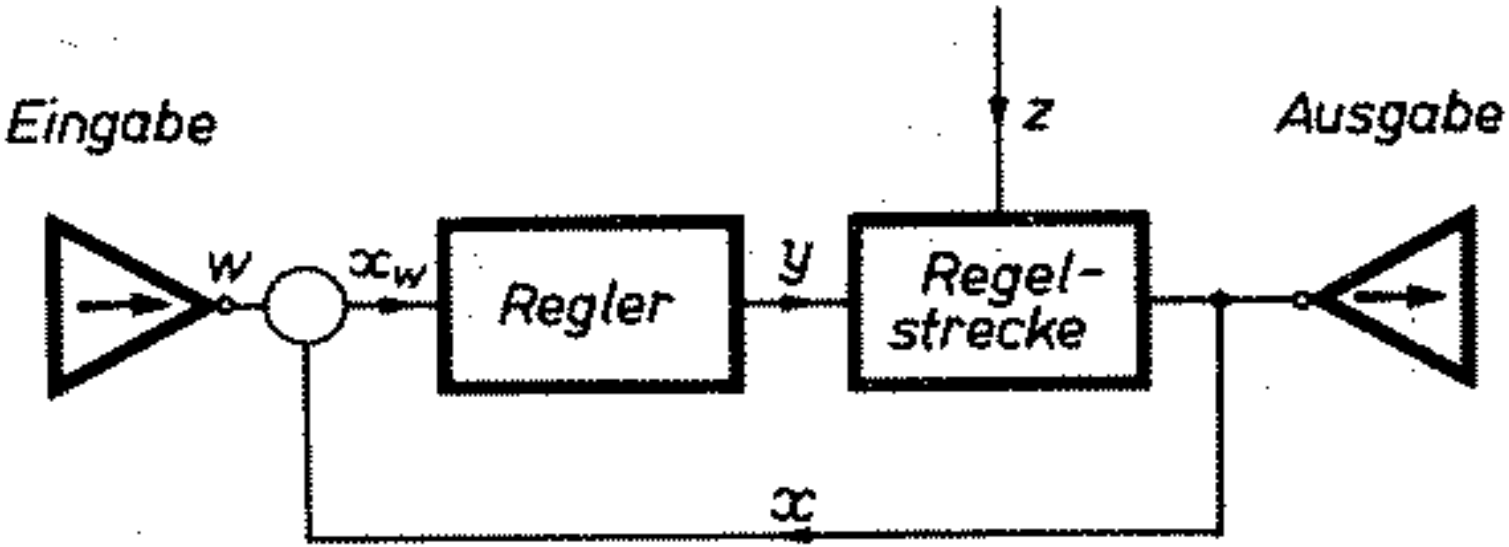

w = Führungsgröße
x = Regelgröße
y = Stellgröße
z = Störgröße

Abb. 3 Regelkreis.

aus: Steinbuch 1972, p. 75

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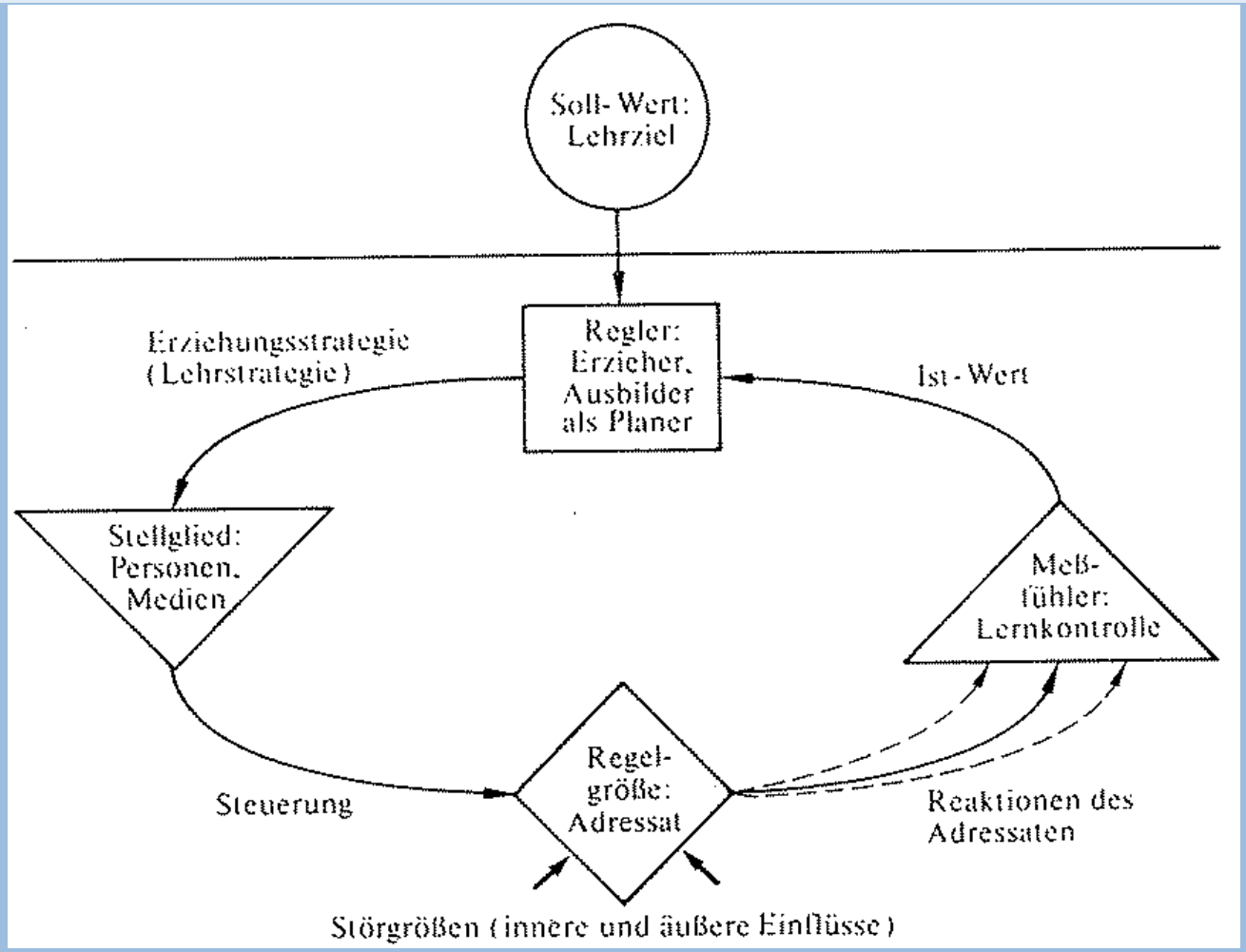

aus: von Cube 1986, S. 49

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Lawrence M. Stolurow & Daniel Davis: Teaching Machines and Computer-Based Systems. In: Robert Glaser (ed.): *Teaching Machines and Programed Instruction II.* Washington D.C.: National Education Association of the United States 1965, p. 162-212.

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«In most general terms, a teaching machine is an instructional mechanism used to produce systematic behavioral changes in a student whose responses to the material presented determine the further operation of the mechanism. … Teaching machines that can be touched are examples of the general concept, and each of them implements a set of specific functions associated with teaching. No physical machine should be confused with the general teaching machine concept as just defined in this paragraph.»

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Implications for Research

«The implication … is that research should be conducted on the relationships between input behaviors (aptitude and performance), programs (strategies and content), and outcomes (time, final performance level, and topic covered).»

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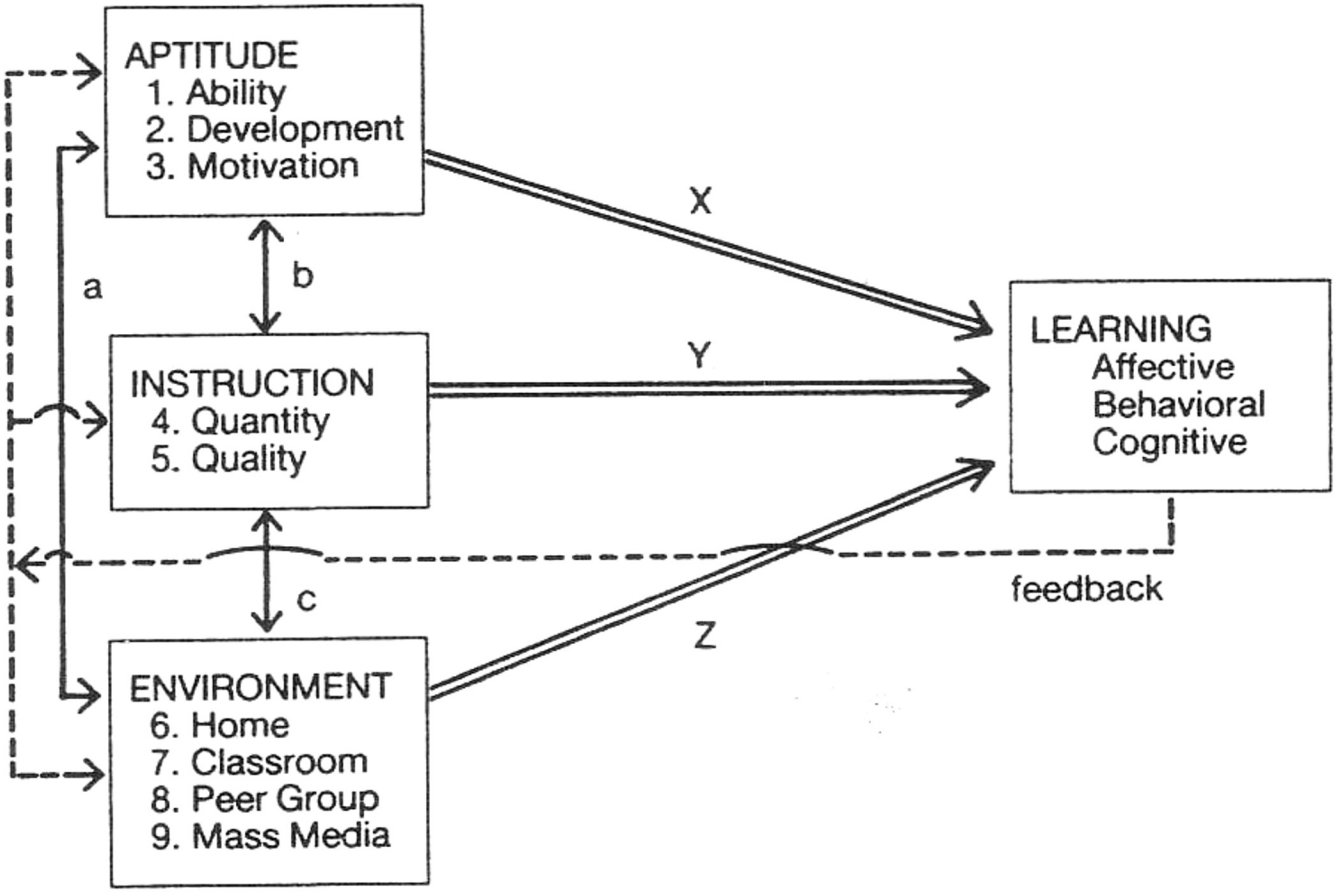
Herbert J. Walberg (*1937)

Nine Factor Model of Educational Productivity



Aptitude, instruction, and the psychological environment are major direct causes of learning (shown as double arrows X, Y and Z). They also influence one another (shown as arrows a, b and c), and are in turn influenced by feedback on the amount of learning that takes place (shown as broken arrows).

Figure 2.1 Causal Influences on Student Learning

aus: Fraser, Walberg, Welch & Hattie 1987, p. 158

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«Unlike most sectors of the American economy that steadily increase their productivity over time, schools become less rather than more efficient, a serious matter given the size of the education sector and the central and increasing importance of learning in the American economy and society» (Walberg 2007a, p. 104).

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«As in agriculture, medicine, public health, and modern industries, we can turn to rigorous science as one of the best sources for informing ourselves» (Walberg 2007b, p. vii).

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«As in agriculture, medicine, public health, and modern industries, we can turn to rigorous science as one of the best sources for informing ourselves» (Walberg 2007b, p. vii).

«The prior problem is estimating the magnitude of effects of educational inputs on outputs; this primarily involves causal rather than value questions» (Wang et al. 1987, p. 149).

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The Factory Model of Schooling

«For most of the 20th century, American education has been dominated by a factory model of schooling based on a world view associated with the Industrial Revolution. This model is consistent with the traditional view of a teacher as an authority whose role is to disseminate knowledge to students, largely through lectures and verbal exchanges. Knowledge, according to this traditional conception, is an entity that exists in some tangible form (in books, the minds of authorities, etc.), and this entity is capable of being transferred to students in a more or less intact form. This view of knowledge and teaching is consistent with the functional, pragmatic nature of early American social philosophy and the focus of early American psychology on behavior rather than knowledge» (Shuell 1996, p. 735).

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W. James Popham (*1930)

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«SBE [Standard-Based Education] lays out an eminently sensible three-step strategy to improve the caliber of schooling. Step one calls for the isolation of appropriate curricular aims. Step two requires teachers to provide instruction in order for students to achieve the skills and knowledge set forth in the aforementioned curricular aims. And step three involves the assessment of students to see if they have, in fact, mastered the curricular aims that their teachers were seeking to accomplish. … SBE is nothing more than a posh *ends-means* model wherein content standards represent intended ends, teaching constitutes the means for achieving those ends, and test results supply the evidence regarding whether the means did, in fact, achieve the intended ends» (Popham 2004, p. 17).

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Ich danke Ihnen für Ihre Aufmerksamkeit!