LOGIC OF EDUCATION AND OF EDUCATOLOGY:
DIMENSIONS OF PHILOSOPHY OF EDUCATION

by Elizabeth Steiner Maccia

Educational Theory Center

Occasional Paper 64-160

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1. The Purpose of the Paper

Once again we meet to discuss what it is to do philosophy of education. Somehow, it will not do to say "Philosophy of education is what philosophers of education do", and proceed to do. We suspect our doing, and are reinforced in our suspicion by the cry of the classroom teacher "Enough of the teaching of such doing, for it helps us little in the teaching of sums."[1] Even if Russellian annoyance with the seeking of knowledge for power rather than love[2] permits disregard of the cry, still there is another reinforcement of our suspicion. University colleagues not holding the governmental view of truth accuse us of having no object to love. Philosophers of education qua philosophers of education appear both powerless and loveless.

Philosophers of education have not been alone in this appearance. Other kinds of philosophers who persist in discussing the right way to live are spurned in a community becoming ever more dedicated to science or what they take to be science. On the other hand, philosophers who desist and turn to analytic matters, particularly the logic of science, have found an object of both love and power. What lesson is to be learned? A simple one--let us desist from discussing the right way of educating and turn to the logic of education, if we desire to be no longer loveless and powerless. Let me plead, however, that not all of you desist. The sphere of morals lies outside of the logic of education. "We must have some concept of the kind of person we wish to produce, before we can have any definite opinion as to the education which we consider best."[3]

The purpose of this paper now must be apparent. I intend to
discuss my finding of an object of love and power through a turn to the
logic of education. My discussion may be only a start in the careful
delineated of these dimensions of philosophy of education. It should,
however, permit me to correct some of my philosophical mistakes of the
past and offer to you "Some tolerably hard nuts to crack - nuts that
will /?/ require all the nut-crackers . . . /you/ happen to possess."[4]

2. The Later Wittgensteinian Sense of 'Logic'

The later Wittgenstein is the Wittgenstein of the Investigations;
the earlier is of the Tractatus. The earlier Wittgenstein had what the
later Wittgenstein called "a tendency to sublime the logic of our
language".[5] It is this tendency that makes one think of logic as a norm.
What can be said is taken to be what is allowed in a calculus. One
thinks of a logically correct grammar or an ideal language. There is a
logic supposed to govern the unity of language. Such thinking, taking,
and supposing was questioned by the later Wittgenstein.

> The more narrowly we examine actual language, the sharper becomes the
> conflict between it and our requirement. (For the crystalline purity
> of logic was, of course, not a result of investigation: it was a
> requirement.) The conflict becomes intolerable; the requirement is
> now in danger of becoming empty.--We have got on to slippery ice
> where there is no friction and so in a certain sense the conditions
> are ideal, but also, just because of that, we are unable to walk.
> We want to walk: so we need friction. Back to the rough ground![6]

To get back to rough ground, Wittgenstein took off the ideal glasses; and
the ideal language became a game among many games.

> Our language can be seen as an ancient city: a maze of little streets
> and squares, of old and new houses, and of houses with additions from
> various periods; and this surrounded by a multitude of new boroughs
> with straight regular streets and uniform houses.[7]

This later Wittgensteinian sense of 'logic' stretches logic beyond the bounds set by the 17th. century rationalistic temper and maintained today by scientific empiricism[8] and logical empiricism[9]. In the context of the logic of education, this stretching allows the possibility that the logic of education is not the logic of science.

3. The Two Senses of 'Logic of Education'

There are two senses of 'education'. 'Education' can be used to mean the process of instruction, i.e. the conjunction of teaching and learning behaviors. Usually too 'education' in this first sense carries with it the notion of system. The process of instruction is systematic or takes an institutional form. A second sense of 'education' is indicated by education professors and education courses. 'Education' can be used to mean the inquiry or research into the process of instruction, *i.e.*, I shall distinguish the latter sense from the former through the use of the term 'educatology'.[10] *Therefore,*

From these two senses of 'education' arise two senses of 'logic of education'. 'Logic of education' can mean the logic of the process of instruction or the logic of the inquiry of research into the process of instruction. Utilizing the term 'educatology', the first-stated meaning will be designated as the logic of education, and the second as the logic of educatology.

There is work going on in both domains of the logic-of. B. O. Smith's concern has been with the logic of education[11], while I. Scheffler's has concerned himself with the logic of educatology[12]. To state the matter differently, B. O. Smith is concerned with the games played by the teacher,

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while I. Scheffler has concerned himself with the games played by those speaking about the games played by the teacher (the games played by the educational inquirer or researcher). In these endeavors, Smith has been more early Wittgensteinian, and Scheffler later Wittgensteinian. Smith has the tendency to sublime logic and set forth the moves of the scientist as those of the teacher. Scheffler, on the other hand, does not have this tendency and sets forth a rich complex of moves cutting across the scientific, the practical, and the ethical spheres as those of the educational inquirer or researcher.

4. Confusions About the Logic-of

Before considering further the logic of education in its two senses, the ground of understanding will be cleared. The growths that produce confusion as to the endeavor are: history of, psychology of, sociology of, and analysis itself.

It was within the logic-of or philosophy-of endeavor with respect to science that the growths were discovered and cut down. The sophistication of that endeavor amply attests to the merit of ground-clearing. There was recognition that one may do

the history of science, i.e. study the development of scientific inquiry or research;

the psychology of science, i.e. study the way in which scientific inquiry or research depends upon the individual conditions of the men doing such inquiry or research;

the sociology of science, i.e. study the way in which scientific inquiry or research depends upon the societal conditions of the men doing such inquiry or research; and

analysis, i.e. explicate concepts as a part of the total task of
scientific inquiry or research.

These doings, however, were not to be confused for or to confuse the

logic-of or philosophy-of endeavor. As Carnap put it:

> . . . it is possible to abstract in an analysis of the statements of
> science from the persons asserting the statements and from the
> psychological and sociological conditions of such assertions. The
> analysis of the linguistic expressions of science under such an
> abstraction is logic of science.[13]

> . . . by 'analysis of science' . . . is meant an investigation which
> differs from the branch of science to which it is applied.[14]

The first quotation clears the ground of history of, psychology of, and

sociology of; the second quotation, of analysis as part of the total task

of scientific inquiry or research.

Wittgenstein has stated the matter for all logic-of endeavors as

follows:

> These are, of course, not empirical problems; they are solved, rather,
> by looking into the workings of our language, and that in such a way
> as to make us recognize those workings: in despite of an urge to
> misunderstand them. The problems are solved, not by giving new
> information, but by arranging what we have always known. Philosophy
> /of/ is a battle against the bewitchment of our intelligence by
> means of language.[15]

5. Logic of Education

Wittgenstein has noted that if the psychologist is to study human

behavior, his study is essentially about language behavior.[16] Wittgenstein

also has noted that "in psychology there are experimental methods and

conceptual confusion"[17]. Why is there conceptual confusion? If the

psychologist is to study language behavior, men playing language games,

then concepts arrived at through analysis of the grammatical movements of

such games must be introduced into psychology. The logic of languages has

been ignored, and so there is conceptual confusion.

The process of instruction too centers in language behavior. The study of the educationist too is essentially about language behavior. Also in educatology, therefore, conceptual confusion can be avoided only through the introduction of concepts arrived at through analysis of the grammatical movements of such games.

The current emphasis upon structure of subjects

> The curriculum of a subject should be determined by the most fundamental understanding that can be achieved of the underlying principles that give structure to that subject.[18]

and upon a discipline-centered curriculum[19] points to the recognition of the necessity for educatology to include concepts arrived at through an analysis of the language games which are part of the instructional process.

In order to determine the possible languages games whose analysis provides concepts for educatology, a descriptive theory of instruction is required. Elsewhere I have attempted this[20], and hence shall not repeat it in detail here. Nevertheless, I shall sketch in the outlines, so that the endeavor of the logician of education can be seen in the perspective of the educationist.[21] As an educationist, one analyzes or explicates concepts. I explicated the concept of instruction. Another example would be Scheffler's analysis of the concept of teaching.[22] This type of analysis is part of the total task of educational inquiry or research, and if viewed within the logic of or philosophy of education, is a confusing growth. To cut down the growth or to sort out this type of analysis does not discount its importance or necessity.

As an educationist, therefore, and not as a logician of education, I explicated the concept of instruction through the concepts of influence and rule-governed behavior. Instruction as an influence relation became a relational term requiring two things for its exemplification--teaching and learning or teacher behavior and learner behavior. One cannot state that $I=f(B_T)$ and $I=f(B_L)$, where 'I' denotes instruction, 'B_T' teacher behavior and 'B_L' learner behavior. Only teacher behavior together with learner behavior produce instruction. That is to say, one can state correctly only that $I=f(B_T, B_L)$. Influence is a commonality between teacher and learner behaviors. This commonality clearly points to instruction as communication ('communicate' comes from the Latin, 'communis', meaning common). The behaviors involved in instruction are rule-governed ones. They form games, and so have moves or rules. Games are subject to analysis. Whether all these games--all means of communication, e.g. facial expressions and color as well as words--are to be called 'language games' may not be too important.

The rule-governed behaviors involved in instruction may be sorted out with respect to motivation and content. Some teacher behaviors, such as statements of approval or smiles, provided there is commonality with learner behaviors, function as motivation for instruction. Other teacher behaviors, such as presenting problems in arithmetic, provided there is commonality with learner behaviors, function as content of instruction. The behaviors in these two categories are not mutually exclusive, e.g. problems in arithmetic in themselves may be rewarding.

The nuts of the motivational games and of the non-language (in the usual sense of 'non-language') content games are harder to crack, and consequently it is more difficult to bring into focus the role of the logician of education in terms of these games. What I shall say now in the context of language content games will relate to these other games of instruction. Cognition is present in all human games.

Cognitive structures bring into focus the role of the logician of education. Moves in language games are cognitive structures. Cognition or knowing is integral to possession of structures[23], since such possession is finding one's way about in language games.

> How do I know this colour is red?--It would be an answer to say: "I have learnt English".[24]

One's language behavior is governed by rules of the games. One is disciplined. One is in possession of disciplines--systems of cognitive structures.

> The central and typical application of the term 'having a concept' are those in which a man is a master of a bit of linguistic usage.[25]

The logician of education, then, is one who analyzes the disciplines or language games and lays bare their structure. Such analysis is a logical prerequisite to introduction of a given discipline in the curriculum. It frames the taxonomy of teacher behaviors with respect to the discipline. Which disciplines ought to be introduced is not a question for the logician of education. This is question within the sphere of morals which lies outside of logic.

That there is much for the logician of education to do, if one takes a later Wittgensteinian point of view, is patent. Little has been

done in analyzing structure outside of scientific structure. Moreover, even all that is known of scientific structure is not brought to bear upon curricular matters. Logicians of education need to be involved in curriculum construction.[26]

6. The Logic of Educatology

The educationist inquires into the process of education. Since this process usually takes an institutional form, the inquiry usually is about human behavior in the school. Teacher and learner behaviors are singled out for emphasis, although all other behaviors, such as adminis- trative behaviors, must be taken into account. What the educational inquirer usually is seeking, therefore, is knowledge of the process of education within in the school. This knowledge is called 'educatology'.

When the educational inquiry is a first careful inquiry, it may be called educational re-search or neo-search. Re-searching is searching once again so that the search this time is a careful one. Perhaps the term 'research' has come to designate all careful inquiry, because much of man's earlier searching, whether in his own life or in the historical life of man, was not done with care and consequently needs to be done again. However, a searching done for the first time might well be careful which involves one in the paradox of research although no re-searching. Indeed, one does not honor a careful inquiry with the title of research, if the careful inquiry has already been done by another. Therefore, prior to one's careful inquiry he reviews the inquiries of others (the literature) to see if the inquiry has been made in a careful way, and thus need not be undertaken by him. Re-searching

must be neo-searching, a new careful searching or the first careful inquiry.

Educatology is a group of grammatical movements about human behavior in the school, and the unique feature of this behavior is the making of grammatical movements. Educatology, thus, consists of grammatical movements about grammatical movements. Where there are grammatical movements, there is logic. Logic of educatology emerges. Looked at from the side of the educational inquirer or educational researcher who is making the moves, the logic of educatology becomes the logic of educational inquiry or educational research.

That there is much for the logician of educatology to do is patent. Consider the mistake in the logic of educatology which has narrowed educational research to one aspect of research derived from the logic of scientific research, i.e. the grammatical moves of observational verification. Indeed, most educational research courses are restricted to the study of such grammar. Consider my own mistake that made educatology a technological grammar built up of parts of the grammars of psychology, sociology, and philosophy.[27] This mistake provides the basis for most foundations courses. Finally, consider the difficulties in marking off the language game or games of educatology which is a first task of the logician of educatology. The papers addressed to the question, "Is there, or can there be, an academic field or discipline of education?", are eloquent testimony to the difficulties.[28]

Elsewhere G. S. Maccia and I have attempted to correct the two mistakes mentioned and to come to grips with the marking off of at least

one game the educationist can and is playing.[29] The details of these attempts will not be repeated here, but the outlines will be sketched to illustrate one endeavor of the logician of educatology, i.e. the logic of scientific educatology or educational science.

If one pages through the Handbook of Research on Teaching[30], attends AERA meetings, notes the nature of funded educational research, pays attention to educational research courses, and becomes aware of what is going on in bureaus of educational research, then it becomes apparent that a game is being played by some which is similar to those of psychology and sociology. Just as the psychologist and sociologist attempt to make grammatical moves similar to those set forth by the logician of science so do some educationists. Furthermore, it becomes apparent that most psychologists and sociologists have not played the game in such a way that knowledge about behavior in the school has resulted. Most have not attended to human behavior in the institutional setting called 'the school'. This is not a unique non-attending, for the economic and political institutions have been left largely to the economist and the political scientist respectively. Since most results of interest to the scientific educationist or educational scientist are not there, he makes a mistake, as I have, if he supposes he can simply incorporate all the moves of the psychologist and sociologist. The moves of the educational scientist may be similar, but they are not the same.

There may be some who assert that the moves ought to be the same, since 'psychology' by definition is the study of all individual human behavior, and 'sociology' of all group human behavior. I suppose there

is merit in eliminating the names 'educational scientist', 'economist', and 'political scientist' in favor of 'psychologist' and 'sociologist', if a proviso is stated. The proviso is necessary, for

> "What's the use of their having names," the Gnat said, "if they won't answer them?"

The proviso is that endeavors of the educational scientist, economist, and political scientist be seen as endeavors of the psychologist and sociologist. Otherwise, when we call the names 'psychologist' and 'sociologist' and expect to call scientists of all of human behavior, no one will be there to answer. Words need not tyrannize and keep tasks from being done.

One game of the educationist, therefore, consists of scientific moves in order to describe and explain behavior in the school. To describe is to sort out and characterize the behaviors, and to explain is to relate them. To relate them is to come to know the conditions producing them, i.e. to be able to predict. This kind of educatology, hence, provides means for controlling what goes on in our schools. The educational scientist moves to produce scientific educatology.

The mistake in the logic of educatology which has narrowed educational research to the grammatical moves of observational verification has hindered the development of scientific educatology. The context of this mistake has been the Baconian perspective which has come to dominate the minds of educational researchers. The descriptions and explanations which constitute scientific theory are thought to result from inductive moves. Observations are thought to furnish the stuff out of which one devises the characteristics and relations of behaviors in the school.

These lower-order generalizations, then, are thought to furnish the stuff out of which one devises higher-order generalizations. In this manner, scientific theory is thought to be constructed. The result has been inadequate scientific theory. If one claims not to bring theory to observations, then he operates on the basis of characteristics and relations he claims not to have and which consequently are not elucidated and delimited and so subject to modification if inadequate. If one claims to devise higher-order generalizations inductively from lower-order generalizations, then the conjunction of the resulting higher-order generalizations would be equivalent to the conjunction of the lower-order generalizations. The theory would not permit its own growth. Adequate scientific theory is open permitting the deduction of yet other kinds of lower-order generalizations.

The perspective required to correct the mistake and to explicate the logic of scientific educatology is the Peircean one. Peirce introduced retroductive moves and redefined the inductive moves. The moves of the educational scientist would be retroductive ones in which characteristics and relations are devised from a point or points of view and not from observations, although in a context of observations, deductive ones in which the characteristics and relations are explicated to obtain lower-order generalizations which are directly checkable, and inductive ones in which the lower-order generalizations would be evaluated as to whether the instances of behavior in the school in terms of which they did check out were representative of the entire collection of such instances of behavior in the school. (Notice that induction is redefined as a

statistical argument, and has nothing to do with the origin of theory.)
Such evaluation permits judgment of the lower-order generalizations as
to whether they may be accepted or should be modified or should be
rejected entirely. Actually rough evaluation takes place during the
process of devising. Points of view are ruled out which will not produce
adequate generalizations. It is precisely for this reason that devising
should be done with awareness of the actual events taking place in the
school.

The theory models approach was introduced by us to explicate the
moves with respect to the origin of points of view. Obviously, a point
of view to devise educational theory originates from other theory, common
sense and otherwise, known to the researcher. Theorizing, therefore, is
limited in terms of the researcher's background. Such limitation could
prevent adequate theorizing. The theory models approach makes deliberate
the process of forming points of view. Such deliberateness permits the
researcher to extend his background, if necessary. If he does not have
in his background theory that could be reformed into a point of view from
which to devise adequate theory, then he can set out to intellectually
roam the disciplines. Such roaming could lead to discovery of an origin
for a point of view, and the point of view could be formed. In forming
the point of view, concepts from the theory are selected and arranged.
The concepts may be modified in any way required for a point of view
which will lead to adequate theory. The approach is essentially inter-
disciplinary, but it is not simply taking theory from one field into
another. The term 'theory model' is used for the point of view formed

from theory, and thus the approach is called 'the theory models approach'. This approach to educational theory is summarized in Schema 1.

Other Theory $\xrightarrow{\text{model formation}}$ Theory Model $\xrightarrow{\text{retroduction}}$ Educational Theory

Schema 1: The Theory Models Approach to Educational Theorizing

It is important to note that the use of 'model' differs from the common usage of educational researchers. Through content analysis of recent literature dealing with the use of models for the study of various aspects of education, it was found that theory models have been given little significance in that endeavor. Instead, for most educational researchers, the expression 'theory model' would contain a redundancy, since the educational theory itself is taken to be a model insofar as it represents (is a model of) some aspect of education. This identification of theory and model led to a disregard of the approach to theory construction in which one theory becomes a model for another theory. Consequently, in educational theorizing, models usually were not considered a source of theory, and hence could not function in theory construction. Perhaps this is another way of indicating the prevalent Baconian perspective.

The logician of educatology has a broader task than indicated by our endeavors. The educationist plays other games, e.g. the game of prescribing what ought to go on in our schools. There is no intent in this paper, or in any of our work, to suggest that scientific educatology or educational science is the only game. Educational research is broader than educational scientific research, and the logical mistake of restricting the term 'educational research' to the grammatical moves of

observational verification is not corrected entirely by including the grammatical moves of scientific theory construction through theory models.

7. Conclusion

The object of love and power is now before you. Perhaps enough delineation has been done, so that possible conclusions with respect to our discipline may be entertained. Does it not follow that two other dimensions of our task as philosophers of education are the logic of education and the logic of educatology? Furthermore, may not one conclude that besides the individual doing of the logic of education and of educatology, we ought to

1. broaden our philosophy of education curriculum to include courses in the logic of subjects or disciplines and courses in the logic of educational research, and

2. engage in group educational research projects, such as curricular improvement projects, as logicians of education and educatology?

FOOTNOTES

1. NEA Research Division, "Teacher Opinion Poll on Teacher Preparation," _NEA Journal_, 1963, 52, 34.

2. Bertrand Russell, "Science and Values," in _Readings in Philosophy of Science_, ed. by Philip P. Wiener, New York: Charles Scribner's Sons, 1953, pp. 596-601.

3. Bertrand Russell, _On Education_, London: Unwin Books, 1960, p. 28.

4. Lewis Carroll, _Symbolic Logic and the Game of Logic_, New York: Dover Publications, Inc., 1958, p. xvii.

5. Ludwig Wittgenstein, _Philosophical Investigations_, New York: The Macmillan Co., 1953, paragraph 38.

6. _Ibid._, paragraph 107.

7. _Ibid._, paragraph 18.

8. Charles W. Morris, "Scientific Empiricism" in _International Encyclopedia of Unified Science_, Volume 1, Part 1, Chicago: University of Chicago Press, 1938, pp. 63-75.

9. H. Feigl, "Logical Empiricism", in _Readings in Philosophical Analysis_, ed. by H. Feigl and W. Sellars, New York: Appleton-Century-Crofts, 1949, pp. 3-26.

10. 'Pedagogy' could be used, and, of course, is a term of long-standing. The term, however, has not been used for some time in the United States, perhaps due to the hostile implications--dogmatism, severity, and pedantry--associated with the term 'pedagogue'. For those who cannot disassociate themselves from the hostile implications, the term 'educatology' is offered as a substitute.

11. See "A Concept of Teaching" in _Language and Concepts in Education_, ed. by B. O. Smith and Robert H. Ennis, Chicago: Rand McNally & Co., 1961, pp. 86-101, in which Smith indicates the nature of his endeavor.

12. See Chapters I, II, and III in _The Language of Education_, Springfield, Illinois: Charles C. Thomas, 1960.

13. Rudolf Carnap, "Logical Foundations of the Unity of Science," in _International Encyclopedia of Unified Science_, Volume 1, Part 1, p. 43.

14. _Ibid._, p. 42.

15. <u>Philosophical Investigations</u>, paragraph 109.

16. <u>Ibid</u>., Section V.

17. <u>Ibid</u>., Section XIV.

18. Jerome S. Bruner, <u>The Process of Education</u>, Cambridge, Mass.: Harvard University Press, 1960, p. 31.

19. Occasional Paper 63-143, <u>The Scientific Perspective: Only One Curricular Model</u>, The Educational Theory Center, The Ohio State University. This paper was presented as a part of the Public Lecture Series on Content and Discipline in the Curriculum, The Graduate School of Education, The University of Chicago, July 1963.

20. See Occasional Paper 64-155, <u>Instruction as Influence Toward Rule-governed Behavior</u> which is available from The Educational Theory Center, The Ohio State University. This paper was presented to The Ninth ASCD Curriculum Research Institute, Eastern Section, Washington, D.C., March 2, 1964.

21. Just as the scientist is the one who produces science, so the educationist is the one who produces educatology.

22. <u>The Language of Education</u>, Chapters IV and V.

23. Possession of a cognitive structure is not meant in any spatial sense. To possess a cognitive structure is to behave according to a rule.

24. Wittgenstein, <u>Philosophical Investigations</u>, paragraph 381.

25. P. Geach, <u>Mental Acts</u>, London: Routledge & Kegan Paul Ltd., 1957, p. 13.

26. At present I am involved as one of the principal investigators for Cooperative Research Project HS-082: Development of Economic Curricular Materials for Secondary Schools. My role is that of logician of education and of educatology. That is to say, I am working on the structure of economics and on the structure of curricular research.

27. "The Separation of Philosophy from Theory of Education", in <u>Studies in Philosophy and Education</u>, 1962, 2, 158-169.

28. These papers are found in the volume, <u>The Discipline of Education</u>, which was edited by John Walton and James L. Kuethe and was published by The University of Wisconsin Press in 1963.

29. See Sections I and II, Metatheory and Metatheoretical Background, of Cooperative Research Project No. 1632, Construction of Educational Theory Models, 1963.

30. Edited by N. L. Gage, Chicago: Rand McNally & Company, 1963.

ERRATA

p. 2, l. 4:   'delineation' not 'delineated'

p. 3, l. 18:   'inquiry or research' not 'inquiry of research'