The authors examine conceptions of education including the unarticulated yet clearly discernible one governing the day-to-day classroom activities of teachers and students. The paper attempts to show that on the one hand all these conceptions are inadequate and defective in different ways and on the other they all suffer from the reductionist fallacy, namely, the fallacy of trying to reduce the rich and complex notion of education into some single category. The authors also point out that many people, including educators, conceive of education as a substance and product without any awareness of the most undesirable and stifling consequences of such a conception. In contrast, they argue that education should be regarded as a dynamic process in order that it may be fruitful, significant, and enlightening.

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On Some Misconceptions of Education

Formulating a clear conception of education is not only very difficult but also, according to some, futile and not relevant to the everyday educational reality in the schools. The former may be true, but those who maintain the latter are mistaken. For the kind of conception one has of education determines the way in which one theorizes about it, and theories in turn guide and influence the practice of education. Our purpose in this paper is to examine certain highly influential conceptions of education and show that all of them in one way or another commit the reductionist fallacy and therefore are inadequate and even misleading. It is not our task here to propose alternative and more adequate conceptions of education. That is for another occasion.

First some general remarks about education. Education here will be introduced as a triadic relation in which each and all of the following are essential components: teacher, student, and subject matter. Furthermore, in parallel with science as process and science as product, we distinguish education as process and education as product. Education as process would include such things as the various facilities and devices employed in teaching and learning, lectures, classrooms, libraries, films, tapes and so on, all in the general matrix of teaching, learning, and subject-matter. Education as product will be all those attitudes, methods, skills, abilities, information and knowledge the possession of which will enable a person in turn to engage in the process of education.

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1. Some people have maintained not only that education has behavioral objectives and that these objectives can be explicated by means of strictly operational descriptions but that education *is* displaying certain kinds of behavior under certain conditions. It will be shown here, however, that all attempts to define education solely through behavioral and operational criteria are inadequate. In order to do this, let us consider the form of an operational definition, which is the following:

Def. $Ex \equiv (Cx \supset Bx)$.

Here 'Ex' means "x has education," 'Cx,' "x is in a certain situation," and 'Bx,' " "x behaves in a certain way." The enormous difficulties associated with this kind of definition are too well known in the philosophy of science to need special treatment here.[1] But let us consider their consequences in the context of education. Ex is defined by a conditional statement, "if Cx is the case, then Bx is also the case." It follows, according to the rules of material implication, that when Cx is false, no matter whether Bx is the case or not the whole statement is true and consequently Ex is true. This means that as long as x is not in the particular situation (C) and behaves in any way whatever, x has to be regarded as educated. That is, one is compelled to say that if only the situation (C) is avoided, then even the most uneducated man can pass for the most educated man!

Furthermore, if Ex is defined fully and exhaustively by a finite number of operational and behavioral descriptions of the above form, then we have a closed-ended definition of E, which means that education is a closed system. But this is certainly the last thing a progressive educational theorist would like to commit himself to. On the other hand, leaving the list of operational statements describing E incomplete and open for possible new descriptions would mean that the meaning of E is never exhausted by any available list of behavioral descriptions. In other words, the meaning of 'education' is not defined fully and exhaustively in operational terms. Thus we may adopt an open-textured, partial operational definition of 'education,' which is of the form,

$$\text{Def. } Cx \supset (Ex \equiv Bx),$$

the famous reduction-sentence of Carnap.[2] According to this, if x is in a certain situation (Cx), then x is educated (Ex) if and only if x exhibits certain behavior (Bx). Here the meaning of 'education' is specified only for those persons who are in the situation C. This makes 'education' an open-ended concept, and at no time can one give a complete explication of education on operational and behavioral criteria.

2. In the tradition which stems from John Dewey, the goal of education is often considered to be efficacious problem-solving, and 'education' is defined accordingly in terms of problem-solving activities. It is our con-

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[1]C. G. Hempel, "The Theoretician's Dilemma: A Study in the Logic of Theory Construction", *Philosophical Problems of Natural Sciences,* Dudley Shapere, editor (New York: Macmillan, 1965), pp. 31-52.

[2]*Ibid.,* p. 43.

tention that a definition of 'education' purely in terms of problem-solving activities is too narrow. For, firstly, one wonders what problems one is solving when one reads and writes poetry or listens and plays music. If education consisted solely of problem-solving activities, a good part of the educational curriculum, such as arts, literature, athletics and the like, would have to be thrown out.

Secondly, the definition of 'education' as a problem-solving activity presupposes that problems are somehow recognized in the first place and all we need to do is to solve them. On the other hand, if it does not so presuppose then one must provide criteria for recognizing something as a problem, for in this context it is absurd to talk about recognizing a problem as a problem-solving activity. There are thus only two ways open here: (1) to reject recognizing problems as a proper part of education which would be equivalent to tacitly claiming that people somehow mysteriously see problems: and (2) to provide, as part of education, general criteria for recognizing problems.

Dewey offers a list of five steps which he distinguishes in the process of problem-solving. These are the following: (1) felt difficulty, (2) location and definition of the problem, (3) suggestion of possible alternative solutions to the problem, (4) determining and evaluating the consequences of these suggestions, and (5) further observation and test of experience, which leads to the acceptance or rejection of the solution.[3] In the light of this scheme, a problematic situation is defined by Dewey as one in which the organism experiences tension in a given environment because it is unable to adjust to the environment. But is is easy to see that although it may be true that every situation of felt difficulty is one involving a problem, the converse is not the case. That is, not every situation involving a problem can properly be characterized as a situation of felt difficulty and tension. Thus Dewey's criterion for recognizing problems is at best a sufficient condition but not a necessary condition. In short, it is too narrow.

The point here is that it is not adequate to define a problematic situation as one in which the organism experiences tension due to maladjustment to a given environment. For it is hard to see what it means to say that a mathematician is experiencing tension in his environment when he is trying to solve the problem of, say, Goldbach's theorem. Such a definition can be saved only by stretching and distorting the meanings of 'tension' and 'environment.' In short, such a definition is adequate only for practical contexts and not for theoretical or aesthetic contexts such as mathematics and poetry.

The conception of a problematic situation as resulting from difficulty in adjustment may lead, and has led, to the degeneration of education to

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[3]Adrian M. Dupuis, *Philosophy of Education in Historical Perspective,* (Chicago: Rand McNally & Co., 1966), p. 124.

the adjustment of the presumably maladjusted students and to the satisfaction of students' needs and desires, which presumably eliminates "felt tensions." Indeed, in contemporary educational literature there is an overwhelming preoccupation with the student's "needs" and "interests," while very little attention is given to the problem as to how to encourage and provide challenge to the inquiring and exploring spirit of the student. We are never told where these needs and interests come from, whether they can be created and fostered by a skillful and engaging presentation of subject-matter, or whether the teacher must patiently wait until the needs and interests which only the student knows, if at all, just show up. Moreover, "need" refers to some sort of organismal deficiency, biological, psychological, or social, and it is eliminated when it is satisfied; whereas an "inquiring and exploring spirit" describes a state of mind or a disposition which neither indicates a deficiency nor seeks to rest in satisfaction.

A further difficulty with defining 'education' as problem-solving activity is that different people in the same environment recognize different problems and some of them none. The behavioristic explanation in terms of conditioning for this state of affairs can only be offered at the pain of infinite regress and paradox. Infinite regress, because it says "x recognizes problem p because he was so conditioned." But our point is more fundamental than this. It is to ask, how, in the first place, y (whoever he is, parent, teacher, preacher) who conditions x recognizes the problem? The obvious answer is "Well, z conditioned y," and so on *ad infinitum*. Further, it would seem that in the absence of conditioning no problem could be recognized other than those for which one is conditioned. It then follows that either no new problems can be recognized, or all problems have once and for all been recognized. The first alternative is patently false, and by *modus tollens* the argument from conditioning is false. Explicitly stated: If the recognition of every problem is due to conditioning, then no new problems can be recognized. New problems are recognized. Therefore, the antecedent is false. The second alternative is not worth considering, because it can only be asserted by a god or by a demented person. It is also a metaphysical claim which, as distinct from a scientific claim, is potentially unfalsifiable. For where does one go for a list of all problems?

3. Having sensed the difficulties associated with the attempts to define 'education' as a problem-solving activity, some have suggested that education is to be regarded as "experience" which permeates all aspects of human life, and no limitations are to be set as to what kinds of experience qualify for education, for all kinds do. Whereas the former definition was too narrow, the latter is too broad. There are all kinds of experience which fall outside the triadic relationship of education. Such an experience would be, for instance, a lonely walk in the woods. The word 'education' can only be used here in a loose and meaningless way. It is certainly possible to say that all our experiences, including walking alone in the woods, are in some sense educative, and in this sense the process

of education does not come to an end until life itself ends. It is also true that all education is experience for the teacher and the students who are involved in it; this is indeed a truism. But there is a distinction in the sense of 'education' in the two cases and the blurring of this distinction is fatal to all educational theorizing as well as to all institutional education. For if 'education' means any experience whatever, then what distinguishes schools from the world outside the schools and teachers, not only from students, but from any other persons? And we can ask further, what justifies the existence of schools and the teaching profession?

A further difficulty in characterizing education as "experience" is that since everyone has experiences of one kind or other, everybody is equally educated. One might as well say that everybody is equally uneducated. To use a phrase of Wittgenstein, the word 'education' is idling here. Therefore, it becomes necessary to provide some critrion or criteria for discriminating between what experiences do — what do not — count as education.

All the foregoing attempts to define 'education' illustrate in one sense or other the reductionist fallacy. More explicitly, they all try to reduce education either to certain kinds of behavior or to problem-solving activity or to some vague, nebulous, all-encompassing experience. They are all fallacious attempts because of the absurdities, question begging, infinite regress, and paradoxes which they give rise to.

We come now to a detailed consideration of the reductionist fallacy in various aspects of educational theory and practice. A reductionist fallacy is said to occur whenever attempts are made to subsume items belonging to one category under another category. The categories may be qualities, relations, modalities, modes of being and so on. They may also be logical, epistemological, or ontological, etc. Thus a tender-minded philosopher would say that the tough-minded philosopher commits the reductionist fallacy when the latter tries to reduce, for instance, psychology to neurophysiology, or human history to economics, in particular the modes of production, and so on. One important point to note here is that there can be no talk of a reductionist fallacy outside of a categorical schema or heirarchy. That this is so becomes clear from the fact that what is reductionist fallacy to one philosopher or theorist may not be so to another. Thus reducing psychology to neurophysiology would be a fallacy to one who holds that there is an ultimate categorical distinction between psychological phenomena and neurophysiological phenomena, whereas for thoroughgoing materialists, such as J. J. C. Smart and David Armstrong, it is not a fallacy; on the contrary, it is a virtue to be cultivated and accomplished.

Another way of characterizing the reductionist fallacy is what Gilbert Ryle calls "category mistake"[4] or Russell's "confusion of types." Thus

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[4]Gilbert Ryle, *The Concept of Mind,* (New York: Barnes & Noble, 1962), pp. 16-23.

for Ryle it would be a category mistake to assert that public holidays, prime numbers and pears exist. Similarly, it would be a category mistake to say that both bodies and minds exist. And for Russell, it would be a category mistake (type mistake) to talk about a class and its members as though they were the same kind of entities. So much for the general notion of reductionist fallacy. We shall now turn to illustrate this fallacy in the context of education.

An educational situation can properly be described as one of triadic relation, in which the relata are the teacher, student, and subject-matter. Thus, the relational character of education may be expressed as Txyz (x teaches y to z). In the context of non-authoritarian educational systems in which the teacher is not considered omniscient and infallible, an interesting consequence is as follows: The relation between x and z is non-symmetrical, unlike in an authoritarian context in which it is asymmetrical; that is, in a non-authoritarian context both Txyz and Tzyx could be true, whereas in the authoritarian context Txyz is always true and Tzyx always false. And since modern educational theories insist on non-authoritarianism, the non-symmetrical character of interaction between student and teacher obtains. It may be pointed out here by way of contrast that, unlike teaching, buying and selling are purely asymmetrical. It is this latter kind of relations that characterize authoritarian education; that is, "if x sells y to z, then it is false to say that z sells y to x ($Sxyz \supset \sim Szyx$)" is analytically true. But education in a non-authoritarian framework being open-textured, the above kind of analytical relations cannot follow and this is the hallmark of an enlightened educational system.

But by stretching the notion of education one way or the other to the extreme, one commits the reductionist fallacy. Depending upon which direction one stretches, a certain form of the fallacy results. Thus the authoritarian stretches it in a direction which makes the teacher omniscient and omnipotent and the student blank-minded and impotent. On the other hand, the libertarian stretches it in the opposite direction, making the student omniscient, omnipotent, and omniresponsible. The fallacy committed in both cases is reducing a triadic relationship to a monadic relationship. Some may like to argue that this is not the correct conclusion, for according to them, in so far as the teacher and the student are still present, at least bodily, it cannot be other than a dyadic relationship. But we submit that this is a mistaken view, for the stretching in either case is done to such an extent that relational predicates are made to collapse into monadic predicates. To put it crudely but truthfully, in one case the student is no more than an attribute or property of the teacher, and in the other the teacher is an attribute or property of the student. Thus consider, for instance, the authoritarian variety. Since the student here has no reciprocal relation to the teacher, there is no dialogue between the two and the situation is correctly described by saying that the teacher engages himself in a monologue; and monologue is surely a monadic predicate, although of a peculiar kind.

When the teacher is reduced to an attribute or property of the student, there can no more be a dialogue between the teacher and the student than there could be in the converse case. The reduction of the teacher to an attribute of the student is a rather novel and not very common phenomenon compared to the reduction in the other direction. Nevertheless, examples of it abound in current educational literature. Consider, for instance, the suggestion that the teacher's duty is to help the student to help himself.[5] To be sure, there are here a helper and one to be helped, but only in a pickwickian sense, for it is suggested that the two are really one and the same person, namely, the student. Now it is the student who is having a monologue with himself. One looks in vain for any mention of either somebody who teaches or something that is taught. ". . . teachers must develop techniques for aiding youngsters to draw accurate conclusions about their own abilities, skills, and past experiences."[6] In such an educational situation the teacher and his genuine function as the other pole in the dialogue are reduced to a mere appendix of the student. The concern of education is shifted from increasing and developing the student's skills and abilities themselves, from which "accurate conclusions" are then drawn in some mysterious way. The student, for his part, is expected to "self-evaluate" himself, but no clues are given as to where one is to look for the criteria for this evaluation, or whether any criteria exist outside the student at all.

Educational journals today are loaded with lofty-minded talk about "self-realization," "self-evaluation," "self-cultivation," "life," "happiness" and so on, and one suspects that here too the reductionist fallacy is in some way or other a result of the preoccupation with the aims of education so conceived. From a preoccupation with "self-realization," "life," "happiness" and the like as the aims of education two things follow: (1) the obscuring of the real and immediate problems of education as a process concerned with the theoretical and practical means and procedures for realizing certain objectives by glib exhortations about self-cultivation, happiness, and self-realization; and (2) by making whatever is meant by "self-realization," "life," and "happiness" the final goal and end of education, education as a never-ending process is thus brought to an end. For education is now explicated and justified in terms of some goal which is extrinsic to it, while "the truth is much more that there is a quality of life embedded in the activities which constitute education and that 'self-realization' can be explicated only by reference to such activities."[7] But when, instead, 'education' is explicated by reference to "self-realization," then education as a process is reduced to a substance, a product.

It was said earlier that education can be distinguished as a process and as a product. But "product" here does not mean a goal or an end with

[5]Frederick A. Rodgers, "To Think, To Learn, To Act", *Educational Leadership*, (Nov. 1968), pp. 159-160.

[6]*Ibid.*, p. 160.

[7]Richard S. Peters, "Must an Educator Have an Aim?", *Philosophy of Education*, William K. Frankena, editor (New York: The Macmillan Co., 1965), p. 51.

respect to which the process is defined. We may again consider a parallel in science. The building of a bridge or a space craft are certain kinds of products of physics, but they are not its goals. If they were, then physics as a science and a process would come to an end at the accomplishment of these goals. Similarly the attitudes, methods, skills and abilities are products of education but not its goals, the achievement of which would bring education as a process to an end.

If education is conceived in terms of some goal, it becomes a monadic relationship in which the only relatum is the end to which education is the means and all dialogue is eliminated. Education thus becomes a static entity which may be exchanged between students and teachers and passed on to new generations, just like a dollar bill. Symptomatic of the conception of education as a substance and product is the oft-expressed view that education is something which is "gained" in much the same manner as wages are gained. Thus recently students of a small college in Southern United States went on strike and protest against an enlightened president and faculty for the latter's emphasizing the need for full and active participation by the students through dialogue, confrontation, and polarization of ideas as essential ingredients of educational process. When *Time* magazine called this bizarre phenomenon a "protest in reverse,"[8] an indignant sympathizer of the protest wrote:

> Why call it a "protest in reverse" when students seek to gain an education? "Dialogue," "Confrontation," and "Polarization of Ideas" can be had on the streets and across the back fence. Who needs a college for that?[9]

The import of the above outburst is clear — the college is not a place of educational process — dialogue, debate, exchange and polarization of ideas; but is like a grocery shop where one goes and buys soap and soda. In short, colleges are shopping-centers where products are found on shelves waiting to be gained and possessed.

The rules which govern the producer's and consumer's market also apply to education conceived as a product. It may or may not be bought according to the means and wishes of the customers, but its quality cannot be changed by the wishes and desires of the customers. Thus we have a purely asymmetrical relation between the businessman and the customer or between the teacher and the student. The student, like the customer, shall under no circumstances become teacher or businessman, or participate in the teaching or business activity. Thus Dr. Hessen[10] from the "School of Business" at Columbia University strongly maintained that the university is a business establishment where students are customers and that if the students do not like what they get at Columbia, they may go

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[8]"Students", *Time* (Nov. 29, 1968), p. 90.
[9]Donald W. Treick, "A Letter to the Editor", *Time* (Dec. 13, 1968), p. 8.
[10]"Campus Riots, A Panel Discussion", *The David Susskind Show,* Channel 50, Toledo, Dec. 1, 1968.

elsewhere or set up their own rival university, but they may not demonstrate or riot.

It becomes clear from the foregoing analysis of various kinds of reductionist fallacies in education that the reduction of process to substance is more fundamental than the reduction of relationship to property, in that the former necessarily implies the latter and underlies it. For part of the definition of 'substance' is having monadic predicates, and it takes at least two substances to have a relational predicate between them. On the other hand, process, being a dynamic category, can never significantly have a monadic predicate. A process is essentially a matrix of relations and only so conceived will education be fruitful and enlightening.