John Dewey's Dual Theory of Inquiry and Its Value for the Creation of an Alternative Curriculum

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Abstract

Dewey's theory of inquiry cannot be reduced to the pattern of inquiry common to both common-sense inquiry and scientific inquiry, which is grounded in the human life process, since such a reduction ignores Dewey's differentiation of the two forms of inquiry. The difference has to do with the focus of inquiry, with common-sense inquiry concentrating on ends characteristic of everyday life and scientific inquiry concentrating on the perfection of the means to inquiry as an end in itself. By not differentiating the two forms of inquiry, the significance of Dewey's innovations in curriculum construction has been underrated. The curriculum created in the University Laboratory School (the Dewey School), was designed to gradually shift children's and adolescents' concerns for ends typical of common-sense inquiry to a concern for means and their coordination, which thereby approaches more closely scientific inquiry. This curriculum was grounded in the basic economic structure of human life for the production of food, clothing and shelter, with reading, writing and arithmetic, along with the disciplines (physics, chemistry and so forth) emerging as functions of life, initially. This curriculum, with modifications, could function to provide a critical basis of modern capitalist relations of production and exchange and the capitalist state.

Key Words: Common-sense inquiry, scientific inquiry, curriculum, occupations, basic needs, production, University Laboratory School, Dewey School, capitalism, exchange, ends, means, John Dewey, human life process

Although there certainly is not a dearth of Marxist studies on the negative aspects of schooling, ranging from Bowles and Gintis' *Schooling in*

Capitalist America (1976) to Apple's *Ideology and the Curriculum* (2004), such works, are just that--largely negative. Dewey's theory, on the other hand, provides both negative and positive aspects and answers the question of what is to be done at the curriculum level (not just at the pedagogical level) to link common-sense inquiry and scientific inquiry.By differentiating and relating Dewey's two forms of inquiry, the article provides a justification for Marxists using Dewey's curriculum, not only as a negative means of critiquing the modern curriculum but also as a positive means of creating a curriculum valuable to working-class children.[1]

Freire attempted to do something similar in his own way when he was Secretary of Education of Sao Paolo between 1989 and 1991, but his understanding of the relation between common-sense and scientific inquiry is that the latter is merely the organized form of the former. Dewey denies that the difference between the two is merely one of organization of data (Harris, 2009); Marx would agree with Dewey in this matter and disagree with Freire. This characterization of the relation between common-sense and scientific inquiry has definite implications for the curriculum. Of course, modifications of the Deweyan curriculum model would need to be made to serve working-class ends, but a modification requires grasping Dewey's model in the first place. To this end, the following seeks to demonstrate the critical and positive nature of Dewey's philosophy of education by analyzing Dewey's distinction between common-sense inquiry and scientific inquiry.

The article is divided into five parts. After the section on the pattern of inquiry and the human life process, the second part outlines Dewey's theory of scientific inquiry. The third part sketches his theory of common-sense inquiry. The fourth part develops the educational implications of Dewey's dual theory of inquiry without modifications by describing Dewey's theory of the basic occupations in relation to his dual theory of inquiry. Dewey's theory of occupations is usually ignored or downplayed when discussing his theory of inquiry. The final part considers some of the limitations of Dewey's dual model of inquiry in the modern capitalist context and suggests some modifications to the curriculum proposed by Dewey.

The Pattern of Inquiry and the Human Life Process[2]

The typical treatment of Dewey's theory of inquiry is to describe the pattern of inquiry in terms of such stages as the emergence of doubt grounded in a problematic situation, observation of conditions that form elements of the nature of the problem (induction), suggestion of a possible solution to the problem, reasoning or deduction and implementation of a solution (with possible feedback loops between the last three stages until the problematic situation is resolved). This pattern has been called the scientific method (Brosio, 1972; Johnston, 2006). One possible source for Dewey's analysis would seem to be his analysis of the scientific inquiry process itself. However, an alternative source for his description of five-stage process may be his analysis of the human life process.

The pattern of inquiry (which includes both common-sense and scientific inquiry), in fact, is an expansion of the life process in general. Dewey's philosophy entails the incorporation of the life process in general into the human life process as an essential feature of it or, if you like, is a subset of that process (just as simple reproduction is a subset of expanded reproduction for Marx). It is for this reason that Dewey, in his *Logic* (1938), placed a chapter on the biological matrix before a chapter on the cultural matrix. In other words, the inquiry process itself is continuous with (though not reducible to) the life process.

Dewey explicitly makes this point: "The purpose of the following discussion [the chapter on the biological matrix] is to show that biological functions and structures prepare the way for deliberate inquiry and how they foreshadow its pattern" (1938, p. 23). It is the life process that forms the mediating link between inanimate and human life in general and human inquiry in particular (whether common-sense or scientific) and, Dewey implies, has the potential to prevent the dualism of human life from the rest of the natural world. It is life that mediates the inorganic processes and the processes specific to human beings. Without such mediation, he implies, dualism necessarily arises:

> The development of a science of the phenomena of living creatures was an unqualified prerequisite of the development of sound psychology. Until biology supplied the material facts which lie between the nonhuman and the human, the apparent traits of the latter were so different from those of the former that the doctrine of a complete gulf between the two seemed to be the only plausible one (Dewey, 1988, pp. 247-248).

The life process, by involving the reproduction of life, in its normal phases proceeds from a stable equilibrium to an unstable process which requires the living being to respond to qualities in such a way that the movement is towards a stable equilibrium again. The life process thus moves towards a stable equilibrium, but that presupposes a movement away from a stable equilibrium, and hence life is a three stage rhythm that occurs within a circle of need, disturbance or conflict, action to meet the need or to resolve the conflict and satisfaction (possible equilibrium, which may or may not be on a wider and more coherent basis): “Empirically speaking, the most obvious difference between living and non-living things is that the activities of the former are characterized by needs, by efforts which are active demands to satisfy needs, and by satisfactions” (Dewey, 1981, p. 194). The rhythm of life is not a method but a pattern of life in general. Some processes may be expanded and some contracted, but the life process involves all three moments as a total life.

That process, unlike inanimate processes, involves responses to qualities (negatively or positively) that lead to consequences that tend to reproduce the living being (Harris, 2012). The capacity of responding to qualities in general in such a way that the consequences maintain the living being’s relationship with the environment involves qualities becoming—though unconsciously—means to specific consequences and thus implicitly meaningful:

> In this response, qualities become productive of results, and hence potentially significant. That is, in achieving effects, they become connected with consequences, and hence capable of

> meaning, knowable if not known. This explains the fact that while we are forced to ascribe qualities to events on the physical level, we cannot *know* them on this level; they have when assigned strictly to that level no consequences. But through the medium of living things, they generate effects, which, when qualities are used to produce them, are consequences. Thus qualities become intelligible, knowable (Dewey, 1981, pp. 205-206).

Animate beings then are sensitive to specific qualities in such a way as to act *as if* the qualities were means to specific consequences.

As the life process itself evolves, the reproductive responses to qualities become more complex, leading to the emergence of differentiated organs and differentiated responses. The emergence of distance receptors (eyes, ears and, to a lesser extent, the nose) that function to register qualitative change at a distance, in conjunction with locomotor organs, can easily result in a tension between sensing being here and now and sensing the qualities of things that satisfy organic needs (such as food) that are there and then (Dewey, 1938)[3]. The conflict leads to self-movement since it is only through action through space in a specific order that equilibrium can be restored:

> In contrast with lower organisms, the more complex forms have distance receptors and a structure in which activators and effectors are allied to distance even more extensively than to contact receptors. What is done in response to things nearby is so tied to what is done in response to what is far away, that a higher organism acts with reference to a spread-out environment as a single situation. We find also in all these higher organisms that what is done is conditioned by consequences of prior activities; we find the fact learning or habit-formation. In consequence, an organism acts with reference to a time spread, a serial order of events, as a unit, just as it does in reference to a unified spatial variety. Thus an environment both extensive and enduring is immediately implicated in present behavior. Operatively speaking, the remote and the past are “in” behavior making it what it is. The

> action called “organic” is not just that of internal structures; it is an integration of organic-environmental connections (Dewey, 1981, p. 207).

The past is not something over and done with in animals with more complicated structures or organs (distance receptors) and living patterns: the past as a consummatory act is preserved in the organic structures—as more or less successful integrations of organs of the organism with its environment that continue to function in the present, but as anticipatory to a further similar experience in the future:

> On the other hand, a consummation or satisfaction carries with it the continuation, in allied and reinforcing form, of preparatory or anticipatory activities. It is not only a culmination out of them, but is an integrated cumulation, a funded conservation *of* them. Comfort or discomfort, fatigue or exhilaration, implicitly sum up a history, and thereby unwittingly provide a means whereby, (when other conditions become present) the past can be unraveled and made explicit (Dewey, 1981, p. 197).

The past and the future meet in the present tensions or conflicts of the living process. The future then becomes an active factor much more so in the functioning present of the organic being with distance receptors. Life thus involves both the past in the present and the future in the present as a behavioural attribute to a much greater extent. The rhythm of the life process becomes intensified and more prolonged.

On the other hand, non-human animals have their coordinations relatively fixed when born when compared to human infants. The coordinations are already relatively smooth and worked out biologically before acting in the world. Some qualities are responded to at birth and others are neglected. Even with living beings without distance receptors, there is always some variability or flexibility on the part of animate beings in modifying or adapting their acts to each other and to the environment and thus both response patterns and the qualities responded to may vary over the lifetime of non-human animals; otherwise, they would be purely mechanical

beings[4]. However, the level of flexibility remains definitely circumscribed. In the case of human beings, the level of flexibility is vastly expanded.

Human beings do not stop being animate beings. Like other animate beings, they are physical beings and rely on turning physical processes into account for their reproduction. Nevertheless, human beings are a distinctive kind of animal, and the life process becomes more complex. Two aspects of animate nature are modified in the case of human beings, and they are both related to the nature of animate beings. In the first place, the act of maintaining the life process cannot be initiated immediately in the organism since the human infant is devoid of sufficient power to maintain itself for a substantial period of its own life process:

> The pre-human animal comes into existence either with coordinations already effected, or with the machinery for a relatively speedy establishment of them at hand. Prolonged infancy or helplessness means precisely that such coordinations, even the chief ones, have to be worked out, have to be learned. What is definite instinct in the animal is unregulated impulsive tendency in the human young. The child comes into the world with a tendency to see, hear, reach, grasp, strike, "locomote," and so on, but with a ready-made ability to do none of these things (Dewey, 1976c, p. 180).

In the second place—and related to the first point--infants do not respond to qualities sufficiently well to achieve any consequence that can serve to maintain their existence. They need to learn to respond to qualities and to convert that response into a means for their own continued existence and for their growth—as all living beings do, however minimally.
Dewey does not explicitly argue for the infant's lack of functional response to determinate qualities, but he implies it. By functional response is meant that the response enables a living being to connect to its environment in a way that permits the living being to continue to act. An infant is an eminent example of a living being that lacks any stable basis for its reproduction; it is a social being par excellence due to its relative lack of fixed functional

organic structures and the consequent need for others to tend to their needs for some time.

On the other hand, as living beings, they still tend to act. This tendency is not due to their nature as human beings but to their nature as living beings. Dewey differentiates these acts from the smooth and functional acts of other animals by calling them impulses as opposed to instincts. This incapacity to respond to qualities functionally immediately (biologically) permits infants, potentially, to respond to qualities as inferential means without actually responding immediately (since they cannot do so) through the formation of habits. It is through the transformation of impulses into habits that the inferential process arises.

The development of habits emerges, for example, through one of the major problems that an infant faces: the need of the infant to increase control over her body (Dewey, 1910). Through increasing control of the body, habits develop that enable the infant to cross-reference her experience of one quality with her experience of another quality so that what is immediately experienced serves as a means for achieving a purpose that will, eventually, become an ideal means. Learning to control the body involves learning to use one organ as a means for experiencing qualities that serve as signs for other qualities not then perceptibly present but that the infant associates with the immediately experienced quality. In this way, what is fleeting existentially, in its function, becomes a stable sign for other qualities and, eventually, objects (things with associated qualities).

The cross-referencing of qualitative experiences is the beginning of the formation of habits (and thought and hence inquiry) through the formation of ends:

> But when, about the age of six months, the child ceases to try to get hold of objects not within reaching distance, it shows that a coordination is so effected that he can cash the check drawn by the eye in the medium of contact values. The baby in whom

> these powers of cross-reference are fairly established is clearly ready for another epoch (Dewey, 1976c, p. 185).

Of course, learning to cross-reference goes hand in hand with learning to recognize special objects called human beings; the physical and social world are intimately related. At the immediate social level, the relation between the infants and adults usually assumes the form of the infant-mother relation and expands in terms of objects associated with that relation:

> In the early months of this period, the child begins to recognize a small number of persons and things which are of recurring importance in his life: mother, nurse, father, bottle, signs of preparation of food, etc. Now, recognition means that an experience reached through one organ does not merely stimulate or set going some other act, but is so definitely coordinated with that other as to be regarded as a sign of it. There is the crude beginning of an image which extends the scope of experience beyond what is immediately present. The sight of the mother, nurse, or bottle suggests other experiences with which it is customarily associated. Expectation, or anticipation, is thus at first always connected with recognition. Both recognition and anticipation involve a presented experience and an imaged experience which are related as factors in a larger experience (Dewey, 1976c, p. 188).

Concomitant with increasing control over the body, the self or person emerges as recognition and anticipation in a social context result in the development of a system of habits and meanings. However crude, a standard for judgement emerges. Conscious differentiation then becomes possible as the past image of the whole experience is carried over into the present as anticipating the future whole experience. With the emergence of the image, comparison can occur between the image as standard and the reality experienced. The image can also begin to be analyzed through reasoning. Observation of conditions in relation to the image can be effected. Testing of the correspondence between the image and the empirical experience can then emerge.

The child's attitude to the world, once it has developed to this point, is capable of experimenting with the world; the child, unlike many adults, has a scientific attitude of testing conceptions (Harris, 2007) rather than dogmatically fixing them independently of evidence:

> As a matter of fact, the child begins with whatever significance he has got out of the one dog he has seen, heard, and handled. He has found that he can carry over from one experience of this object to subsequent experience certain expectations of certain characteristic models of behavior—may expect these even before they show themselves. He tends to assume this attitude of anticipation whenever any clue or stimulus presents itself; whenever the object given him any excuse for it. Thus he might call cats little dogs, or horses big dogs. But finding that other expected traits and modes of behavior are not fulfilled, he is forced to throw out certain traits from the dog-meaning, while by contrast … certain other traits are selected and emphasized (Dewey, 1910, p. 128).

What has this human life process to do with the process of inquiry? The human life process itself implicitly contains the five stages of the so-called unified, scientific method (Brosio, 2000). By the time children start school, they are already equipped with the scientific attitude and, implicitly, the five stages of the human life process (but not the scientific method). They have engaged on numerous occasions with this so-called scientific method—which really is the human life process. These five stages are, in turn, expansions of the life process in general. In the human life process, inference emerges in a social process in order to coordinate actions—the real function of language. The process of reasoning on the basis of inference in turn involves anticipation of consequences on the basis of acting out the image or, in its more developed form, the hypothesis. The five stages are no more identical with the scientific method for Dewey than is extended reproduction identical to simple reproduction for Marx.

The inferential capacity of human beings (suggestion of something not observed based on observation of qualities and things present), and the capacity to reason based on those inferences form part of the daily lives of human beings. Combined with the life process, the five stage process is already implicit in the daily life process of humans. To equate this five-stage process with the scientific method, for Dewey, is sheer dogma. Although Brosio (1994) is surely right to criticize Deweyans for their neglect of an organized agent that could carry out Dewey's vision of a democratic community—the dogma of Deweyans—Deweyans are correct in criticizing many Marxists in underestimating the complexity of the scientific method. The working class requires a realistic appraisal of the level of difficulty in coming to understand the world scientifically if they are going to overcome the challenges (problematic situations) which they face in this world.
The need for the scientific method emerges for Dewey because of the two characteristics of humans that differentiate them from other animals: their initial incapacity to link effectively to the environment, and the mediation of that connection through social relations. Dewey is at pains to point out that human beings, having few structures that can function to wed them to their environment at birth, may well end at a level below that of non-human animals. Vagueness of meaning may contribute to that result:

> A being that cannot understand at all is at least protected from *mis*-understandings. But beings that get knowledge by means of inferring and interpreting, by judging what things signify in relation to one another, are constantly exposed to the danger of *mis*-apprehension, *mis*-understanding, *mis*-taking—taking of a thing amiss. A constant source of misunderstanding and mistake is indefiniteness of meaning. Because of vagueness of meaning we misunderstand other people, things, and ourselves because of ambiguity we distort and pervert. … erroneous meanings, if clear-cut, may be followed up and got rid of. But vague meanings are too gelatinous to offer matter for analysis and too pulpy to afford support to other beliefs. They evade testing and responsibility. Vagueness disguises the unconscious mixing together of different meanings, and facilitates the substitution of one meaning for another, and covers up the failure to have any precise meaning at all. It is the

> aboriginal logical sin—the source from which flow most bad intellectual consequences (Dewey, 1910, pp. 129-130).

It is certainly an advantage for infants to be capable of inferring under certain social conditions, but this advantage, like many, also has a possible disadvantage of being vague, and common-sense meanings are notoriously vague. Non-human animals, by contrast, when they act, generally act decisively and efficiently since their response patterns are from the start designed to respond effectively to specific qualities. Unless human beings learn to control their inferential capacities, they may well end up responding to their environment in ways that lead in no consistent direction that leads to a cumulative end and may indeed undercut their life process.

Scientific Inquiry

Dewey's own formal definition is relevant for determining problems with common-sense inquiry and how scientific inquiry addresses the limitations of common-sense inquiry. Dewey defines inquiry thus: "*Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole*" (1938, pp. 104-105). An indeterminate situation arises objectively when the relation between people and their environment is undergoing change that disturbs the relation in some way. The disturbance is located in the *background* conditions for inquiry, and includes the social customs, habits and institutions as well as the physical conditions. The indeterminate situation is precognitive. Inquiry, then, has a wider context than itself, both in terms of its source and in terms of its function as a means for dealing with that wider context. Inquiry never encompasses the whole of human experience.

Dewey's definition of inquiry implies that a problematic situation contains two essential elements that inquiry must address: an indeterminate situation and a disconnected situation. The situation requires both

clarification and unification. It is this process of clarification and unification that constitutes the learning or educational process in general.

This definition applies to both common-sense inquiry and scientific inquiry. However, the question is whether common-sense inquiry is adequate to the task of controlling observations and reasoning. Common-sense inquiry, however, has mainly to do with the human life process in terms of ends rather than in terms of means. Clarity rather than vagueness may be achieved for daily purposes via the five-stage process, but this is hardly adequate to overcome the limitations of human beings in this regard:

> The operations of common sense are restricted because of their dependence upon limited instrumentalities, namely, bodily organs supplemented by instrumental apparatus that was invented to attain practical utilities and enjoyments rather than for the sake of conducting inquiry. The cumulative effect of these operations conducted for a practical end is to give authority to a set of conceptions made familiar in a given culture (Dewey, 1938, p. 534).

Vagueness of meaning is unlikely to be eliminated when the end is primarily practical, or related to use and enjoyment directly. The above citation also points to the other limitation which scientific inquiry is to overcome: the limitation of human beings as social beings. The plasticity of infants means that their initial impulses can develop in diverse directions due to cultural conditions, but there is no warrant to assume that cultural conditions are consistent with physical and biological conditions of reproduction. The five-stage process provides, without the added control of observational inference and reasoning, no warrant for believing that certain inferences and proposed solutions are adequate to the situation; by focusing on ends, the development of effective control mechanisms are limited.

Observations and suggestions that guide inquiry have, historically, varied in quality, depending on the extent to which they have been regulated in order to minimize biases characteristic of human nature both as living beings who

tend to be more concerned with ends than means and as social beings subject to the biases of the groups to which they belong. Without such regulation, human beings have often fallen into superstition since their inferences have little ground in real connections, and it is real connections that constitute the stable basis for human inference.

The history of science involves the difficult process of separating the purely scientific object from the common-sense object:

> In science, since meanings are determined on the ground of their relation as meanings to one another, *relations* become the objects of inquiry and qualities are relegated to a secondary status, playing a part only as far as they assist in institution of relations. They are subordinate because they have an instrumental office, instead of being themselves, as in prescientific common sense, the matters of final importance. The enduring hold of common sense is testified to historically by the long time it took before it was seen that scientific objects are strictly relational. First tertiary qualities were eliminated; it was recognized that moral qualities are not agencies in determining the structure of nature. Then secondary qualities, the wet-dry, hot-cold, light-heavy, which were the explanatory principles of physical phenomena in Greek science, were ejected. But so-called primary qualities took their place, as with Newton and the Lockeian formulation of Newtonian existential postulates. It was not until the threshold of our time was reached that scientific inquiries perceived that their own problems and methods required an interpretation of “primary qualities” in terms of relations, such as position, motion and temporal span. In the structure of distinctively scientific objects these relations are indifferent to qualities (Dewey, 1938, p. 116).

The use of observable facts as evidence for the existence of other facts does not provide any kind of warranted assurance that the facts used as data are actually appropriate data in the context of the specific problem. The data used may well be so insufficiently prepared because the qualities used are not molded to define the problem more clearly as to point towards

a solution. The facts of common-sense inquiry (with the five-stage process that they share with scientific inquiry), for instance, are not sculpted to perform their *evidential function* as means that function to point to an adequate solution or synthesis:

> The particulars of observations which are experimentally instituted not only form the subject-matter of a *problem* so as to indicate an appropriate mode of solution, but are also such as to have *evidential and testing* value with respect to indicated modes of solution. Operations are deliberately performed that experimentally modify given antecedent objects of perception so as to produce *new* data in a new ordered arrangement. Institution of new data which are relevant and effective with respect to any conclusion that is hypothetically entertained, forms the most dispensable and difficult part of inquiry in the natural sciences. Objects and qualities as they naturally present themselves or as they are "given," are not only *not* the data of science but constitute the most direct and important obstacle to formation of those ideas and hypotheses that are genuinely relevant and effective (Dewey, 1938, p. 425).

The data of common-sense inquiry are inadequate to perform the control function of evidence in relation to the specific problem to be resolved when that problem requires to be grounded sufficiently to be applicable independently of specific contexts. Thus, scientific inquiry in astronomy was impeded because of the common-sense data used (the apparent fixed nature of the Earth) to formulate inadequate hypotheses and not because of the lack of data:

> Consider how the development of astronomic science was arrested because the earth *as an object of direct perception* seemed fixed, while the sun was perceived to move across the heavens every day, and to move, together with the "erratic" planets, from north to south and back again during each yearly period. Consider the enormous obstructions which had to be removed before present astronomical conceptions could be reached along with the extensive and refined institution of *new* data of observation, dependent upon inventions of new

> instruments and techniques. It was not for lack of ingenuity in ordering data but because of what were taken to be data that astronomical theory was so wide of the mark for many centuries. It should be evident, without argument, that any theory which fails to take as basic in its conception of induction experimental operations of transformation of given objects of perception, and institution of new orders of data, is radically defective (Dewey, 1938, pp. 425-426).

Dewey does not specifically attribute the lack of adequate data to the nature of humans as living beings, but the experience of observing the sun move every day without a corresponding direct experience of the earth moving suggests that part of the reason for the belief was human proclivity to respond to qualities as means to other qualities (such as the use of the apparently variable position of the sun to predict when to plant and to harvest); no doubt the conclusions drawn were grounded in the five-stage process that some characterize as the scientific method. On the other hand, although the initial impetus for obtaining inadequate data probably derived from the life process, its sedimentation into dogma was more a result of the social institutions that gathered around the common-sense view:

> Nothing could be more indifferent than questions as to the relative size of the sun and the earth and whether the sun moves round the earth or vice versa, concretely considered. The change of the view of men upon these subjects partly grew out of and partly induced, partly was a symptom of and partly was the cause of, a tremendous change in men's whole political and religious consciousness, simply because those things were part of the interpretation of society at large, of humanity at large, of itself, and of its place in nature (Dewey, 1976a, p. 345).

In common-sense inquiry, the primary concern is with the end (which forms the direct relation between humans and their environment) and not with the means. The nature of the problematic situation differs in just this way between common-sense and scientific inquiry. In the former, the end is of

primary importance, and the means are subordinate. In the latter, the means are of primary importance, or are the end of scientific inquiry: the constant perfection of the means of inquiry as the end. The focus on means as the end is the basis for Dewey's assertion that the data must not only point to a solution but also test it.

In scientific inquiry, through the logical (control) actions of affirmation and negation, the data is prepared to perform its evidential function of grounding the suggestion or solution to the problem. Indeed, for the emergence of a warranted or intelligent solution to emerge, not only must the facts be molded to guide the inquirers into an adequate solution, but they should *simultaneously* function to *test* the resulting category or proposed solution (a plan of action):

> The progress made by inquiry in any branch may, then, be measured by the extent to which it has succeeded in developing methods of inquiry that, at one and the same time, provide material data having conjunct inferential and testing force. *Satisfaction of this condition provides the definition of inductive procedures* (Dewey, 1938, p. 429).

The double requirement of both specifying the problem and testing the solution is not present in common-sense inquiry[5]. The data are prepared only to the point necessary to achieve the specific aims of the person at a particular time and place. The continuum of inquiry (just like the continuity of the life process) is frequently ignored in such a situation. In such cases, data preparation is thus limited in its applicability since its generalization to all times and places is unwarranted. Common-sense inquiry and its solutions are frequently limited to particular local times and places and cannot be used in other times and places whereas in scientific inquiry such limitation is abrogated.

The difference between scientific inquiry and common-sense inquiry, then, is the extent to which they develop the subject matter and the end to which they aspire. In common-sense inquiry, the prime concern is the end as

more directly functional to human beings. In scientific inquiry, the prime concern is the end as functional to further inquiry. Common-sense inquiry has its place as does scientific inquiry. Common-sense inquiry should not be confused with scientific inquiry, nor should modern scientific inquiry be considered as merely a more organized form of common-sense inquiry. The focus of the two forms of inquiry is different.

Rather than pursue Dewey's distinctions of scientific inquiry and common-sense inquiry—despite their shared five-stage process—it might prove more fruitful to look at the view of Marx on the issue. Consider the issue of commodity fetishism. Assume that a worker vaguely feels that there is a problem in her relations to other workers. What data can she use to define the problem? The data are in the form of relations between things: prices, money and quantities of things. If she limits herself to this data, she will unlikely discover that the specific nature of her labour (abstract labour) is connected to this problem. The data needs to be transformed into a different form if the nature of commodity fetishism is to be understood. The person can use the five-stage process all she likes; as long as she retains the same form of data, it is unlikely that she will come to understand commodity fetishism. Dewey, in a similar fashion, when analyzing art forms, refuses to start with the isolated art artefact since, he argues, the isolated form itself occludes an understanding of art (Dewey, 1987).

Consider another example, the profit income that a wholesale or retail capitalist store obtains as a result of the sale of commodities. What people experience is the sale of the price of the commodity above its initial cost to the retailer. What seems to be the case is that the retailer sells the commodities above their initial value. The labour used in exchange seems to increase the value of commodities. In Marxian economics, however, selling is an activity that generates no value at all; the labour that is used in relations of exchange is unproductive labour (though necessary, in terms of capitalist relations) (Shaikh & Tonak, 1994). The value generated in the sphere of production is *distributed* to various capitalist sectors according to the amount of capital invested. What seems to be the case is that the workers in the capitalist retail sector augment the value of commodities

whereas, in fact, they, along with the means of production used in the sphere of exchange, are part of the unproductive expenditures necessary for a capitalist economy to exist. At the level of *distribution*, it seems that the income received in the retail sector is derived from that sector whereas it is ultimately derived from the sector which exploits productive workers (those productive of value and surplus value). Without a substantial reworking of the data, the surplus would be considered to emerge from exchange relations (as indeed it does in neoclassical economics).

The problem does not stop there, however. Within each sphere of capitalist relations of production, there are various proportions between workers and the means or production invested. However, it *appears* to be the case that the rate of profit is dependent on the amount of capital invested per unit of time independently of the ratios of the number of workers hired and means of production purchased; the rate of profit tends to equality across industries despite variations in the proportions of workers to means of production; as a consequence, the appearance contradicts the theory of surplus value—unless those mediations or linkages are made.

The amount of value (and surplus value) *produced* and the amount *distributed* rarely equals each other. Consequently, discussions of income distribution that do not lead to discussions of the transformations of values into prices of production (and hence in the transformation of relations of production into relations of distribution) cannot be considered to lead from common-sense inquiry to scientific inquiry. Rather, such discussions revolve entirely around categories characteristic of common-sense inquiry—even if they involve the five-stage process. The five-stage process is not the scientific method for Marx—nor for Dewey.

Although the five-stage process is not identical to the scientific method, it can serve as a bridge for moving towards such a method since that five-stage process forms the general structure of all inquiry. The pattern of inquiry is derived from the human life process, and since both common-sense and scientific inquiry share that pattern (both are further refinements of what Dewey calls primary experience), it should be possible to move

from the human life process towards the capacity to engage in the scientific method via common-sense forms of inquiry.

Common-sense Inquiry

Dewey criticizes the limitations of common sense in its relationship to modern scientific methods, especially since the latter have not remained aloof from common-sense experience; modern scientific methods have revolutionized ordinary human relations to the physical and biological world. Although there are problems with Dewey's focus on science, Dewey attempts to balance his emphasis on science with an analysis of the place of science in human experience. Science is just one activity—though an increasingly important one—in human experience as a whole. When it is forgotten that science is an activity among many, then Dewey opposes those who make a fetish of science as such. Such a view results in the elimination of the *raison d'être* of science:

> I shall then first state why the expression "common sense" is a usable and useful name for a body of facts that are so basic that without systematic attention to them "science" cannot exist, while philosophy is idly speculative apart from them because it is then deprived of footing to stand on as well as a field of application (Dewey & Bentley, 1989, p. 244).

The emphasis on the term "common" provides Dewey with the first or objective aspect of the positive definition of common sense. It is the basic needs of all human beings as living beings which forms the common element:

> It is highly doubtful whether anything but matters with which actual living is directly concerned could command the attention, and control the speech usage of "mankind," or of an entire community. And we may also be reasonably sure that some features of life are so exigent that they impinge upon the feeling and wit of all mankind—such as need for food and means of acquiring it, the capacity of fire to give warmth and to burn, of weapons for hunting or war, and the need for common customs

> and rules if a group is to be kept in existence against threats from within and without (Dewey & Bentley, 1989, pp. 244-245).

As indicated above, common-sense experience (including common-sense inquiry), or what Dewey calls primary experience in some of his works, involves certain common elements, and these common elements are the focus on the qualitative as the ultimate end (Harris, 2012), especially focusing on use and enjoyment or avoidance of pain and suffering:

> I do not suppose that a generalization of the inquiries and conclusions of this type under the caption of "use and enjoyment" needs much exposition for its support. Use and enjoyment are the ways in which human beings are directly connected with the world about them. Questions of food, shelter, protection, defense, etc., are questions of the use to be made of materials of the environment and of the attitudes to be taken practically towards members of the same group and to other groups taken as wholes. Use, in turn, is for the sake of some consummation or enjoyment. Some things that are far beyond the scope of direct use, like stars and dead ancestors, are objects of magical use, and of enjoyment in rites and legends. If we include the correlative negative ideas of disuse, of abstinence from use, and toleration and suffering, problems of use and enjoyment may be safely said to exhaust the domain of common sense inquiry (Dewey, 1938, p. 63).

The expansion of use and enjoyment in an integrated and differentiated fashion and the reduction of pain and suffering are the ultimate *raison d'être* of science. The common concern of human beings with use and enjoyment (and avoidance of pain and suffering) constitutes the center around which science must revolve if it is to have any function at all. Its analytic and synthetic abstractions would have no function to perform at all if it were divorced from the qualities related to use and enjoyment that are the central concern of human beings: "But careful examination promptly discloses that unless the materials involved can be traced back to the material of common sense concerns there is nothing whatever for science to be concerned with" (Dewey & Bentley, 1989, p. 252). Since human

beings are living beings, they must necessarily be concerned with qualities, and natural and social sciences provides the means by which they can control processes that give rise to new qualities or that reproduce the conditions that led to the experience of a similar previous quality.

Science thus has a function to fulfill, and that function relates to the problems of common-sense experience. The latter provides the problems for science and, ultimately, also the means for specifying whether science has fulfilled its social function since science must ultimately always refer back to common-sense experience or to qualitative experiences to falsify or corroborate its hypothesizes. No scientist can *completely* abstract from qualities; such a supposition would necessarily entail the negation of science. The purely physical world does not and cannot engage in inquiry.

The problems which common sense deals with are teleological. These problems set the stage for the point of departure in scientific inquiry. The latter, in other words, emerges from common-sense inquiry, which can deal only with certain kinds of problems. Scientific inquiry also returns to common-sense experience, expanding its range and qualities. In other words, scientific inquiry is instrumental to common-sense experience by, on the one hand, emerging from common-sense experience (with common-sense inquiry not being able to resolve problems that emerge within common-sense experience) and in refining and expanding the qualitative experiences characteristic of common-sense experience. Scientific inquiry is thus tethered to common-sense experience at both ends and is truly instrumental or mediating between unresolved common-sense inquiries in common-sense experience and resolved common-sense problems that are solved through expanded and refined means:

> (1) Scientific subject-matter and procedures grow out of the direct problems and methods of common sense, of practical uses and enjoyments, and (2) react into the latter in a way that enormously refines, expands and liberates the contents and the agencies at the disposal of common sense. … When scientific subject-matter is seen to bear genetic and

> functional relation to the subject-matter of common sense, these problems disappear. Scientific subject-matter is intermediate, not final and complete in itself (Dewey, 1938, p. 66).

Scientific inquiry that is completely cut off from primary experience has neither delimited problems to solve nor any means by which to determine whether its proposed solutions are in fact solutions. However, science—especially natural science--tends to exclude consciousness and the qualities which human beings experience from its purview, but science as itself a conscious formulation of principles would not exist without the having of qualities nor would science, as a determiner of relations or the conditions for the having of an experience, have something to relate if not for consciousness in daily life, or consciousness in the ordinary sense of the term.

The second or subjective aspect of the positive definition of common sense is the capacity to deliberate and to decide effectively in the daily life of the group or groups to which individuals belong:

> So we need not be surprised to find in the dictionary under the caption “common sense” the following: “Good sound practical sense … in dealing with every-day affairs.” Put these two usages together and we have an expression that admirably fits the case (Dewey & Bentley, 1989, p. 245).

Related to the subjective aspect of primary experience is its implicit contextualization of the process of inquiry or the process of thinking. Common-sense experience involves all sorts of conflicts, but these conflicts are not absolutized as they frequently are in philosophy (Dewey, 1983). Common sense uses such opposites as subject and object, or mind and body, to delimit experience, not to absolutize it. In common-sense experience, specific situations form the background against which such terms are used.

This contextualization of common-sense experience and thought, however, also presents limitations, as noted above. Dewey considers common sense and its corresponding process of inquiry to be a double-edged sword. It provides the *raison d'être* of science, but it also has limitations that science can overcome. Physical science and many of the biological sciences emerged from common-sense inquiry and feed into common-sense experience, but science also provides common sense experience with the means by which it can become increasingly mediated, resulting in refined and broadened experiences. Scientific inquiry does so by controlling the observational conditions and conditions for the formulation of suggestions or solutions and for their elaboration—control functions which are often minimal in common-sense inquiry because of the focus on ends. Such control processes are just as necessary for moving towards a scientific understanding of modern capitalism.

The starting point is with common sense experience and its implicit five-stage process. The *content* of that process can be self-reflexive in that the basic human life process can form the *object* of that process itself. The form of inquiry and its content can, at first, correspond with each other. This is all the more necessary because of the modern epoch's practical denial of the living nature of human beings:

> This splitting up of things that exist together has brought with it, among other matters, the dissevering of philosophy from human life, relieving it from concern with administration of its affairs and of responsibility for dealing with its troubles. It may seem incredible that human beings as *living* creatures should so deny themselves as alive. In and of itself it is incredible; it has to be accounted for in terms of historic-cultural conditions that made heaven, not the earth; eternity, not the temporal; the supernatural, not the natural, the ultimate worthy concern of mankind (Dewey & Bentley, 1989, p. 249).

Educational Implications of Dewey's Dual Theory of Inquiry

Dewey's characterization of the nature of common-sense and scientific inquiry and their relation has definite educational implications. Education, evidently, needs to be inquiry-based. However, the term "inquiry-based learning" is not to be taken as mere inquiry. What is needed is a gradual shift from common-sense inquiry to a form of inquiry that approaches more adequately scientific inquiry. True scientific inquiry will not likely arise in the school (otherwise, schools would be agencies for the advancement of inquiry as such rather than for the advancement of equipping children and adolescents with the tools of inquiry), but people who have learned by means of a an explicit plan to shift from common-sense inquiry to an increasingly scientific approach can not only conserve the scientific attitude of children but also equip them with an appreciation of the need to control their own inferences and reasonings in an increasingly complex manner.

Dewey, however, saw the need for a curriculum that bridged the gap between the attitude characteristic of the majority of people, who engage in common-sense inquiry, with its primary focus on ends and an attitude characteristic of a minority of people called scientists, whose primary focus is on the perfection of means of inquiry. The need to bridge the gap does not mean that the child and adolescent are destined to become scientists. The issue has more to do with the development of the scientific or experimental attitude, or rather in the preservation and enhancement of that attitude among children.

Since the task is to shift from common-sense inquiry to a more scientific form of inquiry, a curriculum must be established that permits such a shift. Education needs to provide continuity between common-sense inquiry and more controlled forms of inquiry. Continuity does not mean identity or absolute difference; it means a transformation (Dewey, 1938). This transformation cannot be external to the concerns of the lives of children and adolescents—it is to involve their general life process and the reflective reproduction of that process.

Dewey's solution to the problem of the need to shift from common-sense to scientific inquiry is largely embodied in his curriculum theory and practice[6]. Dewey's educational solution to the problem of how to educate children is through having children pursue practically the basic occupations that center on the reproduction of the basic needs of all human life: food, clothing and shelter. The basic occupations, being linked to the basic conditions of life, address human beings' proclivity towards ends while also controlling those ends, within limits, since the life process necessarily involves the emergence of problematic situations that demand common-sense inquiry. The occupations provide many occasions for problematic situations and inquiry to emerge and form the daily concerns of the vast majority of people: "The everyday affairs of a community constitute the *life* characteristic of that community, and only these common-life activities can engage the general or common wits and feelings of its members" (Dewey & Bentley, 1989, p. 245). The basic occupations are linked to the conditions of life, whether in the home, the school or at work (Mayhew & Edwards, 1966). They thus link informal and formal education—a cardinal principle of continuity in Dewey's view (Dewey, 1966).

What people select as important from the environment and what they learn to respond to automatically—the specific qualities to which they are sensitive—is largely a function of the occupations in society. The habits persons form are thus functions of the occupations. Basic character formation is thus a function of the habits linked to the basic occupations:

> If we search in any social group for the special functions to which mind is thus relative, occupations at once suggest themselves. Occupations determine the fundamental modes of activity, and hence control the formation and use of habits. These habits, in turn, are something more than practical and overt. … The occupations determine the chief modes of satisfaction, the standards of success and failure. Hence they furnish the working classifications and definitions of value; they control the desire processes. Moreover, they decide the sets of objects and relations that are important, and thereby provide the content or material of attention, and the qualities that are

> interestingly significant. The directions given to mental life thereby extend to emotional and intellectual characteristics. So fundamental and pervasive is the group of occupational activities that it affords the scheme or pattern of the structure of the organization of mental traits. Occupations integrate special elements into a functioning whole (1976b, pp. 41-42).

Contemporary occupations centering on the production of basic needs, however, are too complicated to be grasped adequately in their immediate form. Nonetheless, it is possible to simplify the basic occupations to reflect the capacities of children. At first, through the method of beginning with basic social occupations linked to the home, the children can establish a few connections of the conditions of production of the basic commodities so that the complexity of the modern basic occupations can be, initially, reduced.

Simplification can then assume an historical form by shifting to basic occupations in less developed social relations (such as prehistoric peoples). The basic social occupations, therefore, as a focus for curriculum structure, are subject to simplification through reversion to earlier historical forms so that they become accessible to young children while enabling the children to grow. They enable children to control their present lives through the formation of a certain character and certain skills by using the basic conditions related to human life present explicitly in a simplified form in earlier and less complex societies. The basic processes characteristic of modern industrial life, which initially remain obscure and only implicit, become clearer and explicit. In modern life in its immediate form, by contrast, “the complexity of its organization … frequently obscures the more fundamental relations which, in primitive societies, are laid bare to the view” (Dopp, 1902a, p. 1) whereas the relations are more transparent in less complex forms of social relations[7].

The basic social occupations, evidently, enable children and adolescents to focus on the ends typical of human life. They also enable them to coordinate those ends with increasingly complex means as the

environment becomes increasingly complex. This curriculum, in fact, focuses on the basic social processes of life—the economic structure[8].

Dewey outlines his vision that the changing relationship between humans and the rest of the natural world is most directly and clearly expressed in the economic structure, and the latter in turn is related to activities that are constant (because of human need to reproduce itself) and variable (because of the manner in which they reproduce their needs):

> …we have a single movement in the direction of this more effective coordination of the factors of activity.
>
> From this standpoint the beginning would consist in a consideration of elements, of climate, soil, etc., which at once obstruct and incite the other factor of want, and of reflective consideration, so as to utilize these in order to effect new combinations of them which will meet the wants which arise and we would have the development up through the raw material, the history of the evolution of tools, machines, the growing complications through the use of tools, the increasing multiplication of forces in which the materials of nature are utilizable, and then the history of the various ways in which potential commodities thus brought into being become actual commodities, become materials of consumption and become direct stimuli to further functional activity—in other words, become wealth (Dewey, 1976a, pp. 390-391).

The curriculum grounded in the basic occupations serve to tie other activities into one integrated process—the process of life[9]. Not only do the basic social occupations constitute one constant process (the human life process), but they have done so under varying conditions throughout history (Dopp, 1902b). This process itself reflects the development of scientific principles:

> The modern principle of classification in science is to find a unity of derivation, a principle of common ascent, a vital unity. And then that unity of the life processes (or, in chemistry, of chemical processes) being disseminated through particular

> circumstances, the unity find[s] variety of different expressions (Dewey, 1991, p. 49).

The use of history in conjunction with the occupations thereby permits children to develop differentiated comprehensions of the world according to varying conditions, which eventually leads to the emergence of the studies or disciplines. Gradually, the complexity of modern conditions can be introduced, with the emergence of differentiated forms or organizations of experience (the disciplines). Skills, such as reading, writing and arithmetic, can be integrated into the process of the reproduction of social life when historical social life itself required these specific skill activities. Analytic categories characteristic of the disciplines (biology, physics, chemistry, social studies, history, geography, art) are to emerge gradually. For instance, the study of chemistry emerged in part from cooking, the textile industry and the metallurgical processes associated with the basic occupations (Dewey, 1910). Similarly, physics emerged from the processes of the production and use of tools (Dewey, 1980). Mathematics grew out of the need for measurement (McLellan & Dewey, 1895). As children become adolescents, their capacity to engage in increasingly more remote means for achieving ends and formal studies then become increasingly important. Adolescents can then pursue more specialized studies (the disciplines) that permit them, on the one hand, to grasp more definitely specific problems that they face in life and, on the other, an increased appreciation of the pursuit of the sciences as ends in themselves.

The occupations thus provide a bridge between common-sense inquiry and the much more mediated form of scientific inquiry—a major concern for Dewey. Without such a bridge, more scientific forms of inquiry remain vague and will likely be resisted by most children and adolescents. Moreover, the few who do engage in scientific work as such later in life likely become remote from the concerns of the common person and fail to understand how science is, ultimately, instrumental to the human life process.

On the other hand, the common person easily fails to appreciate how science can enrich her life and how it does affect her life in the modern epoch. For instance, Dewey mentions how metallurgical operations performed by human beings to transform metals into something useful resulted in the identification of about half a dozen metals (1938). By abstracting from the immediate relation between human beings and metallurgical operations, science has enabled human beings to identify over 60 metals. Through scientific inquiry, differentiation of metals and their diverse uses have expanded substantially in a relatively short period of time. The common person needs to understand the need for scientific inquiry in relation to the limitations of common-sense inquiry as the scientist needs to understand that scientific inquiry may be an end for her but is instrumental for most people.

Education through occupations is an *indirect* mode of education in that it is through living the occupations and experiencing the problems associated with them that the problematic situation is clarified and the situation is unified without focusing on the organization or logical structuring of subject matter as subject matter independently of its place in human experience:

> Well now, of course the individual shares in that prevailing atmosphere of interpretation, of evaluations, and that goes along with the prevalent types of social pursuits. As he is initiated into these occupations, as he comes to play his part in them, he partly consciously but more by unconscious absorption interprets plants, animals, stones, sun, moon, stars, rain, and so on, in the same way as those about him (Dewey, 1976a, p. 345).

This indirect mode of education contrasts sharply with the modern school, which defines children and adolescents within its walls as “learners” or “students.” There is no provision whatsoever for structuring a curriculum that shifts from most people’s concern with ends and much less with means. The lives of children and adolescents are reduced to this one aspect of their lives: they become pure abstractions called learners. Learning, instead of being

a means to the end of life, becomes *the* end. Like working for an employer, children and adolescents are treated as if they were learning machines. Although there are undoubtedly counter-tendencies, such as sports activities, dramatic plays and the like (extra-curricular activities), the general tenor in school is that the purpose for children and adolescents being there is to be learning machines. Rather than developing their capacity to control their lives in an increasingly complex fashion, the children and adolescents are expected to learn many meaningless things (such as the measure of a central angle is twice that of an inscribed). Children and adolescents then are supposed to become accustomed to doing activities that have minimal meaning—parallel with working for an employer.

The basic social occupations thus provide a ground for preventing the intellectual gulf between those more involved in the practical world and those more involved in the intellectual world:

> The fundamental point in the psychology of an occupation is that it maintains a balance between the intellectual and the practical phases of experience. As an occupation it is active or motor; it finds expression through the physical organs—the eyes, hands, etc. But it also involves continual observation of materials, and continual planning and reflection, in order that the practical or executive side may be successfully carried on. Occupation as thus conceived must, therefore, be carefully distinguished from work which educates primarily for a trade. It differs because its end is in itself; in the growth that comes from the continual interplay of ideas and their embodiment in action, not in external utility (Dewey, 1976d, p. 92).

The basic social occupations, furthermore, since they deal with the movement of the body and the coordination of its various parts in an active form, develops the conceptual capacities of children and adolescents by enabling them to differentiate their concepts rather than having them remain vague and imprecise (Harris, 2012).

A Modified Deweyan Curriculum for Working-Class Children and Adolescents

Given Dewey's educational solution of providing a means by which to shift from inquiry-based activities focused on ends to those focused more on the means to those ends, with the means used being closely linked to the basic economic structure of any society, it would seem that his curriculum theory would be an appropriate basis upon which to develop a Marxian curriculum theory. There is, however, an evident problem with Dewey's curriculum theory: it excludes class exploitation and class struggle to a great extent. Such exclusion should certainly be criticized, but there is no reason to throw the baby out with the bath water.

The curriculum implemented in the University Laboratory School (also known as the Dewey School) provides a *general* framework for a critical curriculum. The initial framework, based on fundamental human needs, occupations and an historical and geographical approach need not change. In other words, the structure or *form* of the Deweyan curriculum remains quite innovative and useful for critical pedagogues, but some of the *content* needs to be altered. Much of the curriculum, however, would be applicable as is.

Although the development of a Marxian curriculum for schools is undoubtedly a collective effort, some idea of what it might look like could prove fruitful for future development. The following is hardly meant to be definitive.

In general, the typical focus of the elementary curriculum on reading, writing and arithmetic (the three Rs) would be centered, as in the University Laboratory School, in the primary experiences of occupations: the observations of the children, their plays, and their attempts at reproducing the basic needs through diverse occupations. Similarly, the typical focus of the middle and high school curriculum on the disciplines would be linked to

the University Laboratory's School's plan for integrating various natural sciences with the study of the provisions of food, clothing and shelter[10]. The learning of chemistry through cooking, for example, is an excellent way of integrating chemistry as a discipline with *primary* experience (experience which demands use of the senses and thought for concrete purposes in daily life) (Reed, 1996b).

Diverse current social and material conditions aimed at the production of basic needs could be incorporated into the curriculum. Social conditions characteristic of families (even those stripped of a large part of their productive functions) could be contrasted with capitalist social relations. The needs of the household and the immediate occupations and processes associated with food, for instance, would still be applicable, but the *difference* between the concrete and social labour process *within* the household that involves food and the labour process outside, based on capitalist relations, would be given much more emphasis. Since the concrete labour performed in the household is also social labour *while it is being performed*, the contrast to that situation with the capitalist world could develop an appreciation of the uniqueness of capitalist relations of production since labour in the latter situation is not social labour as it is being performed (Harris, 2006). Visits to grocery stores, factories, and food-processing plants would permit children to discuss the differences and similarities between the material and social processes observed and those in the family. The *social* differences would also be brought out. *Property* relations at home and at work would be contrasted. The hierarchical relations characteristic of work would be compared to the (possible) hierarchical work relations at home. Parallels and differences would be drawn through dramatic play and games. For example, the concept of unemployment could be reenacted through a board game of that name. The extent to which the concept of unemployment would be applicable to home life would provide an interesting point of comparison between the two areas of life.

Extending the horizon of children beyond the home, a visit to the farm and a discussion of farm life would provide the occasion for distinguishing

different economic forms of the farm (self-employed farmers compared to hired agricultural workers). As in the Dewey School, older children could trace the different geographical sources of the raw material. The students could research working and living conditions in the different places providing the raw material or other inputs (Clandfield, 1989).

A practical understanding of *exchange* relations would have greater weight in the curriculum so that the children would come to grasp the importance of this relation for their current life and its difference from all earlier relations of production[11]. The function of money as a store of value, as a means of exchange and as a means of payment would be introduced into the earlier years in accordance with the capacities of the children. In particular, the exchange relation in the form of the contractual relation of employment could be introduced; questions of the rights and duties of employees and employers could be broached. Exchange relations would thus form the initial topic. A discussion of the wages of the workers would provide practice in multiplication to determine the total wage per day; students could then discuss the degree to which such a wage would permit an individual or a family to live. A discussion of wages could also serve as a point of departure for comparing wages and salaries in other industries. The teacher could guide students into a discussion of wages and salaries of their own parents or guardians and the reasons for the differences (as indeed was done in grade four in one class in Quebec) (Clandfield, 1989). Students could conduct surveys of occupations and wages in the classroom, in the school and in the community. Bar graphs could be constructed according to the level of income earned. Children could also understand the concept of proportion, ratio or percentage by counting the number of men and women (or boys and girls) working at McDonalds or other fast food outlet near their home. Occupational structures could be graphed according to age or gender. Students could discuss issues of health and safety in the different occupations and whether there was a relationship between measuring a successful enterprise in terms of profit and the level of health and safety at work. They could also discuss whether there is a relationship between the level of danger and the rate of pay. Other areas of research would include the extent of the hierarchy in

different occupations and the notion of ownership and the difference between ownership of the means of production by investors and ownership of the means of consumption by employees.

The curriculum could then shift to a focus on the interface of capitalist production and exchange relations and the inversion of the law of equivalent exchange under capitalist conditions. This shift could be accomplished by combining the money circuit of capital and the productive circuit of capital: M1-C1(MP+L)…P…C2-M2
P…C2-M2 (M1)-C1(MP+L)…P[12].
The money circuit starts out with money but excludes the origin of the initial money. The productive circuit shows more clearly that money emerges through capitalist production, specifically through the exploitation of workers. By considering cycles of production (and consumption), the employer consumes some of the surplus value in the form of consumption goods (expensive food and clothing, yachts, penthouses, jets, and so forth), the initial money invested is used up—but the employer still possesses the same amount of money as before. For example, if an employer invests $5 million, receives a 10% rate of profit annually ($500,000) and consumes $500,000 per year, after 10 years the employer will have consumed the original $5 million invested—and still possess the $5 million for investment. From the point of the money circuit of capital, the origin of the initial money invested from workers in previous rounds of production is hidden; it is necessary to bring out the mediated nature of the money invested to demonstrate the nature of that immediate experience. The $5 million invested after that represents the labour of the workers in the past now being used to exploit them in the present. In other words, when labour is the only basis for social wealth or value, then workers become dominated or controlled by the results of their own labour. By combining exchange and production, this feature of capitalist relations can be emphasized. Of course, so can the increasing domination of workers by the results of their previous labour in the form of accumulation on an extended scale. In this way, the means of mediating conditions for the production of basic needs via the basic occupations could serve to shift the focus of children and adolescents from basic consumption needs to

productive conditions—a move toward scientific inquiry. Further development along these lines could be the simultaneous consideration of the three circuits of capital (money, productive and commodity circuits of capital) and their mutual mediations as well as their temporal succession—mediations consistent with Dewey's metaphysics of human experience (Harris, 2007). Additional complications, such as the reproductive conditions both socially and materially (the reproductive schemes) in the food and other basic industries could be incorporated in order to develop further an understanding of both capitalist relations and the interrelation of social being and material being, thereby contributing further to the breaking down of the walls between so-called academic subjects and technical subjects.

Crime could then be linked to the issue of the form of ownership since, for practical purposes, those who go to prison for committing what is defined as crime are members of the working class (Reiman, 1996). What constitutes a crime, how it is defined and by whom, who does what to whom, sentencing practices and so forth could be a topic of the curriculum. The concept of theft and its relation to the circuits of capital could be broached. Particular case studies might involve such cases as Bill C-45 (the Westray Bill) in Canada to illustrate the process by which corporate criminalization for violation of health and safety laws is attenuated in the legal world (Bittle, 2012). Concrete examples could also be analyzed, such as the case of two brewery workers who worked at the brewery store selling beer. Money went missing. The two brewery workers, after undergoing (and failing) a lie-detector test, finally admitted that they had stolen the money. They were fired. This situation could be compared with the legal appropriation of surplus labour and value by the owners of the capitalist brewery. The curriculum could easily expand and change as the situation warranted it--a typical feature of the Deweyan curriculum.

At the same time, of course, the students would learn about the material conditions for the reproduction of current basic needs. Since the complexity of the material and social conditions of reproduction in modern capitalist society may at first be beyond the reach of many youth, to facilitate

understanding and to build up background knowledge, like the Dewey School, there would be a shift in the curriculum from a concentration on present occupations to past occupations; however, activities associated with appreciating the specific nature of current society would still form a part of the curriculum each year so that knowledge and skills in comparative relations could be developed.

After having grasped practically and imaginatively some aspects of current occupations, students would study and reproduce prehistoric life; they would compare the extent to which it formed or could form a non-contradictory cooperative society. The forms of social life which distinguish the two would be gradually addressed. For instance, the reproduction of the lives of prehistoric societies could enable children to grasp the non-class basis of social life, when the basic resources of life were accessible to all and where only egalitarian and ranked societies existed (the latter characterized by differentiation in status but not in access to basic resources) (Fried, 1967). Barter relations and early forms of money would be considered and their relative weight in the importance of life would be compared to the power of money and its additional function of uniting workers and means of production in modern times (Desai, 1979).

The study of prehistoric life described above differs from the Deweyan curriculum only in emphasis; more emphasis would be in linking the past to the present. The next step, however, differs in nature from the curriculum of the University Laboratory School. The reason for introducing it is to provide a ground for understanding *conflict* over the production of a surplus and its role in advancing certain civilizations at the expense of others. Agricultural production could form the basis for a comprehension of the feudal mode of production, with its parcellized sovereignty, vassalage and benefice (Anderson, 1974; Wood, 1995). This situation could be contrasted with the concentration of political power in the form of the capitalist state and the concentration of the pure exploitation of labour in the capitalist factory. The transition from feudal relations of production to capitalist relations of production could also be discussed. At the same time, botany and related sciences could be incorporated into this section of the curriculum.

Instead of studying the Phoenicians as was done in the University Laboratory School (Mayhew & Edwards, 1966), the students could first study the Maya, Aztecs or Inca civilizations (or other non-European civilizations). They would study their writing and numbering systems, and their weaving, pottery and farming methods. *Formal* lessons in reading, writing and arithmetic could then begin because the social context would provide a *social reason* for learning these tools[13]. The students could next study the Phoenicians and the development of their symbolic systems in order to provide a comparative basis for different symbolic systems, and then they could move on to a study of exploration and the European explorers. Following more closely Marx, the latter would be contextualized in terms of their subjugation of certain civilizations already studied to the power of some European nations and classes. The presentation of the explorers would be *critical.* The beginning of the slave trade could easily be incorporated into the curriculum at this stage.

Of course, the study of explorers opens up the area of the study of stars and constellations and their function in navigation. The students could construct an ancient astrolabe. Similarly, magnetism and its usefulness in constructing a compass for navigational purposes could also be studied, as could the topic of light in relation to a reconstructed telescope. Map reading and drawing could also form an essential component, as it did in the Dewey School. The being of humans in the world, or their relation to the natural world, is to form an undivided part of the social history of human beings, or their social relations.

Recreating the voyages of the Europeans could be the point of departure for further study of the subjugation of one people for the benefit of another. The construction of the Egyptian pyramids by peasants (and, to a certain extent, slaves), the flowering of Greek civilization and the simultaneous existence of slaves, the slave system in the United States, or even the capitalist industrial revolution in England could form logical links to the explorers. In this way, students would investigate the issue of whether civilizations have generally advanced independently through a combination

of technological change and cooperation or through a combination of technological change, power relations of exploitation and domination and concomitant human suffering.[14]

The two essential differences between the critical materialist curriculum and Dewey's materialist curriculum, then, would be firstly the emphasis on the importance of exchange relations and their connection to a different way of organizing human labour and the fundamental difference such a way of organizing human labour has on human life. Secondly, the question of whether civilizations have advanced only through technological change and cooperation, without sacrificing some people in the process, would be a key question and an organizing principle of the curriculum. Nevertheless, the general framework of the Deweyan curriculum would still be intact.

The shift from common-sense inquiry to a more scientific form of inquiry, then, would involve not just the struggles of human beings with their diverse natural environments but the struggles of classes of human beings to obtain surplus labour from other classes—and the resistance of those who supply that surplus. The aim in both processes would be to enable working-class children and adolescents, potentially, to gain control of their environment, both natural and social. Children and adolescents must learn not only about class exploitation but the material world in which they live if they are to gain control over their social lives. To gain real control, however, requires class struggle—but such a curriculum would itself provide a means (though by no means the only one) for achieving that end.

Conclusion

A Marxist materialist curriculum needs some manner of shifting from a focus on ends to the means required to achieve those ends in recognition of the tendency of human beings to focus on ends in abstraction from the means required to attain ends. Dewey's curriculum structure, with its focus on occupations linked to basic needs, permits such a shift by enabling children and adolescents to engage in a common pattern of inquiry while gradually learning to focus on increasingly complex processes, both

material and social. That pattern of inquiry, with its five-stage process, is derived from the expanded life process of human beings and is not characteristic of the scientific method as such. Since scientific inquiry is not merely an organized form of common-sense inquiry, the structure and sequence of the curriculum will have to allow for the differences between the two to emerge as students increasingly become capable of preparing the empirical material to the point where it constitutes a means for pointing towards the definition of the problem and for its solution.

By increasing the capacity of working-class children to grasp the nature of social life at a basic level, both materially and socially under diverse conditions, working-class children will be better equipped to control the world which the working class has created. By emphasizing exchange relations, class exploitation and class struggle and their role in the development of the present world and their role in the present world, the capacity of working-class children and adolescents to grasp the social and material life process in diverse conditions and in modern capitalist society will increase and the intellectual and technical divide that characterizes much of school and social life will decrease, thereby contributing to the unification of the working class—in opposition to the class of employers.

Notes

[1] The purpose of linking Dewey's dual theory of inquiry to his curriculum is to develop a working-class curriculum. The determination of what constitutes a working-class curriculum is derived in part from my own experience—and both Dewey and Freire advocated for the analysis of one's own experience in order to learn. After having worked as a brewery worker for four years, in 1983, I quit and applied for unemployment insurance, explaining that I had quit because of problems arising from politics (having been called, in 1982, a "Marxist son of a bitch" by the bottling manager for having refused to wear a T-shirt that had the inscription "Let's Just Say OV," justifying my refusal by stating that I had nothing but contempt for capitalists and their representatives—and that I was not a cow). The unemployment insurance office worker replied: "What

are you doing discussing politics; you're only a labourer." Ironically, she herself formed part of the working class (Kay, 1979). Despite the so-called knowledge economy that has developed since then, the divide between hand and brain still characterizes the school—and social life in a capitalist world (Rose, 2008). Another personal experience drove home the divorce between intellectual and manual labour. I worked as a French teacher from 2008 until 2011. For the 2011-2012 school year, I was demoted, allegedly for incompetence as a French high-school teacher (I still taught grades six to eight French), working as a glorified educational assistant for two months with one special-needs student in shops (while still receiving a teacher's salary). The intellectual possibilities of shops were wasted. The technical reading was fairly advanced (for me, at any rate since I lack background knowledge in the area), but the theory was rushed through without any real possibility of linking theory and practice in less than a vague manner. The practical work consisted of constructing—largely by hand—part of a gear. This work consisted mainly of sawing and filing for hours on end. Although it may have taught some that accuracy is important, it was largely physical labour—nothing more. Of course, most of those who attended were not supposedly intellectually or academically inclined.

[2] Part of the following is drawn from Harris (2012).

[3] Slack (1955) refers to feedback theory to explain the continuity of the stimulus. Assuming distance receptors, the stimulus continues as long as there is a difference between being at a certain place and the target at which we aim. It is the difference in distance and direction which controls our actions and provides further integrated stimuli that function in the same manner despite differences in content. They become integrated means for the coincidence of being here and the target. The stimulus cannot therefore be reduced to the target but includes all the intervening conditions required to bridge the gap between being at a certain place and being at the place where the target is (or will be).

[4] See Reed (1996a) for a description of Darwin's experiments with earthworms. Darwin found that earthworms changed their response

patterns with changed conditions, selecting elements of the changed environment that were functional for their continued existence and avoiding other elements that were harmful to them.

[5] This specific differentiation of common-sense from scientific inquiry forms a major difference between Dewey's views of the relation between common-sense and scientific inquiry and that of Freire, who shares with Dewey the idea of linking common-sense inquiry and experience to more scientific forms. Freire, however, nowhere specifies any criteria for determining what constitutes scientific inquiry apart from some vague idea of penetrating the world ever more profoundly (Harris, 2009). The issue is complex and has to do with the issue of where to begin in a science. deVries (2008) differentiates between an epistemic starting point and a causal starting point in relation to Hegel's philosophy. Both Hegel and Marx considered the beginning to be implicated in the end epistemologically and, in the case of Hegel, perhaps ontologically; pure being or the commodity form constitute beginnings for the reader since they are both unstable if not contradictory, but are conclusions for both Hegel and Marx. These beginnings must also be capable of being explained; the end must form part of the beginning just as much as the beginning forms part of the end. Dewey, on the other hand, seems to argue that even causal determination involves prior epistemic considerations.

[6] Since most advances in schooling have occurred at the pedagogical level, with changes in the curriculum structure being generally minimal in comparison, Dewey's theory can be safely admired in universities without threatening the power structure in schools (Westbury, 2002).

[7] Dewey's use of occupations has been one-sidedly reduced to "rural" occupations in the literature or, alternatively, a variant of Herbart's cultural epoch theory, with the recapitulation of the species' history at an individual level (Lakes, 1985). Dewey undoubtedly uses some of Herbart's ideas, but he does so for his own purposes and within his own frame of reference; he adapts, in other words, Herbart's ideas to his own ends and modifies Herbart's ideas in the process. It is not a direct imitation or borrowing from

Herbart. Another criticism of occupations as an organizing principle for the curriculum is that the use of handicrafts even in Dewey's days was outmoded and, consequently, unrealistic in connecting what occurs in modern societies; it has no real referent (Palermo, 1992). The referent is the human bias towards ends with the modern expanded means available without the ability to coordinate the two. The use of agricultural and handicraft processes was to emphasize this aspect of what human beings needed to learn. The use of hunting practices was to emphasize the relevance of the present and to the eye for the novel rather than to past conditions. Even Waddington (2006) considers the use of occupations related to handicrafts to be passé in the context of modern computers. Whether modern computers relate to Dewey's goal of connecting the present or immediate response (the subjective moment, if you will) and the past (the objective moment, if you will), in the context of problematic situations (involving the future connected to the present and to the past) requires research. The existence of modern computers, it would seem though, is irrelevant for what Dewey was trying to accomplish. Furthermore, even on the assumption that modern computers should be taken into account, there is an historical connection between modern computers and the textile industry. The binary system used in weaving to control the raising and lowering of threads was used in combination with a card system with holes in the cards in order to produce complicated weaving patterns without the weaver having to intervene directly in the selection of the threads once the system was set up; the processing of the raw material became relatively independent of direct human labour. These binary cards were later applied as input cards by Charles Babbage and then Herman Hollerith in the construction of computers. (Burke, 1978; Williams, 1982; Harris, 1999).

[8] This aspect of Dewey's educational theory and practice may be one of the main reasons why those who support Dewey fail to integrate it into their own analyses of his educational philosophy and practice—its proximity to Marx's views in this respect may be in opposition to their own class interests. For further comparison of Marx's and Dewey's materialist philosophies, see Harris (2006).

[9] Tanner's (1997) discussion of the curriculum in the School notes the sophistication of the curriculum that unified the educational process both horizontally (across subjects at the same grade level) and vertically (across the grades).

[10] As McCarney (1990) notes, unlike Marx, there is a strong tendency in the Western Marxist tradition to denigrate instrumental knowledge and to oppose it to an ideal form of communication.

[11] The importance of including exchange relations in the curriculum should not be underestimated, but they need to be incorporated with a view to their generalization; as Brenner (1977) notes, exchange relations should not be identified with capitalist relations. Indeed, as Weeks (2010) observes, exchange relations that occur in the form of sale without the conditions of their own production being for sale do not involve labour as their regulative basis of production. When, however, exchange arises as both presupposition and result, then labour does indeed become the regulative basis for production and find its most developed form once labour power generally becomes a commodity. However, the importance of linking this with a materialist curriculum is that children can then comprehend that there is a growing contradiction between capitalist wealth, grounded only in labour, and material wealth, grounded in many determinations (as outlined in chapter one of *Capital* and developed in that work)—Marx's dual theory of labour (Harris, 2006).

[12] The reason for changing M2 into M1 is that M2 contains a surplus of value, but whether that is or is not invested, whatever is invested is *realized* money capital in relation to a past production process but only *potential* money capital in relation to a future production process

[13] For a criticism of the inadequacy of formal reading and writing in the modern school system, see Harris (2009) and Harris (2012).

[14] The inclusion of exploitation in considerations of social advance is all the more necessary since such critical pedagogues as Freire implicitly exclude any positive force for exploitation (Harris, 2009).

References

Anderson, P. (1974). *Lineages of the Absolutist State*. London: NLB.

Apple, M. (2004). *Ideology and Curriculum*. New York: RoutledgeFalmer.

Bittle, S. (2012). *Still Dying for a Living: Corporate Criminal Liability after the Westray Mine Disaster*. Vancouver: UBC Press.

Bowles, S. & Gintis, H. (1976). *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life*. New York: Basic Books.

Brenner, R. (1977). The Origins of Capitalist Development: A Critique of Neo-Smithian Marxism. *New Left Review*, I/104, pp. 25-92.

Brosio, R. (1972). *The Relationship of Dewey's Pedagogy to his Concept of Community*. Ann Arbor: University of Michigan.

Brosio, R. (1994). *A Radical Democratic Critique of Capitalist Education*. New York: Peter Lang.

Brosio, R. (2000). *Philosophical Scaffolding for the Construction of Critical Democratic Education*. New York: Peter Lang.

Burke, J. (1978). *Connections*. Boston: Little, Brown.

Clandfield, D. (ed.) (1989). *Building a People's Curriculum: The Experiences of a Quebec Teachers' Collective* Toronto: Our Schools/Our Selves.

Desai, M. (1979). *Marxian Economics.* London: Gray-Mills.

deVries, W. (2008). Sense-Certainty and the `This-Such'. In Moyar, D. and Quante, M. (ed.), *Hegel's Phenomenology of Spirit: A Critical Guide*. Cambridge: Cambridge University Press, pp. 63-75.

Dewey, J. (1910). *How We Think*. Boston: Heath..

Dewey, J. (1938). *Logic: The Theory of Inquiry*. New York: Henry Holt.

Dewey, J. (1966). *Lectures on Philosophy of Education*, *1899*. New York: Random House.

Dewey, J. (1976a). *Lectures on Psychological and Political Ethics: 1898*. New York: Hafner Press.

Dewey, J. (1976b). Interpretation of Savage Mind. In J. Boydston (ed.), *John Dewey: The Middle Works, 1899-1924.* Vol. 2. 1902-1903. Carbondale: Southern Illinois University Press.

Dewey, J. (1976c). The Principles of Mental Development as Illustrated in Early Infancy. In J. Boydston (ed.), *John Dewey: The Middle Works,*

1899-1924. Vol. 1. 1899-1901. Carbondale: Southern Illinois University Press.
Dewey, J. (1976d). School and Society. In J. Boydston (ed.), *John Dewey: The Middle Works, 1899-1924.* Vol. 1. 1899-1901. Carbondale: Southern Illinois University Press.
Dewey, J. (1980). *Democracy and Education*. In J. Boydston (ed.), *John Dewey: The Middle Works, 1899-1924.* Vol. 9. 1916. Carbondale: Southern Illinois University Press.
Dewey, J. (1981). *Experience and Nature*. In J. Boydston, (ed.), *John Dewey: The later works 1925-1953.* Vol. 1. 1925. Carbondale: Southern Illinois University Press.
Dewey, J. (1983). First Introduction to *Universe*. In J. Boydston (ed.), *John Dewey: The Middle Works, 1899-1924.* Vol. 13. 1921-1922. Carbondale: Southern Illinois University Press.
Dewey, J. (1987). Art as Experience. In J. Boydston (ed.), *John Dewey: The Later Works 1925-1953.* Vol. 10. 1934.
Dewey, J. (1988). Theory of Valuation. In J. Boydston, (ed.), *John Dewey: The Later Works 1925-1953.* Vol. 13. 1938-1939. Carbondale: Southern Illinois University Press.
Dewey, J. (1991). *Lectures on Ethics, 1900-1901.* Carbondale: Southern Illinois University Press.
Dewey, J, & Bentley, A. (1989). *Knowing and the Known*. In J. Boydston, (ed.), *John Dewey: The Later Works 1925-1953.* Vol. 16. 1949-1952. Carbondale: Southern Illinois University Press.
Dopp, E. (1902a). *The Place of Industries in Elementary Education*. Chicago: University of Chicago Press.
Dopp, E. (1902b). A New Factor in the Elementary School Curriculum. *The American Journal of Sociology*, 8 (2), pp. 145-157.
Fried, M. (1967). *The Evolution of Political Society: An Essay on Political Anthropology*. New York: Random House.
Harris, F. (1999). Dewey and Marx: A Critical Comparison of their General Functional Theories of Learning. In Sokal, L. and Bruno-Jofre, R. (ed.), *An Educational Mosaic: Proceedings of the 1999 Graduate Students Symposium*. Winnipeg, 20th March 1999. Winnipeg: University of Manitoba, pp. 9-30.
Harris, F. (2006). Dewey's Materialist Philosophy of Education: A Resource for Critical Pedagogues? *The European Legacy*, 11 (3), pp. 259-288.
Harris, F. (2007). Dewey's Concepts of Stability and Precariousness in his Philosophy of Education. *Education and Culture*, 23 (1), pp. 38-54.

Harris, F. (2009). *Human Nature as Continuous or Discontinuous with Nature: Dewey's and Freire's Philosophies of Human Nature and Education*. A Thesis Submitted in partial fulfilment of the Requirements of the University of Manitoba for the Degree of Doctor of Philosophy. Winnipeg: University of Manitoba.

Harris, F. (2012). The Grammar of the Human Life Process: John Dewey's New Theory of Language. *Educational Philosophy and Theory* 44, pp. 18-30.

Johnston, J. (2006). *Inquiry and Education: John Dewey and the Quest for Democracy*. Albany: State University of New York.

Kay, G. (1979). *The Economic Theory of the Working Class*. London: Macmillan.

Lakes, R. (1985). John Dewey's Theory of Occupations: Vocational Education Envisioned. *Journal Vocational and Technical Education*, 2 (1), pp. 41-47.

Mayhew, K. C. & Edwards, A. C. (1966). *The Dewey School: The Laboratory School of the University of Chicago, 1896-1903*. New York: Atherson Press.

McCarney, J. (1990). *Social Theory and the Crisis of Marxism*. London: Verso.

McLellan, J. & Dewey, J. (1895). *The Psychology of Number and its Applications to Teaching Arithmetic*. New York: Appleton.

Palermo, J. (1992). Dewey on the Pedagogy of Occupations: The Social Construction of the Hyper-real. *Philosophy of Education Yearbook 1992*. . Philosophy of Education Society, 1993, available online from: http://www.ed.uiuc.edu/eps/pes-yearbook/92_docs/Palermo.HTM, accessed on 8 July 2008.

Reed, E. (1996a). *Encountering the World: Toward an Ecological Psychology.* Oxford: Oxford University Press.

Reed, E. (1996b). *The Necessity of Experience*. New Haven: Yale University Press.

Reiman, J. (1996). *... And the Poor get Prison: Economic Bias in American Criminal Justice*. Boston: Allyn and Bacon.

Rose, M. (2008). Intelligence, Knowledge, and the Hand/Brain Divide. *The Phi Delta Kappan*, 89 (9), pp. 632-639.

Shaikh, A. & Tonak, E.A. (1994). *Measuring the Wealth of Nations: The Political Economy of National Accounts.* Cambridge: Cambridge University Press.

Slack, C. (1955). Feedback theory and the reflex arc. *Psychological Review*, 62 (4), pp. 263-267.

Tanner, L.N. (1997). *Dewey's Laboratory School: Lessons for Today*. New York: Teachers College Press.
Waddington, D. (2006). *Good Work for a Better Society: John Dewey and Education through Occupations*. A Thesis Submitted in partial fulfilment of the Requirements of Stanford University for the Degree of Doctor of Philosophy. Stanford: Stanford University.
Weeks, J. (2010). *Capital, Exploitation and Economic Crisis*. New York: Routledge.
Westbury, I. (2002).'The Educational Situation as Concerns the Elementary School': Implications for our Time. *Journal of Curriculum & Supervision*, 17 (2), pp. 120-129.
Williams, T. (1982). *A Short History of Twentieth Century Technology, c. 1900-c. 1950*. Oxford: Clarendon Press.
Wood, E. (1995). *Democracy against Capitalism: Renewing Historical Materialism*. Cambridge: Cambridge University Press.

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